



Adverse Childhood Experiences and Depression: Do Left-Behind Families Place Children at Higher Risk in Rural China

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Abstract

Objective Currently, the risk of, trauma associated with, and intervention strategies for adverse childhood experiences (ACEs) among parent-absent children in developing countries have not been adequately discussed. This study aims to explore the associations between ACEs and depression for left-behind children (LBC) in rural China.

Method A total of 4708 children ($M_{age} = 12.07$, male = 48.49%) from eight Chinese provinces were investigated from June to December 2019. Descriptive statistics, nonparametric test and regression analysis were mainly used to analyze the data.

Results First, in the past year, the prevalence of ACEs among rural children in mainland China reached 82.63%, 34.66% of respondents had experienced four or more adverse events, and LBC were at higher risk than parent-present children. Second, ACEs increased the likelihood of children's depression, and the depression of LBC was not more serious than that of children whose parents were at home. Third, the parent-child relationship was negatively correlated with children's depression, while the association between social support and children's depression was not statistically significant. There was no fundamental disparity between LBC and parent-present children in the factors associated with depression.

Conclusion LBC not only suffered from a higher risk of ACEs but also showed better resilience to them. The inadequate coverage, deficient program design and underqualified professional of China children welfare services limited the amelioration of ACEs-related depression. This study suggests that mainland China should prioritize the risk of ACEs in parent-absent families, break the intrinsic link between ACEs and depression, and enhance the professionalism of social support.

Keywords Left-behind children · Adverse childhood experiences · Parental absence · Depression · Residual child welfare system

Introduction

As a global public health issue that seriously affects child development, adverse childhood experiences (ACEs) are defined as “some of the most intense and frequent stressors that children experience in early life, including multiple types of abuse, neglect, parental or caregiver violence, other types of severe family dysfunction, and peer, community and group violence” (WHO, 2016). Despite a range of policies

aimed at protecting children, incidents of ACEs have been widespread worldwide. A recent report covering 155 countries states that in 2019, half of the children aged 2 to 17 had experienced violence, 12.0% had suffered from severe physical abuse, and 15.0% of adolescents had been involved in school bullying (WHO, 2020).

Left-behind children (LBC), defined as “rural minors, one or both of whose parents move from the countryside to urban areas for work who are left in rural areas where their registered residence is located and thus cannot live together with their parents” (All-China Women's Federation, 2013), are typical parent-absent children in China. Due to the strict restrictions of *hukou* (registered residence) and higher urban parenting costs, a considerable number of migrant parents leave their children, entrusting the care of their children to other relatives. According to the latest reports, there are about 68.8 million LBC (Duan, 2016), and the left-behind rate among rural children in mainland China reaches 21.4% (Chen et al., 2015). In practice, the absence of parents may

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put China's LBC at a potentially higher risk of ACEs. Some empirical evidence has confirmed that compared with parent-present children, LBC are more likely to experience corporal punishment and emotional neglect by their grandparents at home (Yang et al., 2020), and LBC who lack parental protection tend to suffer more severe school bullying (Zhang et al., 2019).

However, there are two apparent limitations to this evidence. On the one hand, the empirical surveys, which were conducted in one or a few schools, did not cover the whole country, so the representativeness of their conclusions is questionable. On the other hand, existing studies lack an in-depth analysis of the depression associated with ACEs; in particular, whether there are differences in the association between ACEs and depression among different types of LBC and whether we need to adopt differentiated intervention strategies have not been adequately discussed. Thus, using an empirical survey of 4708 rural children in eight Chinese provinces from June to December 2019, this study aims to answer three questions: First, do LBC have a higher risk of ACEs than children whose parents are at home? Second, after ACEs, is the depression experienced by LBC more serious than that experienced by parent-present children? Finally, are there any disparities in the factors associated with depression between LBC and parent-present children?

Literature Review

Prevalence of ACEs

Although the prevalence of ACEs varies across countries, they are widely considered a common threat to children worldwide. For instance, data from the U.S. Centers for Disease Control and Prevention (CDC) showed that 61.0% of Americans had experienced at least one kind of ACE, and 16.0% of adults reported four or more types (Centers for Disease Control and Prevention, 2020). In Europe, 11.2% of British respondents reported four or more types of ACEs (Hardcastle et al., 2020), and 26.0% of Irish interviewees had endured at least one kind of adverse event before the age of 18 (Ward et al., 2020). Fewer developing countries have reported direct evidence, but it is assumed that ACEs are widespread in those countries as well. Statistically, the rates of in-home physical abuse, emotional abuse, and neglect in developing countries such as Tanzania (Mwakanyamale et al., 2018), Bangladesh (Haque et al., 2019), India (Kumar et al., 2017) and the Philippines (Ramiro et al., 2010) reached 67.0%–82.1%, 21.8%–84.5% and 43.6%–51.9%, respectively, and the rates of school bullying in the Middle East, North Africa and Sub-Saharan Africa reached 41.1% to 48.2% (Currie

et al., 2012). For China, the high prevalence of ACEs is similarly confirmed by a large body of direct and indirect evidence. Among them, 93.5% of respondents in *Shaanxi* and *Chongqing* reported experiencing at least one subtype of ACEs (Li et al., 2015); this figure is higher than the international average. Other indirect evidence corroborates these claims. A survey of children in *Changzhou* found that the rates of neglect by fathers and mothers were 48.3% and 24.2%, respectively (Cui & Liu, 2016). The rates of physical abuse, emotional abuse, and neglect climbed up to 58.4%, 69.6%, and 50.6%, respectively, in six underdeveloped provinces (Qi et al., 2018). While the percentage of being bullied at school in *Xi'an* reached 44.6% (Zhu & Chan, 2015).

Referring to bioecological theory, the emergence of ACEs is related to a combination of the microsystem, mesosystem, exosystem, macrosystem and chronosystem (Bronfenbrenner, 1979). Influenced by the theory, some researchers believe that ACEs are influenced by a series of variables, namely, sociocultural context, family vulnerability, and individual factors (Centers for Disease Control and Prevention, 2019). First, the level of ACEs in a region is often closely linked to sociocultural perceptions. Not only are areas with a high level of cultural tolerance of aggressive behaviors more prone to violence (Rouland et al., 2019) but also areas with low socioeconomic development, unsafe social environments or more significant income disparities also tend to generate more ACEs (Elgar et al., 2013). Second, the dysfunction of the family can also stimulate ACEs. Children whose parents are absent tend to suffer from more family aggression because of impaired intergenerational relationships (Chan, 2015) or school bullying due to weak parent-child protection (Yang & Zhang, 2018). Third, ACEs are closely linked to the children themselves, demographic variables such as sex, age, and ethnicity, which significantly associated with the risk of ACEs (Sedlak et al., 2010).

Considering that Chinese LBC displayed lower parental educational level, more limited household finance, more family dysfunction than non-LBC (Hu et al., 2018; Wan et al., 2020; Zhao et al., 2014; Zhao et al., 2020, b), it is believed that the risk of ACEs for LBC is higher than that of parent-present children (Chen & Chan, 2016). Some indirect evidence also corroborates this conclusion. Evidence from western China showed that compared with non-LBC, LBC had a higher probability of psychological aggression and violent discipline (Wan et al., 2022; Yang et al., 2020); and other surveys conducted in rural China found that any type of parental migration (previous migration, current one-parent migration, current both-parents migration) would increase the risk of children being bullied (Zhu et al., 2020).

ACEs and Children's Depression

It is well documented that ACEs often result in serious psychological trauma for children (Kim et al., 2020). It is estimated that 30.0% of the global burden of mental illness can be attributed to ACEs (Kessler et al., 2010). As an important component of psychological trauma, the association between children's depression and ACEs was commonly presented in empirical studies (Luft et al., 2022; Tan & Mao, 2023). One meta-analysis even showed that children who had experienced four or more types of ACEs were three times more likely to suffer depression than those who had not (Hughes et al., 2017). Theoretically, depression is mediated by emotional regulation disorders under multiple stressors, children in hostile or strained environments are more likely to report emotional adjustment disorders caused by a high-stress atmosphere (Lowell et al., 2014). However, some studies proposed the opposite, that is, that stress events can stimulate children's resilience, which is conducive to reducing the possibility of depression (Ungar et al., 2013).

For LBC, a large number of studies have indicated that LBC in mainland China, Indonesia and Vietnam seem to show increased depression, more loneliness and higher level of anxiety after encountering ACEs than parent-present children (Chen & Chan, 2016; Dai & Chu, 2018; Graham & Jordan, 2011; Zhao et al., 2015), which may be related to LBC's lower level of resilience than non-LBC (Xiao et al., 2019). Further research showed that high-level negative-event-induced stress (Wang & Liu, 2022), limited communication on life difficulties with migrant parents (Wan et al., 2021) and inappropriate grandparenting styles (Yang & Liu, 2020) were risk factors for LBC's resilience, and left-behind status of children may also exaggerate the impact of ACEs on mental health (Tang et al., 2018; Yang et al., 2021) through LBC's decreased self-compassion and hope (Zhang et al., 2019) or increased perceived discrimination (Zhao et al., 2020, b).

Factors Associated with Depression

A large body of research has found that the predictors of depression are multifaceted and are strongly related to risk factors such as the number of ACEs (Rich et al., 2005) and other factors such as family relationships, social support, and demographics. Regarding family relationships, sufficient marital cohesion often predicts lower levels of depression in children (Kaur & Kearney, 2013), and children living in families with limited marital violence are less likely to develop severe depression as a result of fear (Fung, 2021). Better parent-child relationships can also promote healing from the depression caused by ACEs. Research demonstrates that children with enough parental involvement, adequate parent-child interaction and strong family trust are unlikely

to develop severe depression (Liu, 2003; Shuang et al., 2022). The support of family members, teachers and peers is also considered the most potent buffer against depression (van Harmelen et al., 2016), as these relationships can reduce children's discomfort through secure alternative attachments (Dion et al., 2015). For adolescents living in an environment with harmonious family/school relations, ACEs may be perceived as a situational factor rather than attributable to them (Duru et al., 2019), which helps prevent these adolescents from developing emotional dysregulation difficulties as adults. Of course, the positive effect of social support is also considered to be overestimated; when there are more subtypes of ACEs or a higher intensity of ACEs, family and peer support can play significantly attenuated roles (Folger & Wright, 2013; Wang & Liu, 2022). Furthermore, some demographic variables are associated with the severity of depression. Research has confirmed that ACEs are more threatening for girls, early adolescents, particular ethnicities, and children with fewer siblings (Dunn et al., 2016; Kaur & Kearney, 2013; Wan et al., 2021).

Current studies have further confirmed that LBC's depression was negatively correlated with harmonious family relationship and adequate social support. It is documented that the disadvantage of LBC in emotional adaptation would weaken with the presence of one parent, increased parent-child interaction, and short length of time since parent migration (Sun et al., 2015; Wang et al., 2015), showing the optimization of family relations may lead to the relief of LBC's depression. Sufficient evidence has also suggested that higher levels of family, teacher, and community social support were associated with LBC's resilience (Li et al., 2018); with appropriate support provided by the caretakers such as relatives and teachers, it may be possible to reduce the adverse impacts of parental deprivation on LBC (Dai & Chu, 2018). However, the buffering role of support from peers appears to be more controversial. Some studies believed that LBC with more close friends had greater resilience and less depression (Xiao et al., 2019; Zhao et al., 2015); opposite conclusions argued that peer support had non-significant effect on LBC's mental health (Li et al., 2018).

Methods

Hypotheses

Based on the literature, we proposed the following three research hypotheses:

H₁: LBC face a higher prevalence of ACEs than non-LBC in rural China.

H_2 : In rural China, depression is more severe for LBC than for children whose parents are home after experiencing ACEs.

H_3 : In rural China, the factors associated with depression are similar for both LBC and parent-present children.

Participants

The data used in this study are from an empirical survey conducted in eight Chinese provinces. Since LBC are limited to children with rural *hukou*, the study only investigated rural areas in China. The survey was carried out from June to December 2019 in *Sichuan* (Southwest China), *Liaoning* (Northeast China), *Henan* (North China), *Gansu* (Northwest China), *Hubei* (Central South China), *Shaanxi* (West China), *Jiangsu* (Southeast China), and *Guangxi* (South China), covering all major administrative regions of China, with good national representativeness. The study selected one county with an intermediate level of socioeconomic development in each province as a representative survey site, and the average per capita disposable income of rural residents in these eight counties was U.S. \$2182.02 in 2019 (the lowest county was U.S. \$1578.40, and the highest county was U.S. \$2721.21), close to the national average in rural China in 2019 (U.S. \$2322.39).

In a chosen county, the study mainly adopted multiple cluster sampling methods to select the respondents. First of all, we ranked townships in each county according to GDP per capita in 2018, then we selected three townships by systematic sampling, including relatively developed, medium, and relatively underdeveloped townships. Second, we selected the “central schools” as our target school on account of “*The School Consolidation Policy*” (Chinese: “撤点并校”), which means students were gathered into central schools and village schools were gradually withdrawn. After identifying the school, we selected the classes with the same number in grades 5 to 9 through cluster sampling, with a whole class as a sampling unit. In light of children’s cognitive abilities, the interviewees were 10 to 15 years old. All 5180 questionnaires were distributed, and 4943 valid questionnaires from 120 classes (8 counties \times 3 townships \times 5 grades \times 1 class = 120 classes) were returned, with an average of 41.19 children per class, which is relatively close to the average class size (40 persons) in rural China. Furthermore, considering the comparability of independent variables such as parental interaction and marital physical/ verbal violence, we deleted 235 samples who had lost their biological father or mother; therefore, 4708 questionnaires were included in the final analysis. The questionnaire was designed with 47 questions, and the questionnaire took less than 40 minutes to complete.

Measures

Left-Behind Children

The study consisted of two questions to define LBC: a). “Did your father/mother leave your county for work in the past year?” (Options: “yes” or “no”) and b). “How often does your father/mother return home from the workplace each year?” (Options: “never go out for work”, “within one week”, “one week to a month”, “one or two months”, “three to five months”, “six months to one year”, and “over one year”). Furthermore, considering single parent absent or two parents absent in one family could have significant differences of family’s childcare and the influence for LBC (Yang et al., 2020), two questions were used to determine the kinds of LBC, with fathers and mothers addressed separately. In the statistical analysis, those children whose parents have been away at the same time for six months or more are regarded as “both parents-absent LBC” (BLBC), those with only a father or only a mother who has been away over half a year are regarded as “father-absent LBC” (FLBC) and “mother-absent LBC” (MLBC), respectively, and others are regarded as “parent-present children” or “non-LBC”. The results show that 3534 children (75.06%) were parent-present children, FLBC, MLBC, and BLBC were 560 (11.89%), 133 (2.83%), and 481 (10.22%), respectively, for a left-behind rate of about 24.94%.

Children’s Depression

This study applied depression as an operation of psychological trauma. The DSM-5 Depression scale (“*Diagnostic and Statistical Manual of Depression*”, 11–17-year-old adolescent version) proposed by the American Psychiatric Association (APA) was selected to measure depression (American Psychiatric Association, 2013). The DSM-5 showed satisfactory reliability in Chinese children with Cronbach’s alpha reaching 0.85 in an empirical study (Chen et al., 2021). The scale is divided into nine prompts that measure children’s depressive symptoms in the previous two weeks, including “feeling low, depressed, irritable, or hopeless?”, “having little interest or pleasure in doing things?”, and etc. Responses were measure on a four-item Likert scale: “not at all,” “occasionally for a few days,” “more than a week,” and “almost every day.” In the statistical analysis, Cronbach’s α and the KMO (Kaiser-Meyer-Olkin) coefficient were .85 and .91, respectively, with a Bartlett significance of .00. The depression score and the proportion with MDD (major depressive disorder) symptoms were included in the statistics. For the depression score, nine subindicators were first categorized as “not at all” to “almost every day” (range: 0–3) and then summed for the total depression score (range: 0–27). The diagnostic criteria for MDD symptoms (range: 0–100%)

referred to the DSM-5 standard, which was defined as “five (or more) of the following symptoms present during the same 2-week period and representing a change from previous functioning; at least one of the symptoms was either a). depressed mood or b). loss of interest or pleasure” (American Psychiatric Association, 2013).

Factors Associated with Children’s Depression

As there is no accurate official measure of ACEs in mainland China, the Chinese revised version of the ACE-IQ (“*Adverse Childhood Experiences-International Questionnaire*”) scale was used as a self-report measure of children’s ACEs (WHO, 2016). The ACE-IQ scale is used internationally, and the Cronbach’s α and KMO coefficient of its Chinese version reached .83, respectively, in an existing study (Ho et al., 2019). In this study, we selected ten subtypes of ACEs, including “physical abuse in the family”, “emotional abuse in the family”, “sexual abuse in the family” and etc. (as shown in Table 2). Three items named “parental imprisonment”, “witness domestic violence” and “exposure to war violence” on the ACE-IQ scale were not included. The questions and options were consistent with the ACE-IQ scale, with KMO coefficients and Cronbach’s α coefficients of .77 and .80, respectively.

Based on the existing literature, this study also considers the family relationship and social support variables as associated factors against depression in children. Among them, the family relationship was measured by four sub-variables namely, “marital physical violence” (whether you had witnessed your father/mother suffer physical violence from his/her spouse in the last year, “neither parent suffered” = 0, “one parent suffered” = 1, “both parents suffered” = 2); “marital verbal violence” (whether you had witnessed verbal violence between parents in the last year, “hardly ever” = 0, “occasionally” = 1, “often” = 2); “parent-child trust” (whether your father/mother is among the three persons you trusted most in the last year, “neither parent” = 0, “one parent” = 1, “both parents” = 2, the options were “police”, “teacher”, “father”, “mother”, “grandfather”, “grandmother”, “uncle/aunt”, “sibling”, “classmate”, “neighbor”, “village cadres”, “other person”, “none”); and “parent-child interaction” (whether your parents took the initiative of playing, chatting, educating or showing love to you in the last year, “neither parent” = 0, “one parent” = 1, “both parents” = 2). The social support variables measured whether the respondents had received adequate support in the last year with a continuous variable (“no” = 0 and “yes” = 1) for each item, summed to obtain the score for social support. The survey was based on Malecki and Demaray (2002) “*Child and Adolescent Social Support Scale*” and included items such as “caring”, “encouraging”, “accompanying”, and “health educating”; the Cronbach’s α

values for social support from parents, kin, close friends, and teachers ranged from .71 to .81, and the KMO coefficient ranged from .70 to .79. Four demographic variables were also included in the statistical analysis, namely, “child’s sex” (dummy, “male” = 0, “female” = 1), “child’s age” (continuous variable), “child’s ethnicity” (dummy, “Han” = 0, “ethnic minority” = 1), “child’s siblings” (continuous variable).

Statistical Methods

In this study, we adopted descriptive statistics, a non-parametric test, and regression as the statistical methods. Descriptive statistics were mainly used to measure the prevalence of ACEs, and a nonparametric test was used to assess depression scores. The *chi-square* test (χ^2) and two-independent-samples test (*Z*-value) were used to compare group differences among various categories of children. Linear regression and logistic regression analysis were used as essential methods to discuss the factors associated with depression. The main observations were *B*, *OR* (odds ratio), *p-values* and *S.E.* (standard error). All models showed good stability and validity during testing, with adjusted *R-squares* ranging from .12 to .37 and VIF (Variance Inflation Factor) values not exceeding 2.31. SPSS 22.0 (IBM Corp, 2013) was used to calculate the statistics.

Ethics

Ethical issues were reviewed by the institution where the first author worked before the survey. Six ethical standards were strictly adopted. First, written consent was obtained before each investigation with the child, principal, teacher and caregiver. Second, all the investigators were trained and required to follow the regulations in the investigation manuals in the survey, and a paper statement was provided to each investigator. Third, considering the possibility that a teacher might influence a survey, teachers were asked to be absent during the interviews. Fourth, trained investigators were presented with the entire investigative process so they could respond to any questions. Fifth, children were required to sit at a distance to avoid mutual interference with classmates. Six, all the investigations were anonymous, and the child’s personal information was kept strictly confidential.

Results

Sample Description

Table 1 describes the basic information of the respondents. The data show that approximately 48.49% of the children surveyed were boys, 87.64% were of Han ethnicity (the national average Han population is 91.11%), and the

Table 1 Descriptive summary of study sample

Variables	Overall <i>n</i> = 4708	a. Parent-present children <i>n</i> = 3534	b. Father-absent LBC <i>n</i> = 560	c. Mother-absent LBC <i>n</i> = 133	d. Both parents-absent LBC <i>n</i> = 481	Test statistic, effect size
Numbers of subtypes of ACEs	2.71 [2.09]	2.60 [2.06]	3.10 [2.18]	3.17 [1.99]	2.98 [2.10]	$Z_{(ab)} = -5.14^{**}$; $Z_{(ac)} = -3.39^{**}$; $Z_{(ad)} = -3.93^{**}$;
Marital physical violence	0.18 [0.48]	0.18 [0.48]	0.19 [0.48]	0.19 [0.48]	0.18 [0.48]	$Z_{(ab)} = -0.88$; $Z_{(ac)} = -1.12$; $Z_{(ad)} = -0.15$;
Marital verbal violence	0.69 [0.59]	0.67 [0.58]	0.71 [0.59]	0.83 [0.62]	0.71 [0.62]	$Z_{(ab)} = -1.43$; $Z_{(ac)} = -2.93^{**}$; $Z_{(ad)} = -0.97$;
Parent-child trust	1.44 [0.76]	1.49 [0.73]	1.37 [0.75]	1.20 [0.80]	1.21 [0.85]	$Z_{(ab)} = -3.91^{**}$; $Z_{(ac)} = -7.20^{**}$; $Z_{(ad)} = -7.20^{**}$;
Parent-child interaction	1.62 [0.68]	1.65 [0.66]	1.57 [0.70]	1.45 [0.78]	1.54 [0.76]	$Z_{(ab)} = -2.99^{**}$; $Z_{(ac)} = -4.45^{**}$; $Z_{(ad)} = -2.85^{**}$;
Parental support	2.60 [1.49]	2.65 [1.47]	2.66 [1.47]	2.20 [1.60]	2.26 [1.55]	$Z_{(ab)} = -0.17$; $Z_{(ac)} = -3.33^{**}$; $Z_{(ad)} = -5.40^{**}$;
Kinship's support	1.19 [1.20]	1.20 [1.21]	1.18 [1.17]	1.11 [1.21]	1.21 [1.22]	$Z_{(ab)} = -0.07$; $Z_{(ac)} = -1.04$; $Z_{(ad)} = -0.10$;
Close friend's support	1.43 [1.28]	1.40 [1.28]	1.58 [1.27]	1.41 [1.22]	1.46 [1.29]	$Z_{(ab)} = -3.42^{**}$; $Z_{(ac)} = -0.30$; $Z_{(ad)} = -1.08$;
Teacher's support	2.03 [1.52]	2.02 [1.53]	2.04 [1.52]	2.04 [1.55]	2.07 [1.51]	$Z_{(ab)} = -0.26$; $Z_{(ac)} = -0.20$; $Z_{(ad)} = -0.67$;
Child's sex (<i>male = ref.</i>)	2283 (48.49)	1707 (48.30)	282 (50.36)	71 (53.38)	223 (46.36)	$\chi^2_{(ab)} = 0.82$; $\chi^2_{(ac)} = 1.33$; $\chi^2_{(ad)} = 0.64$;
Child's age	12.07 [1.38]	12.01 [1.36]	12.16 [1.42]	12.27 [1.46]	12.35 [1.43]	$Z_{(ab)} = -2.06^{**}$; $Z_{(ac)} = -2.07^{**}$; $Z_{(ad)} = -5.06^{**}$;
Child's ethnicity (<i>Han = ref.</i>)	4126 (87.64)	3108 (87.95)	507 (90.54)	117 (87.97)	394 (81.91)	$\chi^2_{(ab)} = 3.77$; $\chi^2_{(ac)} = 0.01$; $\chi^2_{(ad)} = 12.41^{**}$;
Child's siblings	0.99 [0.69]	1.00 [0.69]	0.97 [0.65]	0.84 [0.80]	0.99 [0.69]	$Z_{(ab)} = -0.70$; $Z_{(ac)} = -3.18^{**}$; $Z_{(ad)} = -0.27$;

a). Non italic characters stand for *n* (%), italics stands for *Mean* [*S.D.*]. b). ** represents $p \leq .01$, * represents $p \leq .05$

average age of the surveyed children was 12.07 years. For the four categories of children, compared to parent-present children, MLBC experienced more marital verbal violence ($Z = -2.93$, $p \leq .01$), less parent-child trust ($Z = -7.20$, $p \leq .01$), less parent-child interaction ($Z = -4.45$, $p \leq .01$) and less parental support ($Z = -3.33$, $p \leq .01$). In contrast, BLBC and non-LBC had visible differences in parent-child trust ($Z = -7.20$, $p \leq .01$), parent-child interaction ($Z = -2.85$, $p \leq .01$) and parental support ($Z = -5.40$, $p \leq .01$). The group disparities between non-LBC and FLBC were limited except for parent-child trust ($Z = -3.91$, $p \leq .01$), parent-child

interaction ($Z = -2.99$, $p \leq .01$), and close friend's support ($Z = -3.42$, $p \leq .01$). Regarding demographic variables, the group differences among the four kinds of children were mainly reflected in the child's age ($Z = -5.06$ – 2.06 , $p \leq .05$). Overall, the sample was comparable in this study.

Prevalence of ACEs

The statistics in Table 2 show that ACEs are widespread in rural China. The most prevalent ACEs were “bullied in the school” (57.56%), “physical abuse in the family”

Table 2 The prevalence of adverse childhood experiences (ACEs) for children in rural China

Variables	Overall <i>n</i> = 4708	a. Parent-present children <i>n</i> = 3534	b. Father-absent LBC <i>n</i> = 560	c. Mother-absent LBC 133	d. Both parents- absent LBC <i>n</i> = 481	Test statistic, effect size
Overall						
At least one ACE	3890 (82.63)	2874 (81.32)	484 (86.43)	118 (88.72)	414 (86.07)	$\chi^2_{(ab)} = 8.54^{**}$; $\chi^2_{(ac)} = 4.67^*$; $\chi^2_{(ad)} = 6.43^*$;
Four or more ACEs	1632 (34.66)	1134 (32.09)	250 (44.64)	58 (43.61)	190 (39.50)	$\chi^2_{(ab)} = 34.05^{**}$; $\chi^2_{(ac)} = 7.75^{**}$; $\chi^2_{(ad)} = 10.54^{**}$;
Child abuse						
Physical abuse in the family	2003 (42.54)	1473 (41.69)	257 (45.89)	61 (45.86)	212 (44.07)	$\chi^2_{(ab)} = 3.52$; $\chi^2_{(ac)} = 0.92$; $\chi^2_{(ad)} = 1.00$;
Emotional abuse in the family	1297 (27.55)	928 (26.26)	180 (32.14)	47 (35.34)	142 (29.52)	$\chi^2_{(ab)} = 8.48^{**}$; $\chi^2_{(ac)} = 5.41^*$; $\chi^2_{(ad)} = 2.31$;
Sexual abuse in the family	152 (3.23)	121 (3.42)	15 (2.68)	4 (3.01)	12 (2.49)	$\chi^2_{(ab)} = 0.84$; $\chi^2_{(ac)} = 0.07$; $\chi^2_{(ad)} = 1.14$;
Child neglect						
Physical neglect in the family	1565 (33.24)	1097 (31.04)	214 (38.21)	51 (38.34)	203 (42.20)	$\chi^2_{(ab)} = 11.43^{**}$; $\chi^2_{(ac)} = 3.18^*$; $\chi^2_{(ad)} = 24.09^{**}$;
Emotional neglect in the family	1874 (38.07)	1245 (35.23)	251 (44.82)	64 (48.12)	225 (46.78)	$\chi^2_{(ab)} = 19.18^{**}$; $\chi^2_{(ac)} = 9.28^{**}$; $\chi^2_{(ad)} = 24.33^{**}$;
Peer violence						
Bullied in the school	2710 (57.56)	1962 (55.52)	361 (64.46)	89 (66.92)	298 (61.95)	$\chi^2_{(ab)} = 15.76^{**}$; $\chi^2_{(ac)} = 6.76^{**}$; $\chi^2_{(ad)} = 7.13^{**}$;
Family dysfunction						
Alcohol dependence in the household	1687 (35.83)	1239 (35.06)	217 (38.75)	54 (40.60)	177 (36.80)	$\chi^2_{(ab)} = 2.87$; $\chi^2_{(ac)} = 1.73$; $\chi^2_{(ad)} = 0.56$;
Mental disorders in the household	678 (14.40)	495 (14.01)	109 (19.46)	25 (18.80)	49 (10.19)	$\chi^2_{(ab)} = 11.45^{**}$; $\chi^2_{(ac)} = 2.42$; $\chi^2_{(ad)} = 5.27^{**}$;
Witness parental divorce	387 (8.22)	228 (6.45)	57 (10.18)	48 (36.09)	54 (11.23)	$\chi^2_{(ab)} = 10.37^{**}$; $\chi^2_{(ac)} = 161.77^{**}$; $\chi^2_{(ad)} = 14.78^{**}$;
Witnessing community violence						
Witness community violence	857 (18.59)	602 (17.03)	131 (23.39)	26 (19.55)	116 (24.12)	$\chi^2_{(ab)} = 13.30^{**}$; $\chi^2_{(ac)} = 0.57$; $\chi^2_{(ad)} = 14.46^{**}$.

a). Non italic characters stand for *n* (%), italics stands for *Mean [S.D.]*. b). ** represents $p \leq .01$, * represents $p \leq .05$

(42.54%), “emotional neglect in the family” (38.07%), “alcohol dependence in the household” (35.83%) and “physical neglect in the family” (33.24%). A smaller percentage of the population (10%–30%) reported “emotional abuse in the family” (27.55%), “witnessing community violence” (18.59%) and “mental disorders in the household” (14.40%). The rate of “sexual abuse in the family” and “witness

parental divorce” was the lowest, reported in 3.23% and 8.22% of the total respondents. Taken together, 82.63% of the children surveyed in rural China had experienced at least one kind of ACE in the past year, and the proportion of children with four or more subtypes reached 34.66%.

The study also observed that the rate of at least one ACE increased sequentially in the order of parent-present

children (81.32%), BLBC (86.07%), FLBC (86.43%), and MLBC (88.72%), with significant group differences ($\chi^2 = 4.67\text{--}8.54$, $p \leq .05$); for more than four ACEs, the proportion of three categories of LBC (BLBC: 39.50%; FLBC: 44.64%; MLBC: 43.61%) was also higher than that of children with parents at home (32.09%, $\chi^2 = 7.75\text{--}34.05$, $p \leq .01$). In the measurement of subindicators, the data further confirmed there were visible disparities in ACEs between non-LBC and three kinds of LBC, with a higher risk for children with parents absent in seven domains except for physical abuse ($\chi^2 = 0.92\text{--}3.52$, $p > .05$), sexual abuse ($\chi^2 = 0.07\text{--}1.14$, $p > .05$) and alcohol dependence in the household ($\chi^2 = 0.56\text{--}2.87$, $p > .05$). Thus, hypothesis H_1 in the study cannot be rejected.

ACEs and Children's Depression

The statistics reflected that ACEs significantly increased children's depression scores. The data show that for four types of children, those who experienced any subtype of ACEs had a 2.23–3.44 times higher depression score than those who did not, and as the number of subtypes of ACEs rose from zero to more than four, the depression score for all the children also increased by 2.97–4.47 times. The statistical results in Table 3 further showed significant group differences among the four categories of children regarding children's depression. It is confirmed that for non-LBC, children who suffered from any ACE had significantly higher depression scores than those of nonvictims ($Z = -22.81$, $p \leq .01$), and nine subtypes of ACEs would significantly deteriorate the depression of the victims ($Z = -25.78\text{--}5.13$, $p \leq .01$)

except for “witness parental divorce” ($Z = -1.04$, $p > .05$). The situation of FLBC is similar to that of non-LBC, but the relationship between “sexual abuse in the family”, “alcohol dependence in the household” with child depression is partially attenuated ($Z = -3.20\text{--}2.81$, $p \leq .05$). As for MLBC and BLBC, there was no statistically significant association between four and more subtypes of ACEs and childhood depression ($Z = -2.41\text{--}0.36$, $p > .05$), indicating that children with parents at home would experience more emotional disorders. Therefore, hypothesis H_2 in the study is rejected.

Factors Associated with Children's Depression

Table 4 measured the factors associated with children's depression in rural China and concludes five findings. First, ACEs ($B = 0.77\text{--}0.91$, $p \leq .01$) were universal risk factors for depression for all children, but it was unlikely to transform into MDD symptoms for MLBC ($OR = 1.27$, $p > .05$). Second, a disharmonious family environment full of severe marital verbal violence could aggravate children's depression ($B = 1.53\text{--}2.24$, $p \leq .05$), but the problem was not serious for MLBC ($B = -0.88$, $p > .05$). Third, close parent-child relationships helped to reduce depression scores and the likelihood of MDD symptoms; parent-child trust ($B = -2.29\text{--}1.12$, $p \leq .05$; $OR = 0.20\text{--}0.55$, $p \leq .05$) and parent-child interaction ($B = -3.04\text{--}0.91$, $p \leq .05$; $OR = 0.35\text{--}0.40$, $p \leq .05$) may act as potential protective predictors. Fourth, except for teachers' support for FLBC ($B = -0.21$, $p \leq .05$; $OR = 0.78$, $p \leq .05$) and MLBC ($B = -0.64$, $p \leq .05$; $OR = 0.51$, $p \leq .05$), all kinds of social support cannot relieve children's depression

Table 3 The depression associated with adverse childhood experiences (ACEs) for children in rural China

	Parent-present children		Father-absent LBC		Mother-absent LBC		Both parents-absent LBC	
	Mean	Z	Mean	Z	Mean	Z	Mean	Z
Overall								
At least one ACE	1.68 (5.14)	-22.81 **	1.65 (5.67)	-8.51 **	2.00 (6.32)	-3.63 **	2.64 (5.88)	-6.36 **
Four or more ACEs	3.21 (7.23)	-26.88 **	3.30 (7.37)	-11.12 **	4.39 (7.71)	-4.20 **	3.86 (7.83)	-9.12 **
Subtypes								
Physical abuse in the family	3.52 (5.86)	-17.64 **	4.02 (6.41)	-6.34 **	4.61 (7.28)	-2.61	4.49 (6.62)	-5.36 **
Emotional abuse in the family	3.67 (6.82)	-19.63 **	4.14 (7.18)	-7.71 **	4.57 (8.15)	-3.44 **	4.43 (7.80)	-6.89 **
Sexual abuse in the family	4.43 (6.37)	-5.13 **	5.05 (7.73)	-2.81 *	5.70 (10.25)	-1.94	5.41 (6.33)	-0.91
Physical neglect in the family	3.52 (6.66)	-20.45 **	3.87 (7.14)	-9.05 **	4.56 (7.88)	-3.99 **	4.08 (7.27)	-7.51 **
Emotional neglect in the family	3.19 (6.90)	-24.82 **	3.62 (6.96)	-8.93 **	4.49 (7.28)	-3.60 **	3.55 (7.56)	-9.96 **
Bullied in the school	2.66 (5.97)	-25.78 **	2.71 (6.44)	-10.86 **	3.36 (7.06)	-4.28 **	3.47 (6.63)	-7.97 **
Alcohol dependence in the household	4.05 (5.32)	-9.18 **	4.63 (5.90)	-3.20 *	6.28 (5.19)	-0.78	5.18 (5.86)	-2.41
Mental disorders in the household	4.15 (6.64)	-11.52 **	4.60 (7.28)	-5.97 **	5.69 (6.44)	-1.03	5.31 (6.45)	-1.47
Witness parental divorce	4.86 (5.64)	-1.04	4.96 (6.12)	-0.76	5.94 (6.41)	-0.36	5.16 (4.42)	-1.13
Witness community violence	3.89 (7.47)	-17.26 **	4.59 (6.86)	-5.46 **	5.57 (6.92)	-2.27	4.34 (8.86)	-8.19 **

We reported adjusted p -values. ** means significant within 99% confidence interval, * means significant within 95% confidence interval

Table 4 Factors associated with child's depression among children in rural China

Variables	Model 1 (Parent-present children)		Model 2 (Father-absent LBC)		Model 3 (Mother-absent LBC)		Model 4 (Both parent-absent LBC)	
	Depression score	MDD symp- tom	Depression score	MDD symp- tom	Depression score	MDD symp- tom	Depression score	MDD symptom score
	<i>B</i> (<i>S.E.</i>)	<i>OR</i> (<i>S.E.</i>)	<i>B</i> (<i>S.E.</i>)	<i>OR</i> (<i>S.E.</i>)	<i>B</i> (<i>S.E.</i>)	<i>OR</i> (<i>S.E.</i>)	<i>B</i> (<i>S.E.</i>)	<i>OR</i> (<i>S.E.</i>)
Numbers of subtypes of ACEs	0.91 (0.04) **	1.25 (0.03) **	0.89 (0.09) **	1.40 (0.07) **	0.89 (0.24) **	1.27 (0.17)	0.77 (0.10) **	1.16 (0.08) *
Marital physical violence (neither parent = ref.)								
one parent	0.71 (0.23) **	1.28 (0.18)	0.09 (0.56)	0.86 (0.40)	-1.58 (1.43)	0.67 (0.94)	1.81 (0.69) **	0.72 (0.52)
both parents	-0.45 (0.32)	0.80 (0.25)	0.81 (0.96)	0.65 (0.70)	-2.67 (1.90)	3.46 (1.09)	0.81 (0.92)	0.63 (0.66)
Marital verbal violence (hardly ever = ref.)								
occasionally	0.09 (0.14)	1.03 (0.13)	0.08 (0.38)	0.89 (0.33)	-0.93 (1.00)	0.83 (0.70)	0.42 (0.40)	1.33 (0.34)
often	1.53 (0.31) **	1.40 (0.23)	1.56 (0.74) *	3.08 (0.48) **	-0.88 (1.48)	1.06 (0.98)	2.24 (0.74) **	4.17 (0.52) **
Parent-child trust (neither parent = ref.)								
one parent	-1.12 (0.22) **	0.55 (0.16) **	-1.54 (0.53) **	0.49 (0.36) *	-2.29 (1.20) *	0.20 (0.78) *	-1.63 (0.51) **	0.52 (0.40)
both parents	-1.46 (0.19) **	0.43 (0.14) **	-1.92 (0.50) **	0.36 (0.35)	-1.53 (0.21) *	0.53 (0.73)	-1.14 (0.44) **	0.76 (0.34)
Parent-child interaction (neither parent = ref.)								
one parent	-0.34 (0.26)	1.11 (0.19)	-0.65 (0.55)	0.52 (0.35)	-3.02 (1.50) *	1.22 (0.92)	0.46 (0.66)	0.37 (0.45) *
both parents	-0.93 (0.22) **	0.76 (0.17)	-1.26 (0.62) *	0.40 (0.43) **	-3.04 (1.26) *	0.83 (0.80)	-0.91 (0.53) *	0.35 (0.35) **
Parental support	0.03 (0.05)	0.96 (0.05)	0.09 (0.14)	1.04 (0.11)	0.18 (0.36)	1.28 (0.25)	-0.06 (0.15)	0.87 (0.12)
Kinship's support	-0.04 (0.06)	0.96 (0.06)	0.20 (0.16)	1.10 (0.13)	0.49 (0.41)	0.93 (0.31)	-0.27 (0.17)	0.97 (0.14)
Close friend's support	0.06 (0.06)	1.00 (0.05)	0.03 (0.16)	1.17 (0.13)	0.15 (0.42)	1.26 (0.30)	0.47 (0.17) **	1.13 (0.13)
Teacher's support	0.02 (0.05)	0.98 (0.05)	-0.21 (0.13) *	0.78 (0.11) *	-0.64 (0.36) *	0.51 (0.27) *	-0.20 (0.16)	0.91 (0.12)
Child's sex (male = ref.)								
female	0.73 (0.13) **	1.12 (0.12)	0.99 (0.34) **	1.00 (0.27)	0.97 (0.91)	0.51 (0.66)	0.35 (0.37)	0.96 (0.30)
Child's age	0.68 (0.04) **	1.19 (0.04) **	0.58 (0.13) **	0.95 (0.10)	0.81 (0.30) **	1.49 (0.20)	0.79 (0.13) **	1.18 (1.10)
Child's ethnicity (Han = ref.)								
ethnic minority	-0.20 (0.20)	0.93 (0.17)	0.69 (0.59)	1.20 (0.43)	-0.36 (1.34)	1.56 (0.87) *	-0.91 (0.49)	0.25 (0.57) *
Child's siblings	-0.06 (0.10)	0.88 (0.09)	-0.65 (0.26) *	0.94 (0.17)	-0.25 (0.55)	1.28 (0.38)	-0.17 (0.27)	0.79 (0.22)
Adjusted <i>R</i> square	0.34	0.12	0.32	0.23	0.34	0.31	0.37	0.21

a). in the linear depression, *B*-values and standard deviations (*S.E.*) are shown inside and outside of brackets, in the logistic depression, *OR*-values and standard deviations (*S.E.*) are shown inside and outside of brackets; b). ** represents $p \leq .01$, * represents $p \leq .05$

($B = -0.27$ – 0.49 , $p > .05$; $OR = 0.91$ – 1.28 , $p > .05$); for BLBC, the support of close friends may even aggravate the depression of children ($B = 0.47$, $p \leq .01$). Last, regarding the demographic variables, the effect of age was substantial,

with depression ($B = 0.58$ – 0.81 , $p \leq .01$) generally increasing for both boys and girls as adolescence approached. Overall, children's depression was primarily related to ACEs and parent-child relationships, and the homogeneity of the four

types of children in the associated factors is higher than the heterogeneity. Thus, hypothesis H_3 in the study cannot be rejected.

Discussion

This study systematically explored the associations among ACEs, depression and parental absence in rural China through an empirical survey based on 4708 respondents and made three critical findings. First, the experience of ACEs is currently shared among children in rural China, and parental absence is highly associated with the risk of ACEs. The survey revealed that 82.63% of respondents had experienced at least one kind of ACE in the past year, and the percentage of those who had four or more ACEs was 34.66%. This result confirms Li et al. (2015) finding that ACEs are widespread among rural children in mainland China. The high rate of ACEs may be related to both the weak socioeconomic development of rural China (Elgar et al., 2013), the hollowing out of rural society (Duan, 2016), and the excessive tolerance of strict family discipline in Confucian society (Cui & Liu, 2016). Further statistical results show that the prevalence of various subtypes of ACEs fluctuates from 3.23% to 57.56%, and more than one third of children report experiencing physical abuse, physical neglect, emotional neglect, bullied at school and alcohol dependence in the household. These findings are similar to those of recent empirical surveys by Qi et al. (2018), reflecting that the risk of ACEs in rural China cannot be ignored across all subtypes. It is worth noting that parental absence has a clear correlation with children's ACEs, the victimization rates of three types of LBC are significantly higher than that of non-LBC. The study agrees with the findings of Chan (2015) that family dysfunction seem to increase children's odds of victimization; family tensions and the alienation of parent-child relationship increase physical abuse, emotional abuse, and domestic violence (Wan et al., 2022; Yang et al., 2020), and the lack of parental protection elevates the likelihood of school bullying (Yang & Zhang, 2018; Zhu et al., 2020).

Second, in rural China, the experience of ACEs may be a risk factor for children's depression, and the association differs by the type of parental absence. This study found that the average depression scores (ACEs victims = 5.32, non-ACEs victims = 1.76) and the likelihood of MDD symptoms (ACEs victims = 0.73%, non-ACEs victims = 2.21%) were 3.02 times and 3.01 times higher for those who experienced ACEs than for those who did not, respectively. Similar to the conclusions of many researchers in Western countries (Hughes et al., 2017; Kessler et al., 2010), depression associated with ACEs is serious in rural China. Admittedly, the data showed that children's depression and negative results increased progressively with increased numbers of ACEs,

which agrees with findings from Rich et al. (2005). Surprisingly, further discussion revealed some group differences in depression among the four categories of children, and LBC seem to be more immune to depression associated with ACEs. Our results support Ungar et al. (2013) conclusion that LBC may spontaneously develop resilience in the face of stressful events, which helps them overcome adverse circumstances and continue to grow successfully. The situational inducement of this phenomenon may firstly lie in Confucianism, which emphasizes "self-improvement and self-reflection" in people's daily life (Ho et al., 2019), that individuals who are faced with adversity, should make an effort to overcome it, which encourages parent-absent children to be resilient; another explanation is the high left-behind rate in rural China, Vietnam's survey has showed that there is limited stigma to child fostering in communities where it is widely practiced, and separation from a migrant parent is less traumatic when the experience is shared by neighboring children (Graham & Jordan, 2011); the third explanation is that the high prevalence of ACEs in rural China based on the goal of maintaining family discipline is not to intentional injury to children (Wan et al., 2020), thus the severity of the ACEs is not closely related to children's physiological function.

Third, the associated factors with children's depression are mainly concentrated in the parent-child relationship. Specifically, there is a consensus in Western societies that parent-child relationships significantly impact childhood trauma (Lowell et al., 2014) because an appropriate parent-child atmosphere is an influential factor mitigating emotional regulation disorders, which may mediate depression (Hong et al., 2012). Chinese evidence also confirmed these conclusions; parent-child trust and frequent parent-child interactions are beneficial for reducing children's depression in rural China. In addition, another potential predictor is marital verbal violence, which is associated with children's depression in BLBC, FLBC and non-LBC families. The strong association can be explained by the fact that violent arguments between parents may lead to hostile or strained family relations (Lowell et al., 2014) and prevent the timely repair of children's depression due to the disruption of the family tensions (Fung, 2021). Marital verbal violence is less pronounced for MLBC, which is related to the higher divorce rate and more frequent verbal aggression in MLBC families, MLBC who lived in intense parental conflicts may have partially adapted to this life. It is also worth noting that the protective role of social support on children's depression may be overestimated in mainland China. Our findings disagreed with van Harmelen et al. (2016) conclusions as social support from family members and peers did not show positive mental relief effects in our survey, suggesting that although informal support may partly meet LBC's emotional needs (Dai & Chu, 2018), its role should not be exaggerated

in a special context. For family members, the emotional damage associated with parental absence is long-lasting and irreparable, and family support without firm parent-child trust, frequent intergenerational interaction and professional intervention skills may not relieve children's psychological vulnerability. In the absence of adult and professional guidance, peer support may even elicit hatred and resentment in BLBC, rather than the gratitude and understanding that adults take for granted (Wan et al., 2021), which support Li et al. (2018) statement that social support from peers had no positive effect on BLBC's mental health. The ineffectiveness of formal support networks such as schoolteachers is likely to be related to professional weakness and the lack of service enthusiasm mentioned by Alisic (2012). Fewer resources at their disposal to provide systematic skills training and capacity building for teachers in developing countries like China make it difficult to intervene on behalf of children vulnerable to depressive symptoms (WHO, 2020). For FLBC and MLBC, the greater protective role of teachers may not come from their professional abilities but from more parent-teacher interaction due to single parents' greater dependence on teachers (Franklin et al., 2012). Overall, although this study cannot accurately assess the degree to which LBC have formed strong relationships with those who care for them in their parents' absence, it may not be appropriate to rely too much on social support without professional guidance.

This study has significant policy implications. Currently, serious risks of ACEs and their potential outcomes still exist among LBC in China, which is closely related to the inadequacy of child welfare services in rural China. Specifically, the defects of child welfare services in China are mainly in the following three aspects. First of all, the coverage of China's child welfare services is insufficient. Although Chinese government has begun to break the traditional orphan-centered residual welfare system and build the school/community-based universal services since 2010, according to a recent UNICEF's official report, only 120 villages and more than 70,000 children were covered universal child welfare services pilot by 2015, while China has nearly 700 thousand villages and 220 million children (UNICEF, 2015), which impeded family and school's supportive roles in child development. Secondly, the design of children welfare services in China is defective. The major interventions and responses of ACEs in rural China is a "prevention-oriented" approach, and child-targeted, universally focused, and school-based educational programs were the most common methods (Luan et al., 2022). Nevertheless, the early intervention program for high-risk families was disregarded, making it challenging for LBC with underlying or existing depression symptoms to access adequate support. Thirdly, the lack of social welfare services is also a result of the professional social worker scarcity. There were only 737 thousand qualified social workers in China (Ministry of

Civil Affairs, PRC, 2021), but their target service population is 264 million elderly people, 298 million minors, 85 million people with disabilities. What's more, a majority of child service practitioners in rural China are part-time (e.g., village cadres or experienced teachers), with little systematic training to offer specialized services such as early intervention in child depression. Therefore, how to provide wide-ranging, well-designed and high-quality professional guidance for LBC, family members, teachers and peer groups through the universal child welfare system are extremely urgent to reduce the depression of rural children living in the defunctionalized families.

Admittedly, there are some limitations of our study. First, the survey was conducted in schools; therefore, out-of-school children, who account for a very small proportion of the population in rural China, were not included in the analysis. Second, the development of depression in children is partly related to genetics, and the lack of genetic data makes it difficult to determine the extent of depression in children due to genetic factors. Third, the study adopted a child's self-report questionnaire and failed to verify the questionnaire with peers, teachers and guardians. Fourth, the correlational nature and difficulty in ruling out confounding variables that may explain observed associations makes it unable to draw causal conclusions. Finally, our research did not measure "parental imprisonment", "witness domestic violence" and "exposure to war violence" in ACEs, which limited the diversity of ACEs measurements. Future research will be optimized regarding the above five aspects to better provide intellectual support for the study and management of ACEs on a global scale.

Conclusion

This study provided crucial evidence that rural Chinese children have experienced ACEs widely based on the large sample survey from eight provinces, especially for LBC who face higher risks of experiencing ACEs than non-LBC, which implies that children with parental absence should be regarded as an important target population in child welfare policy. At the same time, although ACEs have positive associations with children's depression, LBCs seems could perform less susceptible to ACEs-related depression than their non-left-behind counterparts. Because of the stress from their parent-child separation, LBC may have greater psychological resilience, which may help them adjust to ACEs well. Harmony family atmosphere and high-quality parent-child relationships are conducive to the recovery of children's depression; nevertheless, the protective role of social support in children's depression cannot be overestimated, which may be due to the low coverage, imperfect program design, and underqualified professional of child

welfare services. Overall, this study believes that the deficiency of child welfare services could deepen the potential risks of ACEs on depression among Chinese rural children, especially for LBC, thus it is essential to lessen the likelihood that ACEs lead to childhood MDD in Chinese children by enhancing the quality of their family relationships and strengthening their professional social support.

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Data Availability We provide relevant data for academic research.

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

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