



# Externalizing Behavior Problems Among Hui Ethnicity Left-Behind Children in Rural China: A Cross-Sectional Study

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**Objective** This study aimed to investigate the prevalence of externalizing behavior problems (EBPs) and its influencing factors among Hui left-behind children (LBC) in rural China.

**Methods** A cross-sectional study was conducted among school students from the southern rural areas in Ningxia, China (2012–2013). The general self-made questionnaire, Egma Minnen av Bardndosna Uppforstran, Eysenck Personality Questionnaire (for Children), Piers-Harris Children's Self-Concept Scale, and Achenbach's Child Behavior Checklist (for parents) were used to investigate the related information. Binary logistic regressions were conducted.

**Results** The prevalence of EBPs in boys Hui LBC was significantly higher than that of non-LBC (12.37% vs. 6.84%,  $\chi^2=4.09$ , and  $p=0.04$ ). Multivariate logistic regression analysis showed that low self-awareness of behavior (odds ratio [OR]=29.78), introversion (OR=21.67) and intermediate personality (OR=15.83), poor academic performance (OR=11.65) and both parent migrating (OR=2.73) were the risk factors for the EBPs of Hui LBC, while middle and high father refusal and denial (OR=0.11, OR=0.09) were their protective factors.

**Conclusion** Our findings suggest that both parent migrating is a potential risk factor for EBPs among Hui LBC. Hui boys LBC should be paid more attention when formulating relevant policies.

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**Keywords** Hui ethnicity; Left-behind children; Externalizing behavior problems; Rural China; Cross-sectional studies.

## INTRODUCTION

Children's behavioral problems refer to the abnormal behaviors that affect children's social functions, including behavioral and emotional problems, which can be divided into two dimensions: externalizing behavior and internalizing behavior disorders.<sup>1</sup> Externalizing behavior problems (EBPs) refer to a group of behavior problems that are evident in children's outward behavior.<sup>2</sup> The China youth development report jointly released by the China Youth Research Center and

the International Liaison Department of the Central Committee of the Communist Youth League shows that about 30 million children and adolescents under the age of 17 in China are troubled by various problem behaviors, and the data is still increasing year by year.<sup>3</sup> During the past several decades, China has witnessed millions of surplus rural labor force migrating to the city for employment, forming a group of special population of left-behind children (LBC). The term "LBC" refer to children less than 16 years old staying in their rural hometowns and villages for more than half a year because both or one of their parents migrate to the city for employment, and were taken care of by their grandparents, relatives, neighbors, single parent, siblings or themselves.<sup>4</sup> According to the research report released by China women's federation in 2013,<sup>5</sup> there were about 61.02 million LBC in China, who were concentrated in the underdeveloped rural areas in the central and western regions, accounting for 37.7 percent of the total number of rural children. LBC are in a critical period of psychological growth, and the long-term absence of the role of parents will cause lasting negative impacts on their psychological devel-

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opment,<sup>6,7</sup> which is prone to higher behavioral problems,<sup>8,9</sup> among which delinquency, aggression and other EBPs are being increasingly viewed as a public health problem. If these problems are not corrected, it will seriously affect the healthy development of adolescents and lead to social problems such as juvenile delinquency and adult violence.<sup>10</sup> Moreover, Roza et al.<sup>11</sup> found that the EBPs in children and adolescents were predictive of anxiety disorders in young adulthood. Therefore, this study mainly focuses on the EBPs of Hui LBC, which is of great significance to reduce juvenile delinquency and maintain national stability.

Ningxia Hui autonomous region is located in the northwest of China, with a population of 6.30 million. Main ethnic population are Hui and Han in Ningxia, among which Hui population accounts for about 1/3 of the total population of the autonomous region. The Hui population in the southern mountainous region of Ningxia accounted for more than 60 percent, with severe water shortage, barren land, closed transportation, economy backwardness and large labor export. Miaomiao et al.<sup>12</sup> showed that the mental health of LBC in rural areas was worse than that of non-LBC in Guyuan of China. Feng et al.<sup>13</sup> took yongning county as the investigation site and found that the detection rate of behavioral problems of Hui nationality LBC was 31.25%, which was far higher than 17.84% of Han nationality LBC. Previous studies have shown that children's psychological behavioral problems are related to a variety of factors, including children's personality characteristics,<sup>14</sup> self-concept,<sup>15,16</sup> parenting behaviors,<sup>17,18</sup> and family environment factors.<sup>16</sup> A previous study showed that parental migration had a negative impact on children's EBPs.<sup>19</sup> Some studies have shown that changes in family structure in early childhood,<sup>20</sup> poor family communication and reduced positive reappraisal of mothers<sup>21</sup> are statistically associated with later increased EBPs in children. However, to date, little research has focused on the EBPs of the Chinese Hui ethnicity LBC.

Therefore, the aims of this study were to assess the prevalence of EBPs and the influencing factors among the Hui LBC in the rural areas of China. Specifically, we tested the following hypotheses: First, the EBPs would be more prevalent in Hui LBC than non-LBC. Second, under the background of Hui culture, the EBPs of Hui LBC would be related to parenting style, children's personality and children's self-concept. Finally, socio-demographic variables, including age, gender, would be correlated with the EBPs of the Hui LBC.

## METHODS

### Participants

Data were collected from a cross-sectional survey conducted in two counties Xiji, Haiyuan of Ningxia Hui autonomous

region in southern rural mountains from December 2012 to September 2013. Using multistage stratified random cluster sampling methods, we selected six primary schools, five junior high schools in XinYing Township, HongYao township, XingLong town, Xi 'An town, ShuTai township form Xiji and Haiyuan counties. One class from grade 1 to grade 9 was randomly selected from each school. A total of 41 classes were selected for the survey. A total of 2,000 questionnaires were distributed, and 1,905 valid ones were recovered, with an effective rate of 95.25%, among which 955 (50.13%) Hui ethnicity children were the subjects of this study. In these 955 participants, 383 were LBC. Inclusion criteria for LBC: 1) who stay in a rural area for more than half a year while both parents or single parents working outside. 2) They are taken care of by their grandparents, relatives, neighbors, single parent, or themselves. They are aged from 6 to 16 years old. 3) Hui ethnicity LBC. Exclusion criteria: 1) whose both parents or single parent has worked outside for less than 6 months; 2) having a serious physical or mental illness, who diagnosed with physical and mental diseases in the hospital and still taking medication. The study was approved by the ethics committee of Ningxia Medical University.

### Instruments

Sociodemographic characteristics: information about students' gender, age, nationality, academic performance, caregiver and their education level, parents' education level and occupation, frequency contact with parents and frequency contact with parents, only child, parents' divorced and parental migration status was collected.

### Achenbach's Child Behavior Checklist

The Achenbach Child Behavior Checklist (CBCL/6-18) in Chinese was used in this survey by instructing parents or guardians who were familiar with the children to report the children's behavioral problems, which is standardized well and has satisfactory psychometric properties.<sup>22,23</sup> In this study, the parent reported checklist included 113 items to identify children's behavior problems. Parents or caregivers used the 3-point Likert scale (0=not true, 1=somewhat or sometimes true, 2=very true or often true) to report children's behaviors in the past six months. Male and female students each have 8-9 kinds of specific symptoms, including schizoid, depressed, uncommunicative, obsessive-compulsive, somatic complaints, social withdrawal, hyperactivity, aggressive and delinquent behavior. Through principal component analysis of the above factors, we get two dimensions of internalizing behavior problem and EBPs. We calculated the raw score of specific symptoms and compared it with that of the norm. The higher the score was, the more obvious behavior problems were. In this

survey, boys' EBP included hyperactivity, delinquency and aggression; girls' EBPs differed by age according to the sample norm, including hyperactivity, sexual problems, delinquent, aggression and cruel. Children whose raw scores were above the upper threshold of the norm sample in at least one symptom were considered to have behavioral disorders.<sup>22</sup> The score of EBPs was calculated by adding the corresponding symptoms scores, and the repeated items were not accumulated. The Cronbach's alpha is about 0.95 for externalizing behavior in this study.

#### **Egma Minnen av Bardndosna Uppfostran**

This scale was developed by Perris et al.,<sup>24</sup> department of psychiatry, Umea University in Sweden in 1980 to assess parents' attitudes and behaviors. This study adopted the Chinese version revised by Yue<sup>25</sup> in 1993. The revised version took into accounts the cultural differences between Chinese and Western individuals, with a total of 66 items and 11 symptoms. Among them, there are 58 items of paternal rearing style, with a total of 6 symptoms, including emotional warmth and understanding, punishment and strictness, over-interference, favoring subjects, refusal and denial and over-protection. There were 57 items of maternal rearing style, with a total of 5 syndromes, including emotional warmth and understanding, over-interference and over-protection, refusal and denial, punishment and strictness and favoring subjects. This scale was later used by many researchers and obtained good reliability and validity. The test-retest reliability is between 0.58 and 0.82. The split-half reliability is between 0.50 and 0.91, and the internal consistency reliability is between 0.59 and 0.88. The scale is suitable for anyone who is children, if it is a single parent family or is an only child, and deal with related topics to make "unsuitable" for an answer. Each item is scored according to never=1, occasionally=2, often=3, always=4, and unsuitable=0. The score was determined according to the norm mean±standard deviation (SD) score. Factor scores <mean score minus SD was low score, >mean score plus SD was high score, and the rest was middle score.

#### **Eysenck Personality Questionnaire**

Personality was assessed using Eysenck Personality Questionnaire for Chinese children which revised by Gong<sup>26</sup> This version has 88 true-false items and includes four sub-scales: evaluating neuroticism (N), extroversion-introversion (E), psychoticism (P), and lie (L) dimensions. Part of the scale is the reverse scoring title. We calculated raw scores of each sub-scale, and converted into standard T points, standard T <38.5 for typical low score, 38.5 to 43.3 for tended to low score, 43.3 to 56.7 for the middle score, 56.7 to 61.5 as the tendency to high score, >61.5 for the typical high score. In binary logistic

regression analysis, the typical low score and tendency low score were further combined into low score type, and the typical high score and tendency high score were combined into high score type. The Cronbach's alpha was 0.70 for the total scale, 0.76, 0.76, 0.88, and 0.77 for E, P, N, and L, respectively.

#### **Piers-Harris Children's Self-Concept Scale**

Piers-Harris Children's Self-Concept Scale (PHCSS) is a self-rating Scale for Children compiled by American psychologists Piers and Harris in 1969 and revised in 1974. It is mainly used to evaluate Children's self-concept. It is composed of 80 items, including 6 sub-scales of behavioral, intelligence and school status, physical appearance and attributes, anxiety, popularity, happiness and satisfaction. The answer is 1, no 0, part of the question is the reverse score. In 2002, Su et al.<sup>27</sup> introduced and revised this scale, and formulated Chinese city norm,<sup>27</sup> with good reliability and validity. The score was determined according to the norm mean score±SD, the scores <mean score minus SD was low score, the scores >mean score plus SD was high score, and the rest was middle score. The higher the total score or the score of a factor was, the stronger the self-concept or self-concept in a certain aspect was. A high behavior score indicates that the child is behaving appropriately, and a high anxiety score indicates that the child is in good mood and not anxious. The half-reliability of PHCSS scale 0.82 and the Cronbach's alpha was 0.86, which was suitable for the measurement of children's self-concept in China.

#### **Procedures**

We have been supported by the local education bureau and the leaders of the surveyed schools. The head teacher issued the informed consent for the survey to the parents' Wechat group, and explained the purpose and significance of the survey in detail to the students and their parents/guardians, as well as the way of filling in the questionnaire and the confidential method. Written informed consent signed by the participants and their parents/guardians was taken back to school. Among the caretakers who lives with the child who spends the most time with the child gave priority to the evaluation. The head teacher then handed the participants' written informed consent to the investigators. After the questionnaire is distributed in class, the students are required to complete the questionnaire within the prescribed time (60–80 minutes), and the questionnaire is collected by on-site inspection. For students from grade one to grade three, the researchers read each item to the subjects in neutral, non-suggestive language, and asked them to understand and then answer. Achenbach CBCL was taken home by the students and handed over to the guardian to fill in after the communication between the head teacher and the parents. It was col-

lected within 3 days. For the missing students or incomplete answers, we conducted a family supplementary survey. A total of 122 LBC of Hui ethnicity were interviewed using the household survey. All investigators were trained in advance.

### Statistical analyses

Epidata3.0 software (The EpiData Association, Copenhagen, Denmark) was used to establish the database, double input data, and SPSS 19.0 for Windows software (IBM Corp., Armonk, NY, USA) was used for statistical analysis. The chi-square test was used for categorical variables and the independent sample t-test for continuous variables. Binary logistic regression was used to analyze the risk factors of EBPs in Hui ethnicity LBC. All tests were two-tailed, and p-value smaller than 0.05 was considered statistically significant.

## RESULTS

### Sample description

As seen in Table 1, a total of 955 Hui ethnicity children were investigated. Among them, 383 children were Hui ethnicity LBC, 50.65% of which were male. In terms of the age distribution, Hui LBC aged 6 to 11 years accounted for 29.77% (mean±SD, 12.86±2.77 years). There were 572 Hui ethnicity non-LBC, among which 263 were male (45.98%). There were 181 children (31.64%) aged 6–11 years old (mean±SD, 12.62±2.49 years). There was no significant difference in demographic characteristics between Hui LBC and non-LBC (Table 1 for details).

### Prevalence of externalizing behavior problems in Hui nationality children

Table 2 showed that the overall prevalence of EBPs of 955 Hui ethnicity children was 10.16% (97 of 955), among whom 383 Hui LBC had a prevalence of 12.53% (48 of 383) and 572 Hui non-LBC was 8.57% (49 of 572). There was no significant statistical difference between the two group ( $\chi^2=3.95$ ,  $p=0.05$ ). However, among boys of the Hui population, the prevalence of EBPs in LBC was 12.37%, which was significantly higher than that of 6.84% in non-LBC ( $\chi^2=4.09$  and  $p=0.04$ ).

### Prevalence of specific symptoms and externalizing behavior problems in Hui nationality children aged 6–11

When examining the prevalence of specific symptoms and EBPs in Hui ethnicity children, we found that there was no significant difference in the prevalence of specific symptoms and EBPs between Hui ethnicity LBC and non-LBC aged 6–11 (Table 3).

### Prevalence of specific symptoms and externalizing behavior problems in Hui ethnicity children aged 12–16

Table 3 also showed that the prevalence of specific symptoms on children's behavioral problems differed by age and sex. There was no significant difference in the prevalence of specific syndromes and EBPs between Hui ethnicity LBC and non-LBC in girls aged 12–16 (all  $p\geq 0.05$ ). However, Hui ethnicity LBC had the higher prevalence on physical complaints (13.77% vs. 5.71%), uncommunicative (10.14% vs. 3.43%), obsessive-compulsive (14.49% vs. 6.86%), hostility (11.59% vs. 2.86%), delinquent (9.42% vs. 1.71%), and EBPs (14.49% vs. 7.43%) compared with non-LBC in boys aged 12–16 ( $p<0.05$ ).

### Scores of Children's Behavior Checklist syndromes between Hui ethnicity left-behind children and non-left-behind children aged 6–11

As shown in the Table 3, except that the hyperactivity factor score of boys Hui LBC was significantly lower than that of boys Hui non-LBC ( $t=2.71$ ,  $p<0.05$ ), the difference of other symptoms was not statistically significant ( $p>0.05$ ).

### Scores of Children's Behavior Checklist symptoms between Hui ethnicity left-behind children and non-left-behind children aged 12–16

As shown in the Table 3, Hui ethnicity boys LBC had higher scores in schizoid, somatic complaints, uncommunicative, obsessive-compulsive, hostile, delinquent, aggression, hyperactivity and EBPs than that of boys non-LBC ( $p<0.05$ ). Hui nationality girls LBC got higher scores in aggression, cruel and EBPs than that of non-LBC ( $p<0.05$ ).

### Univariate analysis results

First, chi-square test was conducted on the categorical variables that affected the incidence of EBPs of Hui ethnicity LBC. It was found that the frequency of contact with teachers, academic performance and parents' working out conditions were related to EBPs of Hui ethnicity LBC (all  $p<0.05$ ) (Table 4).

Second, an independent sample t-test was conducted on the measurement data. The results showed that behavior, anxiety, popularity, happiness and satisfaction, total score of self-concept, father punishment and strictness, father favoring subjects, father refusal and denial, father over-protection, mother over-interference and over-protection, mother refusal and denial, mother punishment and strictness, E, P, N, and L were significantly related to EBP of Hui ethnicity LBC (Table 5).

**Table 1.** The demographic characteristics between Hui ethnicity LBC and non-LBC

Characteristics	LBC (N=383)		Non-LBC (N=572)		$\chi^2$	p-value
	N	%	N	%		
Sex					2.01	0.16
Male	194	50.65	263	45.98		
Female	189	49.35	309	54.02		
Age group (yr)					0.38	0.55
6–11	114	29.77	181	31.64		
12–16	269	70.23	391	68.36		
Age (mean±SD, yr)	12.86±2.77		12.62±2.49		1.40*	0.16
Only child					0.92	0.34
Yes	15	3.92	16	2.80		
No	368	96.08	556	97.20		
Mother alive					2.52	0.11
Yes	375	97.91	567	99.13		
No	8	2.09	5	0.87		
Father's education level					0.27	0.60
Junior high school or higher	77	20.10	123	21.50		
Primary school or lower	306	79.90	449	78.50		
Maternal education level					0.30	0.58
Junior high school or higher	29	7.57	49	8.57		
Primary school or lower	354	92.43	523	91.43		
Caregiver's education level					0.38	0.54
Junior high school or higher	76	19.84	123	21.50		
Primary school or lower	307	80.16	449	78.50		
Academic performance					3.86	0.15
Good (average score>80)	53	13.84	102	17.83		
Moderate (average score=60–80)	262	68.41	358	62.59		
Poor (average score<60)	68	17.75	112	19.58		
Frequency of contact with teachers					5.52	0.14
At least once a week	26	6.79	38	6.64		
At least once a month	47	12.27	92	16.08		
>Once a month	222	57.96	291	50.87		
Never contact	88	22.98	151	26.40		
Father alive					0.51	0.48
Yes	373	97.39	561	98.08		
No	10	2.61	11	1.92		
Father's occupation					2.46	0.12
Farmers	233	60.84	470	76.92		
Non-farmers	150	39.16	102	23.18		
Mother's occupation					3.43	0.06
Farmers	287	74.93	474	82.87		
Not farmers	96	25.07	98	17.13		
Parents' divorced					0.35	0.56
Yes	16	4.18	20	3.50		
No	367	95.82	552	96.50		

\*t-test. p values are from t-test (continuous variables). LBC, left-behind children

**Table 2.** Prevalence of externalizing behavior problems among different categories of Hui ethnicity children

Variables	Sample size	Positive number	Prevalence rate (%)	$\chi^2$	p-value
Children				3.95	0.05
LBC	383	48	12.53		
Non	572	49	8.57		
Total	955	97	10.16	-	
Boys				4.09	0.04
LBC	194	24	12.37		
Non-LBC	263	18	6.84		
Girls				0.85	0.36
LBC	189	24	12.70		
Non-LBC	309	31	10.03		

LBC, left-behind children

### Multivariate non-conditional logistic regression analysis results

The total score of EBPs of Hui ethnicity LBC was taken as the dependent variable (negative=0, positive=1), and 19 factors with statistical significance in univariate analysis, including behavior, anxiety, popularity, happiness and satisfaction, total score of self-concept, father punishment and strictness, father favoring subjects, father refusal and denial, father overprotection, mother over-interference and overprotection, mother refusal and denial, mother punishment and strictness, E, P, N, L, frequency contact with teacher, academic performance and parents migration status were taken as the independent variables. Multivariate non-conditional logistic regression analysis, by using forward conditions, into the standard of  $\alpha=0.05$ , exclusion criteria=0.10, showed that low self-awareness of behavior (odds ratio [OR]=29.78), introversion (OR=21.67) and intermediate personality (OR=15.83), poor academic performance (OR=11.65) and both parent migrating (OR=2.73) were the risk factors for the EBPs of Hui ethnicity LBC, while middle father refusal and denial (OR=0.11) and high father refusal and denial (OR=0.09) were the protective factors against the EBPs of Hui ethnicity LBC (Table 6).

## DISCUSSION

This study results showed that 97 out of 955 Hui children had EBPs, with a prevalence of 10.16%. Of the 383 Hui LBC, 48 had EBPs, with a prevalence of 12.53%. A total of 49 out of 572 Hui ethnicity non-LBC had EBPs, with a prevalence of 8.57%. The prevalence of EBPs was not statistically significant difference between Hui ethnicity LBC and non-LBC. However, our results<sup>28</sup> showed that the overall prevalence of behavioral problems of Hui ethnicity LBC (25.13%) was sig-

nificantly higher than that of Han ethnicity LBC (17.04%). This result was lower than the prevalence 41.3% reported by Xu et al.<sup>8</sup> But higher than 12.97% reported from China's 22 provinces to investigate children's behavior problems,<sup>22</sup> and 17.6% of Xu et al.<sup>29</sup> reported, also higher than 10.49% of shui LBC's behavior problem prevalence reported by Guo et al.<sup>30</sup> The prevalence of EBPs among Hui LBC was 12.53%, significantly higher than the 4.03% of school-age children in rural Harbin reported by Wu et al.<sup>31</sup> We analyzed that it could be related to ethnic cultural differences, different scales of use and differences in social development, but it was close to 13.2% of the prevalence of EBPs in LBC reported by Hu et al.<sup>32</sup> This study also found that there was no significant difference in the prevalence of EBPs between boys and girls of Hui LBC, which was consistent with the existing research results,<sup>31</sup> but boys Hui LBC had higher prevalence rate of EBPs than that of non-LBC.

In this study, it was found that among Hui ethnicity LBC aged 6–11, the top four prevalence of CBCL-specific syndromes of male subjects were: depression (14.29%), schizoid (8.92%), obsessive-compulsive (7.14%), uncommunicative (7.14%) and EBPs (7.14%). The top four prevalence of CBCL specific syndromes of female subjects were EBPs (13.79%), schizoid-obsessive (12.07%), cruelty (10.34%) and somatic complaints (8.62%). There was no significant difference in prevalence of CBCL-specific syndromes and EBPs between Hui ethnicity LBC and non-LBC aged 6–11, which was not consistent with that reported by Liu et al.<sup>33</sup>

Among Hui ethnicity LBC aged 12–16, the top four prevalence of CBCL-specific syndromes of male students was: obsessive-compulsive (14.49%), EBP (14.49%), somatic complaints (13.77%), and hostility (11.59%). The top four prevalence of CBCL-specific symptoms for female was schizoid (18.32%), EBPs (12.21%), cruelty (9.16%), depressed-withdrawal (7.63%) and immaturity (7.63%). This study found that with the growth of age, the prevalence of EBPs of Hui ethnicity male LBC showed an increasing trend, while the prevalence of Hui ethnicity female LBC showed no increasing trend. It was also found that Hui ethnicity male LBC aged 12–16 had significantly higher EBPs than male non-LBC. In conclusion, our study suggested that Hui ethnicity LBC aged 12–16 had higher EBPs, especially for boys.

This study found that the score of hyperactivity factor of Hui ethnicity LBC aged 6–11 years old was significantly lower than that of non-LBC, and there were no significant statistically difference in other factors of CBCL and EBPs of Hui ethnicity LBC compared with non-LBC. We analyzed that one of the reasons may be the behavioral convergence of young children due to far away from parents and inferiority complex. Another reason is that children at this age are in

**Table 3.** Prevalence and the scores of externalizing behavior problems and specific symptoms in hui ethnicity children (N=955)

Syndromes	Boys						Girls						p-value			
	Aged 6-11		Aged 12-16		Aged 6-11		Aged 12-16		Aged 6-11		Aged 12-16		Aged 6-11		Aged 12-16	
	LBC (N=56)	non-LBC (N=88)	LBC (N=138)	non-LBC (N=175)	LBC (N=58)	non-LBC (N=93)	LBC (N=131)	non-LBC (N=216)	LBC (N=53)	non-LBC (N=93)	LBC (N=131)	non-LBC (N=216)	$\chi^2_a$ (p-value)	$\chi^2_b$ (p-value)	$\chi^2_c$ (p-value)	$\chi^2_d$ (p-value)
	t <sub>1</sub>	t <sub>2</sub>	t <sub>3</sub>	t <sub>4</sub>	t <sub>5</sub>	t <sub>6</sub>	t <sub>7</sub>	t <sub>8</sub>	t <sub>9</sub>	t <sub>10</sub>	t <sub>11</sub>	t <sub>12</sub>	t <sub>13</sub>	t <sub>14</sub>	t <sub>15</sub>	t <sub>16</sub>
<b>Schizoid</b>																
PN (%)	5 (8.92)	7 (7.95)	13 (9.42)	7 (4.00)	-	-	24 (18.32)	34 (15.74)	0.04 (0.84)	-	-	3.79 (0.05)	0.39 (0.53)	-	-	-
Mean±SD	2.13±2.45	2.67±2.53	3.66±3.18	2.74±2.58	-	-	2.69±2.83	2.39±2.56	-1.28 (0.20)	-	-	2.75 (0.01)	1.02 (0.31)	-	-	-
<b>Depressed</b>																
PN (%)	8 (14.29)	7 (7.95)	-	-	2 (3.44)	6 (6.45)	-	-	1.47 (0.23)	0.18 (0.67)	-	-	-	-	-	-
Mean±SD	3.11±4.79	3.35±4.43	-	-	4.72±4.44	4.91±5.38	-	-	-0.31 (0.75)	-0.23 (0.82)	-	-	-	-	-	-
<b>Uncommunicative</b>																
PN (%)	4 (7.14)	10 (11.36)	14 (10.14)	6 (3.43)	-	-	-	-	0.70 (0.41)	-	-	5.82 (0.02)	-	-	-	-
Mean±SD	2.11±2.52	2.39±3.00	6.44±6.04	4.22±4.67	-	-	-	-	-0.58 (0.56)	-	-	3.57 (0.00)	-	-	-	-
<b>Obsessive-compulsive</b>																
PN (%)	4 (7.14)	9 (10.23)	20 (14.49)	12 (6.86)	-	-	-	-	0.40 (0.53)	-	-	4.90 (0.03)	-	-	-	-
Mean±SD	2.80±3.71	3.58±4.11	3.16±3.17	2.28±2.45	-	-	-	-	-1.15 (0.25)	-	-	2.69 (0.01)	-	-	-	-
<b>Somatic complaints</b>																
PN (%)	1 (1.79)	7 (7.95)	19 (13.77)	10 (5.71)	5 (8.62)	11 (11.83)	7 (5.34)	6 (2.78)	1.45 (0.23)	0.39 (0.53)	5.95 (0.02)	0.86 (0.35)	-	-	-	-
Mean±SD	1.34±2.12	1.93±2.92	5.16±5.30	3.65±4.19	3.24±3.75	3.55±4.16	2.70±3.04	2.43±2.78	-1.32 (0.19)	-0.46 (0.65)	2.73 (0.01)	0.87 (0.39)	-	-	-	-
<b>Social-withdrawal</b>																
PN (%)	2 (3.57)	5 (5.68)	-	-	2 (3.44)	7 (7.52)	-	-	0.03 (0.86)	0.46 (0.50)	-	-	-	-	-	-
Mean±SD	1.34±2.08	2.01±2.40	-	-	3.03±3.05	3.08±3.71	-	-	-1.72 (0.09)	-0.07 (0.94)	-	-	-	-	-	-
<b>Hyperactive</b>																
PN (%)	0	0	9 (6.52)	5 (2.86)	2 (3.45)	5 (5.38)	-	-	-	0.02 (0.88)	2.43 (0.12)	-	-	-	-	-
Mean±SD	2.20±2.25	3.39±3.01	3.96±3.49	2.98±3.04	3.05±3.19	3.53±3.74	-	-	-2.71 (0.01)	-0.80 (0.42)	2.64 (0.01)	-	-	-	-	-
<b>Aggressive</b>																
PN (%)	2 (3.57)	1 (1.14)	13 (9.42)	7 (4.00)	1 (1.72)	3 (3.23)	8 (6.11)	5 (2.31)	0.16 (0.69)	0.00 (0.97)	3.79 (0.05)	2.29 (0.13)	-	-	-	-
Mean±SD	4.98±6.19	5.45±5.86	7.04±6.47	5.62±5.61	4.62±4.37	4.80±5.80	6.71±6.13	5.37±5.09	-0.03 (1.00)	-0.20 (0.84)	2.09 (0.04)	2.11 (0.04)	-	-	-	-
<b>Delinquent</b>																
PN (%)	3 (5.36)	4 (4.55)	13 (9.42)	3 (1.71)	3 (5.17)	5 (5.38)	8 (6.11)	7 (3.24)	0.00 (1.00)	0.00 (1.00)	9.45 (0.00)	1.62 (0.20)	-	-	-	-
Mean±SD	1.52±2.69	2.16±2.55	3.08±3.78	2.29±2.71	0.74±1.60	0.61±1.24	4.63±4.32	3.76±3.56	-1.44 (0.38)	0.55 (0.58)	2.08 (0.04)	1.92 (0.06)	-	-	-	-

**Table 3.** Prevalence and the scores of externalizing behavior problems and specific symptoms in hui ethnicity children (N=955) (continued)

Syndromes	Boys						Girls						p-value			
	Aged 6-11		Aged 12-16		Aged 6-11		Aged 12-16		Aged 6-11		Aged 12-16		Aged 6-11		Aged 12-16	
	LBC (N=56)	non-LBC (N=88)	LBC (N=138)	non-LBC (N=175)	LBC (N=58)	non-LBC (N=93)	LBC (N=131)	non-LBC (N=216)	LBC (N=58)	non-LBC (N=93)	LBC (N=131)	non-LBC (N=216)	t <sub>1</sub> (p-value)	t <sub>2</sub> (p-value)	t <sub>3</sub> (p-value)	t <sub>4</sub> (p-value)
Sexual problems																
PN (%)	-	-	-	-	2 (3.45)	6 (6.45)	-	-	-	-	-	-	-	0.18 (0.67)	-	-
Mean±SD	-	-	-	-	0.93±1.55	1.23±1.76	-	-	-	-	-	-	-	-1.05 (0.30)	-	-
Cruel																
PN (%)	-	-	-	-	6 (10.34)	6 (6.45)	12 (9.16)	11 (5.09)	-	-	-	-	-	0.30 (0.58)	-	-
Mean±SD	-	-	-	-	0.98±1.90	1.06±1.78	2.19±3.49	1.36±1.96	-	-	-	-	-	-0.27 (0.79)	-	2.50 (0.01)
Schizoid-obsessive																
PN (%)	-	-	-	-	7 (12.07)	9 (9.68)	-	-	-	-	-	-	-	0.22 (0.64)	-	-
Mean±SD	-	-	-	-	1.74±2.69	1.68±2.90	-	-	-	-	-	-	-	0.14 (0.89)	-	-
Immature																
PN (%)	-	-	6 (4.35)	4 (2.29)	-	-	10 (7.63)	7 (3.24)	-	-	-	-	-	-	-	-
Mean±SD	-	-	1.72±2.10	1.36±1.84	-	-	-	-	-	-	-	-	-	-	-	-
Hostile																
PN (%)	-	-	16 (11.59)	5 (2.86)	-	-	-	-	-	-	-	-	-	-	-	-
Mean±SD	-	-	4.62±4.81	3.33±3.33	-	-	-	-	-	-	-	-	-	-	-	-
Depressed-withdrawal																
PN (%)	-	-	-	-	-	-	10 (7.63)	18 (8.33)	-	-	-	-	-	-	-	0.05 (0.82)
Mean±SD	-	-	-	-	-	-	5.73±4.95	5.19±4.73	-	-	-	-	-	-	-	1.00 (0.32)
Anxious-obsessive																
PN (%)	-	-	-	-	-	-	7 (5.34)	9 (4.17)	-	-	-	-	-	-	-	0.26 (0.61)
Mean±SD	-	-	-	-	-	-	7.27±6.13	6.40±6.02	-	-	-	-	-	-	-	1.31 (0.19)
Externalizing behavior																
PN (%)	4 (7.14)	5 (5.68)	20 (14.49)	13 (7.43)	8 (13.79)	14 (15.05)	16 (12.21)	17 (7.87)	0.00 (1.00)	0.05 (0.83)	4.08 (0.04)	1.79 (0.18)				
Mean±SD	8.07±9.19	9.48±8.75	12.04±10.96	9.41±8.94	9.33±9.20	10.23±11.09	12.31±10.98	9.78±8.45	-0.92 (0.36)	-0.52 (0.61)	2.28 (0.02)	2.26 (0.03)				

LBC, left-behind children; X<sup>2</sup><sub>a</sub>, comparison of LBC and non-LBC in boys aged 6-11; X<sup>2</sup><sub>b</sub>, comparison of LBC and non-LBC in girls aged 6-11; X<sup>2</sup><sub>c</sub>, comparison of LBC and non-LBC in boys aged 12-16; X<sup>2</sup><sub>d</sub>, comparison of LBC and non-LBC in girls aged 12-16; t<sub>1</sub>, comparison of LBC and non-LBC in boys aged 6-11; t<sub>2</sub>, comparison of LBC and non-LBC in girls aged 6-11; t<sub>3</sub>, comparison of LBC and non-LBC in boys aged 12-16; t<sub>4</sub>, comparison of LBC and non-LBC in girls aged 12-16; PN, positive number; SD, standard deviation



**Table 4.** Univariate analysis of the influence of general demographic data on externalizing behavior problems of Hui ethnicity left-behind children (N=383)

Characteristics	Total number	Positive number	$\chi^2$	P-value
Sex			0.17	0.68
Male	194	22		
Female	189	24		
Caregiver's education level			0.12	0.73
Junior high school or higher	76	10		
Primary school or lower	307	36		
Age group (yr)			0.34	0.56
6-11	114	12		
12-16	269	34		
Father's education level			2.78	0.10
Junior high school or higher	77	5		
Primary school or lower	306	41		
Maternal education level			0.37	0.55
Junior high school or higher	29	5		
Primary school or lower	354	41		
Frequency of contact with teachers			10.01	0.02
At least once a week	26	2		
At least once a month	47	4		
>Once a month	222	21		
Never contact	88	19		
Academic performance			14.98	<0.01
Good (average score>80)	53	2		
Moderate (average score=60-80)	262	27		
Poor (average score<60)	68	17		
Only child			0.32	0.57
Yes	15	3		
No	368	43		
Parents' divorced			0.11	0.74
Yes	16	1		
No	367	45		
Parental migration status			4.31	0.04
One parent migrating	252	24		
Both parents migrating	131	22		
Father's occupation			0.00	>0.99
Farmers	233	28		
Not farmers	150	18		
Mother's occupation			2.63	0.11
Farmers	287	30		
Not farmers	96	16		
Father alive			0.43	0.22
Yes	373	46		
No	10	0		
Mother alive			0.00	>0.99
Yes	375	45		
No	8	1		

primary school. Because they are far away from their parents, they learn and master certain interpersonal skills. Compared with the psychological rebellion of middle school students when they entered adolescence, primary school students had simple and peaceful psychology and relatively few behavioral problems.

Our findings showed that Hui ethnicity male LBC aged 12-16 had higher scores on schizoid, somatic complaints, uncommunicative, obsessive-compulsive, hostility, delinquent, aggression, hyperactivity and EBPs than those of male non-LBC, indicating that older Hui male LBC were more likely to have behavioral problems, which was consistent with that reported by Xu et al.<sup>8</sup> The reason may be related to boy's different physiological characteristics, personality traits and family education environment. Our findings also showed that female Hui ethnicity LBC aged 12-16 higher scores in aggression, cruelty and EBPs than those of non-LBC, suggesting that the behavior problems of the older Hui ethnicity female LBC were mainly characterized by aggression and cruelty. Thus, Hui ethnicity LBC aged 12-16 are faced with a wider range of EBPs such as delinquent, hyperactivity and aggression. After entering junior high school, because of parents and teachers pay too much attention to children's academic performance, children's learning pressure becomes larger, which may have an impact on their psychology. In addition, due to parents' migrant work, lack of parental care and discipline, the older they get, the greater their psychological needs will be. This was consistent with the increasing trend of emotional and behavioral problems in the process of children entering adolescence,<sup>34</sup> suggesting that we should focus on Hui ethnicity senior LBC, which was inconsistent with existing study,<sup>31</sup> and it was analyzed that our research objects were different from theirs.

The above results suggest that the high-age male of Hui LBC have a high prevalence rate of EBPs, which is a high-risk population in the group of LBC, and should be paid more attention to.

The results of univariate analysis showed that children's gender, caregiver's education level, parents' education level, parents divorced and only child had no effect on EBPs of Hui ethnicity LBC, which was in line with the previous research results,<sup>35</sup> but was inconsistent with the existing study reported that parents divorced may exacerbate the negative effects of parental migration.<sup>36</sup> However, the frequency of contact with teachers seemed to have an influence, but they were not independent influences in multivariate analysis, which was quite inconsistent with the existing studies.<sup>37,38</sup> The possible reason is that the subjects of this study are Hui ethnicity LBC who influenced by Hui ethnicity culture, which may have a certain regulatory effect on EBPs, or it may be related to the small sample size of this study.

**Table 5.** Univariate analysis of influence of measurement data on EBPs of hui ethnicity left-behind children (N=383)

Variables	EBPs		t	p-value
	No (N=337)	Yes (N=46)		
<b>PHCSS</b>				
Behavior	11.77±2.54	9.20±2.72	6.41	<0.01
Intellectual and school status	8.34±3.28	7.46±3.16	1.73	0.09
Physical appearance and attributes	5.60±2.76	5.52±2.69	0.18	0.86
Anxiety	8.21±2.52	6.93±2.59	3.21	<0.01
Popularity	8.17±2.06	6.87±2.26	3.96	<0.01
Happiness and satisfaction	6.58±1.95	5.91±2.19	2.15	0.03
Total score of self-concept	49.37±10.73	40.59±10.72	4.03	<0.01
<b>EMBU</b>				
Emotional warmth and understanding (F)	44.31±9.59	43.04±10.25	0.84	0.41
Punishment and strictness (F)	19.28±5.81	23.67±8.12	-3.54	<0.01
Over-interference (F)	18.64±4.61	20.41±6.23	-1.86	0.07
Favoring subjects (F)	8.71±3.10	10.00±3.67	-2.59	0.01
Refusal and denial (F)	9.16±3.12	11.20±4.29	-3.11	<0.01
Over-protection (F)	10.28±2.58	11.20±2.78	-2.23	0.03
Emotional warmth and understanding (M)	47.46±9.35	44.72±8.80	1.88	0.06
Over-interference and over-protection (M)	34.07±6.62	36.48±6.89	-2.30	0.02
Refusal and denial (M)	13.01±4.03	16.13±4.82	-4.19	<0.01
Punishment and strictness (M)	14.15±4.50	17.61±5.53	-4.06	<0.01
Favoring subjects (M)	9.91±2.98	10.48±3.40	-1.20	0.23
<b>EPQ</b>				
Extroversion-introversion	15.10±4.19	13.30±3.29	2.80	0.01
Psychoticism	10.29±4.52	11.80±4.13	-2.15	0.03
Neuroticism	4.53±2.76	6.43±2.96	-4.36	<0.01
Lie	13.44±4.25	11.59±3.72	2.82	0.01

Data are presented as mean±standard deviation. EBP, externalizing behavior problem; PHCSS, Piers-Harri Children's Self-Concept Scale; EMBU, Egma Minnen av Bardndosna Uppförstran; F, father; M, mother; EPQ, Eysenck Personality Questionnaire

**Table 6.** Results of multivariate logistic regression analysis predicting externalizing behavior problems of Hui ethnicity left-behind children (N=383)

Variables	Reference		B	SE	Wald	p-value	OR (95% CI)
Behavior	High	Low	3.39	1.18	8.34	0.04	29.78 (2.98–298.08)
		Middle	1.38	1.10	1.56	0.21	3.96 (0.46–34.46)
Extroversion-introversion	High	Low	3.08	1.11	7.66	0.01	21.67 (2.46–191.28)
		Middle	2.76	1.08	6.49	0.01	15.83 (1.89–132.41)
Father refusal and denial	Low	Middle	-2.24	1.07	4.40	0.04	0.11 (0.01–0.86)
		High	-2.40	1.12	4.55	0.03	0.09 (0.01–0.82)
Mother refusal and denial	Low	Middle	1.43	1.23	1.35	0.25	4.17 (0.37–46.45)
		High	2.31	1.26	3.35	0.07	10.08 (0.85–119.66)
Migration status	One parent migrating	Both parent migrating	1.00	0.38	6.86	0.01	2.73 (1.29–5.78)
Academic performance	Good	Poor	2.46	0.90	7.47	0.01	11.65 (2.00–67.78)
		Moderate	1.37	0.83	2.71	0.10	3.95 (0.77–20.26)
Total score of self-concept	High	Low	-1.13	1.21	0.87	0.35	0.32 (0.03–3.48)
		Middle	0.26	1.18	0.05	0.83	1.29 (0.13–12.93)
Constant			-7.59	1.88	16.36	<0.01	0.00

Hosmer and Lemeshow Test for goodness-of-fit:  $\chi^2=3.32$ ,  $p=0.85$ . The fitting is good. SE, standard error; OR, odds ratio; CI, confidence interval

The results of multivariate analysis showed that low behavior score was risk factor for EBPs of Hui ethnicity LBC, indicating that the low score of self-concept behavior tended to cause Hui ethnicity LBC to have higher EBPs, which was consistent with the existing research<sup>39</sup> that pointed out a significant negative correlation between behavioral problems and self-concept. Our findings also showed that introversion and intermediate personality were the risk factors for EBPs of Hui ethnicity LBC, which was consistent with the existing research reported that adolescent personality and externalizing problem behavior were significantly associated at the between-person level.<sup>14</sup>

The results of multivariate analysis showed that poor academic performance is an independent risk factor for the EBPs of Hui LBC. This finding is consistent with previous study has demonstrated that externalizing problem behavior is associated with academic underachievement,<sup>40</sup> and antisocial behavior and delinquency are clearly associated with underachievement of adolescence.<sup>41</sup> It is suggested that teachers and parents should pay more attention to Hui LBC with poor academic performance, and strengthen mental health education to reduce their EBPs.

This survey showed that the risk for the EBPs of Hui LBC whose parents both migrating was 2.73 times higher than that of one parent migrating, which indicated Hui LBC whose parents both migrating was more likely to exhibit the EBPs. This finding is consistent with previous study that has reported an increased risk of abnormal psychological behaviors when both parents migrating,<sup>42</sup> and in line with previous research has reported that children with both parents migrating tended to have more conflict with classmates, higher incidence of fighting and argument with peers.<sup>43</sup> Therefore, in order to reduce the Hui LBC's EBPs, interventions are needed to improve Hui LBC's communication skills with their children and trying to avoid both parents migrating.

Our research also revealed that father refusal and denial above the middle level were protective factors against EBPs of Hui LBC, which was inconsistent with existing research reported that the positive correlation between EBPs and authoritarian parenting style.<sup>44</sup> Family is not only an important cultural carrier, but also is the first learning setting children are exposed to. Parental rearing style is considered a specific educational medium through which Chinese culture and social values are passed on to children. As a result of the impact that traditional Chinese culture and the education system have on parents, a hierarchy still exists between parents and children in most Chinese families. On the one hand, if a child's behavior goes against the will of the caregiver, rejection or punishment may occur. Previous studies<sup>45,46</sup> suggested that corporal punishment by parents was strongly associated with

later children externalizing behavior, such as aggression, criminal and antisocial behavior. On the other hand, Hui ethnicity culture is a kind of national culture formed on basis of Hui culture and Chinese traditional culture. Mosque, market, and Hui community are interrelated and interdependent, and constitute three important links of Hui life: worship, commerce, and residence.<sup>47</sup> In families with plenty of time and a strong religious atmosphere, most Hui children can enrich their understanding of the religion they believe in, either through the conscious guidance of elders' words and deeds or through the religious activities they are exposed to. Hui people believe in Islam and are deeply influenced by Islamic culture. They emphasize obedience in the ethical norms of their daily life. This culture has exerted a subtle influence on Hui children through family and social education, making them unconsciously compromise instead of insisting on their own opinions when confronted with conflicts between their own and others'. With the deepening of China's reform and opening up, the construction of market economy and the influx of a large number of labor force into cities, this pattern has been damaged,<sup>48</sup> so that these LBC can't well inherit the characteristics of Hui culture, become more aggressive and indisciplined. Father refusal and denial, as a form of negative parenting, can be a form of proactive control if applied at the right time and place. Previous studies suggested that proactive control was a preventive parenting technique that anticipates undesirable adolescent behavior<sup>49</sup> and decreased externalizing problem behavior.<sup>50</sup> A meta-meta-analysis study<sup>51</sup> has shown that effective parenting behaviors that enhance children's self-regulatory skills and parent-based intervention had been proved to be effective in improving children's EBPs. Moreover, children learn moral values and social conventions through a process of socialization, much of which involves parenting styles,<sup>52</sup> and it has been proved that moral education can promote the moral development of adolescents and hopefully reduce their EBPs.<sup>53</sup>

Our research had several limitations. Firstly, due to the limited conditions, the sample population was single, involving only five township schools in two project demonstration counties, which limited the scalability of the research results and affected the external validity of this study. Secondly, we collected information from caregivers or parents about children's behavioral problems, which might lead to bias. Thirdly, the scores of the nationwide norm sample used in this study were collected through an epidemiology survey in 1992. It might lead to limitations when we used it to assess children's behavioral problems in current studies, as China has undergone dramatic development in the past decades. Finally, this survey is a cross-sectional study, and it is impossible to obtain detailed information about the complete development process and the overall trends of EBPs over time in Hui ethnicity

LBC. Furthermore, the CBCL is adopted as a screening scale in this survey. Therefore, the prevalence of EBPs and CBCL symptoms of Hui ethnicity LBC cannot be used as the basis for the diagnosis of children's emotional and behavioral problems. In order to provide more compelling evidence concerning influencing factors on EBPs of Hui nationality LBC, a longitudinal and prospective study is recommended to explore the mechanism of how these risk factors lead to EBPs.

## Conclusion

Taken together, this study showed a higher prevalence of EBPs in boys Hui LBC. Boys Hui LBC aged 12–16 had higher prevalence of EBPs than boys Hui non-LBC. Our findings suggested that parental migration was a potential risk factor for EBPs among Hui LBC in rural China. Introverted personality, intermediate personality, low self-conscious of behavior, poor academic performance and both parents migrating are independent risk factors for the occurrence of EBPs of Hui LBC. While, father refusal and denial above the middle level are protective factors against EBPs of Hui LBC. When formulating relevant policies and undertaking age and gender specific intervention measures, influencing factors should be considered to reduce the incidence of EBPs in Hui LBC.

## Availability of Data and Material

The datasets generated or analyzed during the study are available from the corresponding author on reasonable request.

## Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

## Author Contributions

Conceptualization: Xue Yu, Qiuli Li. Data curation: Lingling Wang, Miaomiao Liu. Formal analysis: Xue Yu, Lingling Wang. Funding acquisition: Xiuying Dai. Investigation: Lingling Wang, Miaomiao Liu. Methodology: Xue Yu. Project administration: Qiuli Li, Xiuying Dai. Resources: Qiuli Li. Software: Lingling Wang. Supervision: Qiuli Li. Validation: Lingling Wang, Miaomiao Liu. Visualization: Xue Yu. Writing—original draft: Xue Yu. Writing—review & editing: Xue Yu, Lingling Wang.

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