

Predictors of Relapse in Smoking Cessation with Nicotine Patches

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Abstract

Objective: This research aims to study the efficacy of nicotine replacement therapy (Nicotine patches) in smoking cessation and to detect the risk factors for relapse after abstinence. **Methods:** Eighty-nine male smokers were invited to participate in this study in smoking cessation clinic in Facous cancer center (Sharkia Governorate). The smokers used Nicotine11 patches 30, 20 and 10 which deliver nicotine at rates of 21, 14 and 7 mg respectively over a period of 24 hours for 9 weeks, 3 weeks for each type. The baseline variables included smoking rate and history, demographic characteristics, the Fagerstrom Tolerance Questionnaire (FTQ) score, alveolar carbon monoxide (CO) concentration, body mass index (BMI), motivation to quit score and Hamilton Beck depression scale score. Forty five subjects who had maintained abstinence for 9 weeks were followed for a period of 1 year to ascertain individual characteristics that were predictive of later relapse. **Results:** The rate of abstinence at the end of 9 weeks was 50.6%, at the end of 6 months was 28.1% and at the end of year was 25.8%. Among abstinent subjects, those who were more dependent, more depressed and with less motivation to quit relapsed more significantly. **Conclusion:** This information may be helpful to clinicians seeking to match specific patients to specific treatments with transdermal nicotine in order to maximize treatment outcomes.

Introduction:

Cigarette smoking continues to be the primary cause of preventable death (Centers for Disease Control, 1993), and smoking cessation rates have not changed substantially in recent years, despite advances in treatment (Public Health Service, 1983). Thus it remains important to further examine factors associated with smoking that may affect smoking cessation rates. Meta-analyses of well-controlled clinical trials of nicotine replacement therapy identify a clear and significant advantage for transdermal nicotine (Po, 1993, Fiore et al., 1994, Silagy et al., 1994, Tang et al., 1994). The use of this form of treatment increases the odds of smoking cessation relative to placebo by approximately 2-3 times, both at the end of treatment and at short and long-term follow-up (Po, 1993, Fiore et al., 1994, Silagy et al., 1994). Even with the enhanced treatment efficacy, however, long-term cessation rates are still disappointingly low (20-30%) (Fiore et al., 1994).

Recent studies have identified risk factors for relapse after use of the patch. Patient characteristics and behaviors that increase the likelihood of relapse include smoking while using the patch (Cummings et al., 1994, Foire et al., 1994; Orleans et al., 1994), greater difficulties with cravings in previous quit attempts, past use of formal treatment (Orleans et al., 1994), being less than 40 years of age, less motivation to quit, having less concern about weight gain (Gourlay et al., 1994) and being female (Stapleton et al., 1995).

A number of studies have reported higher lifetime rates of major depressive episodes among smokers (Glassman, 1993) and cross-sectional studies have found more depressive symptoms in smokers (Peres-Stable et al., 1990). Perhaps more importantly, smokers with more depressive symptomatology have more difficulty in attempting to stop smoking (Anda et al., 1990) and are more likely to relapse after quitting smoking (Shiffman, 1982).

Nicotine, the pharmacologically active component of cigarette smoke, has direct and indirect effects on the neurotransmitters thought to be involved in major depression (Hall et al., 1993). Lower levels of nicotine dependence enhances the likelihood of maintenance (Norregaard et al., 1993, Hurt et al., 1994, Richmond et al., 1994). This research aims to study the efficacy of nicotine replacement therapy in smoking cessation and to detect the risk factors of relapse after abstinence.

Subjects and Methods

Subjects were 89 male smokers (at least one pack of cigarettes per day) attending the smoking cessation clinic in Facous cancer center. The assessment of smoking status by the self-report method was confirmed by expired-air carbon monoxide levels of 8 ppm or lower.

The main rating instruments were:

1- Hamilton depression scale (HDS); (Hamilton, 1960) is world-wide the most important observer rating scale for depression. It has been translated into many languages and is used internationally. The reliability, internal consistency, and validity of the scale has been studied with overall satisfactory results. It includes a list of 21-items of somatic as well as psychological symptoms, which are added to get a total score reflecting the severity of the depressive syndrome. A total score of 0-7 means no depression, 8-15 means minor depression and 16 or more means major depression.

2- Fagerstrom tolerance questionnaire (FTQ) (Fagerstrom, 1978) is a self-report instrument that assesses subjects' nicotine dependence. It consists of eight questions and yields a total score of 0-11; a score 7 or higher is interpreted as a high level of dependence

3- Motivation to quit: Rating of motivation to quit easily assessed (ratings were

made on an 11-point scale with 0 = ambivalent and 10 = maximal) and considered by some to be an essential element in the clinical decision to prescribe patch for smoking cessation (Fiore et al., 1992).

Other data collected were: age, gender, number of cigarettes smoked at baseline, duration of smoking, previous quit attempts and body mass index (BMI). The smokers used nicotine11 patches (Ciba Geigy), 30, 20 and 10, a transdermal nicotine delivery system that delivers nicotine at rates of 21, 14 and 7 mg respectively over a period of 24 hours. The duration of the study was 9 weeks 3 weeks for each type in a gradual withdrawal manner. Successful abstainers after these 9 weeks were then enrolled in a new trial to study relapse rate after 1 year and to study the risk factors of this relapse.

Statistical analysis:

The arithmetic mean, standard deviation, t-test and p-value probability.

Results:

Descriptive characteristics of all the subjects who included in the study are shown in table (1). End of treatment data were available for 82 (92.1%) of the 89 subjects. The missing subjects were treated as smokers in all analyses. The percentage of subjects who reported abstinence verified by CO concentration was 50.6% (N = 45) for the entire sample. At the 6-month and 12-month follow up, 28.1% (N = 25) and 25.8% (N = 23) of subjects were abstinent respectively. The relapse was 44.4% (N = 20/45) at 6-month and 48.% (N=22/45) after one year as shown in figure (1).

Table (2) showed that relapse group characterised by smoking more cigarettes/day, more years of smoking, high score of dependence & depression and less motivation score. The age and BMI do not affect the relapse rate.

Table (1)
Descriptive characteristics of all subjects (N=89)

Characteristics	Range	X±SD
- Age	18-65	39.6±7.3
- Cigarettes/day	10-80	28.7±8.2
- Years smoked	01-40	18.1±4.1
- No of previous quits	01-10	03.5±03.2
- BMI (kg/m ²)	19-51.6	29.2±8.4
- FTQ	03-11	7.3k1.5
- CO(ppm)	04-94	34.2±12.8
- Motivation to quit	01-07	5.6k1.3

Fig (1)
Abstinence and relapse after 9 weeks, 6-months and 12 months.

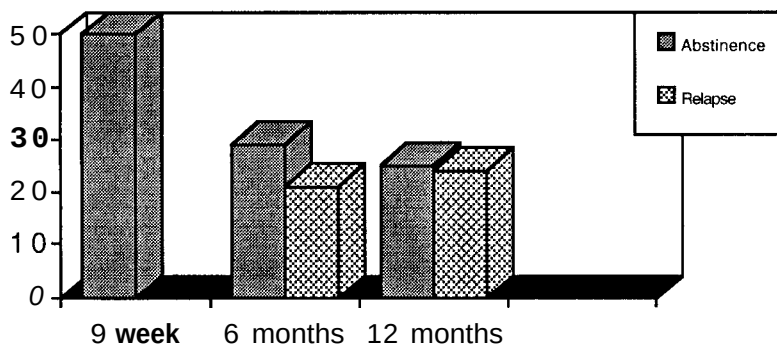


Table (2)
Comparison between the abstinence and relapse groups after 1 year.

Characteristics	Abstinence Group (n=23)	Relapse Group (n=22)	t	p
- Age	32.1k6.2	34.0±6.6	0.89	NS
- BMI	24.4±8.1	25.4L7.5	-0.45	NS
- No. of Cig/day	22.4k7.3	28.8k8.3	1.95	P<0.05
- Duration of smoking	13.4±4.4	17.9k8.4	1.79	P<0.05
- Motivation score	9.0k0.9	6.6k1.2	2.79	P<0.01
- FTQ score	5.4k2.1	7.8k2.4	2.73	P<0.01
- HDS score	6.8±5.5	12.6L8.7	2.05	P<0.05

Discussion:

In the present study, nicotine replacement therapy (Nicotine11 TTS) aided about 50.6% of individuals in stopping smoking. Meta-analysis of well-controlled clinical trials of nicotine replacement therapy identify a clear and significant advantage for transdermal nicotine (Silagy et al., 1994; Tang et al., 1994). The use of this **form** of treatment increases the odds of smoking cessation relative to placebo by approximately 2-3 times, both at the end of treatment and at short and long-term follow-up (Po, 1993; Fiore et al., 1994).

The percentage of abstinent subjects who relapsed between the end of treatment and the 6-month follow-up was 44.4% (20 out of 45) and the 12-month follow-up was 48.4% (22 out of 45). The percentage of abstinent subjects at the end of 1 year was 25.8%. This is consistent with Fiore et al. (1994) who stated that even with the enhanced treatment efficacy, however, long term cessation rates are still disappointingly low (20-30%). Goldstein et al. (1989) found abstinence rate 36.7% after 6-month follow-up of smokers using nicotine replacement therapy. This difference in percentage of abstinence is due to the use of intensive cognitive and behavioral skills training in addition to the nicotine replacement therapy.

The low percentage of relapse between the 6-month and 12-month follow-up periods is consistent with FDA Advisory Panel's Review (1982) which had noted that most recidivism occurs in the first four months.

The laboratory measures (CO measurement) of smoking cessation supported the self report findings noted in previous studies (Rosenberg, 1977; Malcolm et al., 1986). This study found that age did not affect the relapse rate. Gourlay et al. (1994) found that age less than 40 years of age increases the likelihood of relapse.

Both, abstinence and relapse groups were young in age (32-34 years old) and this may explain the high relapse rate in this study.

The finding that BMI did not affect the relapse rate is in keeping with Swan et al. (1997) who found that individuals with BMI greater than 26.4 kg/m² did less well on the 14 mg patch, but did well on the 21 mg patch which used also in our study. This raises the possibility that smokers with a higher level of obesity may not have received adequate nicotine replacement from the 14 mg patch (Prather et al., 1993).

The characteristics that increase the likelihood of relapse include number of cigarettes/day, duration of smoking and high dependence on nicotine. In contrast to the recommendation that highly dependent smokers be considered as good candidates for transdermal, nicotine (Fiore et al., 1992). Lower levels of dependence were associated with better treatment outcome. It has been hypothesized that this effect may result from incomplete replacement of the precessation level and pharmacokinetics of nicotine in more highly dependent smokers (e.g. bolus versus steady state), (Hart et al., 1994; Tang et al., 1994). Higher-dose patches and a different (e.g. slower) schedule of down-titration are more suitable for highly dependent smokers (Swan et al., 1997).

Support was obtained for the recommendation (Fiore et al., 1992) that motivation to quit be considered for treatment assignment in smokers. In the present study, smokers with a level of motivation to quit of greater than 7 on the scale used experienced better treatment outcome and less relapse. This finding is consistent with other studies using conventional methods to identify predictors of relapse (Gourlay et al., 1994).

Smokers with more depressive symptomatology are more likely to relapse after quitting smoking. This is in keeping with (Shiffman, 1982). Smokers with history of major depression tend to smoke more heavily (Breslau et al., 1991) and they experience more severe symptoms of nicotine withdrawal during attempts to quit (Covey et al., 1990; Breslau et al., 1992), suggesting that the relationship between smoking and depression may be dose responsive (Son et al., 1997).

Despite progress with identification of risk factors for relapse following the use of the patch, the available data do not lend themselves readily to matching subgroups of smokers to different patch regimens in order to maximize treatment effectiveness. For example, knowing that patch users with less motivation to quit are at greater risk for relapse (Gourlay et al., 1994) is difficult to translate into a clinically useful algorithm unless it is known how to group smokers (e.g. the cut-point) on their motivation so that informed treatment assignments can be made.

References

- Anda, R.F., Williamson, D.F., Escobedo, I.G. et al. (1990):** Depression and the dynamics of smoking, a national perspective. *JAMA*, 264: 1541-1545.
- Breslau, N., Kilbey, M.M. and Andreski, P. (1991):** Nicotine dependence, major depression, and anxiety in young adults: *Arch Gen Psychiatry*; 48: 1069-1074.
- Breslau, N., Kilbey, M.M. and Andreski, P. (1992):** Nicotine withdrawal symptoms and psychiatric disorders: findings from an epidemiological study of young adults. *Am. J. Psychiatry*, 149: 464-469.
- Centers for Disease Control (1990):** Cigarette smoking, attributable mortality and years of potential life lost. United States, *MMWR Morb Mortal Wkly Rep*, 42: 645-649.
- Covey, L.S., Glassman, A.H. and Stetner, F. (1990):** Depression and depressive symptoms in smoking cessation. *Compr. Psychiatry* 31: 350-354.
- Glassman, A.H. (1993):** Cigarette smoking: Implications for psychiatric illness. *Am. J. Psychiatry*, 150: 546-553.
- Goldstein, M.G., Niaura, R., Follick, M.J. and Abram, D.R. (1989):** Effects of behavioral skills training and schedule of nicotine gum administration on smoking cessation. *Am. J. Psychiatry*, 146: 56-60.
- Hall, S.M., Munoz, R.F., Reus, V.Z. et al. (1993):** Nicotine negative effect and depression. *J Consult Clin Psychol.*, 61: 761-767
- Peres-Stable, E.J., Marin, G., Marin, B.V. et al. (1990):** Depressive symptoms and cigarette smoking among Latinos in San Francisco. *Am. J. Public. Health*, 80: 1500-1502.
- Shiffman, S. (1982):** Relapse following smoking cessation a situational analysis. *J. Consult. Clin. Psychol.*, 50: 71-86.
- Stapleton, J.A., Russel, M.A., Feyerabend et al. (1995):** Dose effects and predictors of outcome in a randomized trial of transdermal nicotine patches in general practice, *addiction*, 90: 31-42.
- Cumming, K.M., Biernbaum, R.M., Zevon, M.A., Deloughry, T. and Jean, C.R. (1994):** User and effectiveness of transdermal nicotine in primary care settings, *Archives of Family Medicine*, 3: 682-689.
- Fagerstrom, K.O. (1978):** Measuring degree of physical dependence to to-

bacco smoking with reference to individualization of treatment. *Addictive Behavior*, 3: 235-241.

Fiore, M.C., Jorenby, D., Baker, T.B. and Kenford, S.L. (1992): Tobacco dependence and the nicotine patch: clinical guidelines for effective use, *Journal of the American Medical Association*, 268: 2687-2694.

Fiore, M.C., Smith, S.S., Jorenby, D.E. and Baker, T.B. (1994): The effectiveness of the nicotine patch for smoking cessation, *Journal of the American Medical Association*, 271: 1940-1947.

Goarlay, S.G., Forbes, A., Mariner, T., Pethica, D. and McNeil, J.J. (1994): Prospective study of factors predicting outcome of transdermal nicotine treatment in smoking cessation, *British Medical Journal*, 309: 842-846.

Hamilton, M. (1960): A rating scale for depression. *J. Neurol Neurosurg Psychiatry* 23: 56-62.

Hurt, R.D., Dale, L.C., Fredrickson, P.A. et al. (1994): Nicotine patch therapy for smoking cessation combined with physician advice and nurse follow-up. *Journal of the American Medical Association*, 271: 595-600.

Malcolm, R., Currey, H.S., Mitchell, M.A. and Keil, J.E. (1986): Silver acetate gum as a deterrent to smoking. *Chest*, 90: 107-111.

Narregaard, J., Tonnesen, D. and Petersen, L. (1993): Predictors and reasons for relapse in smoking cessation with nicotine and placebo patches, *Preventive Medicine*, 22: 261-271.

Orleans, C.T., Resch, N., Noll, E. et al. (1994): Use of transdermal nicotine in a state-level prescription plan for the elderly, *Journal of the American Medical Association*, 271: 601-607.

Rosenberg, A. (1977): An investigation into the effect on cigarette smoking of a new antismoking chewing gum. *J. Int. med. Res.* 5: 68-70.

Po, L.W.A. (1993): Transdermal nicotine in smoking cessation. *European Journal of Clinical Pharmacology*, 45: 519-528.

Prather, R.D., Tu, T.G., Rolf, C.N. and Gurstine, J. (1993): Nicotine pharmacokinetics of nicoderm (nicotine transdermal system) in women and obese men compared with normal sized men, *Journal of Clinical Pharmacology*, 33: 644-649.

Public Health Service (1982): US Department health, education and welfare. The health consequences of smoking: cardiovascular disease. A report of the surgeon general Washington DC: US DHEW Publication no. 84-50204.

Richmond, R.L., Harris, K. and Neto, A.A. (1994): The transdermal nicotine patch: results of a randomized placebo controlled trial, *the Medical Journal of Australia*, 161: 130-135.

Silagy, C., Mant, D., Fowler, G. and Lodge, M. (1994): Meta-analysis on efficacy of nicotine replacement therapies in smoking cessation. *Lancet*, 343: 139-142.

Son, B.K., Markovitz, J.H., Winders, S. and Smith, D. (1997): Smoking, nicotine dependence and depressive symptoms in the CARDIA study. *American Journal of Epidemiology*, 140: 110-116.

Swan, G.E., Jack, L.M. and Ward, M.M. (1997): Subgroups of smokers with different success rates after use of transdermal nicotine. *Addiction* 92(2): 207-218.

Tang, J.L., Law, M. and Wald, N. (1994): How effective is nicotine replacement therapy in helping people to

stop smoking? British Medical Journal, 308: 21-26.

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التنبؤ بالانتكاسات فى الاقلاع عن التدخين بإستخدام لصقة النيكوتين

يهدف هذا البحث نحو دراسة مدى كفاءة لصقة النيكوتين كعلاج تعويضي فى الاقلاع عن التدخين و التعرف على العوامل المؤدية للانتكاسة مرة اخرى بعد الاقلاع.

و لذلك فقد تم اختيار تسعة و ثمانين مدخنا من الرجال من مركز فاقوس-محافظة الشرقية، استخدم معهم لصقات نيكوتين من فئة ١٠ . ٢٠ . ٣٠ التى تقوم بأدخال النيكوتين بمعدل ٧ . ١٤ . ٢١ مجم على مدار اليوم (على الترتيب).

و قد وجد ان معدلات الاقلاع فى نهاية الاسبوع التاسع من الدراسة كانت ٦٠,٥٪ وفى نهاية الشهر السادس ٢٨,١٪ و فى نهاية السنة الاولى ٢٥,٨٪ . كانت معدلات الإنتكاس بين أفراد العينة الذين اقلعوا عن التدخين فى بداية الدراسة أعلى بين الافراد المكتئبين حيث أن دوافعهم للاقلاع عن التدخين كانت أقل.

و قد استنتج من هذه الدراسة انه من الممكن الاستفادة من لصقات النيكوتين للحصول على افضل نتائج للاقلاع عن التدخين فى اشخاص محدده.

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