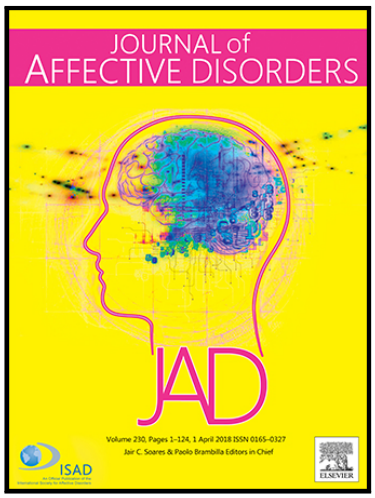

Prevalence of depressive symptoms in primary school students in China: a systematic review and meta-analysis

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Highlights

- Depressive symptoms are common in primary school students in China, but the findings have been mixed.
- The pooled prevalence of depressive symptom in Chinese primary school students was 17.2% (95% CI: 14.3%-20.5%).
- Regular screening and effective interventions should be urgently implemented for this population.

Prevalence of depressive symptoms in primary school students in China: a systematic review and meta-analysis

Running title: Depression in Chinese primary school students

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Abstract

Backgrounds: Depression in children and adolescents is usually under-recognized. Epidemiology of depressive symptoms in primary school students is inconsistent across studies. This study reports a systematic review and meta-analysis on the prevalence of depressive symptoms in primary school students in China.

Methods: Literature search was performed in both international (PubMed, PsycINFO, EMBASE) and Chinese (China National Knowledge Internet, WANFANG Data and Chinese Biological Medical Literature) databases. The random-effects model was used to analyze data.

Results: Twenty-seven studies involving 42,374 subjects were included. The pooled prevalence of depressive symptoms in Chinese primary school students was 17.2% (95% CI: 14.3%-20.5%). Subgroup analyses found that the prevalence significantly varied between geographic regions, with western China reporting the highest prevalence. Meta-regression analyses found that year of survey and study quality were significantly associated with the prevalence of depressive symptoms.

Conclusions: Given the high prevalence of depressive symptoms and its negative health outcomes, preventive measures, regular screening and effective treatments need to be implemented for this population.

Keywords: Depressive symptoms; Primary school students; Prevalence; Meta-analysis; China.

Introduction

Depression is the most common mental health problem among children and adolescents and is also one of the top ten causes of disability among teenagers globally (Global Burden of Disease 2015 Disease and Injury Incidence and Prevalence Collaborators, 2016). Depression in childhood and adolescence is associated with impaired psychosocial functions (Ayuso-Mateos et al., 2010; Judd and Akiskal, 2000) and increased risk of future depression in adulthood (Hankin et al., 1998; Naicker et al., 2013; Rutter et al., 2006). Depression could exist in a continuum of severity, ranging from depressive symptoms, minor depression to major depressive disorder (MDD) (Angst et al., 2000; Judd and Akiskal, 2000). Similar to clinically diagnosed depression, depressive symptoms also have negative health impacts among children and adolescents, such as social problems (Verboom et al., 2014), poor academic performance (Verboom et al., 2014), substance use (Earnshaw et al., 2017), obesity (Johnson et al., 2018) and impaired cognitive functions (Calvete et al., 2013; Cole et al., 2011).

Depression prevalence usually increases substantially throughout the period of adolescence (Hankin et al., 1998; Lewinsohn et al., 1999), with the peak in mid- to late-adolescence (Cyranowski et al., 2000; Patton and Viner, 2007). Despite this observed peak in prevalence, studies examining depression in mid- and late- adolescence, i.e., in primary and secondary schools (Tang et al., 2018) have concluded that depression in primary school students was often overlooked. Although the prevalence of clinical depression (i.e., minor and major depression) is low, e.g., 1% in children in New Zealand (Hankin et al., 1998) and 1.3% in children and adolescents in China (Xu et al., 2018), depressive symptoms are relatively common in school-aged children. Compared with their Western counterparts, school children in Asian countries are more likely to experience depressive symptoms, for instance, the prevalence of depressive symptoms was 17.3% in Korea (Kwak et al., 2008) and 16.9% in Singapore (Magiati et al., 2015), while it was 10.6% in Italy (Frigerio et al., 2001), 9.85% in Greece (Giannakopoulos et al., 2009), 10% in Sweden (Larsson and Melin, 1992) and

8.3% in the UK (Charman and Pervova, 1996). Possible explanations on the discrepancy between Asian and Western countries may be attributed to daily pressures arising from greater emphasis on academic achievement and higher academic stress in Asian countries (Magiati et al., 2015; Tepper et al., 2008). The use of different research methodologies and assessment tools may also result in the discrepancy of depression prevalence. Depression can be assessed by clinical interviews, structured interviews, self-rating scales and interviewer-rated scales (Birmaher et al., 1996). In the past decades, several instruments have been developed to assess depression, such as the Center for Epidemiologic Studies Depression Scale (CESD) (Radloff, 1977), Beck Depression Inventory (BDI) (Teri, 1982) and instruments specific for children and adolescents, e.g., Children's Depression Inventory (CDI) (Kovacs, 1992) and Depression Self-Rating Scale for Children (DSRSC) (Birleson, 1981; Birleson et al., 1987).

Depressive symptoms in school children are associated with certain socio-demographic factors, such as gender (Frigerio et al., 2001; Giannakopoulos et al., 2009; Wang et al., 2016), age (Denda et al., 2006; Kwak et al., 2008), family socioeconomic status (SES) (Frigerio et al., 2001; Giannakopoulos et al., 2009; Zhou et al., 2018b), body image satisfaction (Kwak et al., 2008; Li et al., 2007), anxiety (Lee et al., 2013), academic stress (Wang et al., 2016), and relationships with peers and family (Kwak et al., 2008; Larsson and Melin, 1992; Lee et al., 2013).

In order to reduce the negative health outcomes and develop preventive measures, it is important to understand the epidemiology of depressive symptoms in school children. The epidemiology of affective problems including depressive symptoms is considerably influenced by socioeconomic contexts (Compton et al., 2006; Kleinman, 2004), thus epidemiological studies of depressive symptoms in different countries and areas with different socioeconomic backgrounds have questionable generalizability and need to be examined separately. Although some studies have examined the prevalence of depressive symptoms in primary school students in China, the findings are

inconsistent. To date, no systematic review and meta-analysis of epidemiology of depressive symptoms in this population has been published, which gave us the impetus to conduct this meta-analysis to examine the depressive symptoms and associated factors in primary school students in China. Based on previous findings (Rao et al., 2019), we assumed that depressive symptoms among primary school students in China would be common, and the prevalence would be associated with certain demographic characteristics, such as gender and use of different instrument.

2. Methods

This study protocol was prospectively registered in the International Prospective Register of Systematic Reviews (PROSPERO; registration number: CRD42019124895).

2.1 Data sources and search strategies

Two researchers (DDX and WWR) independently searched both international (PubMed, PsycINFO and EMBASE) and Chinese (China National Knowledge Internet, WANFANG Data and Chinese Biological Medical Literature) databases from commencement to June 18, 2018, using the search terms including: adolescents, students, children, teen, teenagers, depression, depressive disorders, depressive symptoms, prevalence, epidemiology, survey, rate, percentage, China and Chinese. Additionally, the reference lists of included articles and reviews were checked for additional studies. The first or corresponding authors of included studies were contacted for additional information if necessary. Literature search and screening were conducted following the guideline of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Meta-analysis of observational studies in Epidemiology reporting guideline (Moher et al., 2009; Stroup et al., 2000).

2.2 Study criteria

Five researchers (DDX, WWR, XLC, SYW and WIC) independently screened articles by titles and abstracts first and then read the full texts of potential articles. According to the PRISMA statement, the following inclusion criteria were made according to the PICOS acronym: **P**articipants (P) studies on primary school students; using validated instruments to assess depressive symptoms, such as CESD, BDI, CDI and DSRSC; **I**ntervention (I): not applicable; **C**omparison (C): not applicable; **O**utcomes (O): reporting prevalence of depressive symptoms or relevant information that could generate the prevalence of depressive symptoms; and **S**tudy design (S): cross-sectional or cohort studies (only baseline data were extracted) conducted in mainland China (China thereafter) published in English or Chinese. Studies were excluded if they were conducted in special populations (e.g., left-behind children, outpatients, inpatients, obese children or those with physical or other psychiatric disorders), or focused on major depressive disorder. Any disagreement was resolved by a discussion with a senior researcher (YTX).

2.3. *Data extraction*

The same group of researchers independently extracted the following data from eligible studies using a standardized data collection form: geographic location, year of survey, sampling methods, sample size, response rate, mean age, percentage of males, school grades, assessment instrument and cutoff, and the prevalence estimates of depressive symptoms. If the study was based on a multi-center design, the data in each study site was extracted for subgroup analyses. If one dataset was used in different papers, only the one with the largest sample size was included. Data were extracted and double-checked independently by two researchers (DDX and WWR).

2.4. *Quality assessment*

The same researchers independently assessed study quality using the quality assessment instrument for epidemiological studies (Boyle, 1998; Ibrahim et

al.,2013; Loney et al., 1998) with the following eight items: (1) target population; (2) sampling; (3) the response rate; (4) non-respondents; (5) the representativeness; (6) standardized data collection methods; (7) validated criteria for depressive symptoms; (8) the prevalence estimates with confidence intervals. Any discrepancy was resolved by a discussion with a senior researcher (YTX).

2.5. *Statistical analysis*

Due to different sampling methods, demographic characteristics and instruments between studies, the pooled prevalence estimate of depressive symptoms was calculated as effect size (ES) using the Der Simonian and Laird random-effects model (Borenstein et al., 2010). Heterogeneity across studies was estimated with Cochran's Q test and I^2 statistic, with I^2 of ≥ 50% or Cochran's Q of $p<0.05$ indicating significant heterogeneity (Higgins et al., 2003). Subgroup analyses were conducted to explore the sources of heterogeneity according to the following categorical variables: gender (male vs. female), geographic region (Eastern vs. Central vs. Western China, according to the National Bureau of Statistics of China), year of survey (2001-2010 vs. 2011-2016 by median spitting method), and screening instrument (CDI vs. CCES-D vs. DSRSC). Meta-regression analyses were used to examine the associations of the year of survey (continuous variable) and study quality with the prevalence estimates of depressive symptoms. Sensitivity analysis were conducted to explore the outlying studies. The funnel plots, Begg's test and Egger's test were used to assess publication bias. Significance level was set at 0.05 (two-tailed). The meta-analyses were conducted using the Comprehensive Meta-Analysis software, Version 2 (CMA, Biostat Inc., Englewood, New Jersey, USA).

3. Results

3.1 *Study characteristics*

Of the 12,374 articles initially identified, 27 studies with 42,374 participants met the study entry criteria and were included (Figure 1). Study characteristics are summarized in Table 1. Studies were conducted from 2001 to 2016. Apart from one household survey (Zhou et al., 2018b), the remaining studies were school-based surveys. The most widely used screening instrument for depressive symptoms was the CDI (n=19), followed by the DSRSC (n=5) and the CES-D (n=3). Only two studies were longitudinal (Wang and Su, 2005; Zhao, 2014), while the remaining were cross-sectional.

3.2 *Prevalence of depressive symptoms in Chinese primary school students*

The pooled prevalence estimate of depressive symptoms in Chinese primary school students was 17.2% (95% CI: 14.3%-20.5%, I^2=98.65%) (Figure 2).

Subgroup analyses did not find significant associations of prevalence estimates of depressive symptoms with gender, year of survey and screening instruments (all p values > 0.05). There were different prevalence estimates of depressive symptoms between geographical regions (Q=10.416, p=0.005); the pooled prevalence estimate was highest in western China (22.1%, 95% CI: 18.5%-26.2%), followed by eastern (15.8%, 95%CI: 11.6%-21.2%) and central regions of China (13.7%, 95%CI: 10.6%-17.6%) (Table 2). Meta-regression analyses revealed significant association of depressive symptoms prevalence with the year of survey (slope = 0.056, p<0.001) and study quality (slope = -0.068, p<0.001). Sensitivity analysis did not find outlying study that could significantly affect the primary results.

3.3 *Quality assessment and publication bias*

The quality assessment scores ranged from 4 to 8, with a mean score of 5.54±0.94. Three studies clearly described the non-respondents (Fan et al., 2010; Wang et al., 2016; Zhao, 2014) and four studies reported the prevalence estimates with 95% confidence intervals (Fan et al., 2010; Wang et al., 2016; Zhu et al., 2016; Zhu et al., 2013). Seven studies did not report the response

rate or the rate was less than 80% (Ding et al., 2017; Li, 2017; Wang and Su, 2005; Wang et al., 2016; Wu et al., 2017; Yan, 2012; Zhou et al., 2018b). Although the funnel plot of the included studies was asymmetrical in visual inspection (Figure 3), both Begg's and Egger's tests did not find significant publication bias (Begg's test: z=1.32, p=0.19; Egger's test: z=2.04, p=0.052).

Discussion

To the best of our knowledge, this was the first systematic review and meta-analysis of the prevalence of depressive symptoms in primary school students in China. There are around 103 million primary school students in China (Ministry of Education of the People's Republic of China, 2018). According to the current findings, this translates to approximately 17.7 million primary school students suffering from depressive symptoms.

The pooled prevalence in this meta-analysis is similar to the findings in Chinese children and adolescents aged <18 years (19.85%, 95% CI: 14.75%–24.96%) (Rao et al., 2019), but lower than that in Chinese secondary school students (24.3%, 95% CI, 21.3%–27.6%) (Tang et al., 2018). It is also similar to the corresponding figures in some Asian countries, such as 17.3% in the elementary students in Korea and 16.9% in children aged 8-12 years in Singapore (Kwak et al., 2008; Magiati et al., 2015). However, the pooled prevalence is higher than those reported in some Western countries, such as 10.6% in Italian elementary students, 9.85% in Greek children aged 8-12 years and 10% in Swedish school children aged 8-13 years (Frigerio et al., 2001; Giannakopoulos et al., 2009; Larsson and Melin, 1992). A comparative study found that Chinese adolescents aged 6-15 years were more likely to experience depressive symptoms than their counterparts in North America (Tepper et al., 2008). This discrepancy between Chinese and Western school children may be due to different academic stress and competition. Chinese school children usually face great academic stress and heavy homework loads from primary schools. In addition, Chinese parents often have high expectations on children's

academic performance and are more restrictive to supervise their children (Magiati et al., 2015). Some Chinese parents may also be less likely to identify their children's emotional problems and seek help from health professionals than their Western counterparts (Huh et al., 2019; Tepper et al., 2008).

Subgroup analyses found that primary school students in western China reported higher prevalence of depressive symptoms, compared to those in central and eastern China. Since the "China's Western Development Program" launched in 2000, western China has been undergoing dramatic socioeconomic transformation, leading to rapid urbanization and rural-urban migration (Lai, 2002) and new public health concerns (Mou et al., 2013; Ren et al., 2019), particularly in western China (Cai et al., 2017). Some studies found that migrant children and left-behind families are more likely to have mental health problems (Fellmeth et al., 2018; Lu et al., 2012). In addition, as the main labor-sending areas in China, many parents in the western areas seek jobs in coastal cities. They could not well care for and supervise their children, which may increase the risk of depressive symptoms among their children (Liang et al., 2017; Wang et al., 2019). Moreover, compared to other parts of China, the average family income in western area is relatively lower (Lai, 2002). Poor family economic status could also lead to depression among children (Eamon, 2002; Zhou et al., 2018b).

Meta-regression analysis found an increasing trend in depressive symptoms prevalence in Chinese primary school students in the past two decades, which is consistent with previous findings in other countries (Collishaw et al., 2004; Mojtabai et al., 2016; Sigfusdottir et al., 2008; Tick et al., 2007). The possible reasons may be related to the dramatic socioeconomic changes in China (Cai et al., 2017; Xin et al., 2012). Socioeconomic contexts have direct and indirect impacts on child psychosocial development (Schoon et al., 2002). In recent decades, rapid urbanization and internal migration (Mou et al., 2013; Zhou et al., 2018a) have occurred in China, which could lead to family problems, e.g., short parent-child interactions (Zhao et al., 2015), parental emotional problems

(Liu and Wang, 2015; Ni et al., 2016), and increasing divorce rates (Dong et al., 2002; Liu et al., 1999; National Bureau of Statistics of China, 1998-2017). All these factors could increase the risk of depression in children. The prevalence of depressive symptoms was found to be lower in high quality studies, which may be due to the reduced study bias and lower false positive rate of depressive symptoms.

The findings of this meta-analysis should be interpreted with caution due to several limitations. First, except for one national survey with small sample size (n=567) (Zhou et al., 2018b), the other studies covered only 15 out of the 34 provinces/municipalities/autonomous regions in China. Thus, the present finding could not be generalized to all primary school students in China. Second, the heterogeneity was still high, although subgroup analyses have been performed, as this is unavoidable in meta-analysis of epidemiological surveys (Patsopoulos et al., 2008). Third, due to different socio-economic backgrounds, studies conducted in Hong Kong, Macau and Taiwan were not included in this meta-analysis. Fourth, relevant factors associated with depressive symptoms, such as age, rural/urban areas, household income, parents' education level, family history of psychiatric disorders and relationships with peers and teachers, were not examined due to unavailable data in most studies.

In conclusion, given the high prevalence of depressive symptoms in Chinese primary school students, particularly in western China, and its negative health outcomes, more emphasis should be paid to improving the mental health in primary school students. Further longitudinal studies are warranted to explore the contributing factors of depressive symptoms in Chinese school children.

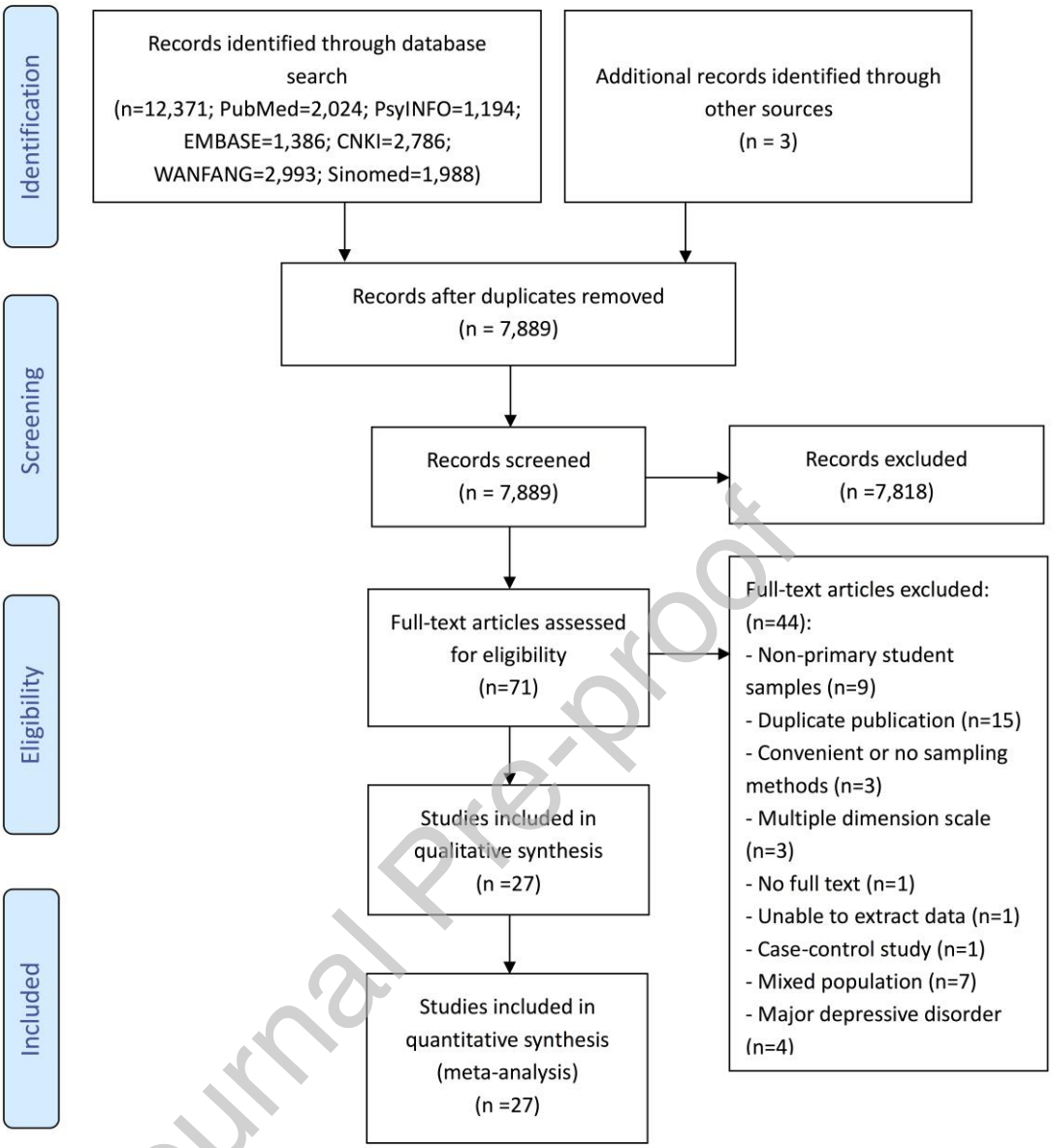

Figure 1. PRISMA flowchart of literature selection

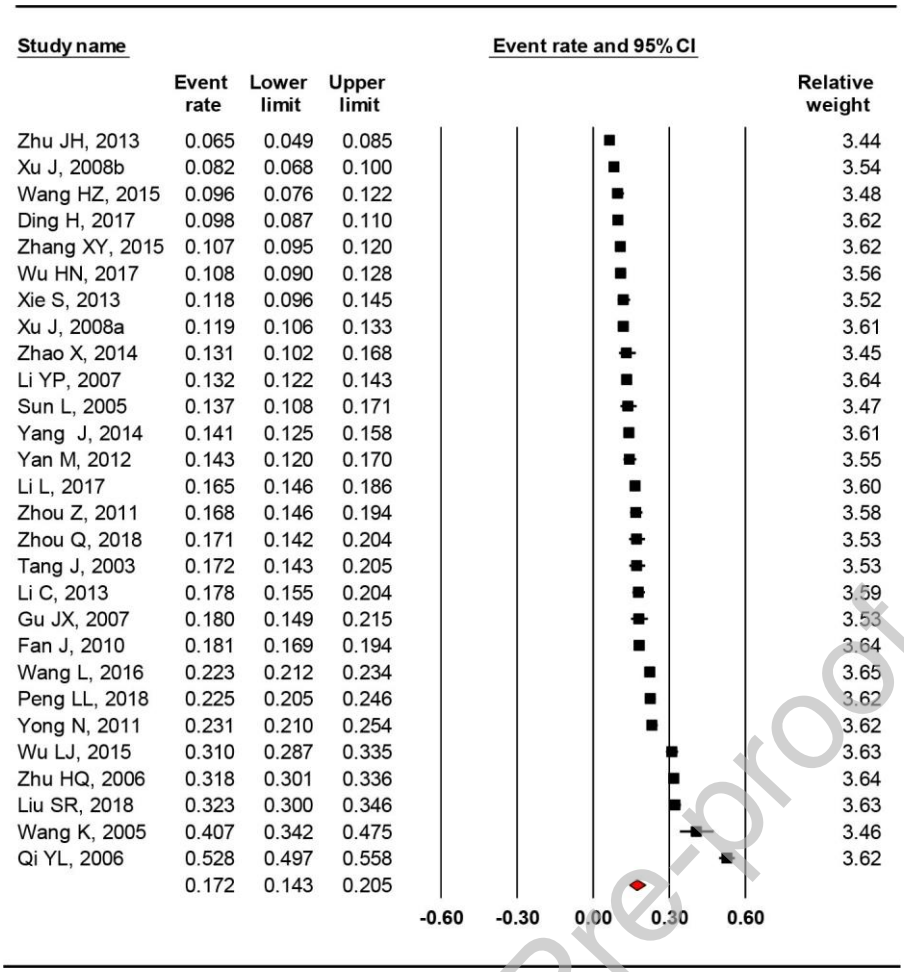

Figure 2. Forest plot of prevalence of depressive symptoms in Chinese primary school students

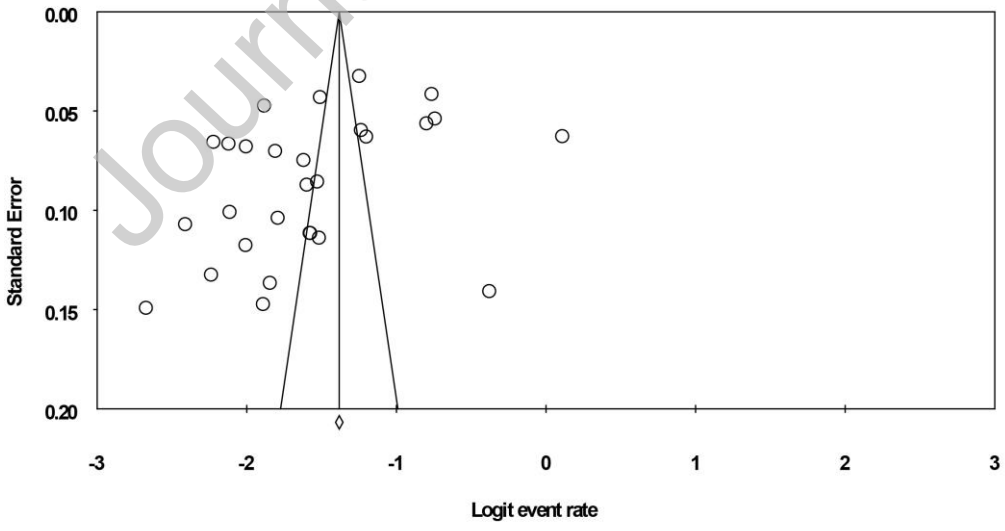

Figure 3. Publication bias of studies included in the meta-analysis

Author Disclosure

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Contributors

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Conflict of interest

There is no conflict of interest related to the topic of this manuscript.

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Table 1 Characteristics of studies included in the meta-analysis

First author, year	References	Province	Region	Survey year	SM	ESS	RS (%)	ESS[p]	Age range	Age (Mean±SD)	Male (%)	Grade	Scale	Cutoff	Prevalence (%)	Quality score
Wu LJ, 2015	(Wu et al., 2015)	Beijing	E	NR	C	1472	NR	1472	NR	NR	50.6	3~5	CDI	>12	31.05	5
Xu J, 2008[a]	(Xu et al., 2008)	Anhui	C	NR	SC	2071	99.7	2071	8~12	9.7±1.0	52.9	3~5	CDI	>19	11.88	6
Xu J, 2008[b]	(Xu et al., 2008)	Guangdong	E	NR	SC	1153	95.5	1153	8~14	9.7±1.0	55.0	3~5	CDI	>19	8.24	6
Wu HN, 2017	(Wu et al., 2017)	Zhejiang	E	2014	SC	2000	NR	1020	NR	NR	NR	NA[c]	CDI	>19	10.78	4
Zhang XY, 2015	(Zhang and Zhou, 2015)	Jiangsu	E	NR	SRC	2362	96.2	2362	NR	NR	53.34	3~5	CDI	>19	10.70	6
Zhao X, 2014	(Zhao, 2014)	Anhui	C	2009	C	816	77.9	404	NR	NR	NR	3~4	CDI	>19	13.11	6
Li C, 2013	(Li et al., 2013)	Chongqing	W	2010	MRC	3013	97.7	931	NR	NR	NR	4~6	CDI	≥19	17.80	6
Li YP, 2007	(Li et al., 2007)	Beijing	E	2005	C	3886	96.0	3886	9~10	NR	51.1	3~4	CDI	≥19	13.20	6
Liu SR, 2018	(Liu and Miao, 2018)	Xinjiang	W	2016	RSC	3610	97.9	1574	NR	NR	NR	4~6	CDI	≥19	32.27	6
Peng LL, 2018	(Peng et al., 2018)	Chongqing	W	2016	SC	3351	95.4	1607	NR	NR	NR	4~6	CDI	≥19	22.50	6
Wang L, 2016	(Wang et al., 2016)	Chongqing	W	2013	MSCR	10,357	79.5	5462	NR	NR	NR	2~6	CDI	≥19	22.32	7
Wang HZ, 2015	(Wang et al., 2015)	Henan	C	2010	MSC	3002	95.2	653	NR	NR	NR	5~6	CDI	≥19	9.65	6
Xie S, 2013	(Xie et al., 2016)	Hubei	C	2011	C	2888	97.9	692	NR	NR	NR	5~6	CDI	≥19	11.85	5
Yan M, 2012	(Yan, 2012)	Hubei	C	2010	SRC	3007	NR	756	NR	NR	NR	4~6	CDI	≥19	14.29	4
Yang J, 2014	(Yang et al., 2014)	Guangdong	E	NR	SC	1676	93.1	1676	8~14	10.68±1.26	49.2	3~6	CDI	≥19	14.08	5
Zhou Z, 2011	(Zhou and Wang, 2011)	Anhui	C	NR	SC	1884	95.2	939	NR	NR	NR	3~6	CDI	≥19	16.83	5

Zhu HQ, 2006	(Zhu et al., 2016)	Hainan	E	2015	SC	4866	97.4	2670	NR	NR	NR	4~6	CDI	≥19	31.80	6
Zhu JH, 2013	(Zhu et al., 2013)	Hubei	C	2010	SR	1975	89.8	743	NR	NR	NR	2~6	CDI	≥19	6.50	7
Li L, 2017	(Li, 2017)	Chongqing	W	NR	SC	1295	98.2	1295	7~13	10.19±1.17	53.51	3~6	CDI	NA	16.53	5
Ding H, 2017	(Ding et al., 2017)	Hubei	C	2015	C	6406	NR	2628	NR	NR	NR	5~6	CES-D	≥16	9.78	5
Zhou Q, 2018	(Zhou et al., 2018b)	25 provinces	--	2012	MS	3056	NR	567	10~15	NR	NR	NA[d]	CES-D	≥18	29.30	5
Fan J, 2010	(Fan et al., 2010)	Shanghai	E	2009	RC	3628	98.5	3628	8~12	10.0±1.0	51.70	3~5	CES-D	≥20	18.11	8
Gu JX, 2007	(Gu et al., 2007)	Hebei	E	2004	C	522	100	522	8~10	8.92±1.13	51.70	2~5	DSRSC	≥15	18.01	6
Tang J, 2003	(Tang et al., 2003)	Hunan	C	NR	C	565	95.9	565	6~13	10.09±1.53	51.30	2~6	DSRSC	≥15	17.17	5
Wang K, 2005	(Wang and Su, 2005)	Hunan	C	2001	C	209	NR	209	NR	NR	NR	2~4	DSRSC	≥15	40.67	4
Yong N, 2011	(Yong et al., 2011)	Chongqing	W	NR	SRC	1417	93.0	1417	8~13	10±1	51.5	4~6	DSRSC	≥15	23.15	6
Sun L, 2005	(Sun and Zhou, 2005)	Tianjin	E	NR	RC	539	95.7	454	NR	NR	NR	3~6	DSRSC	CF[e]	13.66	5
Qi YL, 2006	(Qi, 2006)	Jilin	NE	NR	C	1018	94.3	1018	NR	NR	58.3	4~6	BDI	NA	52.75	4

NR=Not reported; NA=Not available; SD=Standard deviation. ESS=Effective sample size. RS=Response rate. Region: C=Central; E=East; NE=Northeast; W=West. SM=Sampling method: C=Cluster sampling; M=Multistage sampling; R=Random sampling; S=Stratified sampling. Scale: CDI=Children's Depression Inventory; CES-D=Center for Epidemiologic Studies Depression Scale; DSRSC=Depression Self-Rating Scale for Children; BDI=Beck Depression Inventory.

[a]: Data reported about Anhui study site in Xu J, 2008;

[b]: Data reported about Guangdong study site in Xu J, 2008;

[c]: The samples were primary school students aged <14;

[d]: The samples were primary school students;

[e]: CF=Cutoff: 8~12 years: male≥16, female≥15; 13~16 years: male≥14, female≥16;

[p]: Primary school.

Table 2 Subgroup analyses on the prevalence of depression symptoms

Subgroups	Categories (Number of studies)	Proportion (%)	95% CI (%)	Events	Sample size	I^2 (%) within subgroup	Q (P) across subgroups
Gender[a]	Male (12)	21.8	16.1-28.9	2149	10,415	98.20	1.224 (0.269)
	Female (12)	16.7	11.5-23.8	1456	9564	98.17	
Region	East (10)	15.8	11.6-21.2	3326	18,843	98.80	10.416 (**0.005**)
	Central (10)	13.7	10.6-17.6	1197	9660	95.48	
	West (6)	22.1	18.5-26.2	2797	12,286	95.86	
Survey year	2001-2010 (9)	15.3	12.1-19.2	1787	11,732	95.79	0.948 (0.33)
	2011-2016 (8)	18.5	13.6-24.7	3484	16,220	98.77	
Scale	CDI (19)	15.4	12.5-18.9	5740	31,366	98.48	3.247 (0.197)
	CES-D (3)	14.5	9.4-21.9	1011	6823	97.62	
	DSRSC (5)	21.3	15.5-28.7	666	3167	94.36	

Bold value: p<0.05; CDI=Children's Depression Inventory; CES-D=Center for Epidemiologic Studies Depression Scale; DSRSC=Depression Self-Rating Scale for Children.

[a]: Twelve studies reported the depressive symptom prevalence of both genders. The extracted data were divided into two arms for each study.