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Background

Mental disorders are dominant health problems for children and adolescents in China. Previous systematic reviews on childhood-onset mental disorders have focused on country-level prevalence data in China, and none of them quantified difference in prevalence of childhood-onset mental disorders by geographic regions. Additionally, previous literatures addressed the global data coverage indicated that there are limited publications on population representative data on childhood-onset mental disorders in China. Notably, these studies did not search any Chinese citation database(s).

We took this opportunity

- (1) To conduct searches on both the **English and Chinese language databases**;
- (2) To undertake meta-analyses on childhood-onset mental disorders by **provincial, regional, and country levels**;

in order to summarise the pooled prevalence variations within China.

Methods

Four electronic databases were searched: PubMed, EMBASE, PsycINFO, and **China National Knowledge Infrastructure (CNKI)**.

Childhood-onset mental disorders included attention-deficit/hyperactivity disorder (**ADHD**), conduct disorder (**CD**), autism spectrum disorders (**ASD**), and autistic disorder (**AD**), based on the Diagnostic and Statistical Manual of Mental Disorders (DSM), the International Classification of Disease (ICD), or the Chinese Classification of Mental Disorders (CCMD). We collected articles reported diagnostic prevalence estimates based on representative population in China.

Meta-analysis was conducted weighting for population size of the study location represented according to the China Statistical Yearbook 2017. **Data coverage** was calculated by multiplying age proportion and location proportion represented by each study. **Meta-regression** was performed to investigate whether or not geographic region is a potential factor associated with variation of the prevalence estimates.

Results

Our search identified 913 records, and 412 records were identified from CNKI. After removal of duplicates and title, abstract full-text screening, 59 studies were eligible for final inclusion in this review, six were in English, and 53 were in Chinese (**Fig 1**).

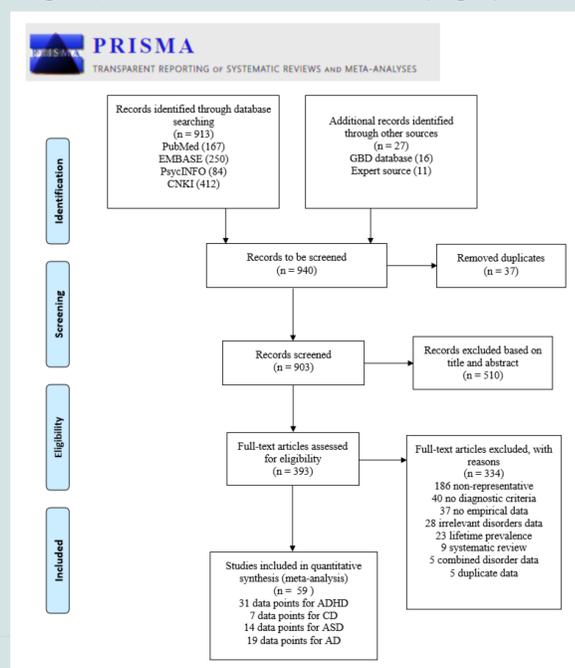


Figure 1: PRISMA Flow Diagram

The estimated prevalence of **ADHD** to be **5.07%** (3.49–6.92; **12 million cases**); prevalence of **CD** to be **1.34%** (0.73–2.13; **3 million cases**); prevalence of **ASD** to be **0.35%** (0.18–0.56; **1 million cases**); and prevalence of **AD** to be **0.12%** (0.07–0.17; **370,000 cases**).

Results of meta-regression revealed that **geographical location** was a risk factor associated with variation in prevalence estimates.

Results of sub group analysis shown in **Fig 2**. **Northeast region** was associated with **lower prevalence of ADHD** compared to north (B = 0.40, p < 0.01), east (B = 0.23, p < 0.01), southcentral (B = 0.16, p < 0.05), and northwest region (B = 0.40, p < 0.01).

Southwest region was significantly associated with **lower prevalence of ASD** (B = -0.08, p < 0.01), compared to northeast region.

East and northwest region were significantly associated with **lower prevalence of AD**, compared with northeast region (B = -0.03, p < 0.01; B = -0.02, p < 0.01).

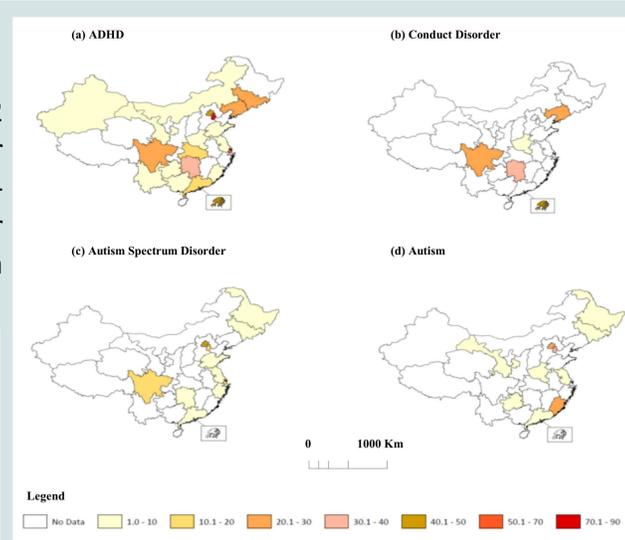


Figure 3: Data coverage (%) for childhood-onset mental disorders in 33 provinces in China

We derived estimates of the prevalence of ADHD from 20 provinces, representing 9.54% data coverage; prevalence of CD from 6 provinces, representing 4.47% data coverage; prevalence of ASD for 11 provinces, representing 2.44% data coverage; prevalence of AD from 11 provinces, representing nearly 2.88% data coverage of population aged 0-19 years in China.

The provinces with the higher data coverage for the four childhood-onset mental disorders were municipalities such as Beijing, Tianjin, and Shanghai. Conversely, there were **10 provinces which have no representative prevalence data** on childhood-onset mental disorders since 1980. (**Fig 3**).

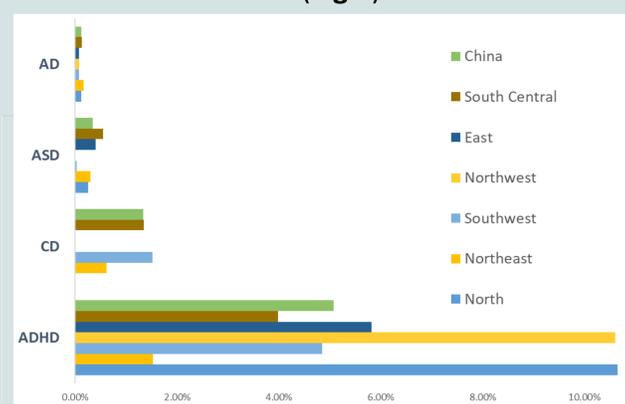


Figure 2: Estimated prevalence of childhood-onset disorders across 6 regions and China

Conclusions

Our findings show **large provincial and regional variations** in prevalence of ADHD, CD, ASD, and AD across China. Furthermore, the low data coverage reported in our results has indicated an **urgent need for researchers** to conduct more **nationally or sub-nationally representative surveys** on these particular mental disorders **using rigorous methodologies**.

Conflicts of Interest: none to declare