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A 2-year longitudinal psychological intervention study on the prevention of internet addiction in junior high school students of Jinan city.

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Abstract

Objective: To investigate the effect of psychological intervention on the prevention of internet addiction in junior high school students of Jinan.

Methods: A total number of 888 junior high school students in Jinan City were assessed by Internet Addiction Disorder Diagnostic Scale (IADDS). 57 cases students were diagnosed with internet addiction according to the scores of IADDS, while the rest 831 students were required to fill the self-designed general questionnaire, such as demographic questionnaire and Symptom Checklist 90 (SCL-90) and randomly divided into the intervention and the control groups. The psychological intervention was given in 4 states during two years, one stage in each semester, and there were 4 classes in each stage.

Results: In the intervention group, the IADDS and SCL-90 scores were significantly lower compared with those in the control students at different time points of T2 and T3 (all P_s<0.01). In the intervention group, the different factors of SCL-90 were decreased after each intervention (all P_s<0.01). These results showed that the intervention has positive effects on the mental health of students. The positive rate of internet addiction screened by IADDS in the intervention group was considerably lower compared with that in the controls at T2 and T3 time points (all P<0.05).

Conclusion: Longitudinal prospective and preventive psychological intervention can effectively improve the mental health of junior middle school students of Jinan city and reduce the incidence of internet addiction.

Keywords: Internet addiction, Junior high school student.

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Introduction

The Internet has become an indispensable part of people's lives today, whereas excessive use of internet may lead to a problematic disorder of internet addiction or commonly called problematic or Pathological Internet Use (PIU). It refers to compulsive and excessive internet use, preoccupied with or loss of control over Internet usage, which probably interferes with daily life [1-3]. Compared with adults, adolescents are more frequently exposed to internet and more vulnerable towards PIU [4], and it is estimated that about 8.8% of Chinese adolescents are affected [5]. PIU probably leads to multiple signs and symptoms, such as personality development disorders, psychological distress, poor schooling performance and even social problems [6,7]. Additionally, substance abuse disorders, impulse control disorders and high comorbidity with effective disorders have also been documented in PIU patients [8,9]. There are numerous researches focusing upon the epidemiology, predicting factors, clinical diagnosis, and negative outcomes of PIU. Nevertheless, how to treat PIU has been rarely investigated. It is an urgent task for adolescents, family relatives, schools and the whole society [10,11].

A systematic review introduced different patterns of psychological interventions in the treatment of Internet addiction. Most of these psychological therapies have been delivered in individuals and applied in an outpatient setting. Among all techniques, Cognitive Behavioral Therapy (CBT) is considered as the most commonly employed option to treat Internet addiction [10,12]. Winkler et al. performed a meta-analysis to compare the effect among varying interventions in the treatment of Internet addiction and demonstrated that the effect of CBT was not significantly higher compared with those of alternative psychological therapies, although CBT seemingly acted as a dominant method in the management of Internet addiction. In addition, individualized counselling treatment yielded certain disadvantages and limitations. Subsequent studies focusing upon multiple modalities remain to be investigated [11]. In terms of psychological treatment of Internet addiction and PIU, group therapy framework has been employed to support clients in a majority of research.

Compared with individual therapy, group therapy possess many have more advantages and benefits [13-15]. It can establish a support network of individuals who are encountering identical difficulties and challenges. The stories told by the remaining group mates might place the difficulties of the patients into perspective. Additionally, group therapy can establish an atmosphere to openly discuss sensitive issues and topics relevant to Internet addition. Since people employ different approaches to cope with different situations, group therapy can provide the possibility of learning from other members and enhance individual coping skills. Considering all the benefits mentioned above, group therapy framework has been widely applied to treat internet addiction and issues related to internet use.

At present, the intervention treatment of adolescent internet addiction is still in the exploratory stage, and has not formed a relatively authoritative treatment model. Psychological intervention, cognitive psychotherapy, group psychotherapy, family therapy and social support intervention are the most frequently used interventions. Previous researches have proposed the intervention programs of cognitive behavioral therapy [16,17]. Therefore, on the basis of former theory, the current study employed group psychological propaganda and education course as the intervention strategy.

Meta-analytic reviews of the Internet addiction have noted that there is a lack of longitudinal data [18,19]. Most of the results were based on cross-sectional investigations, the previous research methods of Internet addiction in China were investigation or case study, and there was no prospective prevention study. This study included junior high school students as research subjects, and performed mental health education and psychological intervention. The aim of this study is to evaluate the effect of psychological intervention in improving the mental health of junior high school students and the prevention of internet addiction.

Methods

Participants

A cluster sampling of 888 junior high school students from one middle school in Jinan City of Shandong Province were selected for questionnaire investigation in this study. The Internet Addiction Disorder Diagnostic Scale (IADDS) was used to assess the Internet addiction of students, which was reviewed by two clinical psychiatrists at the same time. There were 57 students diagnosed with Internet addiction, and they were treated by individual counselling therapy, and excluded in this study. The remaining 831 students were randomly divided into the intervention (n=446) and the control groups (n=385). All students were required to fill a self-designed general questionnaire, such as demographic questionnaire, IADDS, Symptom Checklist 90 (SCL-90). Those participants presenting with mental disorders, physical disabilities or alternative behavioral addictions were excluded from subsequent study. In total, 759 valid questionnaires were collected in the final analysis, consisting of 398 students in the intervention and 361 students in the control groups. All participants and their parents provided informed consent for their participation.

Procedures

All participants were required to fill these questionnaires independently before intervention (the baseline assessment T1, at the beginning of the first term in the first year), the filling-method of these questionnaires was explained by researchers, and the questionnaires were taken back on the spot.

There were totally 5 psychiatrists and 3 school teachers, who conducted the intervention. All of them have the background medical psychology and educational psychology, and have received systematic psychological training. They all have rich experience in mental health propaganda and education. In this study, group psychotherapy, cognitive behavior therapy for the Internet addicts were completed by them.

The psychological intervention was given in 4 states during two years, one stage in each semester, and there were 4 classes in each stage, one class per week and all classes were finished in the first month of the semester. The whole course of psychological education is carried out in a lively and orderly environment. The class explanation is easy to understand. In combination with the psychological characteristics of teenagers' curiosity, sensitivity, depression, inferiority, loneliness, self-control, interpersonal tension and so on, the internet addiction knowledge is explained step by step. It included the education of knowledge of internet addiction, self-psychological adjustment and health care, self-psychological decompression, and psychological counselling [20].

The post-intervention assessments were conducted in two time points (T2, at the end of second semester in the first year; T3, at the end of second semester in the second year, respectively). In order to ensure the quality of the questionnaire and prevent boredom of the participants, all participants were given material rewards in each survey. Procedures were approved by the Institutional Review Board of the Shandong Mental Health Center. The details of the procedures are presented in Figure 1.

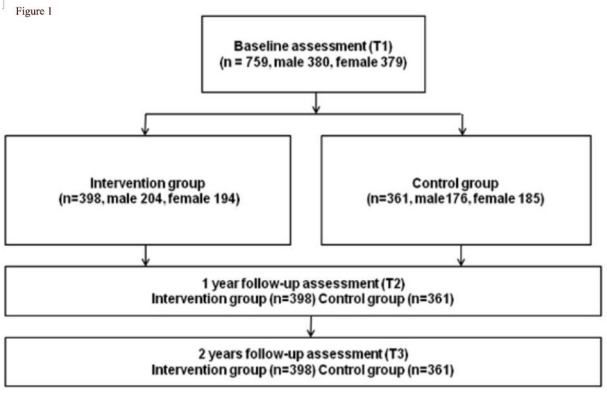

Figure 1. *The intervention process and participant's flow diagram at the different time points (T1-T3).*

Measurement

Internet addiction disorder diagnostic scale (IADDS): This is a self-rating scale made by Zan [21], including 3 dimensions of craving and tolerance, withdrawal reaction and adverse reaction. The scale consists of 13 items with different items rated as yes (1 point) or no (0 point). The total score of the scale is equal to or greater than 5 mean that the participant has Internet addiction. The measurement error of the scale is controlled at the level of 0.1952, which accords to IRT reliability requirements. The scale yields high internal consistency (α=0.85 for the entire scale) and a high test-retest reliability (r=0.96).

Symptom checklist 90 (SCL-90): It was compiled by Wang XD [22]. This scale includes 10 factors such as somatization, compulsion, interpersonal sensitivity, depression, anxiety, fear, hostility, paranoia, psychosis and others, it contains 90 items with each rated from 1 to 5 points. The scale can reflect the mental health status of students from different sides, and the change of mental health can be assessed through multiple measurements. The correlation coefficient and Kappa value of SCL-90 were 0.94 and 0.96 respectively.

Statistical analysis

The data analysis proceeded with SPSS 18.0 software. The effect of different interventions among participants between the intervention and control groups was statistically compared by t-test and ANOVA analysis at different time points of T1, T2 and T3. The comparisons of each factors of SCL-90 at each time point of the intervention group were analysed with repeated-Measures ANOVA analyses. The positive rate of Internet addiction was statistically compared between the intervention and control groups. A P value of less than 0.05 was considered as statistical significance.

Results

Comparisons of IADDS and SCL-90 scores at each time point between the intervention and control groups

The total scores of IADDS and SCL-90 at each time point between the intervention and control groups were compared with repeated-measures ANOVA analyses, with Group (intervention group and control group) as between-subjects factors, and Time (T1-T3) as the within-subjects factor, followed by Bonferroni/Dunn post hoc tests as appropriate. We found significant main effects of time (F=7.53, P<0.001, v=2), Group (F=17.21, P<0.001, v=2) and Group x time interaction (F=26.24, P<0.001, v=8). The post hoc tests showed that the IADDS scores significantly differed between the intervention and control groups at the time points of T2 and T3 (all P_s<0.01); and the scores of SCL-90 at the time points of T2 and T3 also significantly differed between two groups (all P_s<0.01, Table 1).

Comparisons for SCL-90 scores at each time point of intervention group

In the intervention group, the different factors of SCL-90 at each time points were analysed with repeated-measures ANOVA analyses, with the Time as the within-subjects factor. We found significant main effects of Time at each factor; the detailed statistical values are shown in Table 2. These results showed that the intervention has positive effects on the mental health of adolescents.

The positive rate analysis of internet addiction screened by IADDS

At the baseline assessment, a total number of 57 students were screened as Internet addiction by IADDS questionnaire, and the positive rate of Internet addiction was 6.42%. While in the intervention group and control group, there were no one cases of Internet addiction at the time point of T1 (the positive rate both were 0.00%); at the time point of T2, there were respectively 0 case (0.00%) in the intervention group and 9 cases (2.49%) internet addiction in the control group; at the time point of T3, there were 1 case (0.25%) in the intervention group and 13 cases (3.60%) of Internet addiction in the control group. The positive rate of Internet addiction at each time point between two groups was analysed with χ^2 test. The results showed that the positive rate of Internet addiction significantly differed between two groups at the time points of T2 and T3 (all P_s<0.05, Table 3).

Table 1. *Comparisons for IADDS scores and SCL-90 scores at each time point between the intervention group and the control group ($\bar{x}$ ± s).*

	Intervention group (n=398)		Control group (n=361)	
	IADDS score	**SCL-90 score**	**IADDS score**	**SCL-90 score**
T1	1.24 ± 1.23	121.12 ± 31.40	1.27 ± 1.15	121.92 ± 33.03
T2	0.91 ± 1.12$^{*\Delta}$	110.56 ± 14.82$^{*\Delta}$	1.46 ± 1.30	127.33 ± 38.08
T3	0.67 ± 0.98$^{*\Delta}$	106.89 ± 14.22$^{*\Delta}$	1.44 ± 1.36	126.88 ± 35.34

Note: compared with T1, *P<0.05. Compared with control group, $^{\Delta}$P<0.05.

Table 2. *Comparisons for SCL-90 score at each time point of intervention group ($\bar{x}$ ± s).*

SCL-90 (n=398)	T1	T2	T3	F$^{\Delta}$
Somatization	1.27 ± 0.37	1.19 ± 0.21	1.16 ± 0.18	17.4
Compulsion	1.51 ± 0.45	1.40 ± 0.27	1.35 ± 0.24	25.74
Interpersonal sensitivity	1.39 ± 0.42	1.27 ± 0.22	1.22 ± 0.21	32.18
Depression	1.33 ± 0.41	1.22 ± 0.19	1.21 ± 0.20	24.32
Anxiety	1.37 ± 0.47	1.27 ± 0.23	1.22 ± 0.25	23.71
Hostility	1.39 ± 0.49	1.29 ± 0.29	1.25 ± 0.30	14.62
Fear	1.28 ± 0.39	1.19 ± 0.25	1.18 ± 0.24	13.76

Paranoia	1.29 ± 0.41	1.20 ± 0.25	1.19 ± 0.26	12.96
Psychosis	1.28 ± 0.38	1.19 ± 0.24	1.07 ± 0.14	62.92

Table 3. *The positive rate of Internet addiction between the intervention group and the control group.*

	Positive rate of internet addiction		P
	Intervention group (n=398)	Control group (n=361)	
T1	0.00%	0.00%	1
T2	0.00%	2.49%	<0.01
T3	0.25%	3.60%	<0.01

Discussion

In this present investigation, the incidence of Internet addiction in middle school students was evaluated and the effect of psychological intervention on the prevention of Internet addiction was assessed. At the baseline assessment, there were 6.42 % students who were diagnosed as Internet addiction, in the control group, the prevalence of Internet addiction ranged between 2.49 and 3.60% over the 2 y period. These prevalence rates align with those reported by other investigations [23,24], while in the intervention group, the prevalence rates were respectively 0.00 and 0.25% over the 2 y period. In addition to the prevalence rates of Internet addiction, the total scores of IADDS and SCL-90 in the intervention group were significantly lower compared with those in the control group after the psychological intervention. In the intervention group, the different factors of SCL-90 at the time point of T2 and T3 were significant lower than that of the time point of T1. The results are consistent with previous evidence indicating the effectiveness of psychological therapy in improving the Internet addiction [14].

The online behaviors of certain individuals are abnormal and problematic which need professional guidance because they are unable to deal with the experiences by themselves, validating that clinical treatment is of necessity. Internet addiction is related to severe individualized mental damage and distress. In the clinical settings, if an individual is manifested with severe impairment, internet addiction could be deemed as a mental disorder which requires clinical treatment. Psychological therapists who handle with Internet addiction propose that relevant symptoms presented by the individuals during the course of treatment resemble the conventional substance-related addictions, such as salience mood modification, tolerance, withdrawal, conflict and relapse [25]. Researches showed that group psychological intervention is effective [14]. However, there are limited prospective studies on the prevention of Internet addiction. In current investigation, we conducted a prospective psychological intervention to non-addicted students according to their psychological characteristics, such as poor self-control, self-abasement, loneliness, poor cognitive ability and escaping from the reality [26,27], the results showed that prospective psychological intervention can significantly reduce the total scores and each scale score of SCL-90, which suggested the prospective psychological intervention can improve the mental health of students.

Conclusion

In this study, the positive rate of Internet addiction for students of grade one junior high school at baseline assessment was 6.42%, which was consistent with related researches [28,29]. Previous study showed that Internet addiction students may have several psychological and behavioral problems, such as physical discomfort, being hard to get rid of the bad thoughts and behaviors, interpersonal sensitivity, depression, anxiety, hostility, phobia and paranoia [30-32], and the more severity of the emotional problems, the greater possibility of the occurrence of Internet addiction [33]. In this study, we paid more attention to the mental health training along with the education of Internet addiction knowledge. The total scores of SCL-90 and IADDS were significantly decreased in intervention group after two years psychological intervention, which was consistent with the relevant researches in China [34]. While, the total score of IADDS in control group was increased. The positive rate of newly Internet addiction in intervention group was significantly lower than that of the control group, which suggested that the prospective psychological intervention in students of middle school could prevent the development of Internet addiction.

The present study is the population-based adolescent sample that was investigated using a 2 y longitudinal design. However, some limitations of this study should be noted. The investigation was based on self-reported questionnaires rather than on external assessments or structured clinical interviews. The main limitation of the study is that the hours spend on the internet of participants was not assessed at each time point. Last but not the least, the diagnostic criteria was only based on the IADDS scores. Future studies are suggested to combine solid and acceptable diagnostic criteria as well as longitudinal design to make comprehensive and integrative formulation to the development of Internet addiction treatment and preventive strategies. Although there are several limitations in our study, considering the prevention is more important than intervention in the addiction field, our prospective and preventive psychological intervention are very important to improve the mental health of junior high school students in Ji'nan city and prevent the occurrence of internet addiction effectively.

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Conflict of Interest

All authors declare they have no conflicts of interest.

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