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FAMILY FEATURES AND ACADEMIC AND SOCIAL-EMOTIONAL DEVELOPMENT OF LEFT-BEHIND CHILDREN IN HUBEI, CHINA

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ABSTRACT

Nearly half of children in China were affected by migration, and more than one-third of rural children had been left at home, classified as rural left-behind children (LBC). Despite numerous studies on migration and LBC, little research has investigated the issues of LBC by connecting their development with family features. This study aimed to identify associations between family features and children's academic performance and social-emotional development, focusing on differences between LBC and non-LBC. A quantitative method was applied, covering 548 primary school children in Shennongjia District, Hubei Province, China. Disparities between LBC and non-LBC were found in their social and emotional development, which disappeared among one-child families. Surprisingly, no significant differences were found in their academic performance, behavioral development, or certain demographic features, including gender, age, and family economic status. Furthermore, family features associated with children's development were found to be family structure, maternal factors such as maternal migration status and mothers' education, fathers' migration status, and the role of caregivers. Indeed, maternal migration status was identified as a vitally influential predictor of children's social-emotional development, while fathers' migration status was another influential predictor of children's emotional development. Drawing from ecological systems theory, this study underscored the importance of family in children's development and highlighted the compensatory function of schools and governments for disadvantaged contexts such as migration through educational policies and practices. Concurrently, it emphasized the imperative for heightened attention to the social and emotional well-being of LBC and comprehensive intervention support for stakeholders.

Keywords: *Migration, Left-behind Children (LBC), Academic Performance, Social-emotional Development, Family Features*

INTRODUCTION

Amid the current global agenda of the Sustainable Development Goals (SDGs), with the core emphasis on the fourth goal of "inclusive and equitable quality education," increasing attention has been directed towards education for vulnerable and disadvantaged children (UNESCO, 2015). In China, notable progress has been made towards achieving SDG 4. Yet, challenges persist, particularly regarding "leaving no one behind" and addressing urban-rural disparities. Specifically, in China, rural left-behind children, living without one or both migrant parents from rural areas, have emerged as one particularly vulnerable group highlighted by UN analysis (UN China, 2021). Additionally, given China's rural-urban disparities in education, children from this group have been experiencing significant disadvantages, including challenges such as a huge population and lower attendance rates in 2020 (NBSC China et al., 2021).

Migration and Left-behind Children

With China's rapid economic development, the migrant population soared to 375.8 million in 2020, comprising 26.6% of the total population, and reached 295.62 million rural migrant workers by 2022. (NBSC, 2021; NBSC, 2023). Factors such as high urban living costs and constraints of the Hukou system (Chinese household registration system) have led to numerous children being left behind in rural areas while their parents migrated to cities. In this study, "left-behind children" (LBC) were defined as individuals under 18 years old who had been left in their original places by one or both of their migrant parents for more than six months (NBSC China et al., 2021). In 2020, domestic migration affected 138 million children, comprising 46.4% of China's child population. Concurrently, the population of LBC more than doubled from 30.09 million in 2000 to 66.93 million in 2022. Ten provinces, such as Hunan, Henan, Sichuan, and Hubei, accounted for 81.51% of rural LBC enrolled in schools across China in 2020 (Wei, 2022). While extensive literature addressed the socioeconomic achievements, welfare, and living conditions of migrant workers, issues related to LBC have garnered increasing attention within the academic field in recent decades.

Family and Children's Development

Research has underscored the significance of both cognitive and non-cognitive skills in shaping children's social outcomes (Heckman et al., 2006). Cognitive abilities, dealing with thinking activities such as reading, writing, and arithmetic, underpinned children's academic development (Cattell, 1987). Non-cognitive skills, which encompassed personal attitudes, motivations, and characteristics, were defined as "patterns of thoughts, feelings, and behaviors" (Borghans et al., 2008). Social-emotional development, a critical aspect of non-cognitive development, pertains to "the child's experience, expression, and management of emotions and the ability to establish positive and rewarding relationships with others" (Cohen et al., 2005).

Ecological systems theory, proposed by Bronfenbrenner (1979) and emphasizing the impacts of multiple environmental systems on human development, formed the basis of the theoretical framework of this study. Within this framework, the family, located in the microsystem, played a pivotal role in individual development. Previous studies have underscored the strong link between children's academic success and their family environment (Rezaei-Dehaghani et al., 2018). Similarly, families laid the groundwork for children's social-emotional learning (Dworkin & Serido, 2017). Specifically, key family features, such as family structure (e.g., number of siblings), socioeconomic status, and parents'/caregivers' education have been identified as influential factors in children's development (NICHD, 2005; Mühlendahl, 2007; Gjelaj & Shala, 2014). Moreover, attachment theory, as proposed by Holmes (2014), asserted that long-term parental separation, particularly maternal separation, had negative impacts on children's academic performance and social-emotional development. Associated factors included inadequate caregiver education, prolonged migration duration, and low family income (Tao & Zhou, 2012; Wen & Lin, 2012; An, 2020; Shi et al., 2021). While theories and previous studies had highlighted important family-related factors in children's development, further empirical evidence on the practical issues within China's social context was urgently needed.

Development of Left-behind Children

Parental migration exhibited mixed and unclear impacts on children's development. For instance, a study conducted in the Philippines in 2003 found positive effects of parental migration on children's outcomes, particularly in nutrition, education, and physical health (Asis, 2006). However, in China, long-term separation from migrant parents led to various challenges for LBC, including weak parent-child relationships, inadequate nutrition, and higher rates of stunting and underweight (Gong & Yang, 2010; Pan & Chen, 2014; Xu & Wang, 2015). Simultaneously, LBC faced increased risks of accidents, crimes,

abduction, and abuse. Also included are poorer academic achievements, more mental problems, socialization difficulties and bullying at school (Chan, 2009; Jiang & Li, 2014; Chelala, 2018; Fellmeth et al., 2018). Additionally, gender disparities were observed, with girls at a greater risk of being left behind (Li, 2018). Despite potentially better family economic conditions due to migration, LBC lacked parental supervision and communication, leading to dissatisfaction with life and studies and disadvantages in health-related behaviors and school engagement (Wen & Lin, 2012). Meanwhile, several studies reported no significant disparities in school behavior and physical development between LBC and non-LBC (Xiang, 2007).

Overall, the ambiguous findings and intricate conclusions underscored the necessity for systematic and comprehensive investigations into the impacts of parental migration on LBC's development. Prior studies had offered partial insights by comparing metrics like mean scores between LBC and their counterparts. However, these comparisons often overlooked underlying issues and failed to establish associations between children's development and their unique family features. Therefore, through addressing these limitations by employing more rigorous and scientific methods, this study contributed to an evidence-based understanding of LBC issues.

With the unique household registration system, namely the Hukou system and other related social welfare systems in China, issues of LBC have garnered significant political attention. Despite efforts by both central and local governments, there persisted a dearth of empirical evidence to assess their progress and address unsolved problems. Therefore, by providing empirical evidence through comparative analysis of LBC and non-LBC, the imperative for further work and enhancements in educational policies should be highlighted.

The Present Study

Given these research gaps and practical needs in the field, this study employed a comparative approach to examine and investigate the issues related to the development of LBC in China. The primary objective was to identify associations between family features and children's academic performance and social-emotional development at the primary school level, with a special focus on the challenges faced by LBC.

First, this study aimed to identify developmental disparities between LBC and non-LBC in terms of academic performance and social-emotional development. Second, it explored the associations between family features and children's academic and social-emotional outcomes. Finally, by identifying gaps and associated family features, this study sought to explain the root causes of developmental disparities between LBC and non-LBC. With this intention, it aimed to delineate the progress made and challenges faced in addressing LBC issues, thereby informing further academic research and providing implications for educational policies and practices.

METHODOLOGY

Geographic Scope and Participants

The study was conducted in Shennongjia District, Hubei Province, China. Hubei Province was one of the largest migrant labor supply provinces, ranking 10th in 2020 with 9.25 million migrant labors, even under COVID-19-related mobility restrictions. Moreover, Hubei suffered from a huge population of rural LBC at the primary school stage, ranking 6th among all provinces in 2020 (Wei, 2022). As one of the most impoverished districts within Hubei, Shennongjia District predominantly relied on forestry and agriculture, characterized by a concentrated population and typical rural dynamics.

Official data disclosed that rural LBC at the primary level constituted the largest segment, numbering 15.9 million in 2020 (NBSC et al., 2021). Therefore, this study focused on children from rural areas at the primary school stage. With the help of SPSS, four schools were chosen through simple random sampling from a pool of twenty-five primary schools within the target area. From each selected school, three classrooms were sampled using stratified sampling from Grade 2, Grade 4, and Grade 6. The total sample comprised 548 children (45.3% male; 54.7% female).

Measures

A quantitative approach was utilized to investigate the issues of LBC by collecting and analyzing numerical data through statistical techniques. A structured questionnaire, adapted from the Questionnaire on Left-behind Children developed by Jiangxi Normal University (Xu et al., 2007), was employed. Assisted by school principals and teachers, paper-based questionnaires were distributed in target classrooms to gather the necessary information. The questionnaire comprised of two parts; Part I, completed by the child with Pinyin interpretations, aimed at gathering the child's basic information and experiences; along with Part II, completed by the child's caregiver, which addressed family-related information.

In this study, the dependent variables were children's development, encompassing academic performance and social-emotional development. Academic performance data were derived from children's scores in three core subjects (Chinese, Math, and English) from previous semester examinations, categorized into four levels (100-90, 89-80, 79-60, and less than 60). The exam papers utilized across the four participating schools aligned with local educational assessment standards. Simultaneously, data on social-emotional development were assessed through questions regarding children's experiences and feelings, covering social (six questions; e.g., do you like making friends?), emotional (six questions; e.g., do you feel sad in your daily life?), and behavioral (eight questions; e.g., do you have quarrels with others at school?) aspects. Given the diverse and mixed findings in prior research mentioned above and the urgent issues of LBC in China, this study focused on independent variables related to family features, operationalized across five dimensions: (a) parents' migration status and duration; (b) family structure: one-child or multi-child family and number of siblings; (c) the role of caregiver (parents, grandparents, siblings, other relatives, themselves); (d) father's /mother's /caregiver's educational background; and (e) family economic status.

Statistical Analysis

This study employed a systematic approach to quantitative analysis, proceeding in three main steps. First, factor analysis was applied to identify underlying variables, with collinearity assessed and two questions excluded to ensure data integrity (KMO=0.816, p=0.00). Second, a series of variance analyses, including chi-squared tests, independent sample t-tests, and one-way analysis of variance, were conducted to compare development between LBC and non-LBC, and among different family feature groups. Lastly, correlation and regression analyses investigated associations between children's development and family features, identifying significant relationships and predictors.

FINDINGS

Descriptive Findings

Table 1 presented descriptive statistics of 548 participants, among which 69.3% (n=380) were LBC. Among the total population, only 16.1% (n=88) were from one-child families, with 65.9% of them being left behind; while 83.9% (n=460) had siblings, with 70% of them being left behind. Left-behind girls constituted 52.1% (n=198) of the LBC group. Furthermore, 30.8% (n=117) of LBC were under the care

of others rather than their parents. Among the LBC group, 64.8% (n=355) had fathers away from home, whereas only 19.7% (n=108) had migrant mothers.

Table 1. *Demographic Data and Descriptive Results*

	N	%
Total samples	548	100
LBC	380 (52.1% Female)	69.3
Non-LBC	168 (60.7% Female)	30.7
Gender		
Female	300 (66.0% LBC)	54.7
Male	248 (73.4% LBC)	45.3
Family Structure		
One-child	88 (65.9% LBC)	16.1
Multi-child	460 (70.0% LBC)	83.9
Caregivers		
By Parents	417 (63.1% LBC)	76.1
By Others	131 (89.3% LBC)	23.9
Migrant Parents		
Both Migrated	83	15.1
Both at Home	168	30.7
Migrant Father	355	64.8
Migrant Mother	108	19.7
Grades		
Grade 2	172 (76.7% LBC)	31.4
Grade 4	191 (63.9% LBC)	34.9
Grade 6	185 (68.1% LBC)	33.8

Differences between Left-behind Children and Non-left-behind Children

Table 2 presents the results of variance analyses between LBC and non-LBC. Among LBC, the proportion of girls was higher than that of boys. However, there was no statistically significant difference in gender or age between LBC and non-LBC ($p>0.05$).

Furthermore, LBC attained higher mean scores in Chinese and math subjects but scored lower in the English subject compared to non-LBC. However, between the two groups, no statistically significant difference was observed in academic performance. Simultaneously, the results of children's social-emotional development, as shown in Table 2, were more nuanced and exhibited variability. Notably, LBC and non-LBC demonstrated significantly divergent levels of social-emotional development ($p<0.01$), with significant differences observed in social development ($p<0.05$) and highly significant differences in emotional development ($p<0.001$). While no significant difference was found in behavioral development ($p>0.05$). Further analysis revealed that non-LBC had significantly better mean scores in both social and emotional development, with the discrepancy being more pronounced in emotional development.

Table 2. *Results of Variance Analyses between LBC and Non-LBC*

	t	Sig.	MD	Std. Error D		Mean	Std. D
Gender		0.062					
Age	1.726	0.085	0.258	0.149			
Children's Development							
Academic	-0.906	0.365	-0.084	0.093			
Chinese	-1.340	0.181	-0.097	0.072	Non-LBC	1.821	0.799
					LBC	1.918	0.773
Math	-1.091	0.276	-0.095	0.087	Non-LBC	1.679	0.829
					LBC	1.774	0.986
English	0.867	0.386	0.091	0.105	Non-LBC	2.512	1.132
					LBC	2.421	1.131
Social-emotional	-2.849	0.005**	-0.248	0.087			
Social	-2.053	0.041*	-0.079	0.039	Non-LBC	1.606	0.403
					LBC	1.686	0.424
Emotional	-3.509	0.000***	-0.140	0.040	Non-LBC	1.613	0.407
					LBC	1.753	0.480
Behavioral	-1.794	0.073	-0.073	0.041	Non-LBC	1.705	0.422
					LBC	1.778	0.449
Family Features							
Migrant Conditions	-22.611	0.000***	-0.839	0.037			
Family Structure	-1.785	0.502	-0.078	0.043			
The Role of Caregiver	-6.315	0.000***	-0.260	0.041			
Educational Background	-1.790	0.074	-0.138	0.077			
Father	-2.110	0.035*	-0.182	0.086	Non-LBC	3.860	0.956
					LBC	4.040	0.922
Mother	-1.068	0.286	-0.094	0.088			
Caregiver	-1.343	0.180	-0.138	0.103			
Family Income	0.369	0.712	0.030	0.081			

Value Dimension of Academic Performance: 1:100-90; 2:89-80; 3:79-60; 4: less than 60.
Value Dimension of Other Data: the smaller the better.
**p<0.05, **p<0.01; ***p<0.001*

In terms of children's family features, statistically significant differences were observed in family migrant conditions and the role of caregiver ($p<0.001$), consistent with the definition of LBC. In addition, significant differences were found in fathers' educational backgrounds, with migrant fathers having lower educational levels than fathers at home. Nevertheless, no significant difference was detected in family structure or family economic status between LBC and non-LBC.

Family and Children's Development

To investigate associations between family features and children's development, statistical analysis methods were employed to address the following concerns. (a) Whether significant differences existed in children's academic performance and social-emotional development based on their different family features; (b) whether correlations existed between family features and children's academic performance and social-emotional development; and (c) the identification of influential family predictors on children's development.

Table 3 showed findings related to concern (a). For children's academic performance and their family features, significant differences were observed in math scores based on parents' migration duration ($p<0.05$), with children experiencing migration for 1 to 2 years scoring lower ($M=2.103$). Similarly, difference was found in Chinese scores between one-child and multi-child families ($p<0.05$), with children from one-child families performing better ($M=1.705$). Table 4 displayed further results on these differences, revealing no significant developmental gap between LBC and non-LBC from one-child families. However, LBC from multi-child families exhibited poorer social and emotional development than their counterparts.

Table 3. *Results of Variance Analyses on Children's Development among Groups*

F	Academic Performance			Social-emotional Development			
	Chinese	Math	English	General	Social	Emotional	Behavioral
Migrant Conditions	1.685	0.578	0.708	2.202*	2.324*	1.693	2.005
Father Migrated or not	0.897	0.011	0.209	3.282	0.694	6.996*	0.099
Mother Migrated or not	0.126	0.048	1.358	2.866**	0.243*	0.314**	0.877**
Migrant Duration	0.245	2.803*	0.391	0.933	1.605	0.85	1.108
Family Structure							
One-child/multi-child	1.77*	0.155	5.065	0.192	0.01	2.42	0.00
Number of Siblings	2.077	0.512	0.508	0.324	0.648	0.337	0.56
Role of Caregiver	0.895	0.752	0.378	3.028*	0.709	2.636*	2.303
Educational Background							
Father	2.209	1.075	1.135	0.901	0.85	0.695	0.643
Mother	0.689	0.095	0.155	2.403*	1.344	2.253*	2.001
Other Caregiver	0.606	0.495	1.033	1.716	1.106	1.033	1.61
Family Income	1.04	0.178	0.569	1.728	1.402	1.13	1.516

**p<0.05, **p<0.01; ***p<0.001*

Table 4. *One-child Family and Multi-child Family- LBC and Non-LBC*

	Academic			SE		
	Chinese	Math	English	Social	Emotional	Behavioral
One-child Family	0.539	0.977	0.515	0.986	0.402	0.928
Multi-child Family	0.267	0.252	0.236	0.001***	0.026*	0.056
LBC				M=1.698	M=1.754	
Non-LBC				M=1.604	M=1.601	

Value Dimension: the smaller the better.
**p<0.05, **p<0.01; ***p<0.001*

Significant disparities were evident in children's social-emotional development concerning family features. For social development, children with migrant mothers exhibited a significant difference compared to those with at-home mothers ($p<0.05$). Variations in family features, including fathers' and mothers' migration status, caregiver roles, and mothers' educational backgrounds, put differences in children's emotional development ($p<0.05$). Post-hoc tests revealed that children cared for by their siblings exhibited significantly poorer emotional development. Meanwhile, the only significant difference in behavioral development was found between children with migrant mothers and those with at-home mothers.

Table 5 showed correlations between children's development and family features. Academically, children's Chinese performance correlated with whether they were from one-child families ($p<0.05$) and the number of siblings ($p<0.05$). Meanwhile, there was no correlation between children's math scores and parents' migrant duration, despite significant differences found above. No other significant correlation was found between children's academic performance and family features in this study.

Table 5. *Results of Correlations between Children's Development and Family Features*

Correlations	Chinese	Math	English	General	Social	Emotional	Behavioral
Migrant Conditions							
Father Migrated or not	0.071	0.015	-0.022	0.075	0.051	0.1*	0.037
Migrant Migrated or not	0.006	0.066	-0.018	0.125**	0.087*	0.12**	0.117**
Migrant Duration	0.018	-0.023	-0.023	0.021	-0.028	0.016	0.02
Family Structure							
One-child/multi-child	0.103*	0.034	-0.02	0.019	0.048	-0.01	0.04
Child Number	0.1*	0.057	-0.051	0.014	0.021	0.018	0.009
Role of Caregiver	-0.001	0.058	-0.002	0.078	0.032	0.068	0.066
Educational Background							
Father	-0.025	0.045	0.016	0.004	0.003	0.012	0.01
Mother	-0.025	-0.008	0.012	-0.032	-0.024	0.011	-0.042
Other Caregiver	-0.023	0.007	-0.013	-0.042	-0.026	-0.012	-0.049
Family Income	-0.079	-0.003	-0.008	-0.001	0.009	0.017	-0.021

*$p<0.05$, **$p<0.01$; ***$p<0.001$

Subsequently, significant correlations were identified between children's social-emotional development and mothers' migration status, in terms of social ($p<0.05$), emotional ($p<0.01$), and behavioral development ($p<0.01$). Fathers' migration status only showed a significant correlation with children's emotional development ($p<0.05$). However, no correlations emerged between children's social-emotional development and family structure, educational background, or economic status, despite some significant variances observed.

Regression analyses (Table 6) revealed that maternal migration status significantly predicted children's social development ($p<0.05$), emotional development ($p<0.01$), and behavioral development ($p<0.01$). Similarly, fathers' migration status was a significant predictor of emotional development ($p<0.05$). These findings underscored the different roles of fathers and mothers, as well as the substantial impacts of parents' migration on various aspects of children's social-emotional development.

Table 6. *Results of Regressions between Children's Development and Family Features*

		Standardized Coefficients					
	Correlation	Beta	F	R^2	Adjusted R^2	t	p
			Social				
Father Migrated or not	0.051						
Mother Migrated or not	0.087*	0.0869	4.158*	0.0076	0.0057	2.0392	0.0419

			Emotional				
Father Migrated or not	0.1*	0.0997	5.478*	0.0099	0.0081	2.3406	0.0196
Mother Migrated or not	0.12**	0.1199	7.966**	0.0143	0.0126	2.8224	0.0049
			Behavioral				
Father Migrated or not	0.037						
Mother Migrated or not	0.117**	0.1168	7.552**	0.0136	0.0118	2.748	0.0062

**p<0.05, **p<0.01; ***p<0.001*

DISCUSSION

Left-behind Children and Non-left-behind Children

Contrary to previous studies, such as by Li (2018) propositions that boys were more likely to migrate with parents while girls were left behind, in this study, 66% of total girls and 73.4% of total boys were left behind in the target region and no significant gender difference was observed between LBC and non-LBC. Given the higher proportion of girls (54.7%) among the total sample, left-behind girls outnumbered left-behind boys. Despite no statistical significance, the higher proportion of girls among rural children and rural LBC in this study should raise practical concerns for stakeholders. By investigating different family features, this study also revealed that in migrant families, fathers were more likely to migrate than mothers, consistent with national trends showing a higher proportion of male migrants (63.4%) (NBSC, 2023). Interestingly, contrary to national statistics indicating an increase in rural migrant workers with higher education levels, this study found that fathers of LBC had significantly lower educational backgrounds. This suggested that fathers with higher education levels were less likely to migrate, highlighting the influence of parental education on family migration decisions.

By examining the developmental disparities between LBC and non-LBC, notable differences were observed in social and emotional development. Consequently, LBC exhibited poorer social and emotional well-being, consistent with reported issues, such as heightened risks of anxiety, depression, and suicidal tendencies (Fellmeth et al., 2018). However, no significant disparities were noted in behavioral development, contrary to assertions by Wen and Lin (2012) which suggested LBC with disadvantages in health-related behavior. Surprisingly, academic performance between LBC and non-LBC was found to be statistically equal, contradicting previous studies indicating significant academic disadvantages for LBC (Jiang & Li, 2014).

The success of LBC in keeping up with non-LBC in their academic performance and behavior found in this study was supported by ecological system theory (Bronfenrenner, 1979) which states that an individual's development interacted with different scopes, such as family, schools, and others. At the same time, this study provided practical evidence supporting this theory, indicating that multiple levels of systems had effects on children's development. It suggested that influential scopes, such as schools, communities, and societies, could function as compensatory or protective factors for disadvantaged contexts like migrant families. For example, schools could mitigate family disadvantages and help disadvantaged children keep pace with others academically (Alexander, 2016). Moreover, the target region, Hubei Province, boasted excellent educational resources and ranked high nationwide (MOE of China, 2022). Therefore, schools there could receive adequate support from governments and were well-equipped to offer quality education to LBC. Also, these findings underscored the effectiveness of

pertinent governmental policies aimed at enhancing education for rural LBC, such as establishing boarding schools to broaden educational access and create a supportive learning environment for children lacking sufficient adult supervision. Nonetheless, the identified developmental gaps in social and emotional development offered insights into existing unsolved challenges and provided guidance for future endeavors by schools and governments addressing challenges faced by LBC, advancing progress towards SDG 4 in China.

Family and Children's Development

This study investigated family features associated with children's development. Overall, these relevant features were family structure, maternal factors such as maternal migration and mothers' educational background, fathers' migration, and the role of the caregiver. As for family structures, further analysis revealed that statistical differences between LBC and non-LBC were only observed within multi-child families, with no such difference detected in one-child families. As Seror (2022) posited, "the acquisition of non-cognitive skills can be interpreted as resulting from the formation of self-representations in parent-child interactions." Namely, this suggested that children from one-child families might receive more daily childcare and attention from adults, fostering better adult-child interactions, regardless of their left-behind status.

Subsequently, maternal factors were found to have more pronounced effects on children's social-emotional development, with maternal migration status emerging as a vitally significant predictor of children's social, emotional, and behavioral development. Whether children lived with or without their mothers exhibited the strongest correlation with and influence on their emotional development and had a notable impact on behavioral development. While less pronounced, this influence remained statistically significant in the context of social development. The findings aligned with Wen and Lin's (2012) argument that children left behind by migrant mothers experienced the most significant disadvantages in health behaviors. Given the strong relationship found between parents' educational backgrounds and children's social-emotional development previously (Gjelaj & Shala, 2014), this study also identified significant disparities in children's emotional development based on varying levels of maternal education.

Nonetheless, fathers' educational backgrounds did not show any significant relationship with children's development in this study. As mentioned earlier, this might be attributed to the observation that fathers with poorer educational backgrounds were more likely to migrate to the target region. Notably, these findings aligned with attachment theory, suggesting that children's social-emotional development relied on establishing a stable attachment to a primary caregiver, often the mother, providing a secure base for the child's exploration of the world (Holmes, 2014). Moreover, this study revealed that fathers' migration status was also a significant predictor of children's emotional development, contradicting previous claims that fathers' migration alone had less impact (Shi et al., 2021). The role of caregivers only mattered in children's emotional development, with those cared for by siblings exhibiting poorer emotional well-being. Interestingly, inconsistent with the arguments from Shi and others (2021), family income was not statistically associated with children's development in this study. Conversely, no significant difference in family income was observed between migrant and non-migrant families, providing evidence of the success of governmental policies aimed at reducing the huge rural-urban migration and economic disparities.

Implications

The findings above had vital implications for ongoing programs and educational policies addressing the issues of rural LBC and rural-urban migration towards achieving the targets of SDG4 in China. Given the importance of maternal factors in their children's social-emotional development, in cases where migration was unavoidable, especially maternal migration, supportive policies should be provided for

stakeholders, including teachers in schools and substitute caregivers at home. For example, enhancing communication between migrant parents and their children, as well as substitute caregivers and educators, leveraging programs such as information and communication technology (ICT), could be beneficial. Moreover, schools and governments should prioritize efforts to establish a comprehensive and multi-dimensional intervention network to support LBC and their families, with more concerns on the social-emotional development of LBC. Furthermore, providing educational support and monitoring networks for parents and substitute caregivers on child-rearing through initiatives from local and central governments could further aid in the development of their children.

Limitations

Several limitations should be acknowledged in this study. First, there were constraints on the measures assessing children's development. Specifically, test scores might not fully capture academic performance, and self-reports for social-emotional development might introduce bias. Second, while schools and classrooms were selected via random sampling methods, even with some representativeness for the whole picture, limited geographic scope and age range might affect generalizability. Third, further studies were required to explore practical interactions between children and their surrounding environments, such as schools and communities. Despite identifying maternal migration as a predictor, empirical suggestions for migrant mothers were difficult to derive from this study. Hence, future studies should investigate the pathways of family features in influencing children's development for targeted interventions for LBC.

CONCLUSION

Even though the total number of left-behind girls exceeded that of left-behind boys in this study, no significant gender difference was observed between LBC and non-LBC. Indeed, LBC faced prolonged separation from their migrant fathers instead of mothers, with less educated fathers being more likely to migrate to support their families. However, family economic status did not differ between LBC and non-LBC. Additionally, LBC demonstrated comparable academic and behavioral performance but exhibited lower levels of social-emotional development compared to non-LBC. Moreover, there is no developmental disparity between the two groups in one-child families. However, under insufficient supervision and guidance from adults, LBC from multi-child families exhibited diminished social-emotional development, and those under the care of their siblings tended to experience less favorable emotional outcomes compared to others.

The academic success of LBC indicated progress and effectiveness of policies aimed at improving their education and underscored the pivotal role of schools and communities, besides families, in children's development, as posited by ecological system theory. Nevertheless, challenges persisted in the social-emotional domain. With the findings showing that LBC suffered from poorer social and emotional development, this study highlighted the need for educational policies that put priority on the social and emotional well-being of LBC.

Overall, mothers emerged as pivotal figures in children's social-emotional development, with maternal migration status impacting children's emotional, social, and behavioral development significantly. Specifically, children living with mothers exhibited better outcomes in these areas compared to those separated from mothers. Particularly, the strongest correlation was found between maternal migration status and children's emotional development, and emotional development varied in different mothers' educational backgrounds. Children's emotional development was also influenced by fathers' migration status and the role of other caregivers.

Based on the findings above, this study provided practical evidence of China's progress in addressing the educational challenges faced by LBC. Simultaneously, it highlighted the need to prioritize their social-emotional development. Several implications emerged for future research and educational practices. For instance, establishing comprehensive intervention and monitoring networks involving families, schools and government, as well as providing educational support on child-rearing for caregivers at home, could be beneficial for migrant families and advancing SDG 4 in China.

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