Analysis of Mental Health Status of Rural Left-behind Children in China Based on Meta-analysis Method

LiWen Zhang*
Kunming University, China, 650200

*Corresponding author e-mail: 476839605@qq.com

Abstract. Computer retrieval was performed in the CNKI, Chongqing VIP Chinese Science and Technology Periodicals Full-text Database, Wanfang Sci-tech Periodicals, and Chinese Biomedical Database, with the retrieval time limit from 1984 to 2017. The statistical results suggest that in the eight dimensions in the MHT scale (learning anxiety, social anxiety, loneliness, physical symptoms, phobia, impulse, allergies, and intropunitive reactivity. Except for the last two dimensions, the scores of the other six dimensions of the left-behind group were higher than those of the non-left-behind group (P = 0.0001 ~ 0.03). Hence, targeted education on mental health of children left behind in rural areas.

Keywords: Left-behind Children, Diagnostic Tests for Mental Health, Meta-analysis

1. Introduction
With economic development, a large number of rural surplus laborers have left their hometowns to work, and a special group of “left-behind children” has been observed. The problem of the healthy growth of left-behind children and young people has become a concern of educate scholars, government departments, and other sectors [1-2]. In recent years, Many surveys show that the left-behind situation is very harmful [3-4]. However, there is no obvious mental health difference problem in non/left-behind children [5-6]. This study makes a comprehensive summary and analysis on the mental health of rural left-behind children, to understand the current state, and to provide ideas for further in-depth study of effective interventions.

2. Materials and Methods

2.1. Source of Information
1) Literature Retrieval
Computer retrieval is performed in the CNKI, Chongqing VIP Chinese Science and Technology
Periodicals Full-text Database, Wanfang Sci-tech Periodicals Full-text Database, and Chinese Biomedical Database, with the retrieval time limit from 1984 to 2017. The retrieval keywords include left-behind children, mental health. A total of 53 articles were retrieved, and 12 articles met the inclusion criteria.

2) Concept Definition
Left-behind children (6 ~ 16 years old). The Psychological Scale uses the Mental Health Diagnostic Test (MHT), which was revised in 1991. The scale consists of learning content, anxiety, loneliness, introvertive, allergy, physical symptoms, phobia, and impulsiveness. Table composition.

3) Inclusion/Exclusion Criteria
Literature inclusion criteria: ① Published Chinese literature, ② Mental health measurement using the “Mental Health Diagnostic Test” (MHT), Exclusion criteria: ① The original data only had positive detection rates for the two groups, no mean and standard deviation, ② Normal models were used as controls, ③ Multiple articles with the same retrieval objects and similar retrieval content, ④ Only those with statistically significant differences were provided. There is too little literature or literature information to measure factor scores [6].

2.2. Statistical methods
According to the requirements of the meta-analysis, the collation data was collated, and the database was established. Classic meta-analysis was performed on the difference between the means of continuous variables. Weighted mean difference as the influence of left-behind group and non-left-behind group, and the heterogeneity test statistic value was selected for heterogeneity test. Based on the results of homogeneity test, a random effect model is selected. Calculate the combined weighted mean difference and 95% CI for each study result.

The ratio of odds (Odds Ratio, OR) is two ratios such as shown in equation (1):

\[ C = \text{(ratio of an event in group A) / (ratio of an event in group B)} \]  \hspace{1cm} (1)

The relative risk refers to the incidence of the two groups as shown in equation (2):

\[ D = \text{(incidence rate of an event in group A)/(incidence rate of an event in group B)} \]  \hspace{1cm} (2)

Where C represents the ratio and D represents the relative risk.
Statistical analysis of all data was performed using Rev-Man4.2 software.

3. Meta-analysis

3.1. General Characteristics of the Included Literature
According to the inclusion and exclusion criteria of literature, 12 reference samples were finally included, as shown in Table 1.

| Numbering | Sample source | Sampling method | Sample size | Total |
|-----------|---------------|-----------------|-------------|-------|
| P1        | Hunan         | Random sampling | 94          | 117   | 211   |
| P2        | Jiangxi       | Random sampling | 457         | 307   | 764   |
| P3        | Chongqing     | Stratified cluster sampling | 246 | 102   | 348   |

Table 1. General features of references used
3.2. Heterogeneity test results

Detection result $\chi^2$ value suggested that the heterogeneity of the eight factors was statistically significant (P <0.05). Hence, each factor analysis should be conducted based on a random effect model, as shown in Table 2.

Table 2. Analysis of psychological diagnosis Meta non-left-behind children

| Measurement factor | WMD (95% CI) (fixed effect) | WMD (95% CI) (random effect) | $\chi^2$ values | Z values | P values |
|--------------------|-----------------------------|------------------------------|-----------------|----------|----------|
| Learning anxiety   | 0.23(0.18,0.29)             | 0.50(0.25,0.75)              | 161.01*         | 3.88     | 0.0001   |
| Anxious            | 0.24(0.20,0.28)             | 0.27(0.12,0.40)              | 74.97*          | 3.63     | 0.0003   |
| Loneliness         | 0.68(0.64,0.71)             | 0.42(0.19,0.65)              | 236.66*         | 3.63     | 0.0003   |
| Intropunitive      | 0.53(0.47,0.57)             | 0.32(-0.39,1.02)             | 198.28*         | 3.88     | 0.0003   |
| Allergic reactivity| 0.24(0.20,0.28)             | 0.23(0.00,0.46)              | 224.32*         | 3.63     | 0.0003   |
| Physical symptoms  | 1.06(1.01,1.12)             | 0.60(0.20,0.99)              | 428.08*         | 2.97     | 0.0030   |
| Terror             | 0.32(0.27,0.37)             | 0.31(0.02,0.60)              | 228.09*         | 2.13     | 0.0300   |
| Impulsive reactivity| 0.68(0.64,0.71)          | 0.42(0.17,0.67)             | 262.58*         | 3.27     | 0.0010   |

Note: * P <0.05.

3.3. Sensitivity analysis

Table 2 shows that when different statistical models are selected, the difference between the combined value point estimates and interval estimates of the groups is not significant, suggesting that suggesting the conclusion of the meta-analysis is robust. In addition, after excluding a document with the smallest sample content, the health test scores of the left-behind and non-left-behind groups were compared. The results showed that left-behind children scored higher. See Table 3.

Table 3. Analysis of psychological diagnosis Meta non-left-behind children (remove literature with smaller sample size)

| Measurement factor | WMD(95% CI) | $\chi^2$ values | Z values | P values |
|--------------------|------------|----------------|----------|----------|
| Learning anxiety   | 0.51(0.22,0.79) | 149.91* | 3.5     | 0.0005   |
| Anxious            | 0.30(0.14,0.46) | 62.73* | 3.68    | 0.0002   |
| Loneliness         | 0.35(0.11,0.60) | 189.02* | 2.84    | 0.004    |
| Intropunitive      | 0.51(0.11,0.92) | 445.90* | 2.49    | 0.010    |
| Allergic reactivity| 0.27(0.03,0.51) | 160.66* | 2.24    | 0.020    |
| Physical symptoms  | 0.51(0.06,0.95) | 382.19* | 2.23    | 0.030    |
| Terror             | 0.42(0.35,0.50) | 11.92* | 10.87   | <0.0001  |
| Impulsive reactivity| 0.39(0.10,0.68) | 262.55* | 2.63    | 0.009    |

Note: * P <0.05.

3.4. Analysis of publication bias
A funnel plot of the index's total anxiety reactivity showed that the points of each study effect were distributed asymmetrically, suggesting that there might be publication bias. (Figure 1).

![Funnel plot of index's total anxiety reactivity](image)

**Figure 1.** Funnel analysis of total anxiety of rural non-left-behind children

### 4. Conclusions and discussions

#### 4.1. Psychological problems of left-behind children

They cannot enjoy the comfort and care of their parents. In an environment that does not receive attention and encouragement, deviation of character and development of abnormal psychology, so that the emergence may include physical symptoms, anxiety, fear, nervousness, and other emotional distress, and adaptation to the environment and problems in life. Studies have shown that MHT is more targeted than other measurement tools and can better reflect the mental state of children and adolescents and is suitable for the overall measurement of mental health of children and adolescents. The correlation analysis between the subscales of this test and the statistical results of the internal consistency coefficient show that the questionnaire has good reliability and validity.

#### 4.2. Mental health of children left behind in rural areas

Meta analysis through multiple small sample integration studies. Improved the effectiveness of the original statistics, resolves inconsistencies in the retrieval results, and improves the effect estimates. This study shows that in the six aspects of learning anxiety, anxiety, physical symptoms, impulse, loneliness reactivity, and phobia reactivity, the scores of left-behind children are higher than those of left-behind children, suggesting that the mental health level of left-behind children is generally lower than that of non-left-behind children. For left-behind children, because are out, their guardians who stay at home tend to neglect to cultivate their learning attitude and enthusiasm for learning, and when they encounter difficulties in the learning process. After the second frustration, learning anxiety tends to increase, and when learning anxiety is extremely enhanced, there will be a weariness or truancy. Because left-behind children lack opportunities to communicate with their parents, they often need to face life's difficulties independently, and develop a self-respecting personality gradually. When peers criticize, their bodies develop more pronounced symptoms, Anxious reactions such as anxiety and terror. Driven by strong anxiety, they often show restlessness, irritability, and impulse reactivity. Children who have grown up in an environment that lacks parental care and a normal family
atmosphere, lacks the emotional warmth of parental caressing and contact, often lacks a sense of security, and tends to show psychological characteristics of isolation, timidity, and inferiority, and their interpersonal skills. Often poor, social interaction shrinks, which leads to loneliness.

4.3. Heterogeneity and sensitivity analysis

According to the results of the meta-analysis, there is heterogeneity between the results of each study, which may be due to the different baseline levels of each study. After sensitivity analysis, there is not much difference between the effect value point estimation and interval estimation, and the results of the combined studies SUGGEST that it is feasible. The funnel chart in this article shows asymmetry, suggesting that there may be publication bias. The reason may be due to the positive results of literatures, and due to the limitation of the number of included literatures, the sample size is still limited. However, after the small sample retrieval literature is obtained, this is observed in the results have not changed. As new retrieval is continuously updated, Meta-analysis will draw more reliable conclusions.

Parents should strengthen their ties and emotional communication with left-behind children. Guardians of left-behind children should also pay attention to psychological counseling for this special group. The whole society should pay attention growth in the mentality of children and adolescents. Care more about such a group, so that they in the psychological problems when timely communication and treatment, so that they can grow up healthily!

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