**The impacts of parent-child communication on left-behind children’s mental health and suicidal ideation: A cross sectional study in Anhui**

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A R T I C L E I N F O

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A B S T R A C T

This study aimed to investigate the impact of previous maternal migration experiences on left-behind children’s (LBC) mental health status and suicidal ideation, and the possible mediating role of parent-child communication. A cross-sectional study among rural children was conducted in Anhui, China, in 2018. LBC who self-reported that (a) their fathers were migrants and (b) they were living with their mothers at the time of the survey were included in this study. The participants were then divided into two subgroups by previous maternal migration experience. Previous maternal migration was associated with worse mental health and a higher prevalence of suicidal ideation among LBC compared with their peers. Healthy communication between children and parents fully mediates the adverse eﬀects caused by previous maternal migration experiences on mental health among LBC, and communication with mother partially mediates the association with suicidal ideation. Communication classes for returning parents oﬀered jointly by governments and schools could be an eﬀective way to mitigate the impacts of maternal migration on child mental health and should be studied.

1. Introduction

Although large-scale labour migrations to urban environments sig- niﬁcantly contribute to the Chinese economy, they have also caused long-term parental absences in their original–rural residential areas, resulting in the societal phenomenon of left-behind children (LBC). While, in the international context, LBC refers to children whose par- ents migrate into another country, in China, LBC generally refers to rural children whose fathers or mothers or both migrate to another city outside of their original residence area as recorded on the *hukou* system, for at least 6 months ([Duan & Zhou, 2005](#_bookmark29)). The *hukou* system is a government system based on household registration required by law in China. The *hukou* is issued per family, and oﬃcially identiﬁes a person as a resident of an area and includes identifying information such as name, parents, spouse, and date of birth. Many social welfare policies

are assigned by this *hukou* system, including health insurance and education. In China, one is identiﬁed as “migrant” if he/she moves out of his/her original residence area recorded on the *hukou*, and thus may not be able to receive social welfare in their new place of residence.

In 2014, the Chinese Women’s Federation, the largest Chinese non- governmental organization playing a decisive role in women and chil- dren’s welfare protection, estimated there were 61 million LBC in rural areas, accounting for 38% of rural children and 22% of the total youth population in China ([All-China Women’s Federation, 2013](#_bookmark20)). Being left behind by both parents and taken care by other relatives in the family (e.g. grandparents) is the predominant form of separation, followed by being left behind by only their fathers ([Guang et al., 2017](#_bookmark34)). Maternal migration, speciﬁcally, exerts adverse eﬀects on child development, including fewer educational opportunities ([Yang & Duan, 2008](#_bookmark58)), and poorer nutritional status ([Li & Su, 2014](#_bookmark40)).

*Abbreviations:* LBC, left-behind children; SDQ, the strengths and diﬃculties questionnaire; LBC-MP, LBC report their mothers had previously migrated; LBC-MN,  LBC report their mothers had never been migrants

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Parental absences also result in a range of psycho-social and de- velopmental risks to LBC due to lack of parental monitoring, super- vision, and support ([Ding & Bao, 2014](#_bookmark26)). Compared to their rural counterparts whose parents do not migrate, LBC reported more symp- toms of anxiety and depression ([Fang, Su, Gill, & Birmaher, 2010](#_bookmark30)), poorer health-related quality of life ([Hao & Cui, 2007](#_bookmark35)), lower self-es- teem ([Jia, 2012](#_bookmark36)), and fewer pro-social behaviors ([Liu, Li, & Ge, 2009](#_bookmark41)). However, none of these studies was able to tell how would these mental health problems of LBC evolve according to family environment changes like reunion with their parents.

Suicide has become one of the top causes of children and adoles- cents worldwide ([Nock et al., 2008a](#_bookmark48)). And as one widely accepted model for suicidality accentuates that suicidal ideation is the ﬁrst stage of suicide ([de Wilde, 2002](#_bookmark24)). One recent systematic review suggested that globally, LBC had a 70% increased risk of suicidal ideation com- pared with their peers ([Fellmeth, Clarke, & Zhao, 2018](#_bookmark31)). It has also been estimated that between 12.9% and 20.0% rural LBC reported suicidal ideation ([Deng & Li, 2014](#_bookmark25)), much higher than that of the observed rate of non-LBC in China (10.9%) ([Fu, Xue, Zhou, & Yuan, 2017](#_bookmark32)). However, while parental absence has been identiﬁed as a risk factor for LBC’s suicidal ideation, the eﬀect of reunion with parents remains unexplored among LBC in China.

As most migrant workers stay within China, it is not uncommon for migrant parents to return home (staying with children for months or permanently) when family needs or problems arise. In families where both parents migrate, typically the mother will be the ﬁrst to return home, while the father will continue to work away from home ([Qiu,](#_bookmark51) [2016](#_bookmark51)). However, the limited available evidence suggests that reunions do not relieve the problems resulting from previous separation. One study conducted in rural China found that the adverse eﬀects of a previous parental migration experience (single or both parents) on a child’s mental health were as signiﬁcant as the eﬀects of an ongoing parental migration ([Zhao, Wang, Li, Zhou, & Hesketh, 2017](#_bookmark60)). However, the authors did not explore potential remedies for adverse eﬀects of parent-child separation on children’s mental health. We wish to further explore the impact of maternal reunions on LBC’s mental health, and reﬂect on possible interventions to mitigate and remedy the adverse consequences of parental migration.

While research regarding the impact of reunions on LBC in China is scant, reports on the US military families’ parental deployments and returns can provide us with instructive evidence. Reunions between children and parents who were deployed have many similarities with parental reunions with LBC; they are both major stressors, and in both scenarios, family members have to renegotiate roles, as returned par- ents may not recognize how their children have changed during their absence, and children may worry that their parents may be redeployed again ([Mmari, Roche, Sudhinaraset, & Blum, 2009; Wilson et al., 2011](#_bookmark45)). For these military families, communication processes such as age-ap- propriate disclosure (e.g., parents’ talking with their children about topics in ways that are appropriate for their age and development), social support, and shared decision-making can help mitigate children’s deployment-related stress and promote adaptation to new circum- stances ([Walsh, 2003](#_bookmark56)).

The parent-child relationship and communication between parents and children are of extreme importance for child development. Families are central to the well-being of their children, with strong parent-child relationships and communication playing a critical role in the promo- tion of children’s mental health ([Loon, Ven, Doesum, Hosman, &](#_bookmark42) [Witteman, 2015](#_bookmark42)). Several studies with small samples in China ([Niu, Li,](#_bookmark46) [& Wang, 2019; Zhang, Meng, & Wu, 2018](#_bookmark46)) showed that LBC generally communicate with their migrating parents via mobile phone or/and instant-messaging software like Wechat. As noted, the majority of LBC (50–60%) communicated with their migrating parents at a relatively low frequency, about less than once a week. Open and positive com- munication with parents was found to be related to better mental health status and fewer risky behaviors among children with diﬀerent

backgrounds ([Tasopoulos-Chan, Smetana, & Yau, 2009](#_bookmark55)); however, this approach is seldom used in China.

This study aims to investigate the impact of previous maternal mi- gration experiences on mental health status and suicidal ideation, and the possible protective role of parent-child communication of LBC in Anhui. Anhui, located in southeastern China, is a relatively under- developed province with around 16 million migrant workers and 4.5 million LBC ([Duan, Lu, Guo, & Wang, 2013](#_bookmark28)). Based on the aforemen- tioned review of the literature, two major hypotheses were examined in the present study: ﬁrst, previous maternal migrant experiences can exert adverse eﬀects on LBC’s mental health and likelihood of suicidal ideation; second, parent-child communication may play a mediating role between previous maternal migration and mental health and sui- cidal ideation among LBC.

1. Methods
   1. *Data collection*

Data for this study come from a cross-sectional study which focused on rural left-behind children’s mental health status and was conducted in Anhui Province, in May 2018.

This study was conducted in two counties within the Anhui Province, Wuwei and Nanling. Within each county, two towns were randomly selected. Then, one primary school and one middle school were randomly selected from the school roster of the Town Education Bureau. Thus, eight schools were included in the present study, from which all students, in Grades 5 to 8 (mostly aged from 11 to 17) were identiﬁed as eligible and were invited to participate. Students were excluded if they reported their parents died (both or single) or divorced or if their caregivers did not provide approval to the informed consent form. The study was performed during lunch breaks and course re- cesses, during which eligible students were assessed by two trained investigators using uniform instruction. To support students’ privacy, all teachers and school staﬀ were asked to leave the classrooms during the survey. No personal information of students, including those who did not participate the survey, was recorded. Across the eight schools, 2067 (5th-8th grade; aged 11–17) out of 2100 eligible students com- pleted the questionnaire, representing a response rate of 98.42%.

For the present study, only children who reported their fathers were migrants and were currently living with their mothers were included to study the eﬀects of parent-child communication on LBC’s suicidal ideation and mental health against previous maternal migrant experi- ences. Thus, two comparison groups were generated: one whose mo- thers had previously migrated but currently live with the child (LBC- MP) and one whose mothers never migrated and have always lived with the child (LBC-MN) ([Table 1](#_bookmark7)).

* 1. *Measures*
     1. *Outcome variable*

We used the Strengths and Diﬃculties Questionnaire (SDQ), a standardized tool with established reliability and validity, to assess the mental health of LBC ([Goodman, Meltzer, & Bailey, 1998](#_bookmark33)). It is con- sidered to be a useful adjunct in the screening for possible mental health problems in children for both epidemiological purposes and clinical studies ([Lai et al., 2010](#_bookmark38)), which has been validated in China ([Lai](#_bookmark38) [et al., 2010](#_bookmark38)). The SDQ consists of ﬁve subscales: emotional symptoms, conduct problems, hyperactivity, peer problems and prosocial beha- viors; each subscale contains ﬁve items in the form of statements re- quiring a response via a three-point Likert response scale: 1 (not true); 2 (somewhat true); or 3 (certainly true). The total diﬃculties score was calculated by summing the scores from all scales, except the prosocial behaviors. The Cronbach’s alpha in the present study was 0.63. Higher scores on the total diﬃculties, emotional symptoms, conduct problems, hyperactivity, and peer problems and lower scores on the prosocial

Table 1

Descriptive statistics for left-behind children stratiﬁed by maternal migrant experiences.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | LBC-MP (N(%)) | LBC-MN (N(%)) | χ2 or t | *p* |
| Gender Male | 152(56.09) | 100(51.81) | 0.830 | 0.395 |
| Female | 119(43.91) | 93(48.19) |  |  |
| Grade Fifth | 46(16.67) | 38(19.49) | 3.110 | 0.375 |
| Sixth | 54(19.57) | 44(22.56) |  |  |
| Seventh | 82(29.71) | 61(31.28) |  |  |
| Eighth | 94(34.06) | 52(26.67) |  |  |
| Family economic status Poor | 55(19.93) | 50(25.64) | 2.179 | 0.336 |
| Fair | 136(49.28) | 88(45.13) |  |  |
| Wealthy | 85(30.80) | 57(29.23) |  |  |
| Any sibling Yes | 181(65.58) | 136(69.74) | 0.900 | 0.370 |
| No | 95(34.42) | 59(30.26) |  |  |
| Number of friends 3 or less friends | 107(38.77) | 91(46.67) | 2.926 | 0.089 |
| More than 3 friends | 169(61.23) | 104(53.33) |  |  |
| Paternal education level Primary school or below | 65(25.39) | 63(37.50) | 11.54 | 0.003 |
| Middle school | 166(64.84) | 81(48.21) |  |  |
| High school or above | 25(9.77) | 24(14.29) |  |  |
| Maternal education level Primary school or below | 111(43.53) | 86(53.09) | 3.654 | 0.161 |
| Middle school | 122(47.84) | 65(40.12) |  |  |
| High school or above | 22(8.63) | 11(6.79) |  |  |
| Suicidal ideation No | 182(65.94) | 156(80.00) | 11.14 | 0.001 |
| Yes | 94(34.06) | 39(20.00) |  |  |
| Total diﬃculties Mean (SD) | 13.06(5.17) | 12.13(5.30) | 3.620 | 0.058 |
| Emotional symptoms Mean | 3.66(2.19) | 3.18(2.14) | 5.463 | 0.020 |
| (SD)  Conduct problems Mean | 2.47(1.58) | 2.29(1.55) | 1.484 | 0.224 |
| (SD) |  |  |  |  |
| Hyperactivity Mean (SD) | 4.25(2.09) | 3.93(2.06) | 2.718 | 0.100 |
| Peer problems Mean (SD) | 2.67(1.59) | 2.72(1.70) | 0.136 | 0.712 |
| Prosocial behaviors Mean | 6.78(1.94) | 6.77(2.19) | 0.002 | 0.966 |
| (SD)  Communication openness | 26.86(5.88) | 28.08(5.66) | 5.029 | 0.025 |
| with mother Mean (SD) |  |  |  |  |
| Communication problem | 35.88(4.58) | 36.87(4.26) | 5.604 | 0.018 |
| with mother Mean (SD)  Communication openness | 27.72(5.73) | 28.39(5.70) | 1.550 | 0.214 |
| with father Mean (SD)  Communication problem | 37.86(5.06) | 38.75(4.87) | 3.590 | 0.059 |
| with father Mean (SD) |  |  |  |  |

behaviors represent higher levels of psychological problems.

Children’s suicidal ideation was assessed with the following ques- tion: “Did you have suicidal thoughts during the past year?” Of the multiple answer options available, the following statements were identiﬁed as a “yes” answer for suicidal ideation: “During the past year, I had thoughts of killing myself” and “During the past year, I had thoughts of killing myself, but I wouldn’t carry them out.”

* + 1. *Exposure variables*

Children’s maternal migrant experiences were assessed with the following question: “Did your mother ever migrate to another place ever since you were born?” Only children reporting “Yes, but she is currently at home with me.” and “No, she is always at home with me.” were included for the present study.

Parent-child communication was assessed with the Chinese version of the Parent-Adolescent Communication Scale (PACS) ([Lanz, Iafrate,](#_bookmark39) [Rosnati, & Scabini, 1999](#_bookmark39)). This scale is a 20-item tool which can be subdivided into the communication openness with parents (10 items)

and the communication problems with parents (10 items). The scores for items on the problem sub-scale are reversed in value. Thus, a high score indicates a lack of perceived problems and greater openness in the communication. The Cronbach’s alpha for communication with mother was 0.89 and 0.90 for communication with father.

* + 1. *Socio-demographic variables*

Socio-demographic characteristics collected for this study included: gender, educational attainment, family economic status, siblings, number of friends, and parents’ education levels. Family economic status was measured by possession of a number of household items, such as an air conditioner, refrigerator, washing machine, computer, etc. This variable was then coded as either low- (zero to ﬁve item), moderate- (six to seven items), or high-income (eight to nine items) ([Lu](#_bookmark43) [et al., 2018](#_bookmark43)).

* 1. *Ethics approval*

Ethical approval was obtained from Zhejiang University.

* 1. *Data analysis*

We used Chi-squared tests and t-tests to compare sample char- acteristics between LBC who reported their mothers had previously been migrants and those who had mothers who never migrated, as appropriate. We used linear regression ([Table 2](#_bookmark8)) to examine the asso- ciations among maternal migrant experiences and self-reported mental health symptoms, adjusting for gender, educational attainment, family economic status, siblings, number of friends, and parents’ education levels. Then, we used binary logistic regression to examine the asso- ciations among maternal migrant experiences and suicidal ideation, while adjusting for gender, educational attainment, family economic status, siblings, number of friends, and parents’ education levels ([Table 4](#_bookmark16), model 1). Further, we then tested whether communication with parents mediated the associations between maternal migrant ex- periences mental health symptoms ([Table 3](#_bookmark12)) and suicidal ideation ([Table 4](#_bookmark16), model 2) by including these variables in our linear regression

and binary logistic regression models. β (95%CI) was reported for the linear regression model and OR (95%CI) for the binary logistic model.

We analyzed all data using the SPSS (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) and assumed a statistical signiﬁcance level of p < 0.05.

The hypothesized integrated model was tested through path ana- lysis using Amos 21.0 (Arbuckle JL and SPSS Inc., Chicago, USA). In path analysis, mediation eﬀects were addressed when: (a) the indirect paths are nonzero and signiﬁcant and (b) direct paths from the pre- dictor to outcome variables are zero and nonsigniﬁcant when the

mediator is inserted in the model. Multiple indices were used to assess the model ﬁt, including: 1) the likelihood ratio test statistic (χ2); 2) the Comparative Fit Index (CFI); and 3) the Root Mean Square Error of Approximation (RMSEA).

1. Results

We included 471 LBC with a migrant father in this study. Among these participants, 276 (58.60%) reported their mothers had previously migrated (LBC-MP), while 195 (41.40%) had mothers who never mi- grated (LBC-MN). There were no diﬀerences in gender, grade, family economic status, siblings, number of friends, total diﬃculties of SDQ, or communication status with fathers (openness and problem) between LBC who reported their mothers had previously been migrants and those who had mothers who never migrated (*p* > 0.05). Compared with LBC-MN, LBC-MP reported a signiﬁcantly higher prevalence of suicidal ideation (*p* < 0.01), higher emotional symptoms scores on the SDQ (*p* < 0.05), and poorer communication with their mothers (openness and problem, *p* < 0.05).

Regression coeﬃcients for SDQ and maternal migrant experiences among left-behind children with adjustment for socio-demographic characteristics.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Total diﬃculties | Emotional symptoms | Conduct problems | Hyperactivity | Peer problems | Prosocial behaviors |
| β(95%CI) | β(95%CI) | β(95%CI) | β(95%CI) | β(95%CI) | β(95%CI) |
| Group |  |  |  |  |  |  |
| LBC-MN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| LBC-MP | 1.16 (0.17, 2.14) [\*](#_bookmark9) | 0.57 (0.16, 0.98) [\*\*](#_bookmark10) | 0.20 (−0.10, 0.50) | 0.33 (−0.05, 0.71) | 0.04 (−0.26, 0.35) | −0.09 (−0.46, 0.28) |
| Gender |  |  |  |  |  |  |
| Male | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Female | 0.69 (−0.27, 1.66) | 0.70 (0.30, 1.10) [\*\*](#_bookmark10) | −0.05 (−0.35, | 0.34 (−0.04, 0.72) | −0.28 (−0.58, 0.01) | 0.60 (0.24, 0.96) [\*\*](#_bookmark10) |
|  |  |  | 0.24) |  |  |  |
| Grade |  |  |  |  |  |  |
| Fifth | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Sixth | −1.01 (−2.54, 0.53) | −0.16 (−0.79, 0.48) | −0.27 (−0.74, | −0.18 (−0.78, 0.42) | −0.40 (−0.87, 0.07) | −0.06 (−0.63, 0.52) |
| Seventh | −1.25 (−2.68, 0.18) | −0.29 (−0.88, 0.31) | 0.20)  −0.36 (−0.80, | 0.14 (−0.42, 0.70) | −0.76 (−1.20, | 0.62 (0.08, 1.16) [\*\*](#_bookmark10) |
|  |  |  | 0.07) |  | −0.32) [\*\*](#_bookmark10) |  |
| Eighth | −0.93 (−2.36, 0.50) | −0.32 (−0.92, 0.27) | −0.31 (−0.75,  0.12) | 0.52 (−0.04, 1.08) | −0.83 (−1.26,  −0.39) [\*\*\*](#_bookmark11) | 0.46 (−0.08, 0.99) |
| Family economic status |  |  |  |  |  |  |
| Poor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fair | −0.40 (−1.63, 0.83) | −0.05 (−0.56, 0.46) | 0.07 (−0.31, 0.44) | −0.32 (−0.80, 0.16) | −0.09 (−0.47, 0.28) | 0.54 (0.08, 1.00) [\*](#_bookmark9) |
| Wealthy | −0.55 (−1.94, 0.83) | 0.02 (−0.55, 0.60) | 0.25 (−0.17, 0.68) | −0.29 (−0.83, 0.26) | −0.54 (−0.96, | 0.91 (0.39, 1.43) [\*\*](#_bookmark10) |
|  |  |  |  |  | −0.11) [\*](#_bookmark9) |  |
| Any sibling |  |  |  |  |  |  |
| Yes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| No | −0.49 (−1.53, 0.55) | −0.14 (−0.57, 0.29) | −0.10 (−0.42, | −0.32 (−0.72, 0.09) | 0.05 (−0.27, 0.37) | −0.03 (−0.42, 0.36) |
|  |  |  | 0.22) |  |  |  |
| Number of friends |  |  |  |  |  |  |
| 3 or less friends | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| More than 3 friends | −0.80 (−1.80, 0.19) | −0.29 (−0.70, 0.13) | 0.07 (−0.23, 0.37) | −0.10 (−0.49, 0.28) | −0.49 (−0.79,  −0.18) [\*\*](#_bookmark10) | 0.36 (−0.01, 0.73) |
| Paternal education level |  |  |  |  |  |  |
| Primary school or below | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Middle school | −0.54 (−1.64, 0.56) | −0.12 (−0.58, 0.33) | −0.13 (−0.46, | −0.22 (−0.64, 0.21) | −0.09 (−0.43, 0.25) | 0.15 (−0.26, 0.56) |
| High school or above | −1.98 (−3.76, | −0.37 (−1.11, 0.37) | 0.21)  −0.20 (−0.75, | −1.04 (−1.73, −0.35) [\*\*](#_bookmark10) | −0.38 (−0.93, 0.17) | 0.50 (−0.17, 1.16) |
|  | −0.20) [\*](#_bookmark9) |  | 0.34) |  |  |  |
| Maternal education level |  |  |  |  |  |  |
| Primary school or below | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Middle school | 0.48 (−0.59, 1.54) | 0.19 (−0.25, 0.63) | 0.07 (−0.26, 0.39) | 0.16 (−0.26, 0.57) | 0.07 (−0.26, 0.40) | −0.10 (−0.50, 0.30) |
| High school or above | −1.82 (−3.87, 0.24) | −0.87 (−1.73, −0.02) | −0.41 (−1.04, | −0.52 (−1.32, 0.28) | 0.00 (−0.64, 0.63) | 0.96 (0.18, 1.73) [\*](#_bookmark9) |
|  |  | [\*](#_bookmark9) | 0.21) |  |  |  |
| \* p < 0.05. |  |  |  |  |  |  |
| \*\* p < 0.01. |  |  |  |  |  |  |
| \*\*\* p < 0.001. |  |  |  |  |  |  |

[Tables 2 and 3](#_bookmark8) show coeﬃcients of linear regressions for maternal migrant experiences, mental health and communication with parents among LBC. In [Table 2](#_bookmark8), when compared with LBC-MN, LBC-MP re-

ported signiﬁcantly higher scores in total diﬃculties (β = 1.16; 95% CI = 0.17, 2.14) and emotional symptoms (β = 0.57; 95% CI = 0.16, 0.98) after adjustment for socio-demographic characteristics. In

[Table 3](#_bookmark12), the adverse impacts of maternal migrant experiences on left- behind children’s total diﬃculties and emotional symptoms were no longer signiﬁcant when adjustments on communication with parents were introduced.

[Table 4](#_bookmark16) shows odds ratios for maternal migrant experiences and communication with parents and suicidal ideation among left-behind children with adjustments for socio-demographic characteristics. In Model 1, compared with LBC-MN, LBC-MP reported signiﬁcantly higher odds for suicidal ideation (OR = 1.96; 95% CI = 1.25, 3.06). In Model 2, results were no longer signiﬁcant when adjustments on commu- nication with parents were introduced.

Then, the integrative model was examined. Results of a path ana- lysis showed that communication between children and mothers can fully mediate the association between previous maternal migration experiences and the mental health of LBC, and partially mediate the

association between previous maternal migration experiences and sui- cidal ideation of LBC (paths were signiﬁcant with ps between 0.05 and < 0.001). Overall, the proposed model ﬁtted the data well (CFI = 0.997, RMSEA = 0.023, χ2 = 15.11, *p* = 0.235). The stan-

dardized coeﬃcients are presented in [Fig. 1](#_bookmark19).

1. Discussion

To our knowledge, this is the ﬁrst study to investigate the potential protective role of parent-child communication on the eﬀect of maternal migration on LBC’s mental health and suicidal ideation. This study has produced two major ﬁndings: ﬁrstly, previous maternal migration was found to be related to poorer mental health and a higher prevalence of suicidal ideation among LBC, and; secondly, healthy communication between children and parents fully mediated the association between previous maternal migration experiences and the mental health of LBC, and partially mediated the association between previous maternal mi- gration experiences and suicidal ideation of LBC.

Maternal absence can greatly aﬀect a child’s well-being. One review of children of international migrant workers provided robust evidence that the absence of a mother was a signiﬁcant etiological factor in

Regression coeﬃcients for SDQ, maternal migrant experiences, and communication with parents among left-behind children with adjustment for socio-demographic characteristics.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Total diﬃculties | Emotional symptoms | Conduct problems | Hyperactivity | Peer problems | Prosocial behaviors |
| β(95%CI) | β(95%CI) | β(95%CI) | β(95%CI) | β(95%CI) | β(95%CI) |
| Group |  |  |  |  |  |  |
| LBC-MN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| LBC-MP | 0.46 (−0.42, 1.35) | 0.34 (−0.04, 0.73) | 0.06 (−0.23, 0.35) | 0.11 (−0.25, 0.47) | −0.06 (−0.36, | 0.06 (−0.29, 0.40) |
| Communication openness with | −0.04 (−0.15, 0.06) | −0.04 (−0.09, 0.01) | 0.02 (−0.01, 0.06) | −0.02 (−0.07, 0.02) | 0.24)  0.00 (−0.04, 0.03) | 0.09 (0.05, 0.13) [\*\*\*](#_bookmark15) |
| father |  |  |  |  |  |  |
| Communication problem with father  Communication openness with | −0.15 (−0.27,  −0.03) [\*](#_bookmark13)  −0.14 (−0.25, | 0.00 (−0.06, 0.05)  −0.03 (−0.08, 0.01) | −0.05 (−0.09,  −0.01) [\*](#_bookmark13)  −0.03 (−0.06, | −0.05 (−0.10, 0.00)  −0.05 (−0.10, −0.01) | −0.05 (−0.09,  −0.01) [\*](#_bookmark13)  −0.03 (−0.07, | −0.07 (−0.12,  −0.02) [\*\*](#_bookmark14)  0.07 (0.03, 0.11) [\*\*\*](#_bookmark15) |
| mother | −0.04) [\*\*](#_bookmark14) |  | 0.01) | [\*](#_bookmark13) | 0.01) |  |
| Communication problem with | −0.30 (−0.44, | −0.14 (−0.20, | −0.07 (−0.11, | −0.08 (−0.14, −0.03) | −0.01 (−0.06, | 0.04 (−0.01, 0.09) |
| mother | −0.16) [\*\*\*](#_bookmark15) | −0.08) [\*\*\*](#_bookmark15) | −0.02) [\*\*](#_bookmark14) | [\*\*](#_bookmark14) | 0.03) |  |
| Gender |  |  |  |  |  |  |
| Male | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Female | 0.59 (−0.27, 1.45) | 0.63 (0.26, 1.00) [\*\*](#_bookmark14) | −0.06 (−0.34, | 0.31 (−0.05, 0.66) | −0.28 (−0.57, | 0.72 (0.38, 1.05) [\*\*\*](#_bookmark15) |
|  |  |  | 0.23) |  | 0.01) |  |
| Grade |  |  |  |  |  |  |
| Fifth | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Sixth | −1.50 (−2.87, | −0.37 (−0.96, 0.23) | −0.34 (−0.79, | −0.35 (−0.90, 0.21) | −0.46 (−0.92, | 0.13 (−0.41, 0.67) |
| Seventh | −0.13) [\*](#_bookmark13)  −2.91 (−4.23, | −0.91 (−1.47, | 0.11)  −0.68 (−1.11, | −0.38 (−0.91, 0.16) | 0.01)  −0.97 (−1.41, | 0.98 (0.47, 1.49) [\*\*\*](#_bookmark15) |
| Eighth | −1.60) [\*\*\*](#_bookmark15)  −2.32 (−3.62,  −1.03) [\*\*\*](#_bookmark15) | −0.34) [\*\*](#_bookmark14)  −0.83 (−1.39,  −0.27) [\*\*](#_bookmark14) | −0.25) [\*\*](#_bookmark14)  −0.58 (−1.00,  −0.15) [\*\*](#_bookmark14) | 0.08 (−0.45, 0.61) | −0.53) [\*\*\*](#_bookmark15)  −1.01 (−1.45,  −0.57) [\*\*\*](#_bookmark15) | 0.74 (0.23, 1.25) [\*\*](#_bookmark14) |
| Family economic status |  |  |  |  |  |  |
| Poor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fair | 0.25 (−0.85, 1.34) | 0.15 (−0.32, 0.63) | 0.18 (−0.18, 0.54) | −0.10 (−0.55, 0.35) | 0.02 (−0.35, 0.39) | 0.41 (−0.03, 0.84) |
| Wealthy | −0.26 (−1.51, 0.98) | 0.10 (−0.44, 0.64) | 0.26 (−0.15, 0.67) | −0.16 (−0.67, 0.35) | −0.45 (−0.87, | 0.74 (0.26, 1.23) [\*\*](#_bookmark14) |
|  |  |  |  |  | −0.03) [\*](#_bookmark13) |  |
| Any sibling |  |  |  |  |  |  |
| Yes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| No | −0.10 (−1.03, 0.82) | −0.01 (−0.41, 0.39) | −0.03 (−0.34, | −0.19 (−0.57, 0.19) | 0.11 (−0.20, 0.43) | −0.10 (−0.46, 0.27) |
|  |  |  | 0.27) |  |  |  |
| Number of friends |  |  |  |  |  |  |
| 3 or less friends | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| More than 3 friends | −0.49 (−1.38, 0.40) | −0.17 (−0.56, 0.21) | 0.09 (−0.20, 0.38) | 0.02 (−0.34, 0.38) | −0.43 (−0.73,  −0.13) [\*\*](#_bookmark14) | 0.17 (−0.18, 0.52) |
| Paternal education level |  |  |  |  |  |  |
| Primary school or below | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Middle school | −0.19 (−1.17, 0.79) | −0.01 (−0.43, 0.42) | −0.03 (−0.35, | −0.12 (−0.52, 0.28) | −0.05 (−0.38, | 0.14 (−0.25, 0.52) |
|  |  |  | 0.29) |  | 0.28) |  |
| High school or above | −1.09 (−2.68, 0.50) | −0.10 (−0.78, 0.59) | 0.00 (−0.53, 0.52) | −0.76 (−1.41, −0.12) | −0.23 (−0.77, | 0.46 (−0.16, 1.09) |
|  |  |  |  | [\*](#_bookmark13) | 0.30) |  |
| Maternal education level |  |  |  |  |  |  |
| Primary school or below | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Middle school | 0.40 (−0.54, 1.35) | 0.15 (−0.26, 0.56) | 0.06 (−0.25, 0.37) | 0.13 (−0.25, 0.52) | 0.06 (−0.26, 0.38) | −0.08 (−0.46, 0.29) |
| High school or above | −1.41 (−3.24, 0.42) | −0.72 (−1.51, 0.07) | −0.37 (−0.97, | −0.37 (−1.12, 0.37) | 0.06 (−0.56, 0.68) | 0.76 (0.04, 1.48) [\*](#_bookmark13) |
|  |  |  | 0.23) |  |  |  |
| \* p < 0.05. |  |  |  |  |  |  |
| \*\* p < 0.01. |  |  |  |  |  |  |
| \*\*\* p < 0.001. |  |  |  |  |  |  |

mental health problems in children ([Bryant, 2005](#_bookmark23)). Our ﬁndings sug- gest that healthy parent-child communication, or to be more speciﬁc, healthy communication between children and their returned mother, might oﬀset these adverse eﬀects on LBC’s mental health. Of note, our ﬁnding that LBC-MP reported signiﬁcantly poorer communication with their returned mothers compared to LBC-MN deserves attention, and this might be the key to improving LBC’s mental well-being.

Beyond parents returning from a migration, Chinese parents at-large may need guidance on parent-child communication. In Barnes and Olson’s Circumplex Model of Family Relationships ([Barnes & Olson,](#_bookmark21) [1985](#_bookmark21)), positive parent-child communication is characterized by ideas, information, and concerns that are honest and exchanged with joy and conﬁdence. In China, love and violence sometimes coexist: parents feel

that harsh physical discipline is a way of expressing their love and concern ([Qiao & Chan, 2008](#_bookmark50)). Returned parents might take simple but violent methods, which may sometimes evolve into abuse, to harshly discipline their children ([Yang, He, Wang, Liu, & Zhu, 2015](#_bookmark59)). Such actions are far from healthy parent-child communication practices and can harm children’s mental health.

Healthy communication between children and parents partially mediated the eﬀect of previous maternal migration experiences on suicidal ideation among LBC in the present study. Suicidal ideation is a signiﬁcant precursor to suicide ([Nock et al., 2008b](#_bookmark47)), and the risk of suicide among those adolescents endorsing suicidal ideation at age 15 have almost 12 times higher odds of having suicidal attempts between ages 15 and 30 compared with adolescents who don’t ([Reinherz,](#_bookmark52)

Table 4

Odds ratio for suicidal ideation, maternal migrant experiences, and commu- nication with parents among left-behind children with adjustment for socio- demographic characteristics.

Model 1 Model 2

OR(95%CI) OR(95%CI)

Group

LBC-MN 1.00 1.00

LBC-MP 1.96(1.25, 3.06) [\*\*](#_bookmark17) 1.62(0.99, 2.64)

Communication openness with father / 0.96(0.90, 1.01)

Communication problem with father / 1.01(0.94, 1.08)

Communication openness with mother / 0.93(0.88, 0.98) [\*\*](#_bookmark17)

Communication problem with mother / 0.88(0.81, 0.95) [\*\*](#_bookmark17)

Gender

Male 1.00 1.00

Female 1.64(1.07, 2.50)[\*](#_bookmark18) 1.49(0.94, 2.38)

Grade

Fifth 1.00 1.00

Sixth 1.26(0.61, 2.60) 1.07(0.48, 2.37)

Seventh 1.61(0.83, 3.14) 0.86(0.41, 1.80)

Eighth 1.68(0.87, 3.24) 1.09(0.53, 2.25)

|  |  |  |
| --- | --- | --- |
| Family economic status |  | |
| Poor | 1.00 | 1.00 |
| Fair | 1.11(0.64, 1.94) | 1.39(0.75, 2.55) |
| Wealthy | 1.22(0.66, 2.27) | 1.35(0.69, 2.67) |
| Any sibling |  |  |

Yes 1.00 1.00

No 1.02(0.65, 1.62) 0.75(0.66, 1.80)

Number of friends

3 or less friends 1.00 1.00

More than 3 friends 0.79(0.51, 1.22) 0.90(0.56, 1.45)

Paternal education level

Primary school or below 1.00 1.00

Middle school 1.31(0.81, 2.14) 1.56(0.92, 2.67)

High school or above 1.30(0.59, 2.84) 1.69(0.71, 4.03) Maternal education level

|  |  |  |
| --- | --- | --- |
| Primary school or below | 1.00 | 1.00 |
| Middle school | 1.21(0.77, 1.92) | 1.24(0.75, 2.05) |

High school or above 1.14(0.47, 2.77) 1.40(0.52, 3.76)

\*\*\*p < 0.001.

\* p < 0.05.

\*\* p < 0.01.

[Tanner, Berger, Beardslee, & Fitzmaurice, 2006](#_bookmark52)). Although healthy parent-child communication is a protective factor for suicidal ideation among children ([Mark et al., 2013](#_bookmark44)), it was not suﬃcient alone to pre- vent suicidal ideation in the present study. Beyond parent-child

communication, multiple family factors, such as poor parental child- attachment quality ([Bridge, Goldstein, & Brent, 2006](#_bookmark22)), family conﬂict, and lower levels of family cohesion ([Pena et al., 2011](#_bookmark49)) have been shown to be associated with suicidality among youth. How these family factors respond to family environment changes and subsequently inﬂuence children’s suicidal ideation is worthy of further exploration.

As previously noted, children at diﬀerent developmental stages may experience mixed emotions when facing a reunion with parents. Young children whose parents face deployment may feel confused and guilty that somehow they are responsible for their parent’s leaving; school children and adolescents may feel angry and abandoned as well as worry about how the left-behind parent will cope ([Wilson et al., 2011](#_bookmark57)). For parents’ return, young children may experience both excitement and a strong need for reassurance, school children may experience excitement and a strong desire for attention, and adolescents may ex- perience both relief and anger ([Wilson et al., 2011](#_bookmark57)). If the returning parent fails to recognize these complex feelings and emotional needs of their children, it may be hard for them to manage family cohesion and avoid family conﬂict.

Suﬀering from a shortage of human resources, local governments in rural China have taken great eﬀorts to oﬀer preferential policies and new job opportunities for skilled workers to attract them back to rural areas in recent years ([Dollar, 2014](#_bookmark27)). As such, the number of children living with returning parents is likely to increase over the next few years. Governments may consider supporting programs to teach eﬀec- tive parenting skills as a part of beneﬁts packages oﬀered to returning workers. As mentioned before, in families where both parents migrate, typically the mother will be the ﬁrst to return home ([Qiu, 2016](#_bookmark51)). We should pay extra attention to these returned mothers since our results showed that good communication with mothers instead of fathers can mediate the relationship between previous maternal absent and suicidal ideation of LBC. This is consistent with one study conducted in Hong Kong ([Kwok, Lai, & Shek, 2010](#_bookmark37)) that mother-child communication ex- erted stronger eﬀects on suicidal ideation than father-child commu- nication. To be perceived as more positive than father-child relation- ship ([Shek, 2007](#_bookmark53)), mother-child relationship may achieve more in children mental health promotion and suicidal prevention.

In addition, schools and teachers should also consider encouraging children to express their emotions and needs as well as develop colla- borative problem-solving skills ([Walsh, 2003](#_bookmark56)) which may help LBC to cope with their parents’ returns and family environment changes. For example, talking with similar-age peers who could relate to the chal- lenges of parental reunion can beneﬁt children a lot ([Wilson et al.,](#_bookmark57) [2011](#_bookmark57)). The community can hold club activities for LBC with similar experiences to communicate and help each other.

These ﬁndings should be viewed in the context of the study



Fig. 1. Standardized solutions for the structural model of maternal migrant experiences, parent-child communication, suicidal ideation and mental health status among left-behind children.

limitations. First, we only assessed the presence of previous migrant experiences, and failed to include more details like the number, timing, and duration of maternal migrations. Also, children’s perspectives on changes of caregivers should be considered as important unmeasured covariates. Second, our exclusive reliance on adolescents’ self-reporting may result in problems of shared method variance and self-presentation bias ([Smits et al., 2008](#_bookmark54)). Also, we assessed suicidal ideation through use of a questionnaire rather than a sophisticated scale or interview which may underestimate the prevalence of suicidal ideation because students may hide their actual thoughts out of social desirability or over- estimated the prevalence because these students can be too young to understand and report suicide ideation correctly. Third, cross-sectional results from two counties in one underdeveloped province should be extrapolated with caution. Randomized controlled trials are needed to test these results. Fourth, a Cronbach’s alpha of 0.7 or higher is con- sidered good in most social science research while Cronbach’s alpha in this study was under 0.7. Further domestication of the Chinese version SDQ should be explored or alternative tools screening for possible mental health problems in children should be considered. Moreover, this was a relatively small sample compared to the number of variables entered into the regression model which may cause potential bias.

1. Conclusion

Healthy communication between children and parents mediates the association between experiencing maternal migration and mental health symptoms among left behind children and partially mediates the association between maternal migration and suicidality. Future re- search using experimental design should test whether interventions, including a family service packages of parenting skills for returning parents and emotional adjustment for children, can promote children’s mental health and avoids suicides.

Implication and contribution

Our ﬁndings highlight the mediating role of parent-child commu- nication between previous maternal migration and LBC’s mental health and suicidal ideation. Interventions including parenting skills for re- turning parents and emotional adjustment for children to promote children’s mental health and avoid suicides can be creditable attempts.

CRediT authorship contribution statement

Jingjing Lu: Conceptualization, Formal analysis, Investigation, Writing - original draft. Leesa Lin: Methodology, Writing - review & editing. Brita Roy: Methodology, Writing - review & editing. Carley Riley: Methodology, Writing - review & editing. Emily Wang: Methodology, Writing - review & editing. Karen Wang: Methodology, Writing - review & editing. Lu Li: Conceptualization, Supervision, Writing - review & editing. Feng Wang: Conceptualization, Methodology, Investigation, Resources, Project administration, Writing

- review & editing. Xudong Zhou: Conceptualization, Methodology, Project administration, Resources, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing ﬁnancial interests or personal relationships that could have appeared to inﬂu- ence the work reported in this paper.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at [https://](https://doi.org/10.1016/j.childyouth.2020.104785) [doi.org/10.1016/j.childyouth.2020.104785](https://doi.org/10.1016/j.childyouth.2020.104785).

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