

Research Article

DEPRESSIVE DISORDERS AMONG CHILDREN IN THE TRANSFORMING CHINA: AN EPIDEMIOLOGICAL SURVEY OF PREVALENCE, CORRELATES, AND SERVICE USE

Bao-liang Zhong, M.D.,^{1†} Jun Ding, M.D.,^{1†} Hong-hui Chen, M.D., Ph.D.,^{1,2*} Yi Li, M.D.,¹ Han-ming Xu, M.D.,¹ Jun Tong, M.D.,¹ An-qi Wang, M.D.,³ Guang-zong Tang, M.D.,⁴ Jia-sheng Zhu, M.D.,⁵ Dong-quan Yang, M.D.,⁶ Bo Liu, M.D.,⁷ Qiang Wang, M.D.,⁸ Wu-fu Cheng, M.D.,^{1,9} E. Yin, M.D.,⁶ Mei-jun Xu, M.D.,⁷ Tao Zhang, M.D.,⁸ Tian-ming Hu, M.D.,⁹ Xiao-wei Feng, M.D.,³ Hui Li, M.D.,⁴ Tang-qun Dan, M.D.,⁵ Gang-ming Cheng, M.D.,¹ Jian-fang Zhang, M.D.,¹ Hong-jie Li, M.D.,¹ and Jun-hong Zhu, M.D.¹

Background: *To date, no one-phase survey of childhood depression has been performed in China that involves both urban and rural community children. The objective of this study was to determine the prevalence, correlates, and mental health service utilization of depressive disorders (DDs) in a community-based sample of 6–14-year-old children in south-central China. Methods:* Children (3,582) were approached through multistage sampling and interviewed using a Chinese version of the Mini International Neuropsychiatric Interview for Children and Adolescents 5.0, which is a structured interview that is administered by trained psychiatrists to obtain information from children and their guardians. **Results:** *The overall prevalence of all current DDs was found to be 2.8% (95%CI: 1.5–3.9). The risk factors for depression included being 9–14-year old, not attending school, having unmarried parents, living in a nonnuclear family (single parent or parentless family), being taken care of by people other than two parents (single parent, grandparent(s), other relatives, or others) during the past year, and not being breastfed prior to 1 year of age. Only 5.8% of the depressed children had received professional help prior to the interview. Conclusions:* *The prevalence of DDs among children in this part of China is relatively high compared with most figures reported in other countries. Depression in this age group has been a major public health concern, but it is often underrecognized. There is*

¹Affiliated Mental Health Center, Tongji Medical College of Huazhong University of Science and Technology, Wuhan, Hubei, P. R. China

²Wuhan Health Bureau, Wuhan, Hubei, P. R. China

³Wuhan Special Care Hospital, Wuhan, Hubei, P. R. China

⁴Xiaogan City Social Welfare and Medical Rehabilitation Center, Xiaogan, Hubei, P. R. China

⁵The Second Affiliated Hospital of Xianning Medical College, Xianning, Hubei, P. R. China

⁶Yichang Special Care Hospital, Yichang, Hubei, P. R. China

⁷Jingzhou Mental Health Center, Jingzhou, Hubei, P. R. China

⁸Huangshi Mental Health Center, Huangshi, Hubei, P. R. China

⁹Wuhan Wudong Hospital, Wuhan, Hubei, P. R. China

[†]The first two authors contributed equally to this work.

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*Correspondence to: Hong-hui Chen, Vice-director General Office, Wuhan Health Bureau, No. 20, Jiangnan North Road, Jiang'an District, Wuhan, Hubei, P. R. China. E-mail: Dr.Chen_Honghui@hotmail.com or c_honghui@hotmail.com

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Key words: *depression; prevalence; correlate; service; children*

INTRODUCTION

Depression is currently the second leading cause of disability, and it is predicted that it will be the highest medically related cause of death and disability worldwide by 2030.^[1] Several studies have revealed that depressive symptoms are among the most common psychiatric health complaints in children and adolescents in China^[2] and western countries.^[3] The presence of depression in childhood significantly increases the risk of comorbid psychiatric illnesses^[4] and physical disorders.^[5] Furthermore, both retrospective and prospective studies have shown that the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition) diagnoses of anxiety, mood, and multiple substance use disorders in adulthood are significantly predicted by childhood depression.^[6–8] Depression negatively impacts children's growth and development, school performance, and peer or family relationships, and it may lead to suicide.^[9] The negative ways in which children are affected by depression highlight the importance of gaining an understanding of the magnitude, risk factors, and mental health service utilization of depressive disorders (DDs) in children and adolescents. However, in contrast to the numerous epidemiological studies of DDs in adults, the epidemiology of DDs in children has received less research attention, especially in China.

Although epidemiological estimates on the prevalence rates of DDs vary depending on the investigation method, informant report, standardized assessment measure, and diagnostic criteria used,^[10] results from prevalence studies indicate that childhood DDs are not rare.^[11] Dysthymic disorder (DYD) has a current prevalence of 0.6–1.7% in prepubertal children and 1.6–8% in adolescents.^[12] The past-year prevalence rates from previous studies showed a median prevalence estimate of 4.0%, with a range of 0.1–8% for major depressive disorder (MDD).^[13–15] Costello et al. performed a meta-analysis of 26 studies and found that the current prevalence rates of DDs were 2.8% for children under 13 years of age and 5.6% for 14–18-year-old.^[16] In terms of lifetime prevalence, rates as high as 25% by the end of adolescence have been reported.^[4]

It is thought that socio-cultural factors play an important role in the occurrence of mental disorders. Today, Chinese children and adolescents are facing more tremendous socioeconomic transformations than their predecessors. Due to the competitive education system and high parental expectations of academic performance, Chinese students are suffering from high levels of academic stress associated with high school and uni-

versity entrance examinations.^[17,18] Shifting socioeconomic structures have also led to profound changes in the organization of family life. In rural China, due to urbanization, an enormous number of rural laborers are continually migrating to cities in search of better job opportunities. Among these laborers, most of the young parents have to leave their children behind for financial reasons. Thus, millions of children are remained in the rural communities and taken care of by single parents, grandparents, other relatives, or themselves.^[19] Liu et al. found that the children who were left at home and separated from their parents at a younger age had more depressive symptoms.^[19] It is expected that the prevalence of DDs would increase in the context of China's urbanization.

Sample selection is one of the most important factors affecting prevalence. Two-phase studies in schoolchildren, which have the advantages of good sampling efficiency and low cost, are very popular in prevalence estimation of child and adolescent mental disorders.^[20] These studies^[21–34] firstly screened a large sample of schoolchildren with a short depression screening scale and then selected a subsample for a more in-depth standardized diagnostic interview. While it should be noted that these school-based surveys could potentially lead to a selection bias,^[35] as those have mental disorders, i.e. schizophrenia and MDD, are more likely to discontinue their schooling, thus could not be sampled.^[36,37] Childhood depression surveys in communities^[38–42] showed relatively higher prevalence rates than surveys in schools (community children: range = 0.0–4.9%, median = 1.4%, mean = 1.7%; school children: range = 0.0–4.8%, median = 1.2%, mean = 1.3%). As a consequence, existing school-based studies might underestimate the prevalence of DDs in children. Along with the representativeness of the sample, these two-phase studies have also been criticized for a loss of precision in the prevalence estimation.^[43] To the best of our knowledge, only 4 two-phase studies^[23–26] that both use stringent methods and are published in local journals have assessed the prevalence of childhood depression in urban schoolchildren of mainland China. A well-designed study of the prevalence of childhood DDs in a representative community-dwelling sample in China is lacking.

The current study was carried out to (1) provide prevalence estimates of DDs among children living in urban and rural communities of Wuhan, China; (2) identify risk factors of childhood DDs; and (3) investigate the mental health service use of children with DDs. This study was part of a large-scale epidemiological survey

of the prevalence of psychiatric disorders in the population aged ≥ 6 years in Wuhan, China. Because subjects aged ≥ 15 years were categorized into the adult sample and interviewed using an adult mental disorder assessment tool, the present study only reported the results of children aged 6–14 years.

METHODS

SETTING

This survey was conducted in Wuhan, which is a large metropolitan city in south-central China and is the capital of Hubei province. It has a population of approximately 10,020,000 people, and approximately 63.1 and 36.9% residents live in its urban and rural areas, respectively. Like other major cities in China, it is characterized by rapid economic growth and urbanization, with the portion of the urban population growing from 38.1% in 1980 to 65.6% in 2010.^[44] For several years, it has been ranked number 12 in the top 50 cities of China for comprehensive economic strength. According to the official reports, it is also one of the major migrant labor exporting regions in China.^[45]

SUBJECTS AND SAMPLING

Based on previous studies,^[16,24–26] we presumed the prevalence rate of DD was 0.025, with a precision of 0.011, a response rate of 0.85, a confidence interval of 95% (95% CI), and a design effect of 1.2. PASS 2008 (LLC, Kaysville, UT, USA) estimated the sample size to be approximately 4,500. In this study, eligible subjects are defined as follows: (1) community children who were 6–14-year old; (2) children whose parents or guardians agreed to participate; and (3) children who had been living in Wuhan for at least 6 months by November 15, 2009, irrespective of their household registration status (local permanent resident or nonlocal resident). Children were excluded if any of the following criteria were met: (1) no parent or guardian could give informed consent; (2) disabilities due to deafness and aphasia; (3) severe physical illness that obstructs communication; or (4) obvious intellectual disorder.

We adopted a multistage, stratified cluster, random sampling method to obtain a representative sample of children. In stages 1 and 2 of sampling, the 13 districts in Wuhan were divided into two strata (urban versus rural) on the basis of economic conditions, and then 16 subdistricts in urban strata and nine townships in rural strata were randomly selected, respectively. Twenty-eight urban communities from identified subdistricts and 18 rural communities from identified townships were randomly selected proportional to size in stage 3. In the fourth stage, 80–120 households in each identified community were randomly selected. One child was randomly selected from those who were 6–14-year old in each selected household in the final sampling stage. A flow-chart describing the sampling details and participation rates is depicted in Fig. 1.

INSTRUMENTS AND MEASURES

DSM-IV DDs were assessed using the Chinese version of the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID) 5.0.^[46,47] with parallel child/adolescent (MINI-KID-C) and parent (MINI-KID-P) interview versions. The MINI-KID is a structured clinical diagnostic interview designed to assess the presence of DSM-IV mental disorders in children and adolescents aged 6–17 years. Both Chinese versions of the MINI-KID have been proven to be reliable and valid for mental disorders in Chinese children and adolescents.^[46,47] In our survey, DD was considered to be present when either the parent or child version of MINI-KID met the full DSM-IV DD diagnostic criteria.

To diagnose minor depressive disorder (MIDD, one type of depressive disorder not otherwise specified), we changed the skip rule of MINI-KID MDD module. Our interviewers were asked to continue to inquire about the clinical significance of depressive symptoms if the respondents presented with more than one depressive symptom item instead of the original rule, which requires at least five symptom items. This survey included MDD, DYD, and MIDD for establishing DD diagnoses based on a 1-month time frame, and thus provided the current prevalence rates of DDs.

In addition, each subject was given a questionnaire that inquired about the respondent's age, gender, education year, marital status of his/her parents, family type, local residency status, mode of delivery, breastfeeding status, relationship of family members, parenting style, caregiver, and other socio-economic variables. In regards to the mental health service utilization, depressed respondents were asked if they had sought help or treatment for their emotional problems in their lifetime and what types of service they had received. According to the providers of mental health services, the care-seeking behaviors were classified into three categories: never sought help, saw a mental health professional (e.g. psychiatrists, psychologists, or licensed psychological consultants/counselors), or only saw a nonmental health professional (e.g. nonpsychiatric physicians/pediatricians, nurses, herbalists, witch doctors, or religious specialists).

PROCEDURES

The survey was performed from November 2009 through June 2010. Before respondents and their guardians were interviewed, a written informed consent was obtained from their guardians, and declarations of anonymity and confidentiality were made. The Research Ethics Committee of Wuhan Mental Health Center approved this protocol. Professional treatment suggestions were also provided to the guardians of participants with diagnosed mental disorder.

Face-to-face interviews occurred in the subject's home. Two interviewers were assigned to each household to complete interviews separately (one administered the MINI-KID-C, the other one administered the MINI-KID-P), for the purpose of reducing interference with the respondent's family life. Children younger than 13 years were administered the MINI-KID-C interview along with their guardians. Questions were directed to the children, but the parents were encouraged to interject if they felt that the children's answers were unclear or inaccurate. For children aged 13 and 14 years, the MINI-KID-C was administered without a parent present. The MINI-KID-P was administered to the guardian of the subject. The interviewer made the final decision using his/her best clinical judgment regarding whether a participant's answers met the diagnostic criteria for the questions.

QUALITY CONTROL

The interviews were administered by 18 trained psychiatrists who were selected from eight psychiatric hospitals in Hubei Province and had at least 2 years of clinical experience. The psychiatrists underwent a 56-hr training program that included an overview of the MINI-KID, a detailed explanation on the use of the MINI-KID, role play, mock interviews, interview techniques, patient interviews, and survey procedures. The training program was closely monitored and supervised by two senior child psychiatrists. At the end of the program, all the interviewers attended an inter-rater reliability test involving six outpatients with childhood depression, two bipolar adolescents, four schizophrenia children, four pupils, and three middle-school students. The kappa values between interviewers were very good (0.84 for the MINI-KID-C and 0.82 for the MINI-KID-P).

To guarantee the representativeness of our community sample, we used the Family Policy Register System of the respective community to select the households with at least one child in the eligible age

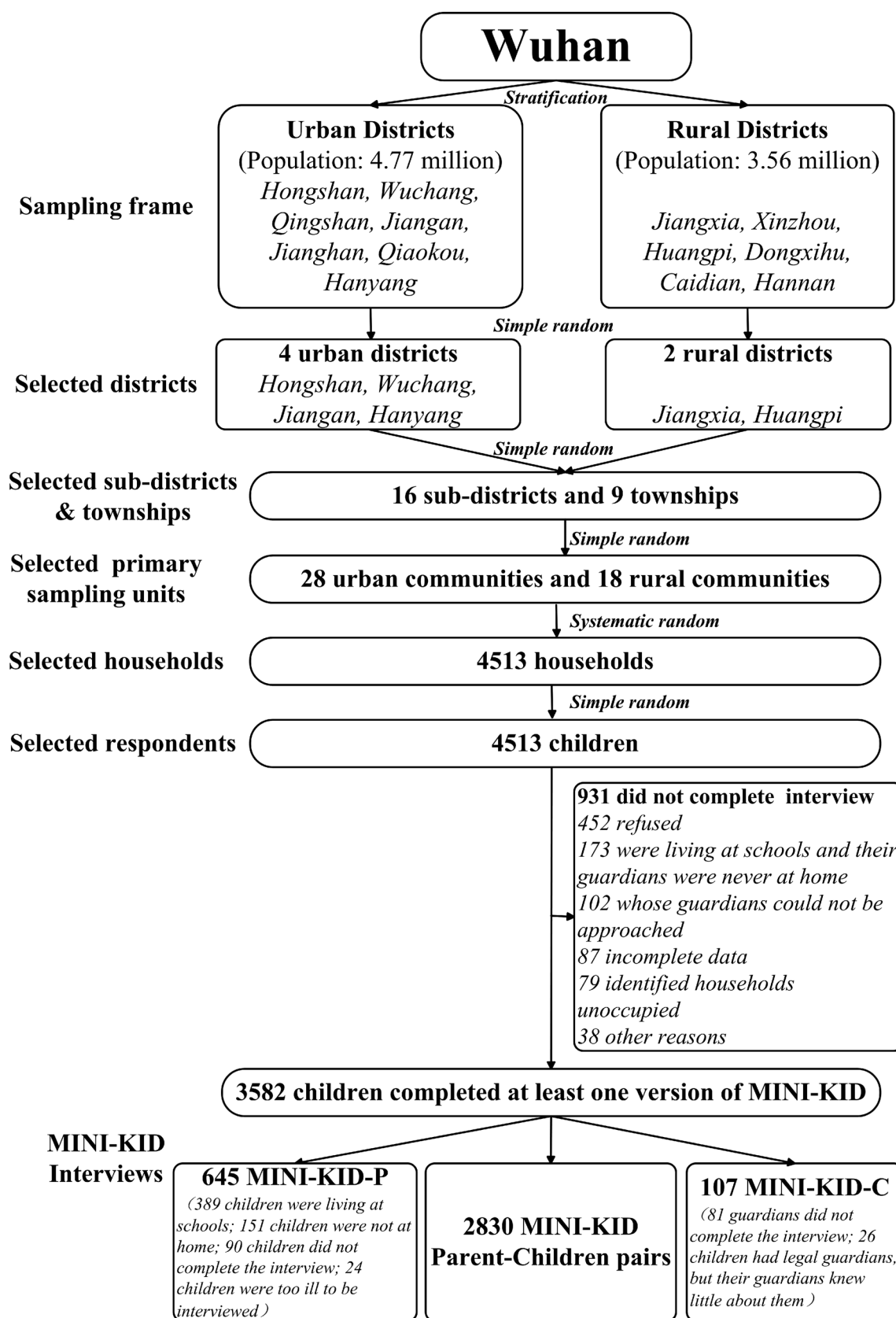


Figure 1. Flowchart of sampling and subject recruitment.

range. The Family Policy Register System belongs to “One-Child-Per-Family Policy,” which is a mandatory national policy to control the Chinese population. This system has the most comprehensive and up-to-date registration rate of community households with children and adolescents.

Prior to the survey, a pilot study of 423 households was conducted in one urban community and one rural community, and 24 depressed subjects were identified through the MINI-KID interviews. Two senior child psychiatrists reassessed these depressed children and 18 normal children with DSM-IV criteria in a double-blind style and found that the agreement coefficient was excellent ($\kappa = 0.94$).

During the survey period, the team leader randomly selected 5% of the respondents and assigned two blinded psychiatrists to reassess them with the MINI-KID independently. One hundred and forty-seven children completed the reassessment, and the kappa value for any DD was 0.93. The concordance of the MINI-KID-P with the MINI-KID-C was found to be 0.85.

All the interviewers were required to submit the interview records on each working day. The data check on the completeness and logicity was completed before the interviewer's submission. Errors and other flaws were solved at the scene.

STATISTICAL ANALYSIS

Respondents who completed either version of the MINI-KID were weighted up to project to the original sample size and were corrected with nonresponse rates by age, sex, and region. We used the Complex Survey module in SPSS 17.0 for Windows to estimate the prevalence of DDs and the respective CIs. We examined associations of any DD with age, gender, and region using χ^2 and χ^2 for trend. The multivariate logistic regression model within the Complex Survey module was used to identify factors associated with depression. Associations between depression and all potential predictors were assessed in univariate analyses, followed by multivariate analyses of the selected subsets. A variable was selected if it was statistically significant at the nominal two-sided 0.05 level in the univariate analysis. Risk ratios (RRs) with 95% CIs were generated for each variable.

RESULTS

SAMPLE CHARACTERISTICS

A total of 3,582 (79.4%) children were interviewed with at least one version of the MINI-KID: 752 (21.0%) subjects completed one version of the MINI-KID and 2,830 (79.0%) subjects completed both child and parent version of the MINI-KID, respectively (Fig. 1). A total of 931 subjects were ineligible for the diagnostic interview for various reasons. Compared to the 3,582 completers, the 931 noncompleters had a higher proportion of rural kids (43.1% versus 38.2%, $\chi^2 = 7.39$, $P = .007$) and older children (10.77 ± 3.42 versus 9.89 ± 2.53 , $t = 8.74$, $P < .001$) but were comparable in the proportion of girls (45.0% versus 47.6%, $\chi^2 = 1.95$, $P = .162$).

Detailed socio-demographic, economic, parental, school, and family variables are shown in Table 1.

PREVALENCE OF CHILDHOOD DDs

The weighted prevalence of any DD was found to be 2.8% (95%CI: 1.5–3.9) (Table 2). Among the DDs, the most common category was MDD with a prevalence of 1.4% (95%CI: 1.0–1.8). Overall, DDs were significantly

more common among girls, rural children, and older kids.

Figure 2 presented the gender-specific prevalence rates of DDs from ages 6–14. Rates were similar before the age of 9 and increased steadily after the age of 10 in both sexes, but were markedly higher in girls between the ages of 10 and 14.

CORRELATES OF CHILDHOOD DDs

In the multivariate analysis (the last column of Table 1), depression was significantly correlated with the older age groups (9–11-year old and 12–14-year old), not attending school, having unmarried parent(s), living in a nonnuclear family (single parent family or parentless family), being taken care of by people other than both parents (single parent, grandparent(s), other relatives, or others) during the past year, and not being breastfed before 1 year of age.

MENTAL HEALTH SERVICE USE OF DEPRESSIVE CHILDREN

Only 5 (5.81%) children with depression had received professional help at some point in the past, and greater than 90% of the individuals with any DD never received any professional help (Table 3).

DISCUSSION

The present child depression survey was completed in one phase, and the majority of children and their guardians contributed information that was used to decide whether the child had a DD. This approach largely eliminated the loss of precision that may occur with a two-phase design. This survey was conducted in only one city of China, thus we should be cautious in generalizing our data. However, our study is one of the very few investigations that uses the MINI-KID, which is a strict standardized diagnostic evaluation tool administered by well-trained professional psychiatrists. The advantage of interviews administered by professionals is that it increases the accuracy of the clinical relevance of the diagnoses.

In a child and adolescent psychiatric assessment, it is typically recommended that data from multiple informants be used, but there is still disagreement on how parent and child reports should be combined in epidemiological studies.^[48] While there may be discrepancies between the two versions of the MINI-KID, we believe that the diagnoses from both versions are valid, as the original version of the MINI-KID-P has been observed to have good concordance with the standard MINI-KID-C.^[49] We also found a high concordance rate between the MINI-KID-C and the MINI-KID-P in this study. A DD is considered to be present if either the parent or child reported version satisfies DSM-IV diagnostic criteria. This “OR rule” helps to redress underreporting by one informant, and although it might be criticized as overinclusive, it seems to be more justified.

TABLE 1. Characteristics of sample, unweighted prevalence rates of depression by variables and crude/adjusted risk ratios for current depressive disorder

Variables		Unweighted sample		Weighted sample	
		No. (%)	No. (rate,%) of DD	Crude RR (95%CI)	Adjusted RR (95%CI)
Gender	Male	1,878 (52.4)	31 (1.7)	1	—
	Female	1,704 (47.6)	55 (3.2)	1.31 (1.14, 1.51)	—
Age group (years)	6~8	1,247 (34.8)	9 (0.7)	1	1
	9~11	1,189 (33.2)	26 (2.2)	2.27 (1.18, 4.33)	1.86 (1.07, 2.65)
	12~14	1,146 (32.0)	51 (4.5)	4.67 (2.02, 9.00)	3.39 (1.67, 5.12)
Currently attending school	Yes	3,484 (97.3)	79 (2.7)	1	1
	No	98 (2.74)	7 (7.1)	3.18 (1.65, 6.17)	2.92 (1.19, 4.65)
Average schooling years of parents	≤10.5	2,220 (62.0)	46 (2.1)	1	—
	>10.5	1,362 (38.0)	40 (2.9)	1.40 (0.97, 2.04)	—
Number of siblings	0	2,676 (74.7)	62 (2.3)	1	—
	≥1	906 (25.3)	24 (2.7)	1.14 (0.75, 1.72)	—
Marital status of parents	Married	3,353 (93.6)	74 (2.2)	1	1
	Unmarried ^a	229 (6.39)	12 (5.2)	2.36 (1.39, 4.03)	2.05 (1.41, 2.69)
Employment status of father	Employed	3,284 (91.7)	76 (2.3)	1	—
	Unemployed	298 (8.32)	10 (3.4)	1.49 (0.84, 2.63)	—
Employment status of mother	Employed	2,787 (77.8)	65 (2.3)	1	—
	Unemployed	795 (22.2)	21 (2.6)	1.11 (0.72, 1.72)	—
Family type ^b	Nuclear family	2,113 (59.0)	48 (2.3)	1	1
	Extended family	1,343 (37.5)	26 (1.9)	0.87 (0.57, 1.32)	0.66 (0.61, 0.72)
	Single-parent family	80 (2.23)	8 (10.0)	4.39 (2.32, 8.33)	3.72 (1.98, 5.46)
	Parentless family	14 (0.39)	3 (21.4)	9.90 (4.02, 24.4)	6.84 (2.57, 11.1)
	Foster family	32 (0.89)	1 (3.1)	1.11 (0.16, 7.81)	0.95 (0.38, 1.52)
Family income	High	265 (7.40)	4 (1.5)	1	—
	Moderate	2,561 (71.5)	68 (2.7)	1.78 (0.73, 4.35)	—
	Low	756 (21.1)	14 (1.9)	1.31 (0.49, 3.51)	—
Family living conditions	High	320 (8.93)	4 (1.3)	1	—
	Moderate	2,688 (75.0)	65 (2.4)	1.95 (0.80, 4.78)	—
	Low	574 (16.0)	17 (3.0)	2.34 (0.89, 6.17)	—
Dominant caregivers during the past year	Parents	2,679 (74.8)	44 (1.6)	1	1
	Single parent	345 (9.63)	14 (4.1)	2.54 (1.51, 4.29)	3.98 (1.27, 6.68)
	Grandparent (s)	508 (14.2)	17 (3.4)	1.23 (2.01, 3.30)	2.63 (1.37, 3.90)
	Other relatives or others	50 (1.40)	11 (22.0)	13.7 (8.00, 23.3)	10.7 (5.55, 15.9)
Relationship of family members	Good	3,324 (92.8)	74 (2.2)	1	—
	Average	245 (6.84)	12 (4.9)	2.19 (1.28, 3.73)	—
	Poor	13 (0.36)	0 (0.0)	0	—
Family history of mental illness	Negative	3,559 (99.4)	84 (2.4)	1	—
	Positive	23 (0.64)	2 (8.7)	4.37 (1.47, 13.0)	—
Dwelling	Urban areas	2,234 (62.4)	36 (1.6)	1	—
	Urban-rural fringe areas	519 (14.5)	16 (3.1)	1.91 (1.14, 3.22)	—
	Rural areas	829 (23.1)	34 (4.1)	2.57 (1.70, 3.89)	—
School performance	Good	1,323 (36.9)	26 (2.0)	1	—
	Average	1,975 (55.1)	47 (2.4)	1.20 (0.79, 1.82)	—
	Poor	186 (5.19)	6 (3.2)	1.72 (0.80, 3.68)	—
	Not attending school	98 (2.74)	7 (7.1)	3.66 (1.80, 7.46)	—
Local permanent resident status	Yes	3,286 (91.7)	73 (2.2)	1	—
	No	296 (8.26)	13 (4.4)	1.93 (1.15, 3.25)	—
Mother's delivery mode	Vaginal birth	2,586 (72.2)	58 (2.2)	1	—
	Cesarean section	996 (27.8)	28 (2.8)	1.25 (0.84, 1.85)	—
Breastfeeding before 1-year old	Yes	2,961 (82.7)	60 (2.0)	1	1
	No	621 (17.3)	26 (4.2)	2.07 (1.39, 3.09)	1.88 (1.28, 2.49)

Note: ^aUnmarried: never married, cohabiting, separated, widowed or divorced.

^bNuclear family: a family group consisting of a pair of adults (usually a married couple) and their children;

Extended family: a family that includes in one household near relatives in addition to a nuclear family;

Single-parent family: a family with children headed by a parent who is widowed or divorced and not remarried, or by a parent who has never married;

Parentless family: the family of children, whose parents have died.

TABLE 2. Estimates of 1-month prevalence rates of DSM-IV depressive disorders, split by gender, age, and residence

DSM-IV DD	N	Unweighted total prevalence (95%CI)	Weighted prevalence (95%CI)							Total
			Gender (n)		Age in years (n)			Residence (n)		
			Male (1,878)	Female (1,704)	6~8 (1,247)	9~11 (1,189)	12~14 (1,146)	Urban (2,214)	Rural (1,368)	
Any DD	86	2.4 (1.9, 2.9)	2.0 (1.4, 2.6)	3.6** (2.8, 4.3)	1.0 (0.5, 1.5)	2.2 (1.5, 3.0)	4.6*** (3.6, 5.6)	1.9 (1.34, 2.38)	3.9*** (3.1, 4.8)	2.8 (1.5, 3.9)
MDD	47	1.3 (0.9, 1.7)	1.1 (0.7, 1.5)	1.8 (1.2, 2.4)	0.5 (0.1, 1.9)	0.9 (0.4, 1.4)	2.4*** (1.6, 3.1)	0.9 (0.5, 1.2)	2.2*** (1.5, 2.8)	1.4 (1.0, 1.8)
DYD	11	0.3 (0.1, 0.5)	0.3 (0.1, 0.6)	0.5 (0.2, 0.8)	0.2 (0.1, 0.7)	0.6 (0.2, 0.9)	0.7 (0.3, 1.1)	0.3 (0.1, 0.5)	0.5 (0.2, 0.8)	0.4 (0.2, 0.6)
MIDD	28	0.8 (0.5, 1.1)	0.6 (0.3, 0.9)	1.3** (0.9, 1.8)	0.2 (0.1, 0.7)	0.8 (0.3, 1.2)	1.6** (1.0, 2.1)	0.7 (0.4, 1.0)	1.3 (0.8, 1.8)	0.9 (0.6, 1.2)

Note: CI, confidence interval; DD, depressive disorder; MDD, major depressive disorder; DYD, dysthymic disorder; MIDD, minor depressive disorder.

Significantly higher than comparison group: ** $P < .01$; *** $P < .001$.

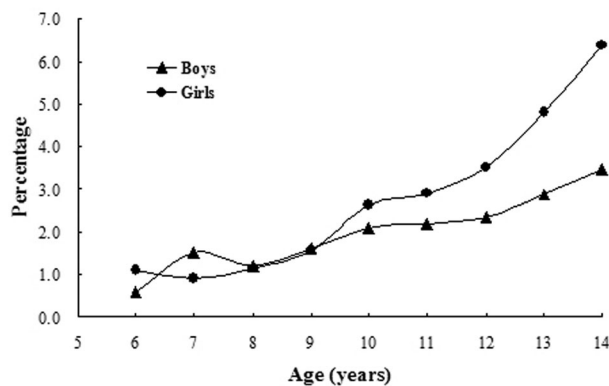


Figure 2. Weighted prevalence rates of depression by age and gender.

Alternatively, we can consider a diagnosis to be conferred only when both versions individually meet DD diagnostic criteria, which would be a very stringent demand, but this is rarely required by the DSM-IV for a diagnosis.

In this study, the prevalence of at least one current DD in 6–14-year-old children was 2.8%. The overall prevalence rates for DDs in our adolescent sample (4.6%) were comparable to those reported in a recent epidemiological survey of the adult Chinese population,^[50] which suggests that adult DD might be adolescent DD in a recurrent form. As shown in Fig. 2, the gender difference in rates of depression emerged during adolescence. This phenomenon might be an indirect reflection of the association between pubertal status and depression in adolescent girls.^[51] Six previous school-based surveys have reported that the current prevalence rates of DDs among Chinese children aged 5–17 years range between 0.93 and 1.62%^[23–26,52] and 2.70%^[33] in Chinese adolescents. Although our sample had a smaller age range (6–14 years), the overall prevalence of current depression in our study was still higher than the previous findings reported for Chinese children and adoles-

TABLE 3. Unweighted lifetime rates of care-seeking behaviors for children with current depression

DSM-IV DD	N	Care-seeking behaviors, N (%)		
		Never sought help	Ever saw mental health professionals	Only saw nonmental health professionals
Any DD	86	78 (90.7)	5 (5.8)	3 (3.5)
MDD	47	42 (89.4)	3 (6.4)	2 (4.3)
DYD	11	9 (81.8)	1 (9.1)	1 (9.1)
MIDD	28	27 (96.4)	1 (3.6)	0 (0.0)

Note: DD, depressive disorder; MDD, major depressive disorder; DYD, dysthymic disorder; MIDD, minor depressive disorder.

cents, even if MIDD was excluded. The current prevalence of any DD in our study was lower than the figures of depressive episode prevalence rates (2.92 and 4.80%) in two Chinese epidemiological surveys that used psychiatric interviews and ICD-10 criteria^[27,30] but was significantly higher than the CCMD-3 (Chinese Classification of Mental Disorders, Third Edition) prevalence rates of two surveys (0% for both) that used psychiatric interviews^[29,34] and the Weinberg Depression Criteria^[53] rate (1.85%).^[54] Compared to western studies, the present study found higher depression prevalence rates than those reported previously in New Zealand (2.30%),^[55] Spain (1.43%),^[42] Britain (0.87%),^[41] Brazil (1.00%),^[10] Denmark (0.80%),^[32] and Norway (0.18%).^[56] After the exclusion of MIDD, the remaining prevalence rate (1.9%) was still higher than that of most western countries. This study also presented higher depression prevalence rates when compared with those of developing countries in Asia (India: 0.10%,^[39] Bangladesh: 0.0%,^[40] and Yemen: 0.30%^[31]). However, three surveys that were conducted in Iran,^[38] Turkey,^[22] and India^[21] reported higher prevalence rates than those of our study: 4.90, 4.20, and 3.13%, respectively. Although the prevalence and methodology of these surveys varied widely (Table 4), these

TABLE 4. Summary of literature on the current prevalence of depression among children and adolescents under 18 years of age

Study	Country	Sample size	Source population	Age range (years)	Survey method	Sample	Instrument	Diagnostic criteria	Informant	Interviewer	Prevalence rates
McGee et al. ^[55]	New Zealand	943	Birth cohort	15	One-phase	CONV	DISC-C-XIII-III	DSM-III	P, A	MHP	MDD: 1.20, DYD: 1.10, DD: 2.30
Gómez-Beneyto et al. ^[42]	Spain	1,127	Community	8, 11, 15	Two-phase	RAND	CBCL+K-SADS-PL	DSM-III-R	P	MHP	DD: 1.43
Ford et al. ^[41]	Britain	10,438	Community	5~15	One-phase	RAND	DAWBA	DSM-IV	P, T, C	LAY	MDD: 0.65, DYD: 0, DD-NOS: 0.22, DD: 0.87
Tang et al. ^[34]	China	565	School	6~13	Two-phase	CONV	DSRSC + PI	CCMD-3	C	MHP	DE: 0
Fleithch-Bilyk et al. ^[10]	Brazil	1,251	School	7~14	One-phase	RAND	DAWBA	DSM-IV	P, T, C	LAY	DD: 1.00
Yang et al. ^[33]	China	2,440	School	12~16	Two-phase	CONV	CES-D+K-SADS-PL	DSM-IV	A	MHP	MDD: 2.40, DYD: 0.30, DD: 2.70
Meng et al. ^[34]	China	1,564	School	10~12	One-phase	CONV	BID	Weinberg Criteria	P, C	NR	1.85
Srinath et al. ^[39]	India	1,578	Community	4~16	Two-phase	RAND	CBCL+DISC-IV	ICD-10	P, A	MHP	DE: 0.10
Mullick et al. ^[40]	Bangladesh	922	Community	5~10	Two-phase	RAND	SDQ+DAWBA	ICD-10	P, T	LAY	DE: 0
Petersen et al. ^[32]	Denmark	373	School	8~9	Two-phase	CONV	CBCL+K-SADS-PL	DSM-IV	P, T, C	MHP	DE: 0.80
Wang et al. ^[27]	China	6,307	School	13~17	Two-phase	CONV	SDS + PI	ICD-10	A	MHP	DE: 2.92
Gu et al. ^[29]	China	522	School	8~10	Two-phase	CONV	DSRSC + PI	CCMD-3	C	MHP	DE: 0
Heiervang et al., ^[56]	Norway	9,430	School	8~10	Two-phase	CONV	SDQ+DAWBA	DSM-IV	P, T	LAY	MDD: 0.07, DYD: 0, DD-NOS: 0.11, DD: 0.18
Fan et al. ^[30]	China	2,171	School	7th, 8th, 10th grade	Two-phase	CONV	SDS + PI	ICD-10	C	MHP	DE: 4.80
Leung et al. ^[52]	China	541	School	7~9th grade	One-phase	CONV	DISC-IV	DSM-IV	P, C	LAY	DD: 1.30
Alyahri et al. ^[31]	Yemen	1,210	School	7~10	Two-phase and one-phase	CONV	SDQ+DAWBA & DAWBA	DSM-IV	P, T	LAY	MDD: 0.30, DYD: 0, DD-NOS: 0, DD: 0.30
Mohammadi et al. ^[38]	Iran	1,105	Community	7~14	Two-phase	RAND	SDQ+K-SADS-PL	DSM-IV	P, A	MHP	DD: 4.90
Guan et al. ^[25]	China	9,495	School	5~17	Two-phase	RAND	CPSSF + K-SADS-PL	DSM-IV	P, T, C	MHP	MDD: 1.59, DYD: 0.03, DD: 1.62
Zhang ^[23]	China	8,488	School	6~17	Two-phase	RAND	SDQ + DAWBA	DSM-IV	P, T, A	LAY	MDD: 0.51, DYD: 0.39, DD-NOS: 0.04, DD: 0.93
Fan et al. ^[26]	China	3,628	School	8~12	Two-phase	RAND	CES-DC+K-SADS-PL	DSM-IV	C	MHP	DD: 1.60
Zhang et al. ^[24]	China	4,585	School	6~16	Two-phase	RAND	SDQ + DAWBA	DSM-IV	P, A	LAY	MDD: 0.63, DYD: 0.57, DD-NOS: 0, DD: 1.20
Demir et al. ^[22]	Turkey	1,482	School	4~8th grade	Two-phase	CONV	CDI+K-SADS-PL	DSM-IV	C	MHP	MDD: 1.55, DYD: 1.75, DD-NOS: 0.6, DD: 4.2
Sarkar et al. ^[21]	India	1,851	School	1~7th grade	Two-phase	RAND	K-SADS-PL screening + K-SADS-PL	DSM-IV	P, A	LAY	MDD: 0.81, DYD: 1.51, DD-NOS: 0.81, DD: 3.13

Notes: CONV, Convenient sample; RAND, random sample; Weinberg Criteria, the Weinberg Criteria for depression in children and adolescents; DISC-C, diagnostic interview schedule for children; CBCL, Achenbach child behavior checklist; K-SADS-PL, schedule for affective disorders and schizophrenia for school-age children-present and lifetime version; DAWBA, the development and well-being assessment; DSRSC, depression self-rating scale for children; CES-D, center for epidemiologic studies depression scale; SDS, Zung's self-rating depression scale; CPSSF, child psychiatric symptom screening form; BID, Bellevue index of depression; CDI, child depression inventory; P, parent; A, adolescent; C, child; T, teacher; MHP, mental health professional; LAY, lay interviewer; PL, psychiatric interview; DD, depressive disorder; MDD, major depressive disorder; DYD, dysthymic disorder; DD-NOS, depressive disorder not otherwise specified; DE, depressive episode.

comparisons indicate that children in this part of China have a relatively high prevalence of depression.

Analyses of related factors indicated that, in communities, depression was more prevalent among kids who were older than 8 years, did not go to school, had unmarried parent(s), were living in an incomplete family, were taken care of by people other than both parents, and were not breastfed before the age of 1 year. These findings indicate that the etiologies of childhood depression are complex and multifactorial. In western countries, many factors have been reported to be associated with early-onset depression, including the following: demographic factors (e.g. older age, female, low socioeconomic status),^[12,57,58] familial factors (e.g. parental psychology, early-onset mood disorders, high familial loading for mood disorders),^[11,12,59] family factors (e.g. family conflict, parental divorce)^[58–61] and psychosocial factors (e.g. poor support, stressful life events, poor maternal function).^[12] The associations between age, marital status of parents and depression that we observed in our study are consistent with previous western studies. However, most of our findings from the risk factor analysis are relatively inconsistent with those reported in western countries. This phenomenon might be a reflection of cultural differences. Exposure to parental depression is an especially strong predictor of depression for western children and adolescents.^[62,63] However, the association between family history of psychiatric illness and depression disappeared in the multivariate analysis in our study. One possible explanation as to why a family history of psychiatric illness did not increase the risk for childhood depression is that the parents' mental illness history was underreported because of the deep-rooted mental disease stigma in the Chinese culture.^[64] Interestingly, a rarely reported association between breastfeeding and depression was found in our study, which is partly consistent with a recent study showing that babies that were breastfed for longer than 6 months had significantly better mental health in childhood.^[65]

Subjects selected from schools are a biased subset of children with less disorders, less symptom severity, and less impairment than children from communities. Our study found that children who did not attend school had a higher risk for depression, thus supporting our previous hypothesis that community children have higher depression prevalence than school children. Our findings on the associations between family types, dominant caregivers, and depression in the present study are very notable. Both findings clearly suggest that parents and family factors play an important role in the mental development of children. The national statistical data^[66] indicates that the internal migration of the rural population has been a key force in the child care-taking patterns of the rural areas in contemporary China. Children in single-parent and grandparent-only families, or who were cared for by others, had poorer mental health than children living with two biological parents.^[67] Despite the fact that the migration of parents out of rural areas can lead to improvements in living conditions and

physical health of children, it may cause deficiencies in parenting. Children being left behind has been linked to disorders such as depression and anxiety.^[19,68] In our sample, subjects who were cared for by people other than both parents accounted for 25.2% of the total sample (of the 25.2%, 80.8% were rural children), and 48.8% (42/86) of the depressed children were not cared for by their two biological parents. Thus, the high prevalence rate of DD in this study is not surprising.

Unfortunately, among the 86 depressed children identified from our study, only 5 (5.8%) ever sought help from mental health professionals for their depression. Viewed from a global perspective, the underutilization of mental health services by children is a universal problem. In western countries, more than 70% of teenagers with DDs do not receive any form of diagnosis and treatment,^[56,69] and a majority of psychosocial disorders in children have been missed.^[70] Undoubtedly, the low service utilization rate is a greater problem in Chinese children. Possible reasons for this may include the stigma associated with depression, atypical clinical manifestation, a lack of adequate child mental health training for health care professionals, an inadequate number of child psychiatrists, a lower parental perceived need for children's mental health care, and inequalities in mental health care insurance for rural children in China.

This study has several limitations that should be noted. First, reliable assessment of depression in children requires gathering information from the parent, child, and teacher, as well as from all other available informants.^[71] Our diagnoses of DDs based on parent and child reports has limitation, as teachers could supply more disease information (i.e. irritability, peer relationship, and academic performance in school) of individuals with "difficult-to-diagnose" depression. Second, our study was primarily focused on the prevalence of depression but not on the correlates of depression, therefore, the problem of overfitting is inevitable in our logistic regression model,^[72] as we studied quite a few candidate predictors but the number of detected depression ("events") was relatively small. Although the risk factors identified in our study seem consistent with those in previous reports, whether they also apply to other regions in China is still questionable. Finally, as we used "OR rule" to generate DD diagnoses, there should be a low prevalence in the 752 subjects who only completed one version of the MINI-KID, which indicated that the overall prevalence rates of DDs in our full sample might be underestimated. Meanwhile, the nonresponse bias from older and more rural subjects in nonrecruited sample also might make us underestimate the depression prevalence.

CONCLUSION

The present study has demonstrated a relatively high prevalence of depression and an extremely low mental health service utilization rate among a community-based sample of 6–14-year-old Chinese children. Depression is a substantial and largely unrecognized issue

among children, which suggests that it has been a major public health issue for Chinese children. Given the many negative impacts of depression on our children and society, there is an urgent need to develop efficacious interventions aimed at the prevention and early recognition of childhood depression. There may be an even greater need for community-based programs to promote rural child and adolescent mental health.

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