

# Research Journal of Pharmaceutical, Biological and Chemical Sciences

## Efficacy of Different Methods Combined with Nicotine Patch Therapy for Smoking Cessation.

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### ABSTRACT

Currently about 1 in 3 adults, or 1.1 billion people, smoke worldwide, 80% of them live in the developing world. Each year, cigarette smoking is responsible for an estimated of 35,000 deaths in Iranian population. There are many different *quit smoking methods*. The aim of this study was to determine the effectiveness of different methods combined with Nicotine patch therapy for smoking cessation. This descriptive cross sectional study was conducted from the beginning of April, 2011 to April 2012 in the smoking cessation counseling center. From the 138 enrolled patients, 17 patients excluded from the study, of 121 remaining patients, the evaluation of knowledge, behavior, smoking status and level of nicotine dependence (Fagerstrom test), divided into 4 groups with different ways: Consultation, physical activity, face to face training and Screening training. Then these patients were treated. Analyses were conducted using SPSS version 18. Baseline characteristics of the groups were compared using analysis of variance (One way ANOVA). Chi-squared ( $\chi^2$ ) test was used to examine predictors of smoking cessation at 12 months. After one year of intervention and follow-up telephone calls at 1, 3, 6 and 12 months, rates of success in quitting smoking were as follows: physical activity: 33.3%, in groups counseling: 26.7%, face to face training: 19.4%, and educational videos:13.3%. Performing physical activity during smoking cessation programs at tobacco cessation counseling clinics can increase quitting rates in the smoking population.

**Keywords:** Exercise, Smoking cessation, Intervention, psychology consulting, Nicotine patch

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## INTRODUCTION

Cigarette smoking is one of the most preventable causes of death [1, 2]. Approximately one third of the world adults (1.1 billion people) are smokers and 80% of them live in the developing world [3]. In Iran, tobacco use is accountable for about 35,000 deaths annually [4]. Cigarette smoking is a major cause of coronary heart disease, cancer and hypertension, and is one of the leading causes of premature mortality in developed nations [1]. Nicotine is extremely addictive [5]; hence, self-quitters failure rates are about 95-98% [6]. For most smokers, quitting is a difficult process because of withdrawal syndrome which occurs following discontinuation of nicotine use in long-term smokers [7].

Various methods exist for smoking cessation including education, group counseling, individual counseling, aversive conditioning, hypnosis, cold turkey, sensory deprivation, desensitization and nicotine replacement therapy (NRT) [4]. Nicotine supplement systems may help alleviate nicotine withdrawal symptoms and reduce urges to smoke [8]. NRT is frequently used as an effective part of smoking cessation methods. It alleviates physiological and psychomotor withdrawal symptoms following smoking cessation and increase the possibility of remaining abstinent. Using the patch for 8 weeks is as effective as longer courses and there is no clear evidence that gradual reduction in the dose is better than abrupt withdrawal. Patches can be worn for 16 to 24 hours a day with equal effectiveness [9]. Increasing the level of physical activity could improve the results of smoking cessation. Physical activity is effective in reducing tobacco withdrawal symptoms and reducing weight-gain after cessation [10]. Smokers believe that exercise is a strategy for reducing the risk of developing tobacco-related disease [11]. In developed countries, different surveys on adolescents suggested that participation in sports help reduce drinking alcohol, cigarette smoking or illegal drug use [12-14]. A smoking cessation program together with exercise could facilitate two simultaneous changes in health behavior [15].

The development and maintenance of healthy behaviors can reduce morbidity and mortality and decrease health care costs (16). Group or individual visits could be delivered in different visits to the clinic. Individual, group, telephone, and internet intervention are four types of counseling provided after the client's visit [17]. Evidences support with the abstinence rate of 7% (95% CI 3–10%) suggest that individual counseling for smoking cessation is effective [18]. However, no evidence suggests that group counseling is more effective than individual counseling. Behavioral interventions with pharmacological treatment together increase success rates of smoking cessation and smokers are encouraged to use both methods if they are serious to quit [17].

### Objectives

Most of the smokers with increased level of awareness regarding hazards of tobacco smoking want to quit. Primarily it is the responsibility of the countries' health-care system to treat tobacco dependence. Generally, using simple approved therapeutic interventions could help consumers of tobacco quit smoking. The aim of this study was to determine the efficacy of different methods combined with Nicotine patch therapy for smoking cessation

## PATIENTS AND METHODS

This descriptive cross-sectional study was a research priority of health center of Kurdistan province for tobacco control program. It has been conducted from the beginning of April, 2011 to April 2012 in the smoking cessation counseling center. During the study 138 visitors to the center entered into the study. In their first visit a questionnaire containing smoking history, demographic characteristics, knowledge, attitude and behavior designed by the center for environmental health, department of health was handed out and *Fagerström Test for Nicotine Dependence* was measured. The Fagerstrom score (0 - 7) was used to classify the level of nicotine dependence. Smokers with a Fagerstrom score of seven or more were classified as high nicotine dependence, while those with a score less than seven were classified as low (0-3) and, moderate (4-6) nicotine dependence.

### Tools

In this Study used intervention to assessing of smokers. After obtaining informed consent, participants were divided into 4 groups. The quitting method contained performing physical activities,

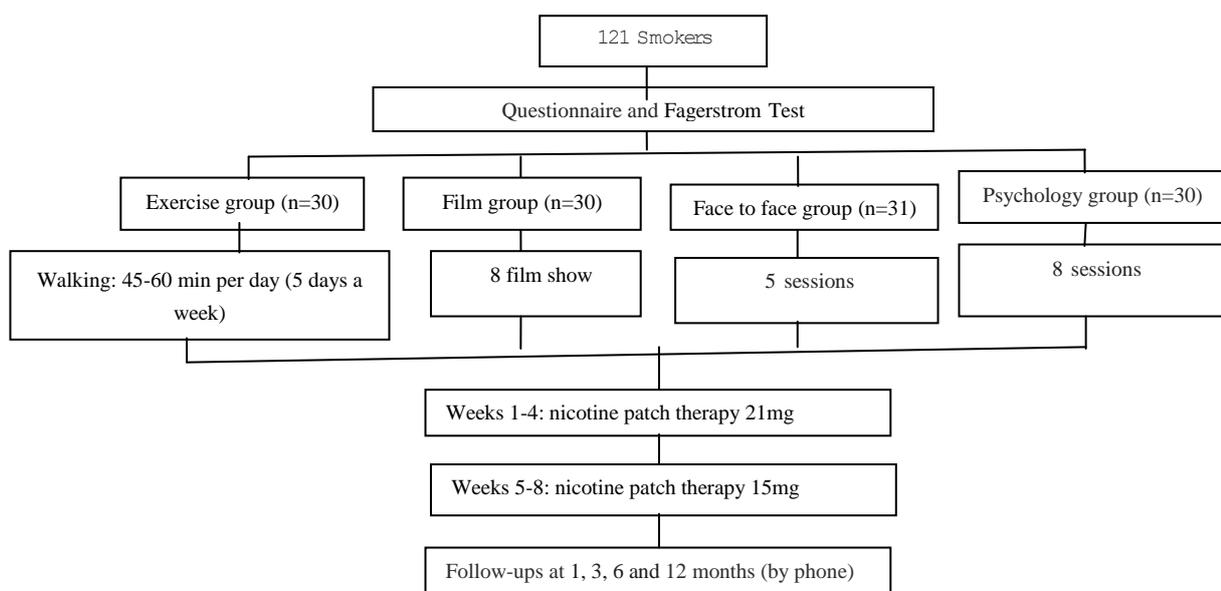
counseling by an expert in mental health, face to face training by an expert in Tobacco Control Program, presenting educational videos on tobacco-related diseases as well as environmental hazards of smoking.

Figure 1 provides an overview of intervention. All participants were advised to use 21 and, 15 mg 16 hours nicotine patches following their final cigarette, throughout the treatment program.

Type of physical activity in this study included walking and climbing which was possible for many people without spending money or taking risks related to the type of sport. Due to varying number of cigarettes consumed by smokers participating in the study, they were advised to reduce their consumption to 7 to 8 cigarettes per day until complete cessation of smoking. As an alternative, 21 milligram of nicotine tags could be immediately pasted on their arm which could be used for 4 weeks. Then from week 4 to 8, 15 mg nicotine tags were used and at the same time physical activity, education by psychologist, face to face education and instructional videos were used. Subsequently 1, 3, 6 and 12 months after the intervention, quitting process were investigated using telephone calls. Analyses were conducted using SPSS version 18. Baseline characteristics of the groups were compared using analysis of variance (One way ANOVA). Chi-squared ( $\chi^2$ ) test was used to examine predictors of smoking cessation at 12 months.

**Ethical Consideration**

**It is approved by ethical committee of kurdestan**



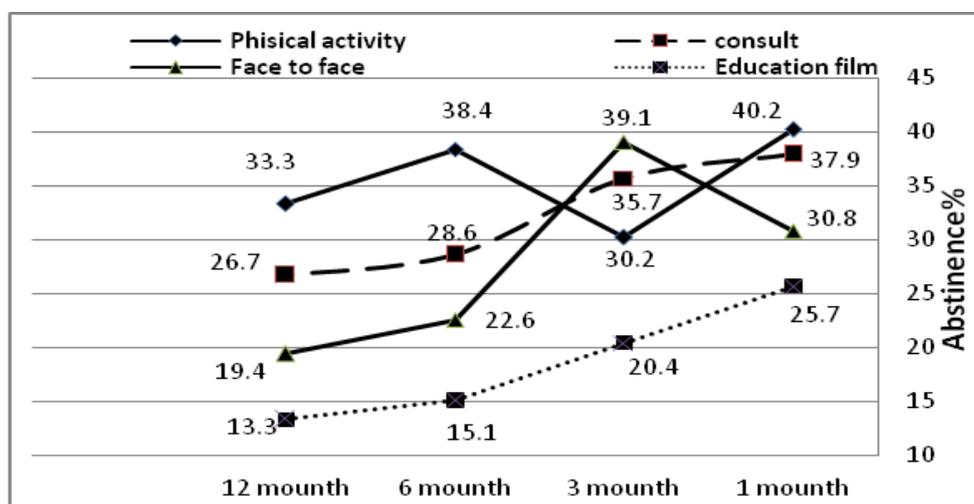
**Figure 1: A flow-chart illustrating the intervention on quit smoking**

**RESULTS**

From the 138 enrolled patients, 17 patients excluded from the study: 3 patients due to cardiovascular and respiratory problems, 2 patients due to psychological problems, 10 patients due to doing regular sport, and 2 patients due to lack of the third session of the circles. Of 121 remaining patients, the evaluation of knowledge, behavior, smoking status and level of nicotine dependence (Fagerstrom test), divided into 4 groups with different ways: Consultation, physical activity, face to face training and Screening training. Then these patients were treated. As shown in Table 1, there is no significant difference among the groups regarding baseline characteristics. Mean number of cigarettes smoked per patient per day was 13.3. All of the patients were male with the mean age of 43.6 years.

**Table 1: Demographic characteristics and Statistical tests of the study population**

| Demographics                      |                              | Exercise<br>n=30(%) | Film<br>n=30(%) | Face to face<br>n=31(%) | Psychology<br>n=30(%) | Statistical test    | P-value     |
|-----------------------------------|------------------------------|---------------------|-----------------|-------------------------|-----------------------|---------------------|-------------|
| <b>marital status</b>             | <b>marital</b>               | 26 (86.7)           | 27 (90)         | 28 (90.3)               | 26 (86.7)             | Fisher's Exact Test | <b>0.94</b> |
|                                   | <b>single</b>                | 4 (13.3)            | 3 (10)          | 3 (9.7)                 | 4 (13.3)              |                     |             |
| <b>literacy</b>                   | No literate                  | 4 (13.3)            | 3 (10)          | 2 (6.5)                 | 3 (10)                | Fisher's Exact Test | <b>0.98</b> |
|                                   | High school graduate or less | 11 (36.7)           | 14 (46.7)       | 12 (38.7)               | 13 (43.3)             |                     |             |
|                                   | Some post-high school        | 9 (30)              | 7 (23.3)        | 12 (38.7)               | 8 (26.7)              |                     |             |
|                                   | College graduate or more     | 6 (20)              | 6 (20)          | 5 (16.2)                | 6 (20)                |                     |             |
| <b>Age, y</b>                     |                              | 44.9±8.1            | 45.1±9.3        | 43.5±10.5               | 41.9±12.7             | One Way ANOWA       | <b>0.67</b> |
| <b>Age started smoking, year</b>  |                              | 20.1±3.4            | 19.2±2.0        | 19.0±3.1                | 19.2±4.5              | One Way ANOWA       | <b>0.60</b> |
| <b>Average cigarettes per day</b> |                              | 11.7±4.0            | 14.2±6.5        | 13±4.9                  | 14.5±6.2              | One Way ANOWA       | <b>0.19</b> |



**Figure 2: comparison of success rate in different methods of quitting smoking**

According to Figure 3, after one year of intervention and follow-up telephone calls at 1, 3, 6 and 12 months, rates of success in quitting smoking were as follows: physical activity: 33.3%, in groups counseling: 26.7%, face to face training: 19.4%, and educational videos:13.3%.

Despite the numerical difference in the success rate of different smoking cessation methods, physical activity and other methods applied in the project (figure3).

**Table 2: Statistical analysis of the success rate in different methods**

| smoking quit rates | Exercise<br>n=30(%) | Psychology<br>n=30(%) | Face to face<br>n=31(%) | Film<br>n=30(%) | Statistical test | P-value |
|--------------------|---------------------|-----------------------|-------------------------|-----------------|------------------|---------|
|                    | 10(33.3)            | 8(26.7)               | 6(19.4)                 | 4(13.3)         | Chi-Square Test  | 0.28    |

Chi square test (Figure 4) showed no significant difference among the success rates of different methods of quitting smoking ( P. value =0.28).

**DISCUSSION**

According the findings of this study there were no significant difference between exercise combined with nicotine patch, psychology consulting, face to face and video education combined with nicotine patch.

Smoking cessation rates in our study is in line with another study in Tabriz- Iran also provided psychology consulting combined with nicotine gum by Vafai et al. This research were conducted on 100 patients and showed smoking cessation rates of 26.7% [19].

A recent study from Heydari et al. demonstrated smoking cessation rates of 49%, 41%, 31% and, 18% at first, third, sixth and twelve months, respectively by phone follow up [20].

Eric et al. to determine the safety and efficacy of the nicotine patch and gum for adolescents who want to quit smoking found that, the proportions of participants who achieved prolonged abstinence (continuous abstinence as of 2 weeks after randomization) were as follows: patch group, 6 of 34 subjects (17.7%); gum group, 3 of 46 subjects (6.5%); placebo group, 1 of 40 subjects (2.5%) [21].

Butler et al. Meta-analyses showed that 5% more smokers quit after brief advice from a physician and, that in the region of 15% quit after more intensive intervention [22].

Watel et al. showed that doing sports as an elite student-athlete has negative correlation with cigarette, alcohol and cannabis use [23].

Jorenby and colleagues found significantly higher rates of smoking abstinence at 12 months with the combination therapy(35.5%) and bupropion alone (30.3%) than with transdermal nicotine alone (16.4%) or placebo (15.6%) [24]. Nicotine patch therapy generally doubles abstinence rates over placebo controls at both short-term (end of patch therapy) and long-term (6 to 12 months) follow-ups [25]. A number of studies on the nicotine patch have reported smoking cessation rates at the end of patch therapy of about 30% to 45% for active patch groups and rates of 20% to 27% after 6 to 12 months of follow-up [26-28].

Mark et al. identified 70 published reports of 69 trials in volving a total of 3298 patients. They found that Varnicline, bupropion and the 5 nicotine replacement therapies studied (gum, inhaler, nasal spray, tablet and patch) were more effective than placebo at promoting smoking cessation [29].

Usher et al. identified 13 trials, six of which had fewer than 25 people in each treatment arm. Three studies showed significantly higher abstinence rates in a physically active group versus a control group at end of treatment. One of these studies also showed a significant benefit for exercise versus control on abstinence at the three-month follow up and a benefit for exercise of borderline significance ( $P = 0.05$ ) at the 12-month follow up [30].

Higher smoking cessation rates were observed in the active nicotine patch group at 8 weeks (46.7% vs 20%) ( $P < .001$ ) and at 1 year (27.5% vs 14.2%) ( $P = .011$ ) [28].

Clinically significant smoking cessation can be achieved using nicotine patch therapy combined with physical activity, psychology consulting, face to face education and film show, follow-up, and relapse prevention. Based on the results of this study, it is recommended to perform physical activity during smoking cessation programs at tobacco cessation counseling clinics in order that increasing levels of quitting rates in the smoking population are predictable.

#### ACKNOWLEDGEMENTS

This study was a research priority in Kurdistan University of Medical Sciences. Hereby, many thanks go to the Deputy of Research and Deputy of Health, Kurdistan University of Medical Sciences for their cooperation and assistance.

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