

# EFFECT OF POSITIVE RUMINATION-BASED SPORTS PRESCRIPTION ON THE MENTAL HEALTH OF TEENAGERS

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received: 16.9.2021;

revised: 4.11.2021;

accepted: 9.12.2021

## SUMMARY

**Background:** Under the pressure of study, relationship, socializing, employment and other aspects, there is an increasing number of teenagers with psychological problems such as pessimism, anxiety, and depression, seriously affecting their physical and mental health and comprehensive development. Therefore, it is of vital importance to attach great importance and actively seek intervention methods to effectively improve their mental health. The aim was to investigate the intervention effect of positive rumination-based sports prescription on the mental health of teenagers.

**Subjects and methods:** 497 teenagers living in four communities randomly selected in Guangxi, China community from February 2021 to August 2021 were included in this study using convenience sampling method. Firstly, Beck Depression Inventory was adopted for measurement, and 61 volunteers were randomly selected from a population of depressive symptoms to participate in intervention. There were 29 people the Experimental group, 32 in the control group. The intervention using positive rumination-based sports prescription was performed on the Experimental group.

**Results:** After intervention, the depression score of the control group and the Experimental group was lower than that before intervention ( $P < 0.001$ ). After intervention, the anxiety score of Experimental group was significantly lower than that of the control group ( $P < 0.001$ ). There was no significant difference in the scores regarding optimism, hope, self-efficacy, resiliency and psychological capital ( $P > 0.05$ ), and the scores of the Experimental group regarding optimism, hope, self-efficacy, resiliency and psychological capital were increased after the intervention, significantly higher than before intervention ( $P < 0.001$ ), and there was no significant difference in the score of resiliency before and after intervention ( $P > 0.05$ ).

**Conclusion:** Positive rumination group counseling and the intervention of health Qigong exercise can effectively reduce anxiety levels of teenagers, improve the levels of optimism, hope, self-efficacy, resiliency and psychological capital, help cultivate teenagers' positive psychology and alleviate negative psychology.

**Key words:** positive rumination - sports prescription - mental health - psychological capital - teenagers

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## INTRODUCTION

Adolescence is a critical period for individual physiological and psychological development, as well as an important transition period from natural person to social person. The ever-accelerating global development has brought about tremendous changes to the study, life, and psychology and other aspects. Adolescence is also the high-incidence period of individual psychological problems due to a lack of effective coping methods and capabilities. Teenagers' mental health has become widely concerned by all walks of life. Studies have found that about 10-20% teenager worldwide are suffering from psychological problems (Bao & Zhao 2017), such as depression (Hankin 2006), anxiety (Liu et al. 2016), suicide (Hu et al. 2015), etc. Therefore, how to prevent psychological problems and promote teenagers' mental health have posed a severe challenge to mental health workers.

According to positive psychology, positive psychological deficiency is the main reason for mental illnesses. Therefore, cultivating positive psychology and enhancing happiness level are effective methods for the prevention and treatment of psychological diseases. Among the studies on the rumination, Feldman et al.

(2008) proposed positive rumination, defined it as individual tendency of positive emotions due to repeated reflections on the positive characters, active emotional experience and a good living environment. Xuan et al. (2018) found that positive rumination training can effectively reduce the anxiety of preschool children's mother, enhance middle school students' positive psychology level. With the emergence of positive psychology, the focus of mental health intervention, not limited to finding the reason, treating accordingly, and changing negative psychology, has gradually transformed into cultivating positive psychology and achieving the goal of prevention and treatment of psychological diseases by improving the happiness level. The cognitive therapy of positive rumination training aims to replace negative rumination with positive rumination. Doering et al. (2018) refers to a response style of individual faced with pressure thinking repeatedly about an emotional event maintains and/or amplifies the emotional response to adept to a bad environment (Kubiak et al. 2014). Subsequent scholars believed that rumination also has positive sides. For example, positive emotional rumination plays an important role in emotional regulation (Karelakis et al. 2013). Therefore, rumination can be divided into active and negative (Yang 2019). The positive

rumination training aims to help individuals strengthen active rumination, reduce negative rumination, thus enhancing mental health level. So far present, the effectiveness of this method has preliminary obtained support in studies (Scaini et al. 2021).

In addition to cognitive therapy, sports prescription is another approach to effectively improve individual mental health (Lukanovic et al. 2020). In recent years, vigorously advocated by Publicity Department of the Communist Party of China, the State Sports General Administration, health Qigong exercise has become a fitness item that people enjoy and participate. Not a fierce exercise in a short time, it requires to comprehend its connotation according to the basic requirements of Qigong exercise, to persevere step by step (Zong 2021). The promoting effect of health Qigong exercise on individual physical and mental health has been empirically supported. For example, Wang & Gao (2013) found that long-term regular practice of health Qigong exercise has a positive effect on old people's mindset. Xiao & Gao (2016) further found that long-term participation in health Qigong exercise can effectively improve the anxiety of the elderly. At the same time, adolescent mental health has become one of problems urgently to be addressed in today's society. It urgently requires high-efficiency counseling methods that save time and energy. Therefore, group psychological counseling has become the best choice. Group psychological counseling aims to promote individual interpersonal exchanges and learning, learning new behaviors and attitudes, helping individual understand and accepting self through the interaction of interpersonal interactions in groups, thus further cultivating better adaptability (Zhang & Zhu 2014).

Although single sports-based intervention program is conducive to enhancing improve the mental health level of teenagers, researchers pointed out that different intervention methods and techniques should be integrated to maximize the intervention effect (Tchouaket & Brousselle 2013). Few previous studies have reported psychological intervention by combining positive rumination training with physical exercise. Therefore, in this study, an intervention is planned to perform on teenagers' depression, anxiety and psychological capital using the sports prescription of health Qigong exercise based on positive rumination group counseling training, and the effect of the method on improving individual negative mental states and positive psychological quality will be verified. This study is expected to provide direct reference for the mental health intervention among teenagers, and also provide objective data for formulating effective physical exercise mode.

## SUBJECTS AND METHODS

### Participants

Junior high school teenagers living in four communities randomly selected in Guangxi, China community from February 2021 to August 2021 were included in this study using convenience sampling method. All respondents voluntarily participated, and we obtained the consent of their guardians and school managers. Firstly, 497 volunteers were selected through convenient sampling method, including 213 boys and 284 girls. The general condition is shown in Table 1. Then, Beck Depression Inventory-II in Chinese Version, BDI-II-C was adopted for measurement, results shown in Table 2. 61 volunteers were randomly selected from students with depressive symptoms, among which there were 29 students in the Experimental group, 11 boys, 18 girls, 32 students in the control group, 17 boys, 15 girls. The study approved by the Ethics Committee has obtained the informed consent from all participants, each of whom signed an informed consent.

**Table 1.** General condition survey list

	N	Percentage
Gender		
Male	213	42.86%
Female	284	57.14%
Grade		
Grade one of junior high school	167	33.60%
Grade two of junior high school	169	34.00%
Grade three of junior high school	161	32.39%
Accompanied by parents or not		
Yes	138	27.77%
No	359	72.23%

### Instruments

Beck Depression Inventory-II in Chinese Version, BDI-II-C (Wu & Huang 2014). BDI-II-C is used to evaluate the severity of depressive symptoms in the past two weeks, including 21 items, 0~3 rating, adding all items to obtain the total score, ranging from 0 to 63 points. No depression: 0~13 points; Mild depression: 14~19 points; Moderate depression: 20~28 points, Severe depression: 29~63 points.

DSM-5 Level 2-Anxiety-Child Age 11-17 (Zhang et al. 2018). DSM-5 is used to assess anxiety symptoms of individuals aged 11 to 17, including a total of 13 items, which inquires the frequency of individual anxiety in the past 7 days, using 1~5 rating (1 = never; 2 = almost never; 3 = sometimes; 4 = often; 5 = almost always). The total score ranges from 13 to 65 points.

**Table 2.** Depression degree of volunteers

Group	Classification of depression				$\chi^2$	P
	No depression	Mild depression	Moderate depression	Severe depression		
Gender					0.341	0.57
Male	71	123	19	0		
Female	101	153	18	2		

Positive Psychological Capital Questionnaire (PPQ) (Zhang & Zhang 2010). PPQ is used to measure individual psychological capital status, including 26 items, a total of 4 dimensions: very optimistic ("I always see a good side"), hope ("I am confident to pursue my own goals"), self-efficacy ("I can always complete the task excellently") and resiliency ("When meeting setbacks, I can recover quickly"). Rating 1 (completely inconsistent) ~ 7 (fully compliant) level, the higher the total number of the item, the higher individual psychological capital.

### **Intervention program**

The intervention lasted 6 weeks, 1-2 times a week, 2 hours each time, one hour for positive rumination group counseling and one hour for exercise prescription by health Qigong exercise. Questionnaire was conducted for measurement before and after intervention.

### **Pre-testing measurement**

Before adopting the intervention mode, teenagers' anxiety, psychological capital, and rumination level were assessed using scales for uniform measurement. No intervention was performed on control group in this study, which rather merely completed the routine activities of the school sports curriculum, without any special sports training and other psychological counseling.

### **Intervention process**

After the pretesting, the research team conducted a positive rumination training and sports intervention on 29 students participating in the event, using positive rumination training program for a total of 6 times, once a week, 1 hour each time. The first counseling topic was "successful opening". The volunteers started training after completing the questionnaire. This research team introduced the core technology of positive rumination training: to guide volunteers with positive rumination to think about positive and negative emotions, and assigned homework, recorded a positive and negative emotion for positive rumination training. Students were asked to use positive rumination once finding any negative emotions, and when providing feedback in the following counseling, focused on analyzing advantages and disadvantages of the counseling process, guided volunteers to actively participate. The second counseling topic was "active forward", aiming to actively look at their past, present and the future, requiring participants to draw a curve with time as the horizontal coordinate and happiness index as vertical coordinate, and to explain, discuss how to think about the good things and bad things with positive rumination, so as to guide the volunteers to learn how to look at things from different angles, inspire volunteers to actively look at the past, present and future. The third counseling topic was "look into the mirror", aiming to actively evaluate, like and accept themselves. Visitors firstly introduced their basic components, namely physiological self (gender, health), psychological self

(personality, temperament, ability) and social self (family, social status, etc.), and then discussed which aspect of volunteers valued themselves, how to analyze their advantages and disadvantages, ideal self, and reality with positive rumination. The fourth counseling topic was "help each other", mainly to guide volunteers to experience companion support, practice "summarize good things and concretize bad things". The fifth counseling topic was "good communication", mainly to learn communication methods, practice the thinking pattern of "receiving and tolerance". The sixth counseling topic was "review this event and summarize the harvest", which guided the volunteers to formulate a plan for the future with the active mentality, and establish a long-term partnership with the team members.

### **Health Qigong intervention**

The Experimental group performed health Qigong training once a week while undergoing positive rumination training, for around one hour each time, under the instruction of teachers of sports training major or professional teachers with fitness and pneumatic teaching experience. Before intervention, they taught volunteers to learn standard movement of health Qigong while emphasizing the integration between the breathing rhythm and action, so that students could naturally breathe in the training. This stage, with the focus on the experience, required trainees to experience the flexion and extension, spiritual relaxation and movement traction during the exercise. However, as the students are beginners, they are mainly focused on breathing. The subsequently weekly health Qigong intervention will be performed on volunteers under the guidance of the team members to ensure the quality and effect of sports intervention.

### **Statistical analysis**

Data processing was performed using SPSS 21.0. Paired-samples t test was adopted to compare the score difference between the Experimental group and the control group in depression, anxiety, optimism, hope, self-efficacy, resiliency, psychological capital before and after intervention. Independent sample t test was adopted to compare the score difference between the Experimental group and the control group in depression, anxiety, psychological capital and other dimensions before and after intervention.

## **RESULTS**

### **Effects before and after depression intervention**

The study has found that the depression score of the control group after intervention was significantly lower than before intervention ( $P < 0.001$ ), while the depression score of the Experimental group after intervention significantly lower than before intervention ( $P < 0.001$ ). There was no significant difference in the score between the Experimental group and the control group before and after intervention ( $P > 0.05$ ) (Table 3).

**Effects before and after anxiety intervention**

The research findings show that the anxiety score of the Experimental group and the control group after intervention was significantly lower than before intervention ( $P < 0.01$ ). Before the intervention, there was no significant difference in teenager anxiety score between the Experimental group and the control group ( $P > 0.05$ ), while after intervention, the anxiety score in the Experimental group was significantly lower than that in the control group ( $P < 0.001$ ) (Table 4).

**Effects before and after psychological capital intervention**

According to the research findings, there was no significant difference in scores regarding optimism, hope, self-efficacy, resiliency and psychological capital in the control group before and after intervention, while the scores regarding optimism, hope, self-efficacy, and psychological capital in the Experimental group were increased, significantly higher than before intervention ( $P < 0.001$ ), with no significant difference in the score of

**Table 3.** Comparison of score changes before and after depression intervention in two groups

Group	Before intervention	After intervention	Difference value before and after intervention	Comparison P value within groups
Experimental group (n=29)	29.38±3.53	16.21±4.79	-13.17±5.89	<0.001
Control group (n=32)	29.09±3.30	16.69±10.55	-12.41±11.23	<0.001
<i>t</i>	0.327	-0.233	-0.338	
<i>P</i>	0.745	0.817	0.737	

**Table 4.** Comparison of score changes before and after anxiety intervention in two groups

Group	Before intervention	After intervention	Difference value before and after intervention	Comparison P value within groups
Experimental group (n=29)	49.45±3.57	26.31±3.40	-23.14±5.59	<0.001
Control group (n=32)	47.72±4.02	43.88±6.06	-3.84±7.86	<0.010
<i>t</i>	1.769	-13.764	-10.944	
<i>P</i>	0.082	<0.001	<0.001	

**Table 5.** Comparison of score changes before and after psychological capital intervention in two groups

Index Group	Before intervention	After intervention	Difference value before and after intervention	Comparison P value within groups
<b>Psychological capital</b>				
Experimental group (n=29)	95.10±7.51	136.24±7.39	41.14±11.18	<0.001
Control group (n=32)	95.19±6.47	99.50±19.74	4.31±20.83	0.250
<i>t</i>	-0.047	9.798	8.475	
<i>P</i>	0.963	<0.001	<0.001	
<b>Optimism</b>				
Experimental group (n=29)	21.17±2.75	32.55±2.50	11.38±3.38	<0.001
Control group (n=32)	21.06±2.65	21.72±6.02	0.66±6.16	0.551
<i>t</i>	0.159	9.333	8.306	
<i>P</i>	0.874	<0.001	<0.001	
<b>Hope</b>				
Experimental group (n=29)	20.00±2.65	33.28±2.39	13.28±3.48	<0.001
Control group (n=32)	20.72±3.12	22.03±4.60	1.31±5.87	0.216
<i>t</i>	-0.964	11.788	9.550	
<i>P</i>	0.339	<0.001	<0.001	
<b>Self-efficacy</b>				
Experimental group (n=29)	27.83±2.61	41.93±4.10	14.10±5.17	<0.001
Control group (n=32)	28.22±3.52	29.59±6.07	1.38±6.91	0.269
<i>t</i>	-0.489	9.207	8.075	
<i>P</i>	0.626	<0.001	<0.001	
<b>Resiliency</b>				
Experimental group (n=29)	26.10±3.19	28.48±6.06	2.38±6.75	0.068
Control group (n=32)	25.19±2.79	26.16±5.59	0.97±7.02	0.441
<i>t</i>	1.197	1.560	0.798	
<i>P</i>	0.236	0.124	0.428	

resiliency before and after intervention ( $P > 0.05$ ). In addition, before intervention, there was no significant difference in scores regarding psychological capital other dimensions between the Experimental group and control group ( $P > 0.05$ ), while after intervention, the scores regarding optimism, hope, self-efficacy, and psychological capital of the Experimental group were significantly higher than that of the control group, but there was no significant difference in resiliency score between the Experimental group and control group ( $P > 0.05$ ) (Table 5).

## DISCUSSION

In this study, through a 6-week positive rumination group counselling with health Qigong exercise, it is found that even the method did not play a role in alleviating depression, it can effectively reduce individual anxiety and improve their psychological capital.

The research results show that teenagers' depression scores in the control group and the Experimental group that after intervention were significantly lower than before intervention, and there was no significant difference in depression scores in two groups before and after intervention, indicating that teenagers' depression scores declined with time, and the intervention method of combining positive rumination training with health Qigong exercise has not played a role, inconsistent with the previous results (Chan et al. 2013, Lu et al. 2020). For example: the research on depression patients by Yang & Yang (2020) found that positive rumination training effectively reduced negative rumination and depression level, and improved individual positive rumination and life satisfaction. Chan & Tsang (2019) found that health Qigong exercise actively improved individual depressive emotion.

The reason for individual depression lies in the expansion of negative rumination and the lack of positive rumination. Depression individuals repeatedly think about negative feelings, and expand the idea to the different aspects of life, so that negative rumination occupies cognitive resources, and positive rumination is contained by lack of cognitive resources (Yang & Yang 2020). Through positive rumination training, individuals can replace with positive rumination and treat positive and negative emotions correctly. Group psychological counseling can help individuals exchange and interact with others, and satisfaction to interpersonal relationship can strengthen individual positive psychology Chan & Tsang (2019). In addition, health Qigong exercise can help individual vent negative emotions. Normally, there are three types of venting negative emotions for individuals, and teenagers' depression should have declined with the enhancement of positive psychological traits. However, this study has not yielded ideal results, which may be related to the category of health Qigong exercise. In this study, Yang Sheng Gong 12 methods were adopted. But other fitness Qigong, such as 12 Duan Jin, 8 Duan Jin or five-animal exercises can be used in

future studies. In addition, the time and frequency of interventions, and the proportion of two intervention methods may affect the effect of the comprehensive intervention. In the future, it is feasible to replace other samples, expand the sample quantity, use other qigong methods, increase the time and frequency of training, thus further investigating the role of this intervention method in alleviating depression.

This study has found that the anxiety score of the Experimental group and the control group were significantly lower than that before intervention, while the before and after difference value of the Experimental group was significantly greater than the control group. In other words, the level of teenagers' anxiety decreased with time, and This comprehensive intervention method of positive rumination group counselling with health Qigong exercise accelerated this process. This result was consistent with previous research (Chang et al. 2019), For example: Scaini et al. (2021) found that positive rumination training helped college students develop a positive cognitive tendency, lower the levels of their negative thinking and social anxiety. Xiao & Gao (2016) found that old people's long-term regular participation in the health Qigong exercise had positive effect on improving their anxiety.

The reasons why this comprehensive intervention method can reduce teenagers' anxiety level lie in the following aspects: firstly, negative rumination makes individuals negatively think about the past, present and future and self, while ignoring their own advantages and holding a pessimistic attitude to the future, and positive rumination can help students learn positive thinking pattern, and focus on the present, look at themselves positively by analyzing the cause, content and results of negative thinking, so as to weaken or replace the negative rumination with positive rumination. In addition, positive rumination training can enhance individual psychological adjustment capabilities (Ahadi & Puente-Díaz 2011), thereby reducing teenagers' unnecessary concerns and anxiety. Secondly, through group counseling, teenagers are encouraged to communicate and help each other and get empathy, propose appropriate recommendations for companions, and set examples for each other to make progress together. Furthermore, according to cognitive behavioral theory (CBT) positive ideas or feelings can be activated by increasing behavior activities, and it is believed by distraction theory Chan & Tsang (2019) that physical exercise can help people temporarily distract attention, transfer anxiety or pressure Chan & Tsang (2019). Health Qigong is a way of exercise requiring individuals to relax, calm, and feel with heart, and it can help individual relax, distract attention, and remove their anxiety. And previous studies have found health Qigong can improve individual's coping style Xiao & Gao (2016), and when an individual solves problems in positive manners, the negative emotions will be greatly reduced. Finally, this comprehensive intervention method can help teenagers relax under the pressure of study and

life, expand interpersonal relationships, break cognitive limitations, and realize their concerns are just small problems and they share similar problems with peers. In this way, it can help individuals free from concerns and gradually adjust their own mental state by themselves.

Psychological capital (Abbas et al. 2012) is a state of individual's positive psychological development, including four core elements: optimism, hope, self-efficacy, and resiliency (You 2016), among which optimism refers to that an individual owns positive attributional pattern, and has a positive attitude towards present and future. Hope refers to the positive incentive status of achieving a predetermined goal by all means. Self-efficacy means that an individual believes to successfully fulfill a specific task, face challenges and strive to succeed. Resiliency refers to that an individual can quickly recovery from adversity, setbacks and failures, achieve positive transformation and growth (Zhang & Zhang 2010). The results of this study have found that in the Experimental group, there was no significant difference in optimism, hope, self-efficacy, resiliency and psychological capital before and after intervention, and scores in optimism, hope, self-efficacy, and psychological capital after intervention were significantly higher than before intervention, no significant change in resiliency. In terms of the before and after intervention difference value, in the Experimental group, optimism, hope, self-efficacy, resiliency and psychological capital were significantly greater than the control group, while there was no significant difference in terms of resiliency, indicating that other than resiliency, this intervention method can effectively improve the levels of individual psychological capital and other dimensions.

The reasons why the comprehensive intervention method adopted in this study can effectively improve individual optimism, hope, self-efficacy and psychological capital levels lie in: firstly, it is an initiative and active event process for teenagers, who can be freed from passive acceptance and forwardness, thereby fully displaying their initiative and activity. They can observe themselves, and experience what they think. Secondly, positive rumination training helps individual face problems, lower their negative expectations, and make correct attributions to the results, hold an optimistic attitude towards the future, rather than blindly expanding negative emotions and doing nothing. Meanwhile, this activity has certain social functions. Teenagers can know more about others by participating in the activity, and interpersonal contact can help them get new social support. Moreover, it has a positive effect on adjusting emotions, and health Qigong exercise can help teenagers develop rich emotions. Even with negative emotions, they can digest or vent negative emotions in physical exercise. And, health Qigong exercise is a psychological training method not just simple exercise and sports item, which can enhance teenagers' anti-pressure ability, cultivate unswerving willpower and strong psychological enduring capacity,

provide a new method to improve their psychological health. Finally, no matter positive rumination training or health Qigong exercise, both emphasize progressive improvement, during which teenagers can gradually complete exercise, make progress in cognition and behavior, and obtain successful experience, thus enhancing the self-efficacy level.

It is found by the study that the intervention method of combining positive rumination group counselling with health Qigong exercise has failed to significantly increase the level of teenagers' resiliency, which may be because resiliency refers to the capability of adjusting from negative and positive events to the best state (Wu et al. 2016). This intervention without long duration and less frequency could only help individuals relieve anxiety, depression from a shallow level, while the deep-level ability of resiliency can only be reached and changed after long intervention. According to this study, it is found that although the change of resiliency in the Experimental group and the control group before and after intervention did not reach a level of significant difference, the change in the Experimental group was greater than the control group. It is feasible to increase the frequency of interventions in future studies to verify the effect of this intervention method on the individual's deep-level capabilities.

## CONCLUSION

It requires to keep concerning the problem of teenagers' mental health and improve their overall psychological quality at the present stage. In this study, a comprehensive intervention method integrating positive rumination group counselling with health Qigong exercise was used for the intervention of teenagers' depression, anxiety, and other psychological problems. The research findings show that, the intervention pattern can effectively lower teenagers' anxiety level, enhance the levels of optimism, hope, self-efficacy, psychological capital, indicating that this method can cultivate teenagers' positive psychology and weaken negative psychology. It is necessary to expand the sample size, increase the number of interventions, and conduct tracking studies in future studies, thus further determining the optimal intervention times, playing an important role in reducing negative psychology, improving positive psychology, and facilitating psychotherapy.

### **Acknowledgements:**

This work was supported by National social sciences Fund of China (19BTY017).

**Conflict of interest:** None to declare.

### **Contribution of individual authors:**

All authors made equal contributions.

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