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ORIGINAL RESEARCH

Comparison of the Mental Health Status of Left-Behind Children Before and After the COVID-19 Pandemic

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Purpose: To investigate and discuss the mental health status of left-behind children in Anhui Province before and after the COVID-19 pandemic and analyze its influencing factors.

Methods: A total of 82 left-behind children studying in grades 4 to 6 in Anhui Province, China were investigated by using the Symptom Check List-90 (SCL-90), Perceived Social Support Scale (PSSS) and Self-Esteem Scale (SES). Differences in the mental health status, perceived social support, and self-esteem of left-behind children before and after the COVID-19 pandemic were analyzed using the independent sample *t*-test. The relationship between mental health, perceived social support, and self-esteem before and after the pandemic was determined using the Pearson product-moment correlation test, and the factors influencing mental health before and after the pandemic were identified using regression analysis.

Results: The SCL-90 scores of left-behind children during and after the pandemic were 134.45 ± 23.17 and 114.52 ± 22.56, respectively, indicating that the SCL-90 score during the pandemic was significantly higher than that after the pandemic. The perceived social support scores of left-behind children during and after the pandemic were 58.99 ± 12.45 and 65.57 ± 11.76, respectively, indicating that the score during the pandemic was significantly lower than that after the pandemic. The self-esteem scores of left-behind children during and after the pandemic were 25.04 ± 4.95 and 28.39 ± 3.84, respectively, indicating that the score during the pandemic was significantly lower than that after the pandemic. The SCL-90 scores before and after the pandemic were significantly negatively correlated with perceived social support and self-esteem. The regression analysis results showed that self-esteem and perceived social support together could explain 25% of variations in the SCL-90 score during the pandemic and 34% of variations in the SCL-90 score after the pandemic.

Conclusion: The mental health level, perceived social support, and self-esteem of left-behind children improved after the pandemic compared with those during the pandemic. Good perceived social support and self-esteem can effectively promote the mental health of left-behind children.

Keywords: COVID-19, left-behind children, mental health, perceived social support, self-esteem

Introduction

Since December 2019, the COVID-19 outbreak across the country and even around the world has had a major impact on economic and social development.[1] To curb the spread of COVID-19, China has adopted measures such as home quarantine, online office, and online education. Primary school is a critical period of children's mental health development and personality molding, which are serious challenged by changes in the learning style, closed living environment, and fear of COVID −19. In rural areas, fear of COVID-19 among left-behind children is higher than that among non-left-behind children.[2] With the accelerated economic transformation, the massive flow of labor force between urban and rural areas has led to the formation of a special social group of left-behind children.[3] Left-behind children refer to those aged less than 16 years who are forced by their parents to stay in their place of domicile because both parents or one parent need to leave their hometown for work and the other parent lacks the guardianship ability.[4] According to Report of Rural

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Education Development in China (2020–2022), as of 2021, the number of rural left-behind children receiving compulsory education in China is 11.992 million, which includes 7.7793 million primary school students and 4.212,700 junior middle school students, accounting for 7.59% of the total number of compulsory education students.[5] Mental health of left-behind children is in poor state.[6] Studies have consistently shown that left-behind children are more likely to have mental health problems than non-left-behind children,[7–10] and these problems are manifested as high levels of emotional symptoms, behavioral difficulties, and learning difficulties[11] such as depression, self-injurious behavior, and game addiction.[12] Left-behind children aged 7–12 years are more likely to experience obsessive-compulsive disorder, interpersonal sensitivity, anxiety, hostility, paranoia, and other problems than other age groups.[7] Mental health development of left-behind children is affected by many factors, with self-esteem and perceptive social support having a strong impact. Social support refers to the respect, care, and help that an individual perceives subjectively from the surrounding social relations (such as family, friends, and significant others). Good social support can help an individual avoid or reduce the impact of stressful negative events and maintain sound mental health.[13] Self-esteem refers to the overall evaluation of an individual self-acceptance and self-worth importance in the process of socialization, and a high level of self-esteem can promote their mental health development.[14]

The present study aimed to explore differences in the mental health status of left-behind children before and after the COVID-19 pandemic and its influencing factors. Questionnaire survey was used as the main research method to investigate the left-behind children in Anhui Province. The results of this study provide references for the mental health development of left-behind children as well as guidance for schools to carry out psychological interventions to improve the mental health level of left-behind children.

Research Methods

Special Committee for Scientific Research and Academic Ethics of Anqing Normal University reviewed and approved this study. Informed consent for children aged 9–13 was obtained from the study participants and their guardians, and guidelines outlined in the Declaration of Helsinki were followed.

Subjects

In total, 91 left-behind children volunteered to participate in this study. Overall, 91 questionnaires were issued during and after the epidemic, and 82 valid questionnaires were recovered, with the effective recovery rate of 91.1%; 9 subjects were excluded because of omissions and cheating. The students' average age was 11.52 years (SD = 1.17), ranging from 9 to 13 years. Among the participants, 57% (n = 52) were females and 43% (n = 39) were males.

Mental Health Survey

In this study, Chinese version of the Symptom Check List-90 (SCL-90),[15] one of the most common mental health assessment tools in the world, was used. The scale is mainly applicable to people aged more than 16 years. The scale comprises 90 questions, including 9 factors, namely somatization, compulsion, interpersonal sensitivity, depression, anxiety, hostility, fear, paranoia, and psychosis. For scoring, the 1–5-grade system was adopted (1 = no, 2 = mild, 3 = moderate, 4 = very serious, and 5 = serious); the factor score denotes the total score of questions for each factor divided by the number of questions, and the total score is the sum of all question scores; the higher the score of each factor and the total score, the lower are the factor symptoms and mental health level. In this study, the Cronbach's α coefficient of the full scale was 0.89 and that of each factor ranged from 0.82 to 0.93.

Perceived Social Support Survey

This study adopted the perceived social support scale (PSSS)[15] to examine the perceived social support of left-behind children. The scale comprises 12 items, which include three factors, namely family support, friend support, and other support. For scoring, the 1–5-grade system was adopted, with "1" denoting "strongly disagree" and "7" denoting "strongly agree". The total score of perceived social support is the sum of each factor score, and it ranges from 12 to 84, with a high score indicating that the level of social support perceived by an individual is high. The theoretical mean

of the total score is 48. In this study, Cronbach's α coefficient for the full scale was 0.90 and that for the three factors ranged from 0.86 to 0.92.

Self-Esteem Survey

Self-Esteem Scale (SES) compiled by Rosenberg and revised by Wang et al[15] was adopted to evaluate left-behind children' sense of self-worth and self-acceptance. The scale comprises 10 items (including five items with reverse scoring), and a 4-grade system ranging from 1 to 4 (representing "very agree", "agree", "do not agree", and "very disagree") was used for scoring. The total score ranges from 10 to 40 points. The higher the score, the higher the level of self-esteem of an individual. The theoretical mean of the total score is 25 points. In this study, the Cronbach's α coefficient of the scale was 0.88.

Statistical Methods

Data were collected by issuing questionnaires. SPSS 26.0 software was used to input and analyze the questionnaire data. The main statistical methods adopted were the independent sample *t*-test, correlation analysis, and regression analysis. The independent sample *t*-test was used to compare differences in the mental health status, social support, and self-esteem of the subjects before and after the COVID-19 pandemic. Pearson correlation analysis was used to determine the relationship among mental health, perceived social support, and self-esteem before and after the COVID-19 pandemic. Regression analysis was used to explore the factors affecting mental health before and after the pandemic.

Results

Comparison of SCL-90 Scores of Left-Behind Children Before and After the Pandemic

The mental health scores of 82 left-behind children during and after the pandemic were compared, which showed that the total score of SCL-90 differed significantly before and after the pandemic ($t = 5.58$, $p < 0.001$). In addition, significant differences were noted among the seven factors of somatization, compulsion, interhuman relationship, depression, anxiety, terror, and paranoia. Specifically, the mental health scores after the pandemic were significantly lower than those during the pandemic, indicating that the mental health level after the pandemic was significantly higher than that during the pandemic. The specific results are shown in Table 1.

Perceived Social Support and Self-Esteem Scores

Comparison of the perceived social support and self-esteem scores of 82 left-behind children during and after the pandemic showed a significant difference in the total score of social support before and after the pandemic ($t = -3.48$, $p < 0.01$). Significant differences were also noted in friend support and other support. Specifically, the total score of social support, friend support, and other support after the pandemic was significantly higher than that during the pandemic. Moreover, a significant difference was noted in self-esteem before and after the pandemic ($t = -4.85$, $p < 0.001$), and the

Table 1 Comparison of Mental Health Status of Left-Behind Children in Rural Anhui Province Before and After the Epidemic (M±SD)

Subscales	During the Epidemic	After the Epidemic	t	p
Somatization	1.48±0.35	1.13±0.22	7.73	<0.001
Obsessive-compulsive	1.68±0.38	1.43±0.40	4.02	<0.001
Interpersonal sensitivity	1.61±0.50	1.44±0.41	2.40	0.017
Depression	1.47±0.41	1.25±0.32	3.75	<0.001
Anxiety	1.50±0.36	1.23±0.30	5.26	<0.001
Hostility	1.37±0.36	1.29±0.33	1.49	0.137
Phobic anxiety	1.47±0.40	1.24±0.29	4.16	<0.001
Paranoid ideation	1.49±0.45	1.18±0.29	5.26	<0.001
Psychoticism	1.39±0.37	1.29±0.31	1.91	0.058
Average scores (SCL-90)	1.49±0.26	1.27±0.25	5.58	<0.001
Total scores (SCL-90)	134.45±23.17	114.52±22.56	5.58	<0.001

Table 2 Comparison of Social Support and Self-Esteem Scores of Left-Behind Children in Rural Anhui Province Before and After the Epidemic (M±SD)

Subscales	During the Epidemic	After the Epidemic	t	p
Family support	20.98±7.16	22.25±4.73	−1.34	0.182
Friend support	19.04±4.38	21.37±4.30	−3.43	0.001
Others support	19.48±4.73	21.73±4.61	−3.09	0.002
Score of perceived social support	58.99±12.45	65.57±11.76	−3.48	0.001
Self-esteem	25.04±4.95	28.39±3.84	−4.85	<0.001

self-esteem score after the pandemic was significantly higher than that during the pandemic. The specific results are shown in Table 2.

Analysis of the Correlation Among Mental Health, Perceived Social Support, and Self-Esteem During the Pandemic

During the pandemic, the self-esteem score and perceived social support score of left-behind children exhibited a positive correlation (r = 0.40, $p < 0.001$). Mental health scores were significantly negatively correlated with self-esteem (r = −0.50, $p < 0.001$), as well as with the awareness of social support (r = −0.32, $p < 0.01$). The results are shown in Table 3.

Correlation Among Mental Health, Perceived Social Support, and Self-Esteem After the Pandemic

After the pandemic, the self-esteem score and perceived social support score of left-behind children exhibited a positive correlation (r = 0.17). Mental health scores were significantly negatively correlated with self-esteem (r = −0.36, $p < 0.01$) and perceived social support score (r = −0.53, $p < 0.001$). The results are shown in Table 4

Regression Analysis of the Influencing Factors of Mental Health During the Pandemic

To determine the factors influencing mental health during the pandemic, regression analysis was conducted, considering the SCL-90 score of left-behind children during the pandemic as the dependent variable and the perceived social support and self-esteem scores as the independent variables. The variables self-esteem and perceived social support variables could explain 25% of variations in the mental health score of left-behind children ($\Delta R^2 = 0.25$); the corresponding regression equation is as follows: $\hat{Y}_{\text{SCL-90 total score}}=201.809–0.26X_{\text{perceived social support}}- 2.07X_{\text{self-esteem}}$. The results are shown in Table 5.

Table 3 Correlation Analysis of Mental Health, Awareness of Social Support and Self-Esteem Among Left-Behind Children in Rural Anhui Province During the Epidemic Period

Subscales	Family Support	Friend Support	Other People Support	Perceived Social Support	Self-Esteem
Somatization	0.04	−0.16	−0.20	−0.20	−001
Obsessive-compulsive	−0.13	−0.15	−0.11	−0.15	−0.42***
Interpersonal sensitivity	−0.18	−0.14	−0.19	−0.23*	−0.44***
Depression	−0.17	−0.16	−0.18	−0.21	−0.38**
Anxiety	−0.14	−0.09	−0.16	−0.14	−0.24*
Hostility	−0.18	−0.25*	−0.28*	−0.26*	−0.40**
Phobic anxiety	−0.08	−0.31**	−0.29**	−0.30**	−0.36**
Paranoid ideation	0.04	−0.11	−0.15	−0.14	−0.27*
Psychoticism	−0.17	−0.22*	−0.31**	−0.29**	−0.41***
Average scores (SCL-90)	−0.20	−0.25*	−0.31**	−0.32**	−0.50***
Total scores (SCL-90)	−0.20	−0.25*	−0.31**	−0.32**	−0.50***
Self-esteem	0.33**	0.30**	0.36**	0.40***	/

Note: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

Table 4 Correlation Analysis of Mental Health, Perceived Social Support, and Self-Esteem of Left-Behind Children in Rural Anhui Province After the Epidemic (R-Value)

Subscales	Family Support	Friend Support	Other people Support	Perceived Social Support	Self-Esteem
Somatization	−0.30**	−0.27*	−0.22	−0.46***	−0.26*
Obsessive-compulsive	−0.51***	−0.39***	−0.36**	−0.54***	−0.47***
Interpersonal sensitivity	−0.33**	−0.22*	−0.19	0.30**	−0.32**
Depression	−0.34**	−0.37**	−0.29**	−0.42***	−0.21
Anxiety	−0.51***	−0.42***	−0.40***	−0.53***	−0.20
Hostility	−0.53***	−0.37**	−0.40***	−0.46***	−0.23*
Phobic anxiety	−0.35**	−0.36**	−0.27*	−0.35**	−0.22
Paranoid ideation	−0.50**	−0.41**	−0.38**	−0.51**	−0.31**
Psychoticism	−0.35**	−0.27*	−0.21	−0.36**	−0.24*
Average scores (SCL-90)	−0.50***	−0.41***	−0.36**	−0.53***	−0.36**
Total scores (SCL-90)	−0.50***	−0.41***	−0.36**	−0.53***	−0.36**
Self-esteem	0.12	0.09	0.07	0.17	/

Note: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

Table 5 Regression Analysis of Influencing Factors of Mental Health of Rural Left-Behind Children in Anhui During the Epidemic Period

Selected Variable	Partial Regression Coefficient (b)	Standard Error (SE)	Standard Regression Coefficient (b')	*t*	*p*	ΔR^2
Perceived social support	−0.26	0.20	−0.14	−1.34	0.183	0.25
Self-esteem	−0.207	0.49	−0.44	−0.42	<0.0001	

Regression Analysis of Mental Health Factors After the Pandemic

Considering the SCL-90 score of left-behind children after the pandemic as the dependent variable and the perceived social support and self-esteem scores as the independent variables, regression analysis was further conducted to analyze the factors influencing mental health after the pandemic. Self-esteem and perceived social support scores could explain 34% of variations in the mental health scores of left-behind children ($\Delta R^2 = 0.34$), indicating that perceived social support and self-esteem can significantly negatively predict the mental health level; the corresponding regression equation is as follows: $\hat{Y}_{\text{SCL-90 total score}} = 221.574–0.93X_{\text{perceived social support}} - 1.64X_{\text{self-esteem}}$. The specific results are shown in Table 6.

Discussion

Mental Health Status During and After the Epidemic

In this study, the total score of SCL-90 of left-behind children during the pandemic was observed to be higher than the national norm (130.02 ± 33.63),[16] indicating the overall poor mental health status of left-behind children during the pandemic, and the results are consistent with those of previous studies.[11,12,17] Conversely, the SCL-90 score of left-behind children after the pandemic was lower than the national norm, which indicated that the mental health of left-behind children

Table 6 Regression Analysis of Influencing Factors of Mental Health of Left-Behind Children in Rural Anhui Province After the Epidemic

Selected Variable	Partial Regression Coefficient (b)	Standard Error (SE)	Standard Regression Coefficient (b')	*t*	*p*	ΔR^2
Perceived social support	−0.93	0.18	−0.48	−5.26	<0.001	0.34
Self-esteem	−1.64	0.54	−0.28	−3.03	0.003	

improved significantly after the pandemic compare with that during the pandemic. This result may be attributed to the cancellation of the closed stay policy after the pandemic, recovery of traffic roads, parents of left-behind children returning to their hometown, and the left-behind children feeling more loved and having a sense of security and trust compared with that during the pandemic. In addition, after the pandemic, the normal teaching mode was restored at school, which puts less pressure on students compared with the online teaching mode prevalent during the pandemic period. For left-behind children, offline learning is easy and helps them acquire new knowledge, and at the same time, it allows them to communicate more with teachers and classmates, resulting in harmonious interpersonal relations between them. As a result, children's mental health level after the pandemic was high. Second, the living environment of left-behind children returned to normal after the pandemic, as they could go to entertainment to relax and relieve pressure and do not need to be in the state of worry about the pandemic, which significantly improved their mental health. Finally, under the pandemic, the parents of left-behind children's work, life security, income instability posed problems and challenges to the families of left-behind children, which adversely affected the mental health of left-behind children. After the pandemic, all types of restrictions were uplifted, residents' work and life returned to normal, and the pressures caused by the pandemic to the families of left-behind children were effectively alleviated, which improved the mental health status of left-behind children.

Perceived Social Support Status During and After the Epidemic

The results of this study showed that the perceived social support score after the pandemic was significantly higher than that during the pandemic, indicating that left-behind children received more support, care, and help after the pandemic. Additionally, the perceived social support score and mental health score were negatively correlated, with perceived social support negatively predicting the mental health level of left-behind children, that is, the higher the perceived social support score, the lower is the SCL-90 score and the higher is the level of mental health. The results of this study are basically consistent with those of previous studies. Song et al investigated 411 floating children in grades 5 to 7 and showed that social support plays a vital role in children's mental health development.[18] Fan et al also showed that the perceived social support has a considerable impact on the mental health of left-behind children, and high social support can effectively improve the mental health level of left-behind children.[19] This result can be explained by stress and coping theory,[20] according to which individuals can use corresponding strategies to cope with stress, and seeking social support is an effective means to cope with stress.[21] Left-behind children with appropriate social support are better able to overcome stress and achieve post-stress growth,[22] thus further improving their mental health.

Self-Esteem Score During and After the Epidemic

Furthermore, this study showed that the self-esteem score after the pandemic was significantly higher than that during the pandemic, indicating that self-esteem of left-behind children improved after the pandemic. Additionally, the self-esteem and mental health scores were found to be negatively correlated, and self-esteem negatively predicted the mental health level of left-behind children. Thus, the lower the self-esteem level of left-behind children, the higher is their SCL-90 score and the worse is their mental health status, which is basically consistent with the results of previous studies.[23] Individuals with high self-esteem have higher self-evaluation and self-worth recognition, which makes them more confident to face difficulties and adversities,[24] better able to cope with negative events, and feel less psychological and emotional distressed, thus having better mental health.

Limitation

However, there are limitations on this research. Firstly, the sample size in this research was limited, we could increase the sample size in future research. Secondly, we only selected participants in Anhui Province, China. Therefore, the extent to other groups needs further research to confirm.

Conclusion

To sum up, the overall mental health status of left-behind children after the pandemic is better than that during the pandemic, with social support and self-esteem having a great impact on mental health of left-behind children.

Accordingly, the mental health status of left-behind children after the pandemic deserves more attention.[6,25] The findings of this study serve as a reference for schools to provide targeted mental health education to left-behind children after the pandemic. For example, schools should attach importance to left-behind children's perceived social support and self-esteem; provide them psychological assistance through Online Photovoice(OPV);[1] carry out psychological counseling services through the psychological test, teacher communication, home visits, and other means to grasp the mental health of left-behind children in a timely manner; and provide them more encouragement and support, thus building a solid social support system for left-behind children. Schools should also focus on improving self-esteem of left-behind children to further improve their mental health. In addition, we also need to pay attention to the role of communities in promoting the mental health of left-behind children. Community-Based Participatory Research (CBPR) is an important intervention strategy conducted with the cooperation of communities and individuals to improve the quality of one's life.[1]

Disclosure

The author report no conflicts of interest in this work.

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