International Journal of
Mental Health Promotion

Tech Science Press

DOI: 10.32604/ijmhp.2024.048483

REVIEW

Does Parental Migration Affect Left-Behind Children's Social Anxiety? A Systematic Review and Meta-Analysis

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Received: 09 December 2023 Accepted: 21 March 2024 Published: 30 May 2024

ABSTRACT

Social anxiety is a common psychological problem among left-behind children (LBC) and has been a popular issue in recent years. Children with higher levels of social anxiety have more emotional and behavioral problems and are prone to negative life events. Although several studies have explored the differences in social anxiety between LBC and non-left-behind children (N-LBC), the findings have not been consistent. In this study, a systematic review and meta-analysis method was used, with 411 papers retrieved on October 01, 2023, from Pubmed, Embase, Web of Science, and Chinese databases (CNKI, VIP, and Wanfang) (PROSPERO registry number: CRD42023472463). Twenty-one studies met the research criteria and included 11,254 LBC and 13,096 N-LBC. LBC scored significantly higher for social anxiety ([WMD (95% CI): 0.35 [0.23, 0.48], $p < 0.001$]) and social avoidance and distress ([WMD (95% CI): 0.35 [0.23, 0.48], $p < 0.001$]). Subgroup analyses showed significant differences in effect sizes for the overall proportion of children left behind ($p = 0.02$). In addition, different types of parental migration may influence the social anxiety of LBC, double-parent migration was associated higher social anxiety than father migration ($p < 0.001$). Future research should focus on treatments to decrease social anxiety of left-behind children. These findings suggest that due to the long-term absence of parental migration, LBC are more vulnerable to negative emotional experiences and behaviours such as anxiety, distress, and avoidance during social interaction, especially for those with both parents absent from the home. Future research should focus on treatments to reduce social anxiety in LBC.

KEYWORDS

Parental migration; left-behind children; social anxiety; meta-analysis

Introduction

With the acceleration of urbanization in China, there has been a significant influx of rural laborers into cities. For reasons of economy and living conditions, in many cases, the children of migrant workers are unable to accompany their parents to cities and are left behind in the countryside. This situation has led to the creation of a special group known as "left-behind children" (LBC). LBC refers to young people who remain in their original living areas while one or both of their parents migrate from their hometowns to work elsewhere for a period of six months or longer, resulting in the children's inability of their children to cohabit with their parents [1]. According to the Facts and Figures on China's Child Population Situation in 2020, 66.93 million children were left behind, accounting for 22.6% percent of the total children in China [2]. Notably, Bronfenbrenner's ecosystem theory model of children, the microsocial environment has a significant impact on children's development [3]. Disruption of family functioning and family relationships due to prolonged parental absence has serious adverse effects on the emotions and behaviors of LBC [4,5]. Specifically, while parental absence can provide better economic support for children, it is also accompanied by a number of negative impacts, such as parental divorce, weakening of the parent-child connection, and inappropriate parenting styles from

grandparents, which also means that the educational and emotional support functions of the family are disrupted [6–8]. One study suggests that lower levels of parental supervision and support increase the incidence of psychological and behavioral problems for LBC [9].

According to the 2021 China Children's Mental Health Survey Report, LBC's mental health has higher risks, with a 28.5% detection rate for depression and 27.7% for anxiety, both higher than non-left-behind children (N-LBC). In addition, LBC are more susceptible to panic, loneliness, and low self-esteem [10,11]. Moreover, LBC also have more serious externalizing behavioral problems [12]. LBC who lacks emotional support are prone to show anti-social behaviors such as bullying and aggression [13,14], smoking [15], poor academic performance and dropping out of school are also more serious problems [16]. Furthermore, LBC have more self-injurious behaviors, such as non-suicidal self-injury (NSSI) [17,18]. A study showed that the prevalence of NSSI among LBC was 4.6%, higher than N-LBC [19].

Social anxiety refers to the fear of embarrassment and humiliation occurring in public social situations, accompanied by distress or even avoidance [20] and has now become the third most prevalent mental disorder [21]. The cognitive-behavioral model suggests that social anxiety is associated with misperceptions. Due to negative self-schemas, social anxiety individuals perceive social situations as dangerous, scrutinize themselves with distorted, irrational beliefs, and are excessively concerned about others' evaluations of themselves. At the same time, they are very afraid of other people's judgments, feel pain interacting with others, and engage in behaviors such as head-down and gaze avoidance [22]. Individuals affected by negative parent-child relationships internalize negative experiences as perceptions of themselves or others, and these misperceptions lead to social difficulties for the individual. Attachment theory suggests that individuals with traumatic experiences in childhood are more likely to develop insecure attachment traits, leading to a greater likelihood of social anxiety, depression, and low self-esteem in interpersonal relationships [23,24]. Several studies have confirmed that adolescents who are left behind are more likely to suffer from emotionally traumatic experiences that lead to social anxiety in children [25,26].

Multiple analyses have demonstrated that LBC tends to exhibit significantly higher levels of social anxiety compared to N-LBC [27,28]. Children of families that lack warm parenting styles are at increased risk of experiencing interpersonal threats, leading to lower pro-social behavior [29,30]. Children who experience social anxiety may have less robust social networks, potentially underperform in school, and could be less well-adjusted [31]. As a chronic anxiety condition, social anxiety is not only persistent but also increases the risk of other serious mental health problems, such as moderate-to-severe insomnia, suicide attempts, substance abuse, depression and behavioral inhibition [32]. After the emergence of COVID-19, the prevalence of social anxiety among LBC has remained high, and it is often found to co-occur with depression [33]. Owing to its considerable adverse effects, social anxiety in LBC should receive widespread attention.

Although the current literature related to social anxiety in LBC is rich, there are a series of problems, such as a lack of representativeness and consistency, and inconsistent findings. In particular, a consistent summary of which factors contribute to social anxiety in LBC is lacking. Therefore, this study collated and analyzed the research literature on social anxiety in LBC, with the aim of obtaining more accurate data on social anxiety scores and evaluating the social anxiety status of Chinese LBC with greater objectivity and timeliness. This study is expected to provide a foundation for improving mental health in LBC.

Methods

The main purpose of this study was to use a meta-analysis to investigate whether parental absence leads to more severe social anxiety in LBC. The systematic review and meta-analysis were performed according to the PRISMA guidelines. The PROSPERO registration number was CRD42023472463.

Search strategy and study selection

Two researchers (WY, and LXJ) conducted a systematic search of the literature. The PubMed, Embase, and WOS databases and several Chinese databases (CNKI, VIP, Wanfang) were searched, from database inception to 01 October 2023. The search strategy and words included: ("left-behind children" OR "stay-at-home children") AND ("social anxiety" OR "social phobia" OR "social anxiety disorder" OR "anxiety disorder" OR " social disorder").

Inclusion and exclusion criteria

One researcher (WY) and another researcher (LXJ) independently screened the screening of the articles, and a third researcher (YPP) adjudicated the results in case of disagreement. The eligibility criteria for inclusion in the study included the following: (1) the sample of the study was LBC; (2) the location of the study was China; (3) the survey instrument used in the study was the Social Anxiety Scale for Children (SASC) or an adaptation of the scale based on it; (4) total social anxiety scores for the LBC and N-LBC groups were reported in the study; and (5) a comprehensive report of the mean, standard deviation, and number of participants. The exclusion criteria included the following: (1) duplication of the literature, (2) incomplete data, (3) inaccessibility of the full text, and (4) use of survey instruments other than the SASC.

Study quality assessment

We used the STROBE checklist [34] to examine the quality of the included literature, this checklist included 22 items, each of which was given a score of 1 point, for a total of 22 points, with more than 11 points being considered to indicate quality.

Statistical analysis

Stata 16.0 was used for statistical analysis. The level of heterogeneity of the included studies was judged according to the I^2 value; when $I^2 = 0$, studies were considered to have no heterogeneity; when $I^2 \leq 50\%$, heterogeneity was considered

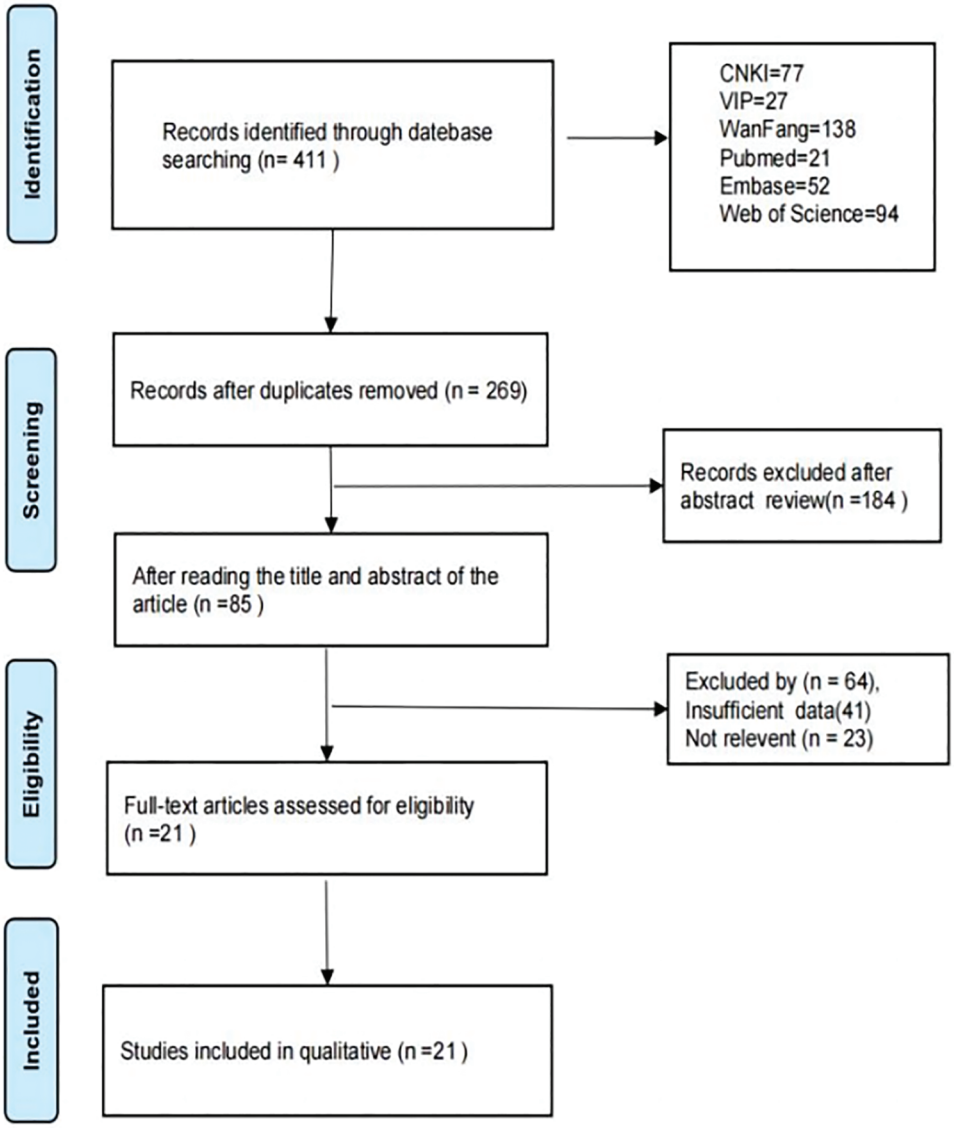

FIGURE 1. Flow diagram of the literature search and studies selection process.

to be low and a fixed-effects model was used; and when I^2 > 50%, heterogeneity was considered to be high, and a random-effects model was used. The weighted mean difference (WMD), and confidence intervals (95% CI) reported in the selected literature were analyzed. We conducted subgroup analyses based on grade and proportion of LBC to the overall population. Publication bias was assessed using funnel plots and Egger's regression test.

Results

Literature inclusion and screening

The 411 retrieved studies were screened. First, duplicates were removed resulting in the retention of 269 related studies. After reading the titles and abstracts, studies that did not meet the inclusion criteria were excluded; subsequently, the remaining studies were further screened according to the criteria. Finally, 21 articles were included (Fig. 1). We extracted data such as author, year, sample size, and research instrument information from the included studies (Table 1). There were 3 English-language studies and 18 Chinese-language studies, with a total of 26,583 children and adolescents in 15 provinces in China. The 21 studies were published from 2007 to 2023, and the minimum sample size was 188 and the maximum was 3,902. The 21 articles included had the following quality assessment scores: two scored 15, two scored 16, six scored 17, six scored 18, four scored 19 and one scored 20.

The social anxiety of LBC and N-LBC

Twenty-one articles with total social anxiety scores were included in the analysis, and the I^2 value was 91.06%, suggesting large heterogeneity between studies in the meta-analysis; therefore, a random effects model was used. According to the results, there were significant differences in social anxiety [WMD (95% CI): 0.35 [0.23,0.48], $p < 0.001$] between LBC and N-LBC (Fig. 2, Table 2). Moreover, the difference between LBC and N-LBC was significant for social avoidance and distress [WMD (95% CI): 0.35 [0.23, 0.48], $p < 0.001$], but no significant difference was found for fear of negative evaluation [WMD (95% CI): 0.17 [−0.03, 0.38], $p < 0.001$].

TABLE 1

Basic characteristics of the included studies

No.	Author/Year	Region	T	M	F	LBC (n)	LBC (%)	E	Scale	Score
1	Jiang et al., 2013 [35]	Zhejiang	405	208	197	109	26.9	P	SASC	16
2	Li et al., 2018 [36]	Guizhou	3,902	2,005	1,897	2,117	54.2	P	SASC	18
3	Yuan et al., 2014 [37]	Hebei	1,345	/		440	32.7	P	SASC	17
4	Zhang, 2017 [38]	Shandong	2,047	1,038	1,009	546	26.7	P	SASC	19
5	Zhuang et al., 2017 [39]	Anhui	852	455	397	505	59.3	P	SASC	19
6	Yang et al., 2014 [40]	Yunnan	531	263	268	219	41.2	P	SASC	17
7	Yuan et al., 2016 [41]	Hunan	351	/		249	70.4	P, J	SASC	16
8	Zhao et al., 2020 [42]	Ningxia	908	455	453	455	50.1	P	SASC	18
9	Zhang, 2019 [43]	Hunan	867	438	429	352	40.6	P	SASC	17
10	Huang, 2023 [44]	Guangdong	910	497	413	128	14.1	P	SASC	18
11	Zhao et al., 2014 [45]	Anhui	2,917	1,533	1,384	1,694	58.1	P, J, S	SASC	18
12	Zhang et al., 2020 [46]	Shandong	549	273	276	190	34.6	P, J	SASC	17
13	Li et al., 2019 [47]	Hunan	1,675	812	794	809	48.2	P, J	SASC	17
14	Wang, 2007 [48]	Sichuan	1,420	716	704	730	51.4	P	SASC	15
15	Fan et al., 2009 [49]	Sichuan, Hubei, Henan, Anhui, Hebei	1,987	1,033	954	778	39.2	P, J	SASC	15
16	Wan et al., 2009 [50]	Anhui	1,034	604	430	762	73.6	P, J	SASC	16
17	Zhao, 2012 [51]	Ningxia	1,457	733	741	679	46.6	P	SASC	20
18	Wei et al., 2016 [52]	Jiangxi	611	/		129	21.1	P	SASC	17
19	Zhang, 2013 [53]	Zhejiang	302	/		135	44.7	P	SASC	18
20	Guan, 2022 [54]	Auhui, Fujian	1705	918	787	643	37.7	J	SASC	18
21	Yang, 2021 [55]	Guangxi	902	440	462	338	37.5	J.S	SASC	19

Note: T = Total, M = Male, F = Female, E = Education, P = Primary school, J = Junior high school, S = Senior high school.

Subgroup analysis

In order to find the origin of the heterogeneity, subgroup analyses were also conducted (Table 3). There was a high level of heterogeneity in both the primary school education group (I^2 = 83.36%, $p < 0.001$) and primary school education and above group (I^2 = 93.67%, $p < 0.001$). The results showed that there was no significant difference in social anxiety between the primary group and the primary and above group ($p = 0.53$). Considering the proportion of LBC in the total study sample, there was a high heterogeneity in both the proportion ≥40% LBC group (I^2 = 67.19%, $p < 0.001$) and the <40% LBC group (I^2 = 92.6%, $p < 0.001$), the results significantly differed in the comparison of social anxiety between the two groups of studies ($p = 0.02$).

Factors associated with social anxiety among LBC

To further explore the factors influencing social anxiety in LBC, we collated the relevant research. Heterogeneity was present in terms of gender and grade level ($I^2 > 50\%$, $p < 0.10$), a random effects model was used. The results showed that there were no gender or grade related significant differences in social anxiety among LBC ($p \geq 0.05$). In addition, there was no heterogeneity in the type of parental migration ($I^2 \leq 50\%$, $p \geq 0.10$); therefore, a fixed-effects model was used. The results showed that the social anxiety of LBC who were separated from both parents was significantly higher than that of LBC who were separated only from their father ($p < 0.001$) (Table 4).

Publication bias and sensitivity analysis

We used several methods to assess publication bias. Firstly, we observed a slight asymmetry in the funnel plot; we thus estimated the number of missing studies by using a cut-and-patch approach and inferred the effect size of any identified missing studies. Three missing studies were identified with an adjusted mean effect size of 0.311 (95% CI [0.190, 0.433]), compared with an unadjusted original mean effect size of 0.354 (95% CI [0.229, 0.479]; Fig. 3). To further evaluate publication bias, Egger's test was performed on the total and dimensional factors. Egger's tests revealed that social anxiety ($p = 0.057$), social avoidance and distress ($p = 0.254$), and fear of negative evaluation ($p = 0.168$) were not significant. Overall, publication bias did not significantly affect the results of the meta-analyses. The exclusion of each of the 21 included studies by excluding one article at a time showed the greater stability of the results of the meta-analysis.

Discussion

The results of this study showed that LBC had higher social anxiety social avoidance and distress scores than N-LBC. Parents working away from home leads to the disruption of the family ecosystem. A dysfunctional family system weakens the ability of adolescents to participate in social interaction in an environment other than the family system [56]. According to previous research, there are multiple factors influencing children's social anxiety, including

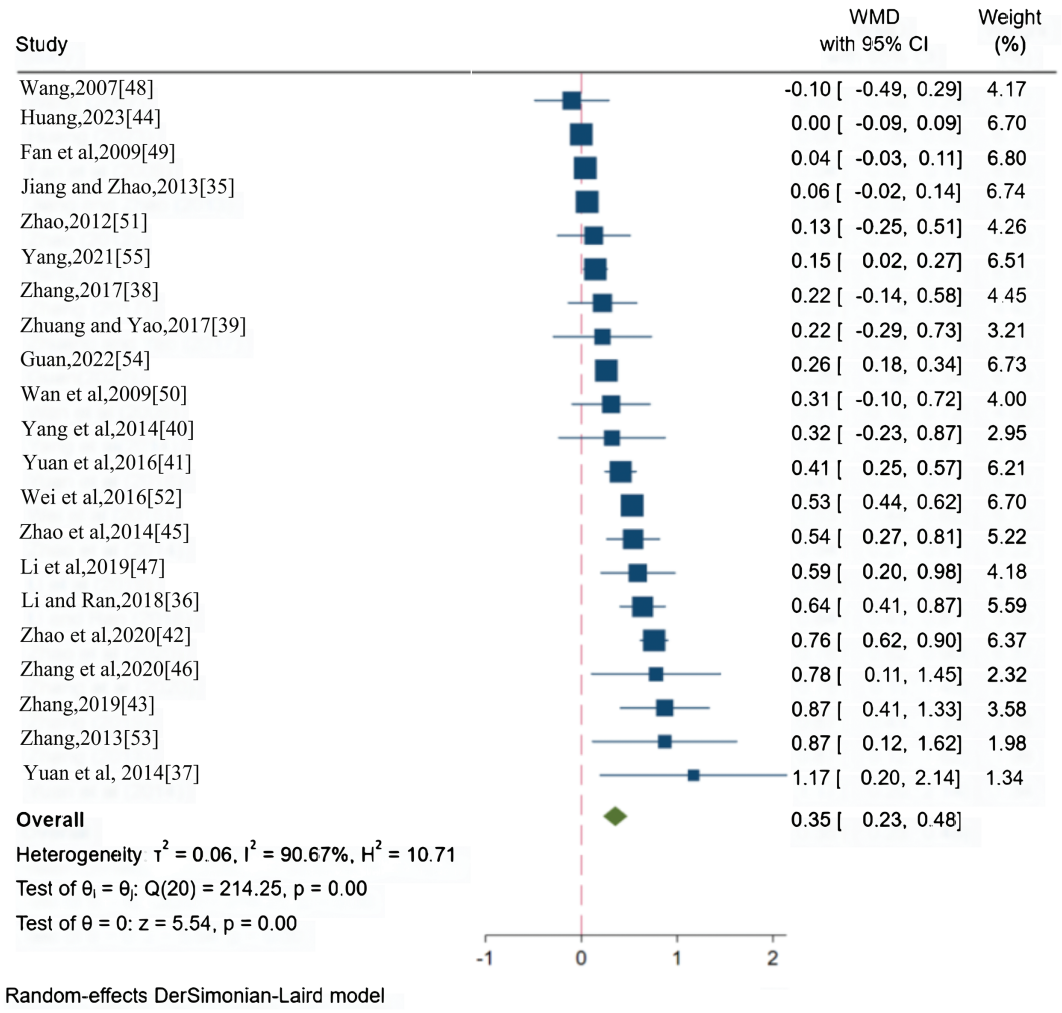

FIGURE 2. Forest plot of total social anxiety score

TABLE 2

Effect values of LBC and N-LBC social anxiety in meta-analyses

Social anxiety	Sample size		No. of studies	WMD and 95% CI	Test of heterogeneity		
	LBC	N-LBC			Q	*p* value	I^2 (%)
Social avoidance and distress	6,055	7,292	11	0.35 [0.21, 0.48]	111.72	0.00	91.05
Fear of negative evaluation	6,055	7,292	11	0.17 [−0.03, 0.38]	151.9	0.00	93.42
Total score	11,254	13,096	21	0.35 [0.23, 0.48]	214.25	0.00	90.67

TABLE 3

Subgroup analysis effect values for social anxiety in LBC and N-LBC

Subgroups	Sample size		No. of studies	WMD and 95% CI	Test of heterogeneity		
	LBC	N-LBC			Q	*p* value	I^2 (%)
Grade							
Primary school	6,246	8,568	13	0.30 [0.16, 0.44]	42.06	0.00	83.36
Primary and above	5,008	4,528	8	0.38 [0.18, 0.58]	163.6	0.00	92.67
LBC proportion of total							
≥40%	8,581	7,394	12	0.47 [0.31, 0.67]	33.52	0.00	67.19
<40%	2,673	5,702	9	0.35 [0.23, 0.48]	108.12	0.00	92.6

TABLE 4

Factors associated with social anxiety in LBC in meta-analyses

Social anxiety	Sample size		No. of studies	WMD and 95% CI	Test of heterogeneity		
	n1	n2			Q	*p* value	I^2 (%)
Gender	1,621[a]	1,655[b]	9	−0.19 [−0.51, 0.13]	118.69	0.00	93.26
Grade	402[c]	331[d]	4	0.26 [−0.43, 0.96]	8.8	0.03	65.91
The types of Parental migration	801[e]	95[f]	4	−0.18 [−0.67, 0.31]	2.47	0.48	0
	801[e]	304[g]	4	−0.69 [−0.99, −0.38]	4.42	0.22	32.2
	95[f]	304[g]	4	0.07 [−0.68, 0.82]	5.65	0.13	46.95

Note: a = Male, b = Female, c = Fifth grade, d = Sixth grade, e = Only father's migration, f = Only mother's migration, g = Both migration.

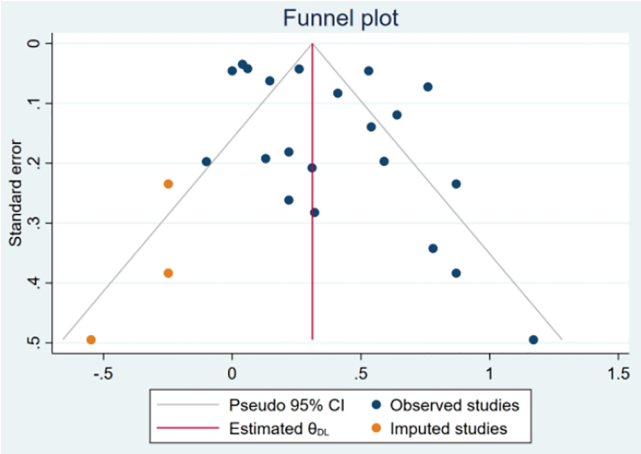

FIGURE 3. Funnel plot of imputed and included studies.

genetic [57], individual (negative social cognitions, self-focused attention, and post event processing, etc.), and environmental factors (negative social cognitions, self-focused attention, and post event processing, etc.) [58–60]. LBC lack key skills, cognitions, and behaviors developed in the family that enable them to succeed in social relationships [61]. In addition, parental absence increases the influence of peers on child development [62], and peer interactions are more likely to trigger deviant behavior in LBC [63]. There is a significant correlation between family interactions and the presence of social anxiety in children and adolescents, with low parental acceptance and family satisfaction leading to more severe social anxiety [64]. In addition, LBC are mostly cared for by their grandparents, who tend to adopt an overprotective parenting style, which makes LBC prone to introversion being more nervous, and having more avoidance of interactions with others [65].

To reduce the heterogeneity of the study, only articles that reported using the SASC scale to measure social anxiety in LBC were included. However, there was still a large amount of heterogeneity, so subgroup analyses were performed. First, the study showed that there was no noticeable variance in the levels of social anxiety among LBC in primary school or those in higher educational stages. The combined effect size shows that the social anxiety of LBC in primary school and above is slightly higher than that of LBC in primary school. This finding is consistent with that of Chen's study, which showed that individuals' levels of social anxiety slightly increased during mid-adolescence (14–16 years old) [66]. However, there is a different view that according to the law of maturity, throughout adolescence, individuals' personalities develop more maturely, and the average level of social anxiety shows a continuous decreasing trend [67]. Furthermore, we compared the levels of social anxiety among LBC who constituted ≥40% and <40% of the total sample, and we found significant differences. The possible reasons for this difference are influenced by the sampling method and school selection. Therefore, we infer that the sampling method and the school associated with the sample may represent two of the origins of heterogeneity. In addition, the funnel plot method, cut-and-patch method and Egger's test were used in this study, and the results were relatively stable with no significant publication bias.

This research examined how different patterns of parental migration impact LBC and revealed that children whose parents both migrated had significantly higher social anxiety than did whose fathers only had migrated. LBC who has two absent parents are more likely to experience dissatisfaction with their lives and themselves and face a higher risk of negative psychological outcomes than LBC with only one absent parent [68,69]. The difference in the social anxiety scores of LBC whose fathers or mothers alone had migrated compared with those whose parents had both migrated reveals the inconsistency in the influence of mothers and fathers on the social anxiety of LBC. One study found that mothers' behaviors were more influential than fathers' behaviors in children with normal and low social anxiety [70]. Poor interactions with mothers can also lead to negative peer interactions due to the chronic lack of maternal involvement and education in the growth of LBC [71]. Future research should focus specifically on differences in social anxiety among LBC with different types of parental immigration.

Limitations

The current meta-analysis has numerous limitations that need consideration. First, the articles included in the study used a single measurement tool. Studies using only the SASC, and

scales adapted from it were included in the analysis, and those using other measurement tools were excluded. Second, the results of the meta-analysis revealed a significant level of diversity; therefore, we conducted subgroup analyses. However, there are still some important factors that may have been neglected as potential sources of heterogeneity. Furthermore, we analyzed influencing factors, and only gender, grade and type of parental migration were analyzed in the study due to the limited amount of data that could be extracted and the small number of included studies. Additionally, the literature included in this study was exclusively on left-behind children in China. In the future, it will be necessary to expand the literature from other countries in order to obtain comprehensive results. Finally, although no significant publication bias was found in our findings, it may still exist. Despite these shortcomings, this study has important implications for the future treatment of social anxiety and the promotion of mental health in LBC. This study may help society and academics pay more attention to LBC, develop relevant policies to reduce their social anxiety problems and promote their healthy development.

Conclusion

In summary, a thorough and systematic assessment of the status of social anxiety among LBC in China was conducted, and the findings indicate that the social anxiety experienced by LBC in China warrants increased focus and consideration, especially for LBC whose parents both immigrated. Considering the potential limitations associated with this meta-analysis, additional research is needed to corroborate these findings.

Acknowledgement: The authors would like to give their special thanks to school, associate editor and the reviewers for their support and assistance.

Funding Statement: This study was supported by the Talent Cultivation Project of Central Support for Reform and Development Funds for Local Universities in Heilongjiang Provincial Undergraduate Colleges in 2021 and the Social Science Fund Project of Qiqihar Medical College (QYSKL2022-03ZD).

Author Contributions: Yao Wang and Xiaojiao Li independently assessed eligibility of manuscripts identified in electronic databases, extracted information from included studies, and wrote the manuscript. Panpan Yang and Zengyan Yu critically and scientifically reviewed the final version of the manuscript.

Availability of Data and Materials: The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Ethics Approval: Not applicable.

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study. Yao Wang and Xiaojiao Li contributed equally.

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