

## Regular Article

# Risk factors for psychopathology among Chinese children

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## Abstract

The present study was designed to examine the family environment and child characteristics associated with psychopathology among Chinese children. A large epidemiological sample of 1695 children aged 6–11 was drawn from 12 elementary schools in Linyi Prefecture of China. Parents completed the Child Behaviour Checklist, the Family Environment Scale, and a self-administered questionnaire including a number of items with regard to family, parental, and child characteristics. Results indicated that the overall prevalence of child psychopathology was 17.2%. Logistic regression analyses showed that a number of family and parental, as well as prenatal, perinatal and postnatal risk factors had significant association with child psychopathology. The most notable risks were derived from poor parental rearing with regard to the child's misbehaviour, low birthweight, and poor marital relations of the parents after controlling for other factors. These findings are consistent with previously reported risk factors for child psychopathology, highlighting the importance of family and early childhood intervention as a measure to prevent child psychopathology in China.

## Key words

children, logistic regression, psychopathology, risk factors.

## INTRODUCTION

Identification and awareness of risk factors for child psychopathology is essential for the planning and delivery of mental health service. Although a number of risk factors associated with child psychopathology have been identified in Western countries, it cannot be assumed that the same factors will operate in China because of the enormous differences between Western and Chinese societies.

In China, with the reform of social and economic systems, traditional concepts and values, lifestyles and family structure are undergoing remarkable change as a result of industrialization, urbanization, and family planning. The psychosocial factors have played a

more and more important role in the development of physical and mental health problems in Chinese people.<sup>1,2</sup> Dramatic reductions in infant and child mortality, and family planning have led to an increased interest in the mental health of Chinese children.

Since the late 1980s, studies have reported on various aspects of Chinese children's psychological problems, and their correlates (such as single-child status, life events).<sup>3–9</sup> Prevalence rates among Chinese children in previous studies were reported from 3.1 to 13%, depending upon case ascertainment, case definition, duration, and setting.<sup>4,6</sup> However, most of the previous studies were undertaken only in large municipal areas, their sample sizes were relatively small, and the effects of psychosocial factors on children's psychological problems have not been systematically investigated yet.<sup>5,7–9</sup>

The current epidemiological study with a large number of children aged 6–11 years ( $n=1695$ ), was carried out to determine the associations of child psychopathology with family (especially family functioning and rearing method), child and biological risk

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factors. The second aim was to examine which factor has the largest association with psychopathology in Chinese children. Furthermore, we aimed to provide sound scientific data for future intervention and prevention of child psychopathology in China.

## SUBJECTS AND METHODS

### Subjects and procedures

In 1997, an epidemiological survey on mental health problems among children aged 6–11 years was carried out in Linyi Prefecture of Shandong Province, which is located in the eastern part of China. Twelve towns were sampled, using the stratified-cluster method, according to social economic status. We explained the aims of the project to the local education committee and got informed consent to carry out the survey. According to our research design, the committee selected one elementary school in each targeted town, as representative of schools of average education level in the area. Finally, a total of 1800 pupils were enrolled in the study. Parents were asked to attend the schools and complete the Child Behaviour Checklist (CBCL),<sup>10</sup> the Family Environment Scale (FES),<sup>11</sup> and a self-administered questionnaire.

### Measures

The CBCL was used to obtain a standardized parents' report on the children's behavioral and emotional problems.<sup>10</sup> It is generally accepted as a psychometrically sound screening instrument for child psychopathology.<sup>12,13</sup> The CBCL's scores also correlate significantly with psychiatric diagnoses from structured interviews.<sup>14</sup> The CBCL contains 118 specific behavioral and emotional problem items and 2 open-ended items for additional problems. The respondent can answer '0' if the problem item is not true of the child, '1' if the item is somewhat or sometimes true, and '2' if it is very true or often true. The parents were asked to score each item that describes the child now or within the past 6 months. By summing the 1s and 2s on all items, nine syndromes, two broadband groups of syndromes (Internalizing and Externalizing), and a total problem score can be computed. The higher the score, the more severe the psychopathology. A Chinese version of the CBCL was used, which previous studies have confirmed its acceptable reliability and validity in Chinese children.<sup>9,15,16</sup> The nine syndromes and their cut-off (i.e. 98th percentiles) for Chinese children were described as follows: Schizoid or Anxious (6), Depressed (10), Uncommunicative (6), Obsessive-Compulsive (9), Somatic Complaints (7), Social

Withdrawal (6), Hyperactive (11), Aggressive (20), and Delinquent (8) for boys; Depressed (14), Social Withdrawal (9), Somatic Complaints (9), Schizoid-Obsessive (4), Hyperactive (11), Sex Problems (4), Delinquent (3), Aggressive (19), and Cruel (4) for girls.<sup>9,10</sup>

The FES was applied as a multidimensional measure of global family functioning and environment, assessing cohesion, expressiveness, conflict, independence, achievement, knowledge, entertainment, moral/religious belief, organization and control.<sup>11</sup> Each subscale consists of nine true-false items. The subscales have acceptable internal consistencies and test-retest reliabilities.<sup>11</sup> Following Moos and Moos's procedure,<sup>11</sup> we calculated scores for each subscale. For the purposes of this study, a total score of less than one standard deviation of the mean for cohesion, expressiveness, independence, achievement, knowledge, entertainment, moral/religious belief and organization was considered indicative of poor family functioning. In contrast, a total score of more than one standard deviation of the mean for conflict and control was considered indicative of poor family functioning. We chose to analyze each subscale as a dichotomous variable to increase its clinical relevance.<sup>17</sup> A Chinese version of the FES (FES-CV)<sup>18</sup> was used and its acceptable psychometric properties have also been confirmed in Chinese populations.<sup>18</sup>

In addition to the CBCL and FES, a self-administered questionnaire was devised to elicit information from parents concerning sociodemographic characteristics, paternal and maternal age, education, occupation, physical health status, personality trait (i.e. introversion, extroversion, and between), marital relations, rearing method with regard to the child's misbehaviors, and prenatal, perinatal, and postnatal suspected risk factors as well.

### Data analysis

Following Achenbach and Edelbrock's definition,<sup>10</sup> if a child obtained a score on any syndromes at or above the Chinese CBCL norms<sup>9</sup> as described above, he/she was considered to be a case with psychopathology. Otherwise, he/she was defined as normal.

A series of logistic regression analysis was performed to explore the association of suspected risk factors with child psychopathology. All variables were initially examined in univariable models. The final multivariable logistic regression model included all variables retaining significance at  $\alpha=0.05$  level after a stepwise elimination procedure. All of the statistical analyses were performed with SPSS 7.5 for Windows (SPSS Inc., Chicago, IL, USA).

**Table 1.** Sample characteristics

	<i>n</i>	(%)
Sex		
Boys	861	(50.8)
Girls	834	(49.2)
Age (years)		
6	288	(17.0)
7	392	(23.1)
8	300	(17.7)
9	238	(14.0)
10	206	(12.2)
11	271	(16.0)
Responders		
Mothers	1331	(78.5)
Fathers	316	(18.6)
Grandparents	48	(2.8)

## RESULTS

### Sample characteristics

Of the 1800 pupils who were sampled from 12 elementary schools, 1695 returned statistically available data, with a response rate of 94%. The characteristics of the sample are described in Table 1.

The family size, including the subject, was 4.6 ( $SD=1.8$ ). The majority of fathers (71%) and mothers (84%) were farmers or laborers. Sixty-nine percent of the fathers and 87% of the mothers had only primary or junior high school education. Mean maternal age was 34.7 years ( $SD=4.7$ ), and the mean paternal age was 35.4 years ( $SD=4.8$ ).

### Age, sex and child psychopathology

In this sample, 292 children obtained scores on at least one syndrome at or over the Chinese CBCL norms. The overall prevalence of psychopathology was 17.2% (95%  $CI=15.4-19.0\%$ ). There was significant difference between boys (21.0%) and girls (13.6%) ( $\chi^2=16.24$ ,  $P<0.01$ ), whereas no significant age effect on the prevalence was found ( $\chi^2=3.84$ ,  $d.f.=5$ ,  $P>0.05$ ).

### Parental factors associated with child psychopathology

Table 2 presents parental factors and their unadjusted odd ratios (OR) for psychopathology among Chinese children. Low education, chronic physical illness, and introversion of personality type for both parents increased the risk of child psychopathology signifi-

cantly. Children with psychopathology were significantly more likely to be exposed to poor marital relations of parents and child-parents relations than those free from psychopathology. Physical punishment for child's misbehaviors showed the strongest association with psychopathology, with an OR of 15.6 (95%  $CI=10.5-23.1$ ). Parental age and occupation showed no significant association with child psychopathology.

### Family functioning and child psychopathology

In order to examine the association of family functioning with child psychopathology, we defined each subscale of the FES as a dummy variable indicative of poor family functioning. As displayed in Table 2, conflict families were at great risk for child psychopathology (OR=8.2). Children in low cohesion homes were more than six times more likely to be disturbed compared with those in high cohesion homes. Other family functioning with a significant association with child psychopathology in univariable analyses were poor expressiveness (OR=2.4), achievement (OR=2.2), moral/religious belief (OR=1.8) and organization (OR=2.9), as well as lack of independence (OR=1.6) and knowledge (OR=2.0) in the home. The FES subscales of entertainment and control were unrelated to child psychopathology.

### Prenatal, perinatal, and postnatal factors associated with child psychopathology

Unadjusted OR and their 95% confidence intervals for prenatal, perinatal, and postnatal factors are presented in Table 3.

Prenatal adversity and delivery complications significantly increased the risk for psychopathology. Children with low birthweight (<2.5 kg) were four times more likely to be disturbed when compared with those with normal birthweight. Delay in walking (OR=2.4) and speech (OR=2.4), as well as bedwetting persisting for up to 4 years of age or older (OR=3.3) were also risks for psychopathology. It should be noted that physical diseases (including high fever, infections of the central nervous system, malnutrition, brain injury, and diseases of the heart, liver and kidney) under 3 years of age had a stronger association with child psychopathology (OR=5.3, 95%  $CI=3.7-7.7$ ).

### Multiple logistic regression analysis

Multiple logistic regression analysis was used to estimate the association of child psychopathology

**Table 2.** Family factors associated with child psychopathology

Variables	N	Cases		Crude	
		No.	%	OR	95% CI
Paternal factors					
Education: Primary school or illiterate	296	66	22.3	1.5	1.1–2.0*
Chronic physical illness	73	30	41.1	3.6	2.2–5.9**
Introversion of personality	120	30	25.0	1.7	1.18–2.6*
Maternal factors					
Education: Primary school or illiterate	806	202	25.1	1.4	1.1–1.8**
Chronic physical illness	41	17	41.5	3.5	1.9–6.7**
Introversion of personality	174	43	24.7	1.7	1.2–2.4*
Marital relations of parents					
Poor	439	103	23.5	2.1	1.6–2.7**
Very poor	52	34	65.4	12.8	7.0–23.2**
Rearing method to deal with child's misbehaviors					
Strict blame	128	49	38.3	5.3	3.6–7.8**
Physical punishment	133	86	64.7	15.6	10.5–23.1**
Indifference and neglect	16	8	50.0	8.5	3.1–23.0**
Child–parents relations					
Poor with mother or father	115	44	38.3	3.5	2.3–5.2**
Poor with both parents	45	18	40.0	3.8	2.0–7.0**
FES: Cohesion <sup>a</sup>	131	68	51.9	6.5	4.5–9.4**
Expressiveness <sup>a</sup>	143	45	31.5	2.4	1.7–3.5**
Conflict <sup>b</sup>	167	92	55.1	8.2	5.8–11.4**
Independence <sup>a</sup>	214	50	23.4	1.6	1.1–2.2*
Achievement <sup>a</sup>	216	62	28.7	2.2	1.6–3.0**
Knowledge <sup>a</sup>	223	60	26.9	2.0	1.4–2.7**
Moral/Religious belief <sup>a</sup>	125	33	26.4	1.8	1.2–2.8**
Organization <sup>a</sup>	121	43	35.5	2.9	2.0–4.4**

OR, odds ratio; CI, confidence interval; FES, Family Environment Scale.

<sup>a</sup> Respondents scoring one standard deviation below the mean; <sup>b</sup> respondents scoring one standard deviation above the mean.

\*  $P < 0.05$ ; \*\*  $P < 0.01$  (logistic regression Wald  $\chi^2$ -test).

**Table 3.** Prenatal, perinatal, and postnatal factors associated with psychopathology

Variables	N	Cases		Crude	
		No.	%	OR	95% CI
Prenatal adversity (infections, complications, life stress, drug usage, physical diseases, etc.)	113	46	40.7	3.7	2.5–5.6**
Delivery complications (anoxia, difficult labour, mechanical injuries, prematurity, etc.)	89	30	33.7	2.6	1.6–4.1**
Low birthweight (<2.5 kg)	29	13	44.8	4.0	1.9–8.5**
Delay in walking (>18 months)	24	8	33.3	2.4	1.0–5.8*
Delay in speech (>18 months)	77	25	32.5	2.4	1.5–4.0**
Bedwetting ( $\geq 4$ years of age)	198	72	36.4	3.3	2.4–4.6**
Physical diseases <sup>a</sup> under 3 years of age	132	63	47.7	5.3	3.7–7.7**

OR, odds ratio; CI, confidence interval.

<sup>a</sup> Physical diseases including high fever, infections of the central nervous system, malnutrition, brain injury, and diseases of the heart, liver, and kidney.

\*  $P < 0.05$ ; \*\*  $P < 0.01$  (logistic regression Wald  $\chi^2$ -test).

**Table 4.** Multiple logistic regression analysis with stepwise elimination procedure at the  $\alpha = 0.05$  significance level for entry into the model

Variables	Adjusted	
	OR	95% CI
Sex: male	2.6	1.9–3.6**
Marital relations of parents		
Poor	1.5	1.1–2.1*
Very poor	3.2	1.5–6.6**
Prenatal adversity (infections, complications, life stress, drug usage, physical diseases, etc.)	2.3	1.3–3.8**
Low birthweight (<2.5 kg)	3.2	1.2–8.7**
Bedwetting ( $\geq 4$ years of age)	2.8	1.8–4.2**
Physical diseases <sup>a</sup> under 3 years of age	2.6	1.6–4.1**
Rearing method for dealing with child's misbehaviors		
Strict blame	3.1	0.9–9.9
Physical punishment	8.3	5.2–13.2**
Indifference and neglect	3.8	2.5–5.9**
FES		
Organization <sup>b</sup>	1.7	1.0–2.8*
Conflict <sup>c</sup>	2.6	1.7–4.0**

OR, odds ratio; CI, confidence interval; FES, Family Environment Scale.

All odds ratios are adjusted for other variables.

<sup>a</sup> Physical diseases including high fever, infections of the central nervous system, malnutrition, brain injury, and diseases of the heart, liver, and kidney; <sup>b</sup> respondents scoring one standard deviation below the mean; <sup>c</sup> respondents scoring one standard deviation above the mean.

\*  $P < 0.05$ ; \*\*  $P < 0.01$  (logistic regression Wald  $\chi^2$ -test).

with each of the risk factors significant in univariable models while simultaneously adjusting for confounding by other exposures. Adjusted OR for other variables from multivariable logistic regression analysis are shown in Table 4.

As indicated in Table 4, poor rearing methods for dealing with the child's misbehaviors presented the strongest association with psychopathology, with OR of 8.3 (95% CI=5.2–13.2) for physical punishment, and 3.8 (95% CI=2.5–5.9) for indifference and neglect. Other significant variables in the final multivariable model were male gender, poor marital relations of the parents, prenatal adversity, low birthweight, bedwetting persisting for up to 4 years of age or older, physical diseases in the first 3 years of life, as well as conflict and poor organization in the home.

## DISCUSSION

The present results indicated that psychopathology in Chinese children was significantly associated with a number of family and biological risk factors. Multivariable logistic regression analysis revealed that the following factors were independently associated

with increased risk for child psychopathology: poor rearing methods for dealing with the child's misbehaviors, low birthweight, poor marital relations of the parents, bedwetting persisting for up to 4 years of age or older, male gender, family conflict, physical diseases and disability, prenatal adversity (e.g. infections, complications, and psychological distress), and poor organization in the home. These findings support the previous reports that the aetiology of child psychopathology is multifactorial.<sup>4,8,19</sup>

It is well known that 'One child in one family' is the principal policy for family planning in China. Children's health and development has become a matter of the utmost concern in families due to dramatic reductions in infant and child mortality, as well as to family planning. Several studies reported that psychological and behavioral problems, such as aggressive behavior, immature behavior, dependence, self-selection of diet and obesity, were prevalent in Chinese children in large part due to parental overexpectancy and over-involvement, and a lack of basic knowledge in rearing children.<sup>4,7–9</sup> However, the association of family factors with child psychopathology has not been well understood in China. In order to examine the association, we divided family



factors into three parts: parental characteristics (i.e. age, education, occupation, physical health, marital relations, child–parents relations, and rearing methods for dealing with the child's misbehaviors), family functioning as assessed by the FES, and general characteristics (i.e. family size, family income, and housing conditions). A series of logistic regression analysis showed that parental characteristics and poor family functioning had a much stronger association with child psychopathology than other factors. Physical punishment for the child's misbehaviors is the strongest predictor after controlling for other factors (OR=8.3, 95% CI=5.2–13.2). These findings highlight the importance of family intervention as one possible strategy to prevent child psychopathology in China.

A large body of literature links abnormalities of pregnancy, delivery and the neonatal period with an increased risk of neurological and psychiatric disorders, both in childhood and in adult life.<sup>20</sup> Several studies also found that parents of low birthweight children reported a higher prevalence of problems involving social development and school performance, which persisted to early adolescence.<sup>21,22</sup> In the present study, we found that prenatal adversity, delivery complications, and low birthweight significantly associated with child psychopathology in univariable models. Low birthweight (OR=3.2, 95% CI=1.2–8.7) and prenatal adversity (OR=2.3, 95% CI=1.3–3.8) remained significant after controlling for other factors. Early intervention programs and long-term follow-up therefore seem to be advisable for these children. Further research might explore more securely the relationship between biological risks (e.g. abnormal cerebral imaging findings) and later development of low birthweight children and those exposed to prenatal adversity and delivery complications.

Furthermore, we found that a delay in development increased the risk for child psychopathology significantly. A child with bedwetting that persisted for up to 4 years of age or older was almost three times (OR=2.8, 95% CI=1.8–4.2) more likely to be disturbed than those ceasing bedwetting under 4 years of age, after adjusting for other factors. From the retrospective study, we could not conclude whether the association between a delay in development and psychopathology is aetiological or comorbid, but these findings are important in suggesting the need for early intervention for those children with a delay in development.

Although the sample was considerably large with a high response rate, and well-established instruments were used, the interpretation of the findings from the

present study must take into account the following limitations of the study. First, parents were the sole source of information regarding child psychopathology and all of the related factors. Second, the identification of child psychopathology only relied on CBCL, which is a screening instrument despite its sufficient reliability and validity. Last, it should be also noted that the present findings were cross-sectional and retrospective. We could not completely rule out the possibility of recall bias, especially for some risk factors originating from the prenatal and early childhood periods. Longitudinal studies with more rigorous design including multiple informants (parents, teachers, and peers), clinical assessment and records are needed to explore the causal linkage between family environment, parental rearing methods, prenatal and developmental factors and child psychopathology.

In conclusion, these findings indicate that psychopathology in Chinese children is associated with multiple psychosocial and biological factors, with familial factors as the strongest predictors. Although the correlation between these factors and child psychopathology is not a novel finding, it is, however, extremely relevant in China, where rapid social change has resulted in increasing stresses on family life, leading to an increase in child psychopathology. These findings highlight the importance of family and early childhood intervention as a possible measure to prevent child psychopathology in China.

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