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*Original Article*

# The effect of art therapy on reoccurring smoking among youths

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**Abstract:** Objective: To evaluate the effect of art therapy on reoccurring smoking among youths. Methods: A total of 114 smokers admitted to the smoking cessation clinic of our hospital were enrolled and randomly divided into the control group (n=61) and the study group (n=53). The control group was given health education intervention, and the study group was given art therapy intervention. The blood lipid level, symptom checklist score, lung function, and high-density lipoprotein cholesterol (HDL-C) and serum total cholesterol (TC) levels of different length of smoking were compared between the two groups. Results: The levels of low-density lipoprotein cholesterol (LDL-C), TC, triglycerides (TG), HDL-C were significantly reduced in both groups, but compared with the control group, the LDL-C, TC, TG, and HDL-C levels of the study group were decreased more significantly, and the difference was statistically significant ($P$<0.05). The symptom checklist scores were significantly reduced in both groups, but compared with the control group, the study group decreased more significantly, and the difference was statistically significant ($P$<0.05). There were significant differences in HDL-C levels among young smokers who had different length of smoking ($P$<0.05), and with the continuous increase in smoking years, HDL-C levels were significantly reduced. After intervention, lung function was significantly improved, and the levels of vital capacity (VC%) and forced expiratory volume in the first second (FEV1%) were significantly increased ($P$<0.05). After intervention, the smoking reduction rate and the success rate of time-point smoking cessation were significantly reduced ($P$<0.05). Conclusion: Art therapy intervention had an ideal effect on young smokers, which could improve blood lipid levels and lung function, reduce the rate of reoccurring smoking, and significantly increase patients' symptom checklist score.

**Keywords:** Art therapy, youths, reoccurring smoking, blood lipid level, lung function, symptom checklist score

## Introduction

Dyslipidemia and smoking are the main factors that induce cardiovascular and cerebrovascular diseases. Smoking can cause endothelial damage and dyslipidemia. Compared with others, patients with dyslipidemia are more likely to suffer from cardiovascular diseases such as stroke, atherosclerosis and coronary heart disease [1]. Clinical data show that the prevalence of dyslipidemia in China is as high as 18.6% and is on the rise, which seriously affects the normal work and life of patients. Therefore, clinical medical staff should explore appropriate intervention methods to reduce the rate of reoccurring smoking [2].

The clinical choice of health education intervention can improve the awareness of smokers, which is a systematic, planned and organized education and social activity, and is conducive to smokers to develop a healthy and beneficial lifestyle and behavior [3]. Art therapy plays an important role in the intervention of young smokers, and has an ideal effect [4]. Art therapy is an important part of psychotherapy, and its intervention method is a non-verbal psychotherapy, which takes artistic activities as an important intermediary to intervene, and then adjusts and eliminates negative emotions through art [5]. However, there is no clinical report on the effect of art therapy on reoccurring smoking among youths [6].

The present study selected 114 smokers who admitted to the smoking cessation clinic of our hospital for health education intervention and art therapy intervention respectively, in order to evaluate the effect of the rate of reoccurring smoking among smokers, improve lung function and the quality of life, and reduce the rate of reoccurring smoking.

## Materials and methods

### *General materials*

A total of 114 smokers admitted to the smoking cessation clinic of our hospital were enrolled and randomly divided into the control group (n=61) and the study group (n=53). Inclusion criteria: ① Patients aged between 18 and 65 years; ② Patients with normal intelligence and clear consciousness to understand and read the questionnaire; ③ Patients had complete general information and could cooperate with clinical study; ④ Patients were local permanent residents; ⑤ The liver and kidney functions of the patients were normal. Exclusion criteria: ① Patients with a history of alcohol or drug abuse; ② Patients older than 65 years; ③ Patients with major organ damage; ④ Patients with high mobility and unable to complete the entire study process; ⑤ Patients who participated in other studies during this study; ⑥ Patient with immune system disease or blood system disease. The study was approved by the hospital ethics committee. Patients signed informed consent before participating in the study.

### *Methods*

The control group was given regular intervention. ① A health education program was customized to understand the needs of young smokers for health education, and analyze their health problems at various stages of smoking cessation through the combination of expert guidance, data review and physician's treatment plan. ② Education methods: mainly including posters, lectures, newspapers and magazines, videos, multimedia, *etc*. ③ Educational content: the harm of smoking was introduced to individuals, families and society and to tell those who quit smoking that cultivating good habits, customizing smoking cessation goals, scientific strategies, positive attitudes, and adjustments of the negative attitudes were the keys to successful smoking cessation. The four major sources of psychological status, direct experience, social physiology, and alternative experience were used as the theoretical framework to formulate educational strategies. Health education was held every Monday and Wednesday morning, and the time for each health education was controlled at 45 minutes.

The study group was given art therapy intervention. ① Music therapy: The music therapy intervention was carried out every Monday and Wednesday morning and afternoon, and the duration of each intervention was controlled at 30 minutes. According to the different mental states of the youths who quit smoking, appropriate music therapy program was selected. With the receptive music therapy method, enthusiastic, relaxed, strong rhythmic, lively and cheerful world famous songs and music were selected to alleviate the depression and anxiety. ② Poetry therapy: poetry recitation, literary reading and poetry collaboration were organized every week according to the literary therapy curriculum. The time was every Tuesday and Thursday morning and afternoon, and controlled at 40 minutes. ③ Painting and calligraphy therapy: Specialized personnel conducted painting and calligraphy exercises for those who quit smoking. The activity time was on Tuesday and Thursday afternoon and controlled at 60 minutes.

### *Observation index*

Comparison of smoking baseline data between the two groups: it mainly included Fagestrom score, length of smoking, CO value, daily amount of smoking, smoking index and other indicators. Fagestrom scale was used to assess the dependence of patients on nicotine. The lower score represented the poor dependence.

Comparison of blood lipid levels between the two groups [7]: 5 mL of fasting venous blood was drawn, centrifuged at 3500 rpm for 10 minutes to obtain serum. Hitachi 7170A automatic analyzer was used to detect low-density lipoprotein cholesterol (LDL-C), serum total cholesterol (TC), triglycerides (TG), and high-density lipoprotein cholesterol (HDL-C). The relevant operation was carried out according to the instructions.

Comparison of symptom checklist scores between the two groups [8]: The Symptom

**Table 1.** Comparison of baseline data of smoking between the two groups (case, %)

| Groups | Case number | Fagestroms score (point) | Length of smoking (year) | CO value ($\times 10^{-6}$) | Daily amount of smoking (stick/day) | Smoking index (year × stick) |
|---|---|---|---|---|---|---|
| Control group | 61 | 7.2±0.8 | 22.8±9.3 | 17.2±3.4 | 22.9±8.8 | 586.5±90.6 |
| Study group | 53 | 7.3±0.9 | 22.6±9.4 | 16.9±3.3 | 23.1±8.7 | 587.4±90.3 |
| $X^2$ | / | 0.352 | 0.585 | 0.406 | 1.625 | 1.952 |
| *P* | / | 0.053 | 0.054 | 0.052 | 0.057 | 0.055 |

**Table 2.** Comparison of blood lipid levels between the two groups (mmol/L, $\bar{x}\pm s$)

| Groups | Case number | LDL-C | TC | TG | HDL-C |
|---|---|---|---|---|---|
| Control group | 61 | 3.2±0.7 | 4.9±0.8 | 1.7±0.5 | 1.2±0.3 |
| Study group | 53 | 2.8±0.6 | 4.4±0.7 | 1.2±0.3 | 0.8±0.2 |
| *t* | / | 17.234 | 16.524 | 16.385 | 17.563 |
| *P* | / | 0.048 | 0.042 | 0.048 | 0.043 |

Checklist 90 (SCL-90) with 0-4 five-level scoring method was used to evaluate the somatization, compulsion, interpersonal relationship, depression, anxiety, hostility, horror, paranoia, psychosis, *etc*. The scale contained 9 factors and 90 items. The lower score indicated the higher level of mental health.

Comparison of lung function between the two groups [9]: The lung function tester was used to detect vital capacity (VC) and forced expiratory volume in the first second (FEV1). The closer to the normal value represented the better intervention effect.

*Statistical methods*

SPSS19.0 statistical software was used for data analysis. Statistical data were tested by two-sided test. Quantitative data were expressed by (x±s), data comparison was performed by t test, and the comparison between 3 groups of samples was performed by analysis of variance. The results were compared by LSD. The qualitative data were tested by $X^2$, and the graph was made by Graphpad Prism 8. *P*<0.05 indicated that the difference was statistically significant.

## Results

*Comparison of baseline data of smoking between the two groups*

The control group had 61 patients including 47 males and 14 females who aged between 18 and 65 years, with an average age of (52.3±3.1) years and an average BMI of (23.5±2.4) kg/m$^2$. The study group had 53 patients including 41 males and 12 females who aged between 18 and 65 years, with an average age of (53.2±3.2) years and average BMI of (23.4±2.2) kg/m$^2$. The Fagestrom score, length of smoking, CO value, daily amount of smoking, and smoking index were not statistically significant between the two groups, and the data of the two groups were comparable (*P*>0.05) (**Table 1**).

*Comparison of blood lipid levels between the two groups*

The levels of LDL-C, TC, TG, and HDL-C were significantly reduced in both groups. Compared with the control group, the levels of LDL-C, TC, TG, and HDL-C in the study group decreased more significantly (*P*<0.05) (**Table 2**).

*Comparison of symptom checklist scores between the two groups*

Before intervention, there was no significant difference in the symptom checklist scores between the two groups (*P*>0.05). After intervention, the symptom checklist scores were significantly reduced in both groups. Compared with the control group, the scores of the study group decreased more significantly, and the difference was statistically significant (*P*<0.05) (**Table 3**).

*Comparison of TC and HDL-C levels of different length of smoking*

There was no significant difference in TC levels among young smokers with different length of smoking (*P*>0.05), and there was no statistical significance between the length of smoking and TC levels (*P*>0.05). There were significant differences in the HDL-C levels of young smokers with different length of smoking (*P*<0.05), and with the continuous increase of smoking

**Table 3.** Comparison of symptom checklist scores between the two groups (x±s)

| Functions | Before intervention | | *P* | After intervention | | *P* |
|---|---|---|---|---|---|---|
| | Control group | Study group | | Control group | Study group | |
| Total score | 134.3±31.4 | 133.2±29.4 | 0.059 | 135.6±32.1 | 112.4±22.7 | 0.033 |
| Somatization | 2.5±0.5 | 2.6±0.4 | 0.055 | 2.4±0.5 | 1.7±0.6 | 0.021 |
| Force | 2.4±0.4 | 2.4±0.4 | 0.053 | 2.1±0.4 | 1.7±0.4 | 0.041 |
| Interpersonal relationship | 2.3±0.3 | 2.3±0.3 | 0.052 | 2.2±0.3 | 1.6±0.5 | 0.039 |
| Depression | 2.7±0.4 | 2.7±0.3 | 0.054 | 2.6±0.5 | 1.7±0.3 | 0.021 |
| Anxiety | 2.7±0.5 | 2.7±0.4 | 0.054 | 2.6±0.2 | 1.8±0.5 | 0.034 |
| Hostility | 2.2±0.3 | 2.1±0.3 | 0.051 | 2.1±0.4 | 1.7±0.4 | 0.021 |
| Horror | 1.7±0.3 | 1.7±0.3 | 0.052 | 1.9±0.6 | 1.4±0.3 | 0.029 |
| Paranoia | 1.5±0.3 | 1.4±0.3 | 0.051 | 1.7±0.5 | 1.6±0.6 | 0.034 |
| Psychotic disorder | 2.0±0.4 | 2.0±0.4 | 0.052 | 1.9±0.5 | 1.9±0.4 | 0.029 |

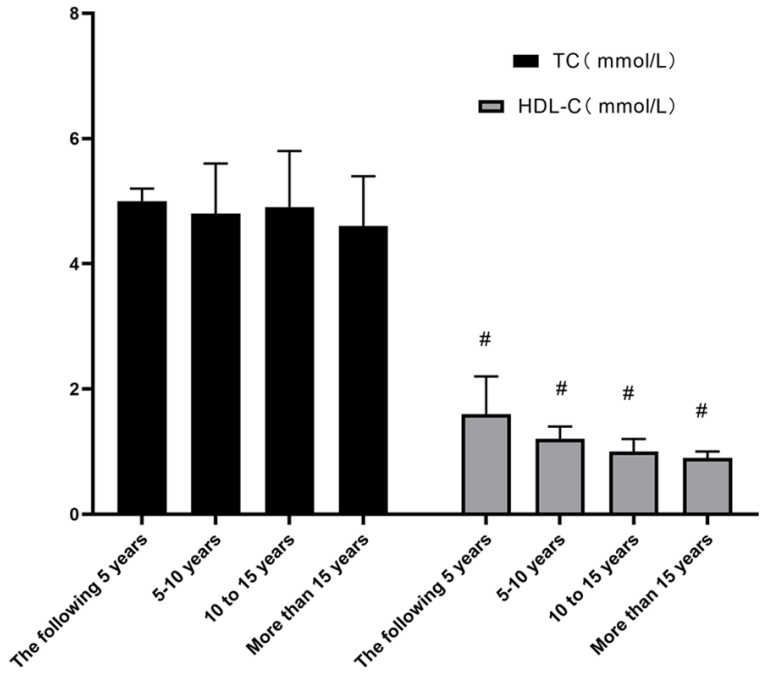


**Figure 1.** Comparison of TC and HDL-C levels of different length of smoking. There was no significant difference in TC levels among young smokers under 5 years, 5-10 years, 10-15 years, and 15 years of smoking years (*P*>0.05), and there was no statistical significance between length of smoking and TC levels (*P*>0.05). There were significant differences in the HDL-C levels of young smoker of different length of smoking (*P*<0.05). With the continuous increase in smoking years, the HDL-C levels were significantly reduced, and the length of smoking and HDL-C levels were significantly positively correlated. # represented that the inter-group differences were statistically significant at the same index and at the same time, *P*<0.05.

years, the levels of HDL-C were decreased significantly (**Figure 1**).

*Comparison of lung function before and after intervention*

Before intervention, there was no significant change in VC and FEV1 levels, and exhibiting no statistical significance (*P*> 0.05). After intervention, lung function was significantly improved, and the levels of VC% and FEV1% were significantly increased (*P*<0.05) (**Figure 2**).

*Comparison of smoking reduction rate and success rate of time-point smoking cessation before and after intervention*

Before intervention, the reduction rate and success rate of time-point smoking cessation were 29.5% and 8.2%, respectively. After intervention, the smoking reduction rate and the success rate of time-point smoking cessation were 82.0% and 18.0%, which were significantly reduced compared with before intervention, and the difference was statistically significant (*P*<0.05) (**Figure 3**).

## Discussion

With the economic development, young people are under increasing pressure, and smoking rate is on the rising [10, 11]. It is clinically proven that the blood lipid levels of long-term smokers will change significantly, increasing the risk of cardiovascular and cerebrovascular diseases [12]. Tobacco contains a variety of compounds such as carbon monoxide and nicotine. When carbon monoxide floods into the liver, a large amount of very low density lipopro-

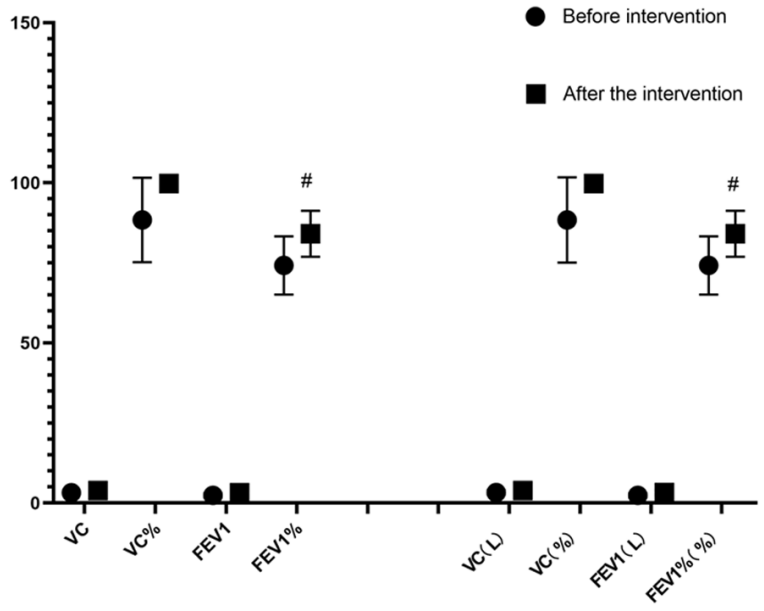


**Figure 2.** Comparison of lung function before and after intervention. Before intervention, the levels of VC and FEV1 did not change significantly, and there was no statistical significance ($P>0.05$). After intervention, the levels of VC% and FEV1% increased significantly, and the difference was statistically significant ($P<0.05$). # represented that the inter-group differences were statistically significant at the same index and at the same time, $P<0.05$.

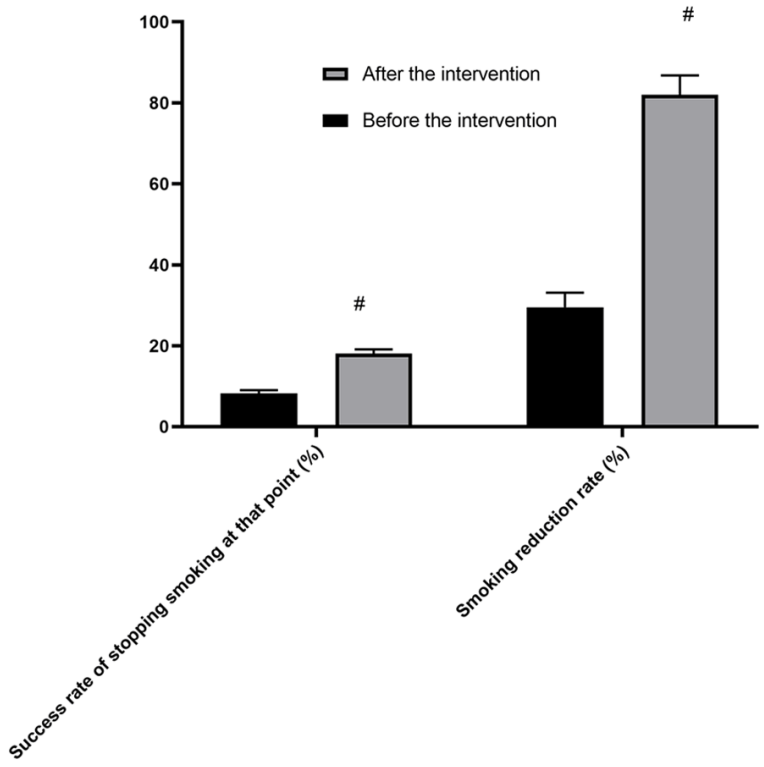


**Figure 3.** Comparison of smoking reduction rate and success rate of smoking cessation before and after the intervention. Before intervention, the success rate of time-point smoking cessation and smoking reduction rate of smokers were 8.2% and 29.5%, respectively. After intervention, the success rate of time-point smoking cessation and smoking reduction rate of smokers were 18.0% and 82.0%, respectively. Compared with before intervention, the smoking reduction rate and the success rate of time-point smoking cessation were significantly reduced after intervention, and the difference was statistically significant ($P<0.05$). # represented that the inter-group differences were statistically significant at the same index and at the same time, $P<0.05$.

tein and TG will be synthesized in the liver. When the synthesis of low-density lipoprotein increases, the level of HDL-C decreases [13]. High-density lipoprotein is an anti-arteriosclerosis factor, which can reverse cholesterol and indirectly or directly transfer excess cholesterol in peripheral tissues to the liver [14]. As a result, when the content of high-density lipoprotein in the blood decreases, cholesterol will accumulate in the arterial wall and the progression of arteriosclerosis will accelerate, increasing the risk of coronary heart diseases [15, 16].

It is very necessary to carry out active clinical nursing intervention for smokers, and insufficient cognition is an important factor leading to smoking [17]. Health education can reduce or eliminate risk factors affecting health, which plays a very important role in disease prevention and the improvement of quality of life [18]. Health education enables smokers to better adapt to the environment in terms of attitude, cognition and emotion, and can maintain physical and mental harmony and health [19]. Health education can allow smokers to judge their own value more accurately, which is conducive

to the mobilization of social roles and fully mobilizes social roles in the process of their own value experience [20, 21]. Art therapy is an important supplement to speech therapy and drug therapy, which can alleviate the depression and anxiety of smokers through a series of intervention methods such as painting, music, and calligraphy. At the same time, it is conducive to the shaping of positive psychological characteristics, which can not only improve the enthusiasm and self-confidence of smoking cessation, but also significantly improve the psychological adaptation [22].

Some scholars believe that clinical nursing intervention can effectively improve the levels of LDL-C, TC, TG, and HDL-C in smokers [23]. The study explored the effect of art therapy on the blood lipid levels of smokers, and the results showed that the levels of LDL-C, TC, TG, and HDL-C were significantly reduced in both groups. Compared with the control group, the levels of LDL-C, TC, TG, and HDL-C in the study group were decreased more significantly. The difference was statistically significant ($P<0.05$), and the results of this study were highly consistent with those of clinical scholars [24]. The results showed that compared with health education intervention, art therapy intervention was more effective and could improve blood lipid levels and prognosis to a greater extent. The study explored the impact of different length of smoking on the HDL-C levels of smokers. The results showed that there were significant differences in the HDL-C levels of young smokers with different length of smoking ($P<0.05$), and with the continuous increase in length of smoking, the HDL-C level was significantly reduced, indicating that the length of smoking was an important influencing factor of HDL-C level, and early art therapy intervention should be carried out for smokers in clinical practice to minimize the damage to lung function. Somatization, interpersonal relationship and psychological function of some smokers were significantly reduced, and the effect of art therapy intervention in this study was more significant [25]. The study explored the impact of health education and art therapy on the symptom checklist scores of smokers. The results of the study showed that the symptom checklist scores were significantly reduced in both groups, and compared with the control group, the scores of the study group decreased more significantly, and the difference was statistically significant ($P<0.05$), indicating that art therapy intervention was more effective than health education intervention in improving patients' negative emotion and cognition. In addition, the results of the study showed that after intervention of art therapy, the smoking reduction rate and the success rate of time-point smoking cessation of young smokers were significantly reduced, and the difference was statistically significant ($P<0.05$), suggesting that through music, poetry, painting, and calligraphy therapy, art therapy can improve patients' depression, anxiety, hostility, horror, and other negative emotions, and help improve the success rate of smoking cessation. Therefore, this intervention method is worthy of vigorous promotion and application.

However, the study had certain limitations, including fewer samples, shorter study duration, and no discussion about the effects of smoking on changes in interleukin-8 and tumor necrosis factor-α concentrations. Therefore, in the next study, more qualified samples should be collected, the duration of the study and better intervention methods should be provided for the smokers.

In summary, the art therapy intervention for young smokers had an ideal effect, which could improve blood lipid levels and lung function, reduce the rate of reoccurring smoking, and significantly increase the patients' symptom checklist score.

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## Disclosure of conflict of interest

None.

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