Internalizing behavior problems among hui nationality left-behind children in rural China: A cross-sectional study

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Abstract

Background: Internalizing behavior problems (IBPs) of left-behind children (LBC) due to parental migration, such as depression and anxiety, has aroused widespread public health concern in China. Limited research to date has focused on studying IBP in Chinese hui nationality LBC. The aims of this present study were to explore the prevalence of IBP and its influencing factors among hui nationality LBC in rural areas of China.

Methods: A cross-sectional study was conducted among school students from southern rural areas in Ningxia, China (2012-2013). The demographic data were investigated by a self-designed questionnaire. The caregivers or parents assessed internalizing behavior problems using Achenbach's Child Behavior Checklist (CBCL for parents). Children completed Egma Minnen av Bardndosnauppforstran (EMBU), Eysenck Personality Questionnaire (EPQ for Children) and Piers-Harri Children's Self-concept Scale (PHCSS). Data on 383 hui nationality LBC aged 6–16 years used in this study were from a survey conducted. Multivariate logistic regression analysis was used to examine the relationship among the independent variables with children's internalizing behaviors.

Results: The prevalence of IBP in hui nationality LBC and non-left-behind children (non-LBC) was 21.7% (83/383) and 18.2% (104/572), respectively, and there was no significant difference between them (χ^2=1.774 P=0.183). However, there was a significant difference in the prevalence of IBP among hui nationality LBC (22.2%) and non-LBC (14.1) for boys (χ^2=5.086 P=0.024). Controlling for gender and age, multivariate logistic regression analysis showed that high mother-favoring subjects (OR=2.697), medium neuroticism (OR=12.77) and high neuroticism (OR=8.436) were risk factors for IBP in hui nationality LBC.

Conclusions: Our findings suggest that parental migration is a risk factor for IBP among hui nationality LBC in rural China. Positive measures should be taken to prevent the IBP of LBC in rural Hui nationality from the aspects of personality development and parental rearing patterns.

Introduction

Children's behavioral problems can be divided into 'externalizing behavior' and 'internalizing behavior' disorders[1]. Internalizing behavior problems (IBPs) refer to a group of behavior problems (e.g., withdrawal, anxiety, depression, somatic complaints) that are the tendency to express distress inwards [2]. This study focuses on childhood IBP, which is a major risk factor for later internalizing disorders, including mood disorders and anxiety disorders [2]. Moreover, previous studies have shown that IBP is associated with a higher risk of physical health symptoms (such as infectious diseases, respiratory diseases, health problems associated with risk behaviors, and weight problems) in children aged 8–20 years[3, 4]. Importantly, this can cause serious functional impairments later in life[5], resulting in an inability to work properly in young adulthood[6].

In recent decades, with the continuous development of China's industrialization and urbanization, millions of low-skilled migrant workers have moved from rural areas to cities to improve the circumstances of their families and children. However, due to the restrictions of hukou and urban public resources, these migrant workers have to leave their children to study in their hometown. Therefore, a special population of left-behind

children (LBC) has been formed. LBC has been defined as children less than 16 years old who stay at hometowns for more than six months due to both or one of their parents migrating to an urban area for work and were taken care of by their grandparents, relatives, neighbors, single parent, siblings or themselves[7]. According to a research report from the China Women's Federation (2013)[8], there were approximately 61 million rural left-behind children in China, mainly in underdeveloped rural areas in the central and western regions, accounting for 37.7 percent of rural children. Children and adolescents are the critical period of psychological growth, and long-term separation of parents and children will have a lasting negative impact on their psychological development [9, 10], which is prone to IBPs such as anxiety, depression and withdrawal[11]. Previous studies have suggested that IBP is the most common mental health problem among adolescents, with prevalence rates of 31.9% for anxiety disorders and 14.3% for mood disorders[12]. These problems, if not corrected, will seriously affect the healthy development of children and adolescents.

The Ningxia hui autonomous region is located in northwest China, with a population of 6.3014 million. The main ethnic groups in Ningxia are the hui and han nationalities, among which the hui population accounts for approximately one-third of the total population of the autonomous region and one-fifth of the total population of the whole country. The hui population in the southern mountainous region of Ningxia accounted for more than 60 percent. Xiji and haiyuan, two national-level poverty-stricken counties in the southern mountainous region, are the gathering places of hui nationality, with severe water shortage, barren land, closed transportation, backward economy and large labor export. However, limited research has focused on studying IBP in Chinese hui nationality left-behind children. Zhao miaomiao et al.[13] reported that the mental health of LBC in rural areas was worse than that of non-LBC in guyuan of China. Feng yutao et al.[14] 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[15], self-concept[16–18], parenting behaviors[19, 20], and family environment factors[18]. Du yasong et al showed that family structure and environment were closely related to children's behavior development[21], and LBC, as a special family structure, will have more emotional[22] and social behavior problems[23]. Existing results showed a sizable adverse effect of exposure to parental migration on the health and education outcomes of children[24]. A previous study reported that parental migration had a negative impact on IBP in children[25]. Some research has shown that changes in family structure in early childhood[26], poor family communication and decreased maternal positive reappraisal[27] were statistically associated with children's later elevated IBP. However, limited research has focused on studying internalizing problems in hui nationality LBC, and there is still a lack of research with large sample sizes that could reveal the actual background of IBP in these children. The present study addressed the research gap by employing logistic regression analysis to examine hui left-behind children’s internalizing behaviors in the Chinese Muslim culture context.

Therefore, this study aims to answer three research questions. First, the prevalence of IBP among hui nationality LBC was investigated. Second, considering the potential influence of individual characteristics, self-concept and family environment on children's mental health, the relationship between multilevel risk factors and children's IBP was discussed. Finally, this study examined the IBP of hui nationality LBC in the context of islamic culture. This study investigated 383 hui nationality LBC and attempted to explore the

relevant factors of IBP in hui nationality LBC, which is of great significance for promoting their mental health and making relevant ethnic policies.

Methods

Participants

From December 2012 to September 2013, a cross-sectional survey was conducted in two counties of Haiyuan, Xiji, a rural mountainous area in southern Ningxia. Six primary schools and five junior middle schools in Xinying township, Hongyao Township, Xinglong Township, Xi'an Township and Shutai Township in Xji County and Haiyuan County were selected by a multistage stratified random cluster sampling method. One class from grade 1 to grade 9 was randomly selected from each school. A total of 41 classes were selected as study subjects.

A total of 2000 students were recruited, and 1905 valid ones were recovered, with a response rate of 95.25%, among which 955 (50.1%) hui nationality children were the subjects of this study. The 955 hui nationality students were divided into the LBC group (n = 383) and the non-LBC group (n = 572). Inclusion criteria for LBC: who stay in rural areas for more than half a year while both parents or single parents work outside. They are taken care of by their grandparents, relatives, neighbors, single parent, siblings or themselves. They are aged from 6 to 16 years old. Exclusion criteria: both parents or single parents had worked outside for less than 6 months and had a serious physical or mental illness.

In this study, a total of 2,000 students were recruited, and 1,905 students recovered effectively. The response rate was 95.25%, among which 955 hui children (50.1%) were the research objects. The 955 Hui students were divided into the LBC group (n = 383) and the non-LBC group (n = 572). LBC inclusion criteria: both parents or single parents working in rural areas for more than half a year. They are cared for by grandparents, relatives, neighbors, single parents, siblings or themselves. Their ages ranged from six to sixteen. Exclusion criteria: Both parents or single parents had worked outdoors for less than 6 months and had a serious physical or mental illness.

Measures

Sociodemographic characteristics:

All surveyed students were asked to fill out questionnaires containing information about the child's socio-demographic characteristics, including gender, age, nationality, grade, class, family situation, academic ability, caregivers and their education level, parents' education level and occupation, frequency of contact with parents, frequency of contact with teachers, etc. During data analysis, the above variables were controlled for as confounding factors.

Internalizing behavior problems

Achenbach's Child Behavior Checklist (CBCL) was developed by Achenbach, Ph.D, American psychology. Published in 1976[1], revised for the first time in 1983 [28]. There are three versions, including the parent report version, teacher report version and self-assessment of older children, among which the parent version has the

most experience and is the basis of the scale. This scale is applicable to children aged 4 to 16 years and has been widely used worldwide. China has also introduced and standardized the scale and formulated national and hunan norms[29, 30]. In this study, the parent report version checklists included 113 items to identify the children's behavioral problems. It was mainly used to assess children's various types of behavior for nearly six months by instructing parents or caregivers who were familiar with the children to report the children's behavioral problems on a 3-point Likert scale (0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true). Male and female students each had eight to nine specific syndromes, including schizoid, depressed, uncommunicative, obsessive-compulsive, somatic complaints, social withdrawal, hyperactivity, aggression and delinquent behavior. Through principal component analysis of the above factors, two dimensions, namely, internalizing behavior problem (IBP) and externalizing behavior problem (EBP), were obtained. We only calculated raw scores of IBP and its specific syndromes, which were used to compare with scores of the norm sample. The higher the score, the more obvious the behavior problem was. Because the measured syndromes differed by age and gender groups according to the norm sample, we calculated and compared the syndrome scores separately. Internalizing problems focus on children's emotional disturbances, including schizoid or depressed, social-withdrawal and somatic complaints. Children's raw scores were above the upper threshold of the norm sample in at least one syndrome and were considered to have behavioral disorders[30]. The IBP score was calculated by adding the corresponding syndrome scores, in which repeated items were not scored accumulatively.

Parenting style: Parenting style was measured by Egna Minnen av Barndoms Uppforstran (Chinese version) revised by Dongmei Yue [31]. Cultural differences between Chinese individuals and Western individuals are considered in the revised version, which consists of 66 items. Among them, there are 58 items of paternal rearing style, with a total of 6 syndroms, 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 syndroms, including emotional warmth and understanding, over-interference and over-protection, refusal and denial, punishment and strictness and favoring subjects. 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 score ± standard deviation. Factors < mean score - standard deviation was low score, > mean score + standard deviation was high score, and the rest was medium score. In this data set, Cronbach's α of the scale was 0.921.

Children's Personality: Personality was assessed using the eysenck personality questionnaire (EPQ for children), which was revised by Yao-xian Gong et al[32]. This version has 88 true-false items and includes four subscales: evaluating extroversion-introversion (E), neuroticism (N), psychoticism (P), and Lie (L) dimensions. Part of the scale is the reverse scoring title. We calculated raw scores of each subscale and converted them 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 medium type, 56.7 to 61.5 for the tendency to high score, and > 61.5 for the typical high score. The Cronbach's alpha was 0.70 for the total scale and 0.76, 0.76, 0.88, and 0.77 for E, P, N, and L, respectively.

Children's self-concept

Children's self-concept was measured using Piers Harris Child's self-concept Scale (PHCSS), which was introduced and revised by Su linyan et al [31, 33], with good reliability and validity. It is composed of 80 items,

including 6 subscales 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. The factor score was determined according to the norm mean score ± standard deviation, the factors < mean score -standard deviation were low score, the > mean score + standard deviation was high score, and the rest was medium score. The higher the total score or the score of a factor was, the stronger the self-awareness or self-awareness in a certain aspect was. For example, 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 the PHCSS scale was r = 0.8176, and the Cronhach 'a coefficient was 0.858, which was suitable for the measurement of children's self-concept in China.

Procedures

We obtained approval and support from the local education bureau and the leaders of the investigated schools. The head teacher issued informed consent for investigation to the WeChat group of parents. Written informed consent signed by the participants and their parents/guardians is brought back to the school. The head teacher then provided written informed consent from the participants to the researchers. After distributing the questionnaire uniformly in the class, we asked participants to complete the questionnaire within the prescribed time (60 ~ 80 min) and checked and withdrawed the questionnaire on the spot. For grade 1 to grade 3 students, the investigator read each item to the subjects in neutral, non-suggestive language and asked them to understand and then answer. Achenbach's Child Behavior Checklist (CBCL) should be taken home by the student and submitted to the caregiver for filling out after communication between the head teacher and their parents and shall be taken back within 3 days. For missing students or incomplete answers to the students, we conducted a household supplementary survey. All investigators received training in advance.

Statistical analyses

SPSS 19.0 software for Windows was utilized for data analyses. The chi-square test was used to compare the difference in enumeration data variables between the LBC and non-LBC groups. A t test was used to compare the difference in measurement data between the two groups. Binary logistic regression was employed to analyze the risk factors of IBP in hui nationality LBC. The value of p takes the probability of two sides, and α takes 0.05 as a test standard.

Results

Sample Description

As seen in Table 1, a total of 955 hui nationality children were investigated. Among them, 383 children were hui nationality LBC, 50.7% of which were male. In terms of the age distribution, hui LBC aged 6 to 11 years accounted for 29.8% (mean age = 12.86 years, SD = 2.77 years). There were 572 hui nationality non-LBC, among which 263 were male (46.0%). There were 181 children (31.6%) aged 6 ~ 11 years old (mean age = 12.6 years, SD = 2.49 years). There was no significant difference in demographic characteristics between hui LBC and non-LBC (see Table 1 for details).

Table 1
The demographic characteristics between hui nationality LBC and non-LBC.

Characteristics		LBC(n = 383)		non-LBC(n = 572)		χ^2	p-value
		N	%	N	%		
Gender	male	194	50.7	263	46.0	2.008	0.156
	female	189	49.3	309	54.0		
Age group	aged 6–11	114	29.8	181	31.6	0.379	0.538
	aged 12–16	269	70.2	391	68.4		
Average age(years)	Mean (SD)	12.86(2.77)		12.62(2.49)		1.402▲	0.161
Only child	yes	15	3.9	16	2.8	0.915	0.339
	no	368	96.1	556	97.2		
Mother alive	yes	375	97.9	567	99.1	2.521	0.112
	no	8	2.1	5	0.9		
Father's education level	junior high school or higher	77	20.1	123	21.5	0.271	0.603
	primary school or lower	306	79.9	449	78.5		
Maternal education level	junior high school or higher	29	7.6	49	8.6	0.303	0.582
	primary school or lower	354	92.4	523	91.4		
Caregiver's education level	junior high school or higher	76	19.8	123	21.5	0.383	0.536
	primary school or lower	307	80.2	449	78.5		
Academic performance	good	53	13.8	102	17.8	3.857	0.145
	moderate	262	68.4	358	62.6		
	poor	68	17.8	112	19.6		
Frequency of contact with teachers	at least once a week	26	6.8	38	6.6	5.518	0.138
	at least once a month	47	12.3	92	16.1		
	> once a month	222	58.0	291	50.9		

Note: Data are number (percentage) or mean (*SD*). ▲ *t*-test. *P* values are from *t*-test (continuous variables). LBC: left-behind children; non-LBC: non-left-behind children.

Characteristics		LBC(n = 383)		non-LBC(n = 572)		χ^2	p-value
		N	%	N	%		
	never contact	88	23.0	151	26.4		
Father alive	yes	373	97.4	561	98.1	0.505	0.477
	no	10	2.6	11	1.9		
Father's occupation	farmers	233	60.8	440	76.9	28.531	0.000
	non- farmers	150	39.2	132	23.1		
Mother's occupation	farmers	287	74.9	474	82.9	8.917	0.003
	Not farmers	96	25.1	98	17.1		
Parents' divorced	yes	16	4.2	11	1.9	4.244	0.039
	no	367	95.8	561	98.1		

Note: Data are number (percentage) or mean (*SD*). ▲ *t*-test. *P* values are from *t*-test (continuous variables). LBC: left-behind children; non-LBC: non-left-behind children.

The prevalence of IBP in hui nationality children

Table 2 shows that the overall prevalence of IBP in 955 hui nationality children was 19.58% (187/955), among which 383 hui LBC had a prevalence of 21.7% (83/383) and 572 hui non-LBC was 18.2% (104/572). There was no significant difference between the two groups (χ^2 = 1.774,P = 0.183). However, there was a significant difference in the prevalence of IBP among hui nationality LBC (22.2%) and non-LBC (14.1) in boys (χ^2 = 5.086P = 0.024). The prevalence of IBP in hui nationality LBC was 14.1% in boys and 21.7% in girls, and the difference between the two groups was statistically significant (2 = 5.537, P = 0.019).

Table 2
Prevalence of IBP among different categories of hui nationality children (%)

Variables		internalizing behavior problems				
		Sample size	Number	prevalence	χ^2	*P*-value
Age group	aged 6–11	295	56	19.0	0.097	0.755
	aged 12–16	660	131	19.8		
LBC	yes	383	83	21.7	1.774	0.183
	non	572	104	18.2		
Boys	LBC	194	43	22.2	5.068	0.024
	non-LBC	263	37	14.1		
Girls	LBC	189	40	21.2	0.019	0.891
	non-LBC	309	67	21.7		
LBC	boys	194	43	22.2	0.057	0.812
	girls	189	40	21.2		
non-LBC	boys	263	37	14.1	5.537	0.019
	girls	309	67	21.7		

Prevalence of IBP and specific syndromes in hui nationality children aged 6 ~ 11

In the investigation of IBP and specific syndromes in hui children, we found that there was no significant difference in the prevalence of IBP and specific syndromes between hui nationality LBC and non-LBC aged 6 ~ 11 years (P value > 0.05). (See Table 3 for details).

Table 3
Prevalence IBP and specific syndromes in hui nationality children aged 6–11 years (%)

syndromes	Boys aged 6–11				Girls aged 6–11			
	LBC(n = 56)	non-LBC (n = 88)	χ^2	*P*-value	LBC (n = 58)	non-LBC (n = 93)	χ^2	*P*-value
Schizoid	5(8.9)	7(8.0)	0.043	0.837	—	—	—	—
Depressed	8(14.3)	7(8.0)	1.470	0.225	2(3.4)	6(6.5)	0.183	0.669
uncommunicative	4(7.1)	10(11.4)	0.695	0.405	—	—	—	—
Obsessive-Compulsive	4 (7.1)	9 (10.2)	0.396	0.529	—	—	—	—
Somatic Complaints	1(1.8)	7(8.0)	1.446	0.229	5(8.6)	11(11.8)	0.388	0.533
Social-Withdrawal	—	—	—	—	2 (3.4)	7 (7.5)	0.457	0.499
Schizoid-Obsessive	—	—	—	—	7 (12.1)	9(9.7)	0.216	0.642
Internalizing behavior	10(17.9)	16(18.2)	0.002	0.961	10(17.2)	20(21.5)	0.408	0.523
Prevalence of IBP and specific syndromes in hui nationality children aged 12–16.								

Table 4 shows that there were significant differences in somatic complaints, uncommunicative, obsessive-compulsive, and internalizing behavior.

(all $P < 0.05$) between hui nationality LBC and non-LBC in the boys group aged 12–16 years. There was no significant difference in the prevalence of internalizing behavior and specific syndromes between hui nationality LBC and non-LBC in the girls aged 12 to 16 years (all $P = > 0.05$).

Table 4
Prevalence IBP and specific syndromes in hui nationality children aged 12–16 years (%)

syndromes	Boys aged 12–16				Girls aged 12–16			
	LBC (n = 138)	non-LBC (n = 175)	χ^2	*P*-value	LBC (n = 131)	non-LBC (n = 216)	χ^2	*P*-value
Somatic Complaints	19(13.8)	10(5.7)	5.953	0.015	7(5.3)	6(2.8)	0.862	0.353
Schizoid	13(9.4)	7(4.0)	3.790	0.052	24(18.3)	34(15.7)	0.390	0.532
uncommunicative	14(10.1)	6(3.4)	5.819	0.016	—	—	—	—
Immature	6(4.3)	4(2.3)	1.061	0.303	10(7.6)	7(3.2)	3.377	0.066
Obsessive-Compulsive	20(14.5)	12(6.9)	4.901	0.027	—	—	—	—
Anxious-Obsessive	—	—	—	—	7 (5.3)	9(4.2)	0.257	0.612
Depressed-Withdrawal	—	—	—	—	10(7.6)	18(8.3)	0.054	0.817
Internalizing behavior	33(23.9)	21(12.0)	7.670	0.006	30(22.9)	47(21.8)	0.062	0.804

Total scores of IBP and specific syndromes for hui nationality children aged 6–11

As shown in Table 5, there was no statistically significant difference in the total scores of IBP and specific syndromes between hui nationality LBC and non-LBC (all $P > 0.05$).

Table 5
Total scores of IBP and specific syndromes for hui nationality children aged 6–11 ($\bar{\chi} \pm s$)

syndromes	Boys				Girls			
	LBC(n = 56)	non-LBC(n = 88)	*t*	*P*	LBC (n = 58)	non-LBC (n = 93)	*t*	*P*
Schizoid	2.13 ± 2.45	2.67 ± 2.53	-1.276	0.204	—	—	—	—
Depressed	3.11 ± 4.79	3.35 ± 4.43	-0.314	0.754	4.72 ± 4.44	4.91 ± 5.38	-0.225	0.822
uncommunicative	2.11 ± 2.52	2.39 ± 3.00	-0.578	0.564	—	—	—	—
Obsessive-Compulsive	2.80 ± 3.71	3.58 ± 4.11	-1.146	0.254	—	—	—	—
Somatic Complaints	1.34 ± 2.12	1.93 ± 2.92	-1.317	0.190	3.24 ± 3.75	3.55 ± 4.16	-0.458	0.648
Social-Withdrawal	1.34 ± 2.08	2.01 ± 2.40	-1.720	0.088	3.03 ± 3.05	3.08 ± 3.71	-0.070	0.944
Schizoid-Obsessive	—	—	—	—	1.74 ± 2.69	1.68 ± 2.90	0.136	0.892
Internalizing behavior	9.39 ± 11.63	11.39 ± 12.14	-0.976	0.330	11.52 ± 11.29	12.03 ± 12.81	-0.251	0.802

Total scores of IBP and specific syndromes for hui nationality children aged 12–16

As shown in Table 6, the hui nationality LBC of boy students had higher scores in schizoid, somatic complaints, uncommunicative, obsessive-compulsive, and IBP than that of non-LBC ($P < 0.05$). However, there was no significant difference in the total IBP score or the constituent syndromes between female hui LBC and female non-LBC (all $P > 0.05$).

Table 6
Total scores of IBP and specific syndromes for hui nationality children aged 12–16 ($\bar{\chi} \pm s$)

syndromes	Boys				Girls			
	LBC (*n* = 138)	non-LBC (*n* = 175)	*t*	*P*	LBC (*n* = 131)	non-LBC (*n* = 216)	*t*	*P*
Schizoid	3.66 ± 3.18	2.74 ± 2.58	2.746	0.006	2.69 ± 2.83	2.39 ± 2.56	1.020	0.308
Somatic Complaints	5.16 ± 5.30	3.65 ± 4.19	2.734	0.007	2.70 ± 3.04	2.43 ± 2.78	0.865	0.388
Uncommunicative	6.44 ± 6.04	4.22 ± 4.67	3.565	0.000	—	—	—	—
Immature	1.72 ± 2.10	1.36 ± 1.84	1.636	0.103	5.11 ± 4.38	4.25 ± 3.86	1.911	0.057
Obsessive-Compulsive	3.16 ± 3.17	2.28 ± 2.45	2.685	0.008	—	—	—	—
Anxious-Obsessive	—	—	—	—	7.27 ± 6.13	6.40 ± 6.02	1.306	0.192
Depressed-Withdrawal	—	—	—	—	5.73 ± 4.95	5.19 ± 4.73	0.996	0.320
Internalizing behavior	17.72 ± 14.88	12.74 ± 11.93	3.203	0.002	16.39 ± 13.01	14.65 ± 12.21	1.256	0.210

Univariate analysis results

First, a chi-square test was conducted on the counting data that affected the incidence of IBP of hui nationality LBC, and it was found that no factors were related to IBP of hui nationality LBC (all $P > 0.05$) (see Table 7 for details).

Second, a t-test was conducted on the measurement data, and the results showed that behavior, anxiety, popularity, happiness and satisfaction, total score of self-concept, father punishment and strictness, father favoring subjects, mother refusal and denial, mother punishment and strictness, mother favoring subjects, extroversion-introversion (E), and neuroticism (N) were related to IBP of hui nationality LBC (see Table 8 for details).

Table 7
Univariate analysis of the influence of general demographic data on IBP of hui nationality LBC (n = 383)

Characteristics		Internalizing behavior problems			
		total number	positive number	χ2	*P*-value
Gender	male	194	43	0.057	0.812
	female	189	40		
Caregiver's education level	junior high school or higher	76	21	1.984	0.159
	primary school or lower	307	62		
Age group	aged 6–11	114	20	1.629	0.202
	aged 12–16	269	63		
Father's education level	junior high school or higher	77	13	1.302	0.254
	primary school or lower	306	70		
Maternal education level	junior high school or higher	29	5	0.363	0.547
	primary school or lower	354	78		
Frequency of contact with teachers	at least once a week	26	4	6.239	0.101
	at least once a month	47	11		
	> once a month	222	41		
	never contact	88	27		
Academic performance	good	53	8	1.590	0.452
	moderate	262	60		
	poor	68	15		
Only child	yes	15	3	0.000▲	1.000
	no	368	80		
Parents' divorced	yes	16	1	1.487▲	0.223
	no	367	82		
Working out conditions	Single parents go out	252	53	0.177	0.674

Note: ▲**Continuous correction chi-square values.**

	Both parents go out	131	30		
Father's occupation	farmers	233	54	0.794	0.373
	Not farmers	150	29		
Mother's occupation	farmers	287	60	0.395	0.530
	Not farmers	96	23		
Father alive	yes	373	46	1.681▲	0.195
	no	10	0		
Mother alive	yes	375	82	0.041▲	0.839
	no	8	1		

Note: ▲Continuous correction chi-square values.

Table 8
Univariate analysis of the influence of measurement data on IBP of hui nationality LBC (n = 383) ($\bar{\chi} \pm s$)

Variables	Internalizing behavior problems		t	*P*-value
	no(300)	yes(83)		
PHCSS				
Behavior	11.69 ± 2.61	10.65 ± 2.82	3.150	0.002
Intellectual and School Status	8.34 ± 3.36	7.86 ± 2.93	1.202	0.230
Physical Appearance and Attributes	5.65 ± 2.80	5.39 ± 2.57	0.765	0.445
Anxiety	8.26 ± 2.56	7.34 ± 2.45	2.924	0.004
Popularity	8.16 ± 2.14	7.49 ± 2.01	2.529	0.012
Happiness and Satisfaction	6.62 ± 1.94	6.08 ± 2.10	2.171	0.031
Total Score of self-concept	49.46 ± 11.03	45.29 ± 9.96	3.112	0.002
EMBU				
Emotional warmth and understanding(F)	44.31 ± 9.58	43.63 ± 10.02	0.567	0.571
Punishment and strictness(F)	19.30 ± 5.92	21.65 ± 7.21	-3.044	0.002
Over-interference(F)	18.72 ± 4.68	19.36 ± 5.45	-1.071	0.285
Favoring subjects(F)	8.67 ± 3.10	9.57 ± 3.44	-2.276	0.023
Refusal and denial(F)	9.30 ± 3.23	9.80 ± 3.72	-1.204	0.229
Over-protection(F)	10.26 ± 2.61	10.86 ± 2.61	-1.827	0.069
Emotional warmth and understanding(M)	47.40 ± 9.17	46.18 ± 9.84	1.053	0.293
Over- interference and over-protection(M)	34.16 ± 6.56	35.10 ± 7.13	-1.129	0.259
Refusal and denial(M)	13.09 ± 4.24	14.47 ± 4.14	-2.638	0.009
Punishment and strictness(M)	14.26 ± 4.71	15.67 ± 4.85	-2.409	0.016
Favoring subjects(M)	9.81 ± 2.90	10.58 ± 3.44	-2.057	0.040
EPQ				
Extroversion-introversion (E)	15.22 ± 4.15	13.69 ± 3.82	3.021	0.003
Neuroticism (N)	10.05 ± 4.53	11.98 ± 4.07	-3.495	0.001
Psychoticism (P)	4.61 ± 2.81	5.29 ± 2.94	-1.930	0.054
Lie (L)	13.33 ± 4.23	12.82 ± 4.19	0.968	0.333

Note: father(F), mother(M)

Multivariate non-conditional logistic regression analysis results

As shown in Table 9 and Table 10, the total IBP score of hui nationality LBC was taken as the dependent variable (negative = 0, positive = 1), and 12 factors with statistical significance in univariate analysis, including behavior, anxiety, popularity, happiness and satisfaction, total self-concept score, father punishment and strictness, father favoring subjects, mother refusal and denial, mother punishment and strictness, mother favoring subjects, extroversion-introversion and neuroticism, were taken as the independent variables. Multivariate nonconditional logistic regression analysis, by using forward conditions, into the standard of alpha = 0.05, exclusion criteria = 0.10, showed that high mother favoring subjects (OR = 2.697), medium neuroticism (OR = 12.77) and high neuroticism (OR = 8.436) were risk factors for IBP of hui nationality LBC.

Table 9
Assignment table of non-conditional logistic regression analysis

Variables	The assignment
Internalizing behavioral problems(Y)	Negative = 0, Positive = 1
Behavior(X1)	Low score = 1,Medium score = 2High score = 3
Anxiety(X2)	Low score = 1,Medium score = 2High score = 3
Popularity(X3)	Low score = 1,Medium score = 2High score = 3
Happiness and Satisfaction(X4)	Low score = 1,Medium score = 2High score = 3
Total Score of self-concept(X5)	Low score = 1,Medium score = 2High score = 3
Father punishment and strictness(X6)	Low score = 1,Medium score = 2High score = 3
Father favoring subjects(X7)	Low score = 1,Medium score = 2High score = 3
Mother refusal and denial (X8)	Low score = 1,Medium score = 2High score = 3
Mother punishment and strictness (X9)	Low score = 1,Medium score = 2High score = 3
Mother favoring subjects (X10)	Low score = 1,Medium score = 2High score = 3
Extroversion-introversion (X11)	Low score = 1,Medium score = 2High score = 3
Neuroticism (X12)	Low score = 1,Medium score = 2High score = 3

Table 10
Results of multivariate logistic regression analysis predicting IBP of hui nationality LBC (n = 383)

variables	reference		B	S.E.	Wald	*P*-value	OR (95%CI)
Mother favoring subjects	Low	Medium	0.088	0.408	0.047	0.829	1.092(0.491 ~ 2.430)
		High	0.992	0.488	4.125	0.042	2.697(1.035 ~ 7.024)
Neuroticism	Low	Medium	2.198	0.615	12.771	0.000	9.007(2.698 ~ 30.068)
		High	2.132	0.627	11.559	0.001	8.436(2.467 ~ 28.842)
constant			-3.425	0.703	23.757	0.000	0.033

Note: Hosmer and Lemeshow Test for goodness-of-fit:$\chi 2 = 0.668$,$P = 0.881$.. The fitting is good.

Discussion

This research found that 187 out of 955 hui children had internalizing behavior problems (IBPs), with a prevalence of 19.58%. Among the 383 hui LBC, 83 persons had IBP, with a prevalence of 21.7%. A total of 104 out of 572 hui nationality non-LBC had IBP, with a prevalence of 18.2%. The prevalence of IBP was not significantly different between hui nationality LBC and non-LBC. However, our findings showed that male hui nationality LBC was more likely to have a higher prevalence than non-LBC. In terms of the prevalence of IBP, the prevalence of hui nationality LBC was 21.7%, which was significantly higher than 6.3% of school-age children in rural areas of Harbin reported by Wu Lijie et al[34] and higher than 15.19% of the prevalence of IBP in LBC reported by Hu H et al[35]. Our results also showed that there was no significant difference in the prevalence of IBP between boys and girls of hui LBC, which was inconsistent with previous research results that suggested that girls were higher than boys [6, 36]. We analyzed that it could be related to differences in ethnic cultural and social development.

In this study, it was found that among Hui nationality LBC aged 6–11 years old, the top three prevalences of CBCL-specific syndromes in male subjects were IBP (17.9%), depression (14.3%), and schizoid (8.9%). The top three prevalences of CBCL-specific syndromes in female subjects were IBP (17.2%), schizoid obsessive (12.1%), and somatic complaints (8.6%). There was no significant difference in the prevalence of specific syndromes and IBP between hui nationality LBC and non-LBC aged 6 ~ 11 years, which was not consistent with that reported by Liu shumiao et al[37].

Among the LBC of hui nationality aged 12–16 years old, the top three prevalences of CBCL-specific syndromes among male students were IBP (23.9%), somatic complaints (13.8%), and hostility (11.6%). The top three prevalences of CBCL-specific syndromes for girls were IBP (22.9%), schizoid (18.3%), depressed-withdrawal (7.6%), and immaturity (7.6%). This study found that with increasing age, the prevalence of IBP in

male hui nationality LBC showed an increasing trend, while the prevalence in female hui nationality LBC showed no increasing trend. In other words, hui left-behind children aged 12–16 have the phenomenon of comorbidity between externalizing and internalizing behavior problems[38], especially for boys.

Our study results show that hui nationality LBC in low age groups are less likely to have IBP. The reason is that children at this age stage are in 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 study showed that male hui nationality LBC aged 12–16 years old had higher scores on schizoid, somatic complaints, uncommunicative, obsessive-compulsive, and IBP than those of non-LBC, indicating that older male hui LBC were more likely to have behavioral problems, which was consistent with that reported by Wei-min Xu[39]. The reason may be related to the boy's different physiological characteristics, personality traits and family education environment. After entering junior high school, because 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[40], suggesting that we should focus on senior hui nationality LBC.

The results of univariate analysis showed that children's gender, caregiver's education level, parents' education level, parents' divorce, frequency of contact with teachers, and parents' working outside situation did not seem to affect the IBP of hui nationality LBC, which is inconsistent with the existing research[41, 42]. The analysis suggests that they may play an indirect role by influencing the development of children's personality and self-consciousness. However, the research found that behavior, anxiety, popularity, happiness and satisfaction, total score of self-concept, father punishment and strictness, father favoring subjects, mother refusal and denial, mother punishment and strictness, mother favoring subjects, extroversion-introversion personality and neuroticism were related to the IBP of Hui left-behind children.

Multivariate analysis showed that the more mothers preferred subjects, the more neurotic the children were (above the middle score), which was an independent risk factor for the IBPs of hui left-behind children, which was not completely consistent with the independent factors influencing the incidence of overall behavioral problems of Hui left-behind children in our study[43].

This study results show that the negative parenting styles, such as the more mothers prefer subjects, the more likely Hui nationality LBC are to have IBP. The more unstable children's emotions are[44], the more likely they are to have IBP dominated by anxiety and depression, etc. The analysis suggests that overindulgence of children by mothers may lead to children's lack of self-restraint and independence, thus leading to children's behavior deviating from the normal range[45]. Family is not only an important cultural carrier but is also 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. Hui culture is an ethnic culture formed on the basis of Islamic culture and traditional Chinese culture. Mosque, market and Hui community are interlinked and interdependent, which constitute three important links of Hui life: worship, commerce and residence[46]. In families with plenty of time and a strong religious atmosphere, most Muslim young people can enrich their understanding of the religion they believe through religious activities consciously guided or contacted by parents' words and deeds because religious parents are more likely to manifest their religious values and beliefs through their daily interactions with their children[47]. This culture subtly influences Hui children through family and social education, making them no longer adhere to their own views in the face of conflicts with others but unconsciously compromise. With the deepening of China's reform and opening up, the construction of the market economy and the influx of a large number of labor forces into cities, the pattern of mosque, market and Hui community has been destroyed[48]. This will affect the family education mode and religious belief system of Hui children, resulting in confusion, anxiety and depression[49].

Our study had several limitations. First, due to the limitations of the conditions, the selected sample population was single, involving only 5 township schools in 2 project demonstration counties, which limited the extensibility of the study results and affected the external validity of this study. Second, we collected information from caregivers or parents about children's behavioral problems, which might lead to bias. Third, 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, the research object of this paper is mainly left-behind children in school, not considering other children dropping out of school. At the same time, 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 IBP over time in hui nationality LBC. Furthermore, the CBCL is adopted as a screening scale in this survey. Therefore, the prevalence of IBP and CBCL syndromes of hui nationality LBC cannot be used as the basis for the diagnosis of children's emotional and behavioral problems. Therefore, to provide more compelling evidence concerning influencing factors on IBP of hui nationality LBC, a longitudinal and prospective study is recommended to explore the mechanism of how these risk factors lead to IBP at the individual and group levels.

Conclusion

This study showed that male hui nationality LBC was more likely to have a higher prevalence of IBP than non-LBC. Our findings suggested that parental migration was a potential risk factor for IBP among hui nationality LBC in rural China. Mothers prefer subjects, and medium neuroticism and high neuroticism are independent influencing factors for the occurrence of IBP in hui nationality LBC. Positive measures should be taken to prevent the IBP of hui nationality LBC in rural areas of China from the aspects of personality development and parental rearing patterns.

Abbreviations

The following abbreviations are used in this manuscript:

LBC: Left-behind children; non-LBC: non-left-behind children; IBPs: internalizing behavior problems; CBCL: Achenbach's Child behavior Checklist; EMBU: Egma Minnen av Bardndosnauppforstran; EPQ: Eysenck Personality Questionnaire; PHCSS: Piers-Harri Children's Self-concept Scale.

Declarations

Ethics approval and consent to participate

Ethics approval was obtained from the Ethics Committees at Ningxia Medical University. Written informed consent was obtained from the students or caregiver in advance.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the present study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author Contributions

XY and QL conceptualized and designed the study. LW and ML contributed to the study design and data collection. XY, LW and QL analyzed the data and drafted the manuscript. XD and LL obtained the funding of this survey and supervised the study. All authors reviewed the manuscript and approved the final manuscript.

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