Depressive Symptoms of Chinese Rural-to-Urban Migrant Children: A Systematic Review and Meta-Analysis

Lixia Yan1,2*, Siyuan Wang3*, Yang Yuan4, Yu Zhang1, and Junhua Zhang1

Abstract
There are many contradictions in previous studies of the status of depressive symptoms among Chinese migrant children, the number of which in the compulsory education stage is about 13.9 million. This systematic review and meta-analysis were designed to compare depressive symptoms among migrant children and their urban children. Around 2,710 papers were retrieved from PubMed, OVID, the Web of Knowledge, CNKI, Wan Fang, Chongqing VIP, and Chinese Social Sciences Citation Index on January 27, 2020. Thirty-Two studies met study criteria with 14,906 migrant children and 10,792 urban children. Migrant children scored significantly higher for depressive symptoms score (SMD = 0.307, 95% CI [0.222, 0.393]). Region significantly influenced the difference of depressive symptoms between migrant children and urban children. Large effect sizes came from studies using scales that focus on depressive mood while studies using scales that focus on depressive behavioural symptoms had small effect sizes. Future research should focus on treatments to decrease depressive mood of migrant children. Future studies can add information about the length of their current stay in the urban location to improve the quality of study. PROSPERO registry: Systematic review registration no. CRD42018090676.

Keywords
sociology of mental health, sociology of health and illness, sociology, social sciences, community and urban sociology, political sociology health psychology, applied psychology, psychology, social work, regional studies, sociology of population, depressive symptoms

Introduction
As a common and recurrent problem in childhood, depressive symptoms are usually associated with negative behavioural, cognitive, and emotional outcomes among young people. For example, poor self-esteem, lower academic performance, worse physical health, more self-harm, and other suicidal behaviors (Cao & Yang, 2018; Yang & Zhang, 2018; Zhang & Yang, 2019). A recent meta-analysis found that the prevalence of depressive symptoms in children and adolescents in China was 19.85% (Rao et al., 2019). Moreover, other research has indicated that the levels of depressive symptoms vary between different subgroups of individuals; 30.7% of left-behind children experienced these symptoms, compared to only 22.8% of those who were not left-behind (Wang et al., 2019). Depression can be harmful to children and expensive to the family/community (Anagnostopoulos, 2008), detection and timely treatment of depressive symptoms is therefore essential to reduce harm to children, and to alleviate the burden to their families and the wider community.

Depression is an emerging public health priority related to migration (Kim et al., 2018). Research has found that migrant children have significantly higher depression and anxiety than non-migrants in Turkey (Diler et al., 2003). Migrants in low- and middle-income countries were found to face significant difficulties that are considered risk factors for depression. For example, discrimination, low social support, and lack of access to social and legal services (Meyer et al., 2017). However, other studies have indicated that overall, 1128177

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immigrant children have fewer mental health disorders than their native-born counterparts (Van Geel & Vedder, 2010), especially in industrialized, western countries (Cantor-Graae & Selten, 2005). This inconsistent relationship between immigration and depression is likely associated with the variation that exists between the characteristics of the migrant populations in these different studies. Thus, further research is required to develop a more contextualized understanding of this relationship (Stevens & Vollebergh, 2008).

There have been substantial demographic shifts in China over the last few decades which may have contributed to child depressive symptoms. Historically, many migrant workers have moved to urban areas for better job opportunities (Zhang, 2018). In order to receive a better education, many children are brought to cities by their migrant parents. In China, migrant children are those under the age of 18 who have left their hukou registration place for 6 months or longer (Wang et al., 2016). According to the 2017 education statistics, almost 19 million migrant children are in China’s compulsory education system, and 13.9 million of these children follow their parents to move to an urban location (Nan, 2018). On the one hand, they are a disadvantaged group that have many difficulties adapting to urban life. As unofficial residents, migrants usually do not have access to social services in local cities. This is particularly the case in some large cities in eastern China, where the government tried to reduce the number of migrants by increasing the entry threshold of migrant children to eliminate the problem of overpopulation in these areas (General Office of the Municipal People’s Government of Beijing, 2020). Such discrimination easily affects the depressive symptoms of migrant children (Zhu et al., 2015). This, along with high parental expectations and increased sensitivity to discrimination and rejection, increases the likelihood of migrant children experiencing trauma during these early years (Zhuo, 2016). Taken together, this information highlights the widespread concern that rural-to-urban migration may have adverse effects on children’s mental health.

The status of depressive symptoms among migrant children was found to vary significantly between studies. Wang et al. (2017) recruited 1,182 migrant children in Guangzhou and found that rural-to-urban migrant children had more mental health problems; about 21% of migrant children suffered from mental health problems compared with only 9.8% of non-migrant children. Cheng et al. (2017) investigated 7,296 rural-to-urban migrant children in Beijing and found that depressive symptoms were during the initial resettlement period after migrating and then decreased. However, after approximately 8 years, depressive symptoms increased again. Lu et al. (2018) used data from an existing database of 4,217 students and found that migrant children(n=1,858)have a higher risk of externalizing problems and self-injurious thoughts and behaviour compared to urban children (n=2,359). However, other studies report that migrant children experience positive mental health. According to Ni and Li (2014), the mental health of migrant children in public schools was better than those in migrant-exclusive schools. Similarly, Qiu et al. (2008) found that migrant children had fewer depressive symptoms than local children in public schools.

Nonetheless, the differences found between depressive symptoms in migrant and urban children may be related to the year of study. Prior to 1996, there was huge discrimination against migrant children; public schools in cities either refused migrant children or charged a large entrance fee. The vast majority of migrant children have to go to those migrant children’s schools that have not obtained the formal school operation qualification (Zhou, 2007). Compulsory education law of the People’s Republic of China (2006) stipulated that the local government should provide equal conditions for migrant children to receive compulsory education (Standing Committee of the National People’s Congress, 2006). Urban residents also increasingly accept migrant children, and migrant children received extensive care from all walks of life. These changes in urban attitudes toward migrant children may affect the difference in depressive symptoms between migrant and urban children (Zhou & Rong, 2011).

Regional differences may contribute to differential rates of depressive symptoms between migrant and urban children. In recent years, the absorptive capacity of the migrant population in East China has been declining, and some megacities have restricted the population growth and immigration (General Office of the Municipal People’s Government of Beijing, 2020). Compared with the big cities in central and east regions, the population pressure in west cities is much less, so there are fewer restrictions on the foreign population thus the external environment of the migrant population is more relaxed (Qi, 2019). From 2010 to 2015, the migrant population and thus, the number of migrant children, decreased in eastern China, including Beijing, Shanghai, Liaoning, Zhejiang, and Jiangsu (Ren, 2018). The increased perceived limitations caused migrant children to experience more depressive symptoms than those in eastern China. In addition to these factors, sample size, the operationalization of “migrant children,” the depression instrument used, and the students’ grade levels may also account for this heterogeneity (Ding et al., 2019).

Given the mixed findings in the literature, and the likely impact of publication date, location of study, and measurement tools, there is a need for an up to date synthesis of quantitative evidence. Thus the objective of this meta-analysis is to compare depressive symptoms of migrant children and their non-migrant counterparts in China. The present study was guided by two research questions: (1) is there a significant difference between depressive symptoms in migrant children and urban children? (2) Will factors such as regions and measurement scales moderate this difference?

Method
This study followed the PRISMA statement (Moher et al., 2009) and the protocol was registered in PROSPERO.
Search Strategy/Syntax

Seven databases (PubMed, OVID databases [including Embase, OVID Medline, APA PsycINFO], Web of Knowledge, CNKI, Wan fang Database, Chongqing VIP database and Chinese Social Sciences Citation Index) were searched until January 27th, 2021. Search terms in PubMed were as follows: (Adolescent OR Child* OR Teen* OR student*) and (migrant OR floating OR migration OR migrate) and (China* OR Chinese) and (depressive OR depression OR melancholia OR MDD). Similar search terms were used in other databases (see Supplemental Material 1 and Figure 1).

Study Inclusion and Exclusion Criteria

Inclusion criteria: (1) observational/cross-sectional study measuring depressive symptoms; (2) migrant children who have moved from a rural area to a city, and have been in the...
city for at least 6 months; (3) urban children under the age of 18-years-old living with their parents; (4) both groups reported mean, Standard deviation (SD), and number (N) of depressive symptoms score or other values (e.g., \(t\) and \(p\)) that can be changed into Standard Mean Difference (SMD).

Exclusion criterion: (1) no empirical or no quantitative data (i.e., commentary, review, or qualitative paper); (2) scales without a focus on depressive symptoms, without clear measurement indices, and those lacking a standardised interpretation suitable for Chinese children scales, such as house-tree-person test (Burns, 1987); (3) repeated or overlapping publications (i.e., if a study was reported in several publications, only the most complete set of data will be used); (4) studies without a control group of urban children who live with their parents; (5) studies with insufficient information (i.e., mean, SD, N of depressive symptom score or other values including, \(t\), \(p\)) to compute SMD in Comprehensive Meta-Analysis 3.0.

**Screening and data extraction.** The eligibility process was conducted in two separate stages: title/abstract review and full-text review. Initially, the first two authors independently screened the titles and abstracts of all papers and excluded those not pertinent. At the second stage, the first two authors independently assessed the full-text version of the remaining papers. Discrepancies were resolved by consensus through discussion between authors. A third senior author decided upon inclusion or exclusion if needed.

The following data were extracted from the included studies: first author, year of publication, scale, region, child age, number, mean, and standard deviation of depressive symptoms in both groups or other parameters such as \(t\), \(p\), and \(F\).

**Outcomes**

Because the cut-off score for depression measures varies, we chose to take the score of depressive symptoms as the primary outcome rather than depression rates. Higher scores indicate more serious depressive symptoms.

Self-report scales of depressive symptoms that were commonly used in the reviewed studies can be divided into two categories. The first type of scale was specifically for measuring depression and has a high psychometric index. These scales include: Beck Depression Inventory (BDI), Children Depression Inventory (CDI), Centre for Epidemiologic Study of Depression self-rating scale (CES-D; Radloff, 1991), Depression Self-Rating Scale for Children (DSRSC), and Self-rating Depression Scale (SDS; Zung, 1965).

The second type of scales were typically a dimension of another scale or a measurement tool developed by investigators and lacked more extensive psychometric evaluation. These scales include: Middle School Students Mental Health Scales (MSSMHS), Symptom Check-List 90 (SCL-90), Yatabe-Gilford Test (Y-G test), and the Sixteen Personality Factor Questionnaire (16-PF).

**Risk of Quality Assessment**

Methodological quality of the articles was assessed using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies and previous studies (Chen et al., 2020). There were 10 items including: study design, sampling method, data collection method, response rate, definition of migrant children, urban children information, measurement, and statistical method. Two authors independently assessed the quality of each study included and disagreements were resolved through discussion (Supplemental Material 2).

**Statistical Analysis**

Analyses were conducted in Comprehensive Meta-Analysis 3.0 (CMA). Migrant children were regarded as the experimental group and urban children as the control group. Given the inherent heterogeneity of the studies, random-effect models were used (Cortese et al., 2018). \(F\) was used to assess the heterogeneity of effect sizes (Higgins & Thompson, 2002). Egger’s test and funnel plots was used to estimate publication biases (Egger et al., 1997). Meta-regression and subgroup analysis were conducted to identify which moderator had a significant effect on the outcome.

**Results**

From a pool of 2,710 non-duplicate potentially relevant references, 32 studies were retained in the meta-analysis. A detailed description of the selection process is shown in Figure 1.

Reasons for the exclusion of studies assessed in full-text length are listed in Supplemental Material 3. Although the sampling method, definition of “migrant children,” and a detailed response rate were not reported in some studies, the majority of the included studies had a clear research design and used appropriate measurements and statistical methods.

Table 1 reports the main characteristics of 32 studies included with a pooled sample size of 14,906 migrant children and 10,792 urban children. The studies were conducted in 14 provinces covering eastern China (Beijing, Guangdong, Fujian, Zhejiang, Jiangsu, Shanghai, code = 0), central China (Hubei, Hunan, Henan, Jiangxi, code = 1), and western China (Sichuan, Chongqing, Xinjiang, Yunnan, code = 2). Participants were mainly recruited from grades one to nine in schools. Scales included BDI, BSI, CDI, CES-D, DSRSC, SDS, 16-PF, MSSMHS, SCL-90, Y-G Test, and two other scales without information in detail.

**Main Analysis**

The results relative to depressive symptoms showed that migrant children scored significantly higher than non-migrant children (SMD = 0.307, 95% CI [0.222, 0.393]) with evidence of true heterogeneity (\(I^2 = 90.388\%\)) (Table 2, Figure 2, Supplemental Material 5 and 6).
| First author (year) | Migrant children | Urban children | Scale | City/province | Region | Grade/age | Definition of migrant children | Length |
|---------------------|-----------------|----------------|-------|----------------|--------|----------|-------------------------------|--------|
| Cao and Liu (2017)  | 776             | 265            | BDI   | Beijing        | Mixed  | 5–9      | Household                      | >6months |
| Chen (2017)         | 414             | 352            | CDI   | Zhongshan      | East   | 7–9      | Household                      | Clear   |
| Chen (2011)         | 184             | 202            | DSRSC | Changsha       | Middle | 3–6      | Household                      | Clear   |
| Chen (2006)         | 140             | 150            | EPQ 16PF | Ruian         | East   | 2–5      | Unclear                        | Clear   |
| Chen et al. (2009)  | 411             | 518            | CDI   | Beijing        | East   | 3–6      | Household                      | Clear   |
| Chen et al. (2018)  | 393             | 481            | MMHI-60 | Nanning Guin   | West   | 7–9      | Household                      | >6months |
| Ding et al. (2012)  | 377             | 150            | CDI   | Suzhou         | East   | 7–9      | Unclear                        | Clear   |
| Fu et al. (2013)    | 236             | 207            | DSRSC | Zhengzhou      | Middle | Age 8–14| Household                      | Clear   |
| Gong (2016)         | 486             | 143            | CES-D | Shenzhen       | East   | 7–9      | Unclear                        | Clear   |
| Jiang and Liang (2021) | 804         | 518            | BSI   | Kunming        | West   | 4–9      | Household                      | Clear   |
| Li (2009)           | 258             | 279            | SCL-90 | Zhengzhou      | Middle | Age 6–13| Unclear                        | Clear   |
| Liu and Feng (2015) | 1,080           | 628            | Survey unclear | Wuhan | Middle | Age 6–9 | Unclear                        | Clear   |
| Lu (2020)           | 140             | 393            | CES-D | National       | Mixed  | Age 10–15| Household                      | Clear   |
| Lu (2012)           | 239             | 318            | CES-D | Quanzhou       | East   | 4–9      | Unclear                        | Clear   |
| Mao (2012)          | 712             | 303            | CES-D | Shanghai       | East   | 7–8      | Household                      | Clear   |
| Peng and Lu (2006)  | 107             | 121            | SDS   | Shenzhen       | East   | 3–6      | Household                      | Clear   |
| Qiu et al. (2008)   | 270             | 120            | MSSMHS | Nanchang      | Middle | 7        | Unclear                        | Clear   |
| Shi and Chang (2015) | 569            | 294            | DSRSC | Shanghai       | East   | 4–5      | Unclear                        | Clear   |
| Sun et al. (2008)   | 686             | 686            | SCL-90 | Shanghai       | East   | 7–8      | Household                      | Clear   |
| Wei (2011)          | 269             | 117            | BDI   | Xiamen         | East   | 6        | Unclear                        | Clear   |
| Wu and Wang (2018)  | 560             | 545            | CDI   | Hangzhou       | East   | 2–6      | Household                      | Clear   |
| Xue (2010)          | 774             | 317            | Y-G Test | Nanjing Suzhou | East   | 7–9      | Household                      | Clear   |
| Yang et al. (2014a) | 399             | 341            | SCL-90 | Chongqing      | West   | 7–9      | Household                      | Clear   |
| Yang et al. (2014b) | 183             | 182            | 16-PF | Suzhou         | East   | Age <18 | Unclear                        | Clear   |
| Yang et al. (2012)  | 258             | 253            | SCL-90 | Wuhan          | Middle | Age 11–18| Unclear                        | Clear   |
| Yao et al. (2012)   | 340             | 210            | SCL-90 | Henan          | Middle | 7        | Unclear                        | Clear   |
| Zhang et al. (2013) | 305             | 205            | MSSMHS | Beijing        | East   | 7–9      | Household                      | Clear   |
| Zhang et al. (2010) | 412             | 148            | DSRSC | Ningbo         | East   | 4–6      | Unclear                        | Clear   |
| Zhao et al. (2018)  | 682             | 1,242          | MSSMHS | Chongqing      | West   | 7–12     | Household                      | <1 year 66 |
| Zhao (2014)         | 741             | 172            | CDI   | Guangzhou      | Mixed  | 6–8      | Unclear                        | 1–3 years 85 |
| Zhou (2008)         | 1,517           | 437            | CDI   | Beijing        | East   | 3–5      | Household                      | Clear   |
| Zhou et al. (2018)  | 184             | 505            | CES-D | 25 province    | Mixed  | Age 10–15| Household                      | Clear   |
Meta-Regression

Meta-regression was conducted with year (continuous variable), number (continuous variable), region (eastern = 0, central = 1, mixed = 2, western = 3), scale (BDI = 0, BDS = 1, CDI = 2, CES-D = 3, DSRSC = 4, SDS = 5, self-developed = 6, subdivision = 7), grade (elementary = 0, middle = 1, mixed = 2), and definition of migration children (clearly defined = 0, unclearly defined = 1) as regressors. The results of the meta-regression analysis are reported in Table 3. Region significantly affected the pooled SMD. None of the other covariates significantly affected the pooled SMD.

Subgroup Analysis

As a follow-up test, region subgroup analyses were conducted. Migrant children scored significantly higher than urban children in eastern China (SMD = 0.405, 95% CI [0.284, 0.527]) and central China (SMD = 0.307, 95% CI [0.124, 0.490]). Although migrant children scored higher than urban children in depression in western China, the effect size was small (SMD = 0.106, 95% CI [0.005, 0.208]) (Table 3). Region significantly affected the pooled SMD. None of the other covariates significantly affected the pooled SMD.

Discussion

In this systematic review and meta-analysis we found that migrant children have significantly higher depressive symptoms than urban children, indicating that the mental health of migrant children is in a relatively low position. It is important to consider that the family environment plays an extremely important role in children’s psychological growth. Compared with urban children, migrant children suffer more frequent intra-city migration and inter-city migration, and the latter has a significant negative impact on the health of the migrant population (Cheng et al., 2021). In addition, the migrant population is different in culture and lifestyle due to substantial rural-urban disparities such as leisure-time activities as well as access to, and utilization of, health service (Zheng & An, 2015). Without local household registration, migrant children are in the city but unable to integrate into urban life. This kind of situation will undoubtedly have a very negative impact on their development, especially their psychological health. Migrant children are also more likely to experience discriminatory abuse, poverty, and other stressful life events than non-migrant children (Fang, 2020; Gao et al., 2020). Compared with their urban counterparts, the home and school environment of migrant children is worse due to low socio-economic status and poor parental knowledge about children’s healthy development. Research suggests that this is related to the problems caused by migrant life and the fast-paced lifestyle in urban China, which is associated with migrant children’s psychological discomfort (Ni et al., 2016). These changes will surely impact psychological growth of migrant children who are often prone to extreme inferiority or behaviour deviations. Thus, migrant...
children are facing greater psychological pressure facilitated by these environmental changes, which exceed their ability to cope with challenges, and therefore lead to poorer physical and mental health.

Region significantly influenced the difference found between depressive symptoms in migrant and urban children. It is likely that this is partly because the acceptance of migrant children in different regions differs. That is, some mega-cities in eastern China once treated migrant workers in an unfriendly manner in order to control the size of the urban population. In comparison, the western and central cities have adopted a friendlier attitude, which has led to an increase in the migrant population. In 2018, the number of migrant workers employed in the central and western regions was reported to be increasing (National Bureau of statistics of the People’s Republic of China, 2019). Another reason for this disparity is the environmental differences that exist between the city of inflow and the place of household registration. It is important, yet difficult, for migrants to identify with both their origin culture as well as the culture of the place to which they migrate (Maehler et al., 2020). In west China, most migrant children migrate within the province (Duan et al., 2013), and the distance between their destination and their household registration area is small, resulting in less cultural upheaval and thus less psychological distress.

Figure 2. Forest plots. Depressive symptoms comparison between migrant children and urban children.

| Study name  | Statistics for each study | Std diff in means and 95% CI |
|-------------|---------------------------|-----------------------------|
| Cao TH 2017 | 0.158 0.018 0.297 2.215 0.027 |
| Chen DJ 2017 | 0.403 0.260 0.547 5.505 0.000 |
| Chen LY 2011 | 0.443 0.241 0.645 4.296 0.000 |
| Chen MF 2006 | 0.391 0.158 0.623 3.293 0.001 |
| Chen XY 2009 | 0.650 0.518 0.783 9.600 0.000 |
| Chen Y 2018 | 0.127 -0.007 0.260 1.861 0.063 |
| Ding F 2012 | 0.223 0.033 0.413 2.304 0.021 |
| Fu HP 2013 | 0.662 0.470 0.853 6.765 0.000 |
| Gong LH 2016 | 0.049 -0.137 0.236 0.516 0.606 |
| Jiang S 2020 | 0.227 0.116 0.338 4.015 0.000 |
| Li HY 2009 | 0.194 0.024 0.364 2.241 0.025 |
| Liu Q 2015 | 0.541 0.441 0.641 10.598 0.000 |
| Lu S 2020 | 0.099 -0.094 0.293 1.004 0.315 |
| Lu X 2012 | 0.384 0.215 0.553 4.444 0.000 |
| Mao YH 2012 | 0.169 0.035 0.304 2.467 0.014 |
| Peng S 2006 | 0.360 0.098 0.622 2.689 0.007 |
| Qiu DM 2008 | -0.057 -0.272 0.158 -0.522 0.602 |
| Shi JH 2015 | 0.523 0.380 0.666 7.171 0.000 |
| Sun L 2008 | 0.059 -0.046 0.165 1.100 0.271 |
| Wei LZ 2011 | 0.239 0.022 0.457 2.154 0.031 |
| Wu HN 2018 | 0.183 0.065 0.301 3.031 0.002 |
| Xue JN 2010 | 0.881 0.745 1.017 12.716 0.000 |
| Yang H 2014 | 0.064 -0.081 0.208 0.862 0.389 |
| Yang HL 2014 | 0.682 0.471 0.893 6.333 0.000 |
| Yang L 2012 | 0.129 -0.045 0.302 1.452 0.147 |
| Yao ML 2012 | 0.209 0.037 0.382 2.377 0.017 |
| Zhang QL 2013 | 0.546 0.366 0.726 5.939 0.000 |
| Zhang WW 2010 | 0.695 0.503 0.887 7.087 0.000 |
| Zhao XM 2018 | 0.013 -0.081 0.106 0.268 0.789 |
| Zhao Y 2014 | 0.001 -0.165 0.166 0.007 0.995 |
| Zhou H 2008 | 0.461 0.354 0.568 8.416 0.000 |
| Zhou M 2018 | 0.162 -0.007 0.331 1.878 0.060 |
| 0.307 0.222 0.393 7.021 0.000 |
in less adaptive stress and depression. However, in eastern China, most migrant children migrate out of their provinces, and their places of origin are quite different from their new place of residence, so they are prone to more psychological problems and depressive symptoms.

Although scales used in this systematic review and meta-analysis are different across studies, the core is the measurement of subjective pain experience (Wang et al., 2016). Therefore, migrant children’s depression scores are higher than those of urban children in all scales. However, effect size differs across scales, which is likely due to variation in the emphasis placed on different characteristics/symptoms within these scales. For example, DSRSC and CDI focus on depressive mood, and the effect size of such tools is the largest, whereas and CES-D focus on depressive behavioural symptoms (Wang et al., 2015), and these tools have the smallest effect size. The sub-dimensions of other scales can measure both depressive mood and depressive behavioural symptoms, with medium effect sizes reported. Therefore, it is important to understand that the higher depression scores of migrant children mean that they are more likely to have depressive emotions than urban children, rather than depressive behavioural symptoms.

This suggests that we need to pay more attention to migrant children and give them more social and interpersonal support. The adverse environmental factors discussed are likely to have a profound, lasting, and negative impact on children’s physical, social, and emotional development. Giving educational support will therefore be important to help children overcome the risk factors, increase the protective factors, and promote positive personal and social development. The results suggest that more psychosocial interventions should be in place to support migrant children, and that schools, families, and society should pay more attention to their depressive symptoms. Many cities in China are gradually lowering the hukou restrictions and creating a friendly social atmosphere, which helps to reduce perceived social class discrimination among migration children that was associated with depression symptoms (Song et al., 2020). Hukou-based discrimination by teachers was positively associated with depression of migrant children and reducing teachers’ discrimination can reduce migrant children’s depression (Jiang & Dong, 2020).

Interpersonal psychotherapy and metacognitive intervention training were found to reduce depression significantly of immigrant children (Sun & Zhang, 2020). Tam et al. (2020) found that depression symptoms significantly decreased over time after a resilience-based intervention, which sought to counteract the risk of migration-related challenges. However, no significant difference was found between the depression scores of participants in the intervention versus the control group. Migrant families should also be supported to develop their communication and build positive relationships with their children, which may decrease the likelihood of them experiencing depressive symptoms (Liu et al., 2020).

This meta-analysis has some weaknesses. First, numerous different scales were used that did not all measure the same symptoms and characteristics of depression. Depression is a multi-faceted construct including affective, motoric, and executive components and each study used a scale that placed a different emphasis on these components. Secondly, the results of the meta-regression should be considered cautiously because there were only 32 studies. Third, some studies did not report sampling method, definition of migrant

### Table 3. Main Results for Model 1, Random effects (MM), Z-Distribution, SMD.

| SET    | Covariate          | β   | SE   | Z    | p    | Q   | p    | R² % |
|--------|--------------------|-----|------|------|------|-----|------|------|
| Region | Central vs. East   | −.376 | 0.142 | 10.32 | .016 | 10.32 | .016 | 22   |
|        | Mixed vs. East     | −.279 | 0.167 |      |      |      |      |      |
|        | West vs. East      | −.333 | 0.203 |      |      |      |      |      |
| Number | .000               | 0.000 | −0.900 | .367 |      |      |      |      |
| Grade  | Middle vs. Elementary | −.014 | 0.139 |      |      | 3.14 | .208 |      |
|        | Mixed vs. Elementary | .213  | 0.174 |      |      |      |      |      |
| Year   | −.011              | 0.017 | −0.610 | .539 |      |      |      |      |
| Instrument | BSI vs. BDI | .171  | 0.340 |      |      |      |      |      |
|        | CDI vs. BDI        | .144  | 0.200 |      |      |      |      |      |
|        | CES-D vs. BDI      | −.071 | 0.201 |      |      |      |      |      |
|        | DSRSC vs. BDI      | .448  | 0.222 |      |      |      |      |      |
|        | SDS vs. BDI        | −.096 | 0.342 |      |      |      |      |      |
|        | Self-Developed vs. BDI | .686  | 0.365 |      |      |      |      |      |
|        | Sub-division vs. BDI | .186  | 0.214 |      |      |      |      |      |
| Definition | Unclear vs. Household | −.165 | 0.102 | −1.610 | .107 |      |      |      |
children, the length of their current stay in the urban location and the response rate in detail. Therefore, more high-quality studies are needed in the future.

Conclusions

Compared with their urban counterparts, migrant children had higher depressive symptoms. Region significantly influenced the difference of depressive symptoms between migrant children and urban children. Large effect sizes came from studies using scales that focus on depressive mood, such as DSRSC and CDI while studies using scales that focus on depressive behavioural symptoms, such as DI and CES-D had small effect sizes. Future research should focus on treatments to decrease depressive mood of migrant children. Future studies can add information about the length of their current stay in the urban location to improve the quality of study.

Author Statements

conceptualization, J.Z. and S.W.; methodology, L.Y. and Y.Y.; software, J.Z.; validation, J.Z., L.Y. and Y.Z.; formal analysis, L.Y.; data curation, J.Z. and L.Y.; writing—original draft preparation, J.Z.; writing—review and editing, L.Y.; supervision, L.Y.; project administration, Y.Y.; funding acquisition, J.Z.

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Ethics and Dissemination

The systematic review and meta-analysis will not undertake any first-hand data collection and therefore do not require ethical approval.

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Supplemental Material

Supplemental material for this article is available online.

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