

# AN ANALYSIS OF VARIABLES DISCRIMINATING THE GROUP OF QUITTER AND NON-QUITTER AMONG THAI MALE ALCOHOL-DEPENDENT SMOKERS

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**ABSTRACT:** The co-occurrence of alcohol and tobacco consumption is well documented. Alcohol-dependent smokers typically have a higher severity of dependence and a lower rate of smoking cessation than non alcohol-dependent smokers, especially among males. Moreover, alcohol-dependent tobacco addiction appears to be more difficult to overcome than either alcohol or tobacco addiction alone. Hence, examining the variables which discriminate between the 'quitter' and 'non-quitter' groups among male alcohol-dependent smokers could aid health care providers in developing effective smoking cessation interventions. The purpose of this study was to identify such variables. This study used a cross-sectional research design involving 421 male alcohol-dependent smokers who had received smoking cessation intervention from health care providers. The participants were selected using the convenience sampling technique, and a multistage random sample was used to select two hospitals, and the Thailand National Quit-line for involvement in this study. All participants completed six questionnaires: 1) the Stage of Change Questionnaire (SCQ), 2) the Processes of Change Questionnaire (PCQ), 3) the Self-efficacy Questionnaire (SEQ), 4) the Decisional Balance Questionnaire (DBQ), 5) the Severity of Alcohol Dependence Questionnaire (SADQ), and 6) the Fragestrom Test for Nicotine Dependence (FTND). The acquired data was analyzed using percentages, means, standard deviations, and discriminant analysis. The major findings of the study were as follows: the variables that could discriminate between the 'quitter' and 'non-quitter' groups among Thai male alcohol-dependent smokers, at the 0.05 significance level were nicotine dependency, self-efficacy, and decisional balance. Furthermore, male alcohol-dependent smokers in the 'quitter' group were found to possess lower levels of nicotine dependence, higher levels of self-efficacy, and higher decision-making abilities than those in the non-quitter group. The findings suggested that smoking cessation intervention strategies for Thai male alcohol-dependent smokers should target nicotine dependence, self-efficacy, and decisional balance. However, level of alcohol dependence among smokers was not significantly able to discriminate between quitter and non-quitter groups. Future studies should consider causal relationships between these factors.

**Keywords:** Quitter, Non-quitter, Smoking cessation, Discriminant variable, Alcohol dependence

## INTRODUCTION

Nicotine dependence is an important issue for alcohol-dependent patients. Eighty percent of people with alcohol dependence are also smokers, and 30% of smokers are also alcohol dependent [1]. When alcohol dependence occurs alongside smoking, it can present more serious health concerns than with non alcohol-dependent smokers [2, 3]. Moreover, alcohol and nicotine codependency can become more complex and difficult to treat than either nicotine or alcohol addiction alone [4, 5].

Both nicotine and alcohol are classified as dependence producing substances, which means that heavy users may find it difficult to quit, and

may continue to use these substances despite it being seen as problematic. Le and colleagues [6] found that repeated administrations of nicotine stimulated alcohol consumption. Often, drinking and smoking simultaneously may seem like automatic behavior [7], which can be explained using the classical conditioning model. Drinking may enhance nicotine cravings in cigarette smokers, and, likewise, the experience accompanying alcohol abuse could also serve as a conditioned stimulus for smoking in the classical conditioning sense, thus reinforcing the smoking and drinking interaction [8].

Heavy drinking is related to heavy smoking, and the negative health consequences of these dependencies are simultaneously becoming both increasingly common and increasingly severe. Several researchers

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have recommended smoking cessation interventions as an effective way to avoid the severe health consequences of smoking. Smoking cessation intervention among alcohol-dependent smokers in particular is seen as a principle strategy to prevent negative outcomes from many associated diseases, alongside efforts to abstain from alcohol dependence [9, 10-14].

In comparison with non alcohol-dependent smokers, alcohol-dependent smokers have lower success rates for smoking cessation. Previous studies have shown that, while the majority of alcohol-dependent smokers express a desire to stop smoking, only a few are successful in doing so. Additionally, alcohol-dependent smokers have been found to have a higher severity of dependence [15], and a lower rate of smoking cessation than non alcohol-dependent smokers [16, 17]. It is possible that alcohol-dependent smokers may experience an urge to smoke in response to the discomfort associated with the urge to drink, which could explain this relationship. A better understanding about the discriminate variables for the 'quitter' and 'non-quitter' smoking groups could help to clarify these findings.

In Thailand, previous data has been collected about the prevalence of smoking cessation and alcohol consumption cessation separately. However, as of yet there is no data available for the prevalence of smoking cessation among alcohol-dependent smokers. Hence, it is now critical to assess the factors involved in smoking cessation for Thai male alcohol-dependent smokers. The purpose of this study is to determine which variables are able to discriminate between the 'quitter' and 'non-quitter' groups among Thai male alcohol-dependent smokers, and the findings will contribute useful knowledge for designing effective smoking cessation interventions to benefit and assist these individuals.

## HYPOTHESES

1. Significant differences will be found between the 'quitter' and 'non-quitter' groups for nicotine dependence, severity of alcohol dependence, self-efficacy, decisional balance, and processes of change among Thai male alcohol-dependent smokers.
2. Lower levels of nicotine dependence, lower levels of severity of alcohol dependence, higher levels of self-efficacy, higher levels of smoking cessation decision-making (decisional balance), higher strategy intensity of use for quitting smoking (process of change) will discriminate between the 'quitter' and 'non-quitter' groups among Thai male alcohol-dependent smokers.

## MATERIALS AND METHODS

The study uses a cross-sectional research analysis design to identify the variables that discriminate between the 'quitter' and 'non-quitter' groups among Thai male alcohol-dependent smokers.

### Participants and procedure

The participants were all alcohol-dependent smokers who had received smoking cessation intervention from health care providers for one month. Alcohol-dependent smokers were identified as having a score of 20 or above on the Alcohol Use Disorders Identification Test (AUDIT). AUDIT scores can be divided into four categories as follows: (1) 0-7 = Low risk drinker, (2) 8-15 = Hazardous drinker, (3) 16-19 = Harmful use, and (4)  $\geq 20$  = Alcohol dependence.

According to the current research setting in Thailand, the data records for co-morbid alcohol and nicotine dependence were separated. Most of the alcohol-dependent smokers involved in this study had received smoking cessation intervention from the following three main settings: 1) drug dependence treatment centers, 2) general hospitals, and 3) smoking cessation services. Multistage random sampling was used to select one drug dependence treatment center and one general hospital out of a sample of hospitals from all regions across Thailand, and the Thailand National Quit-line was selected as the national smoking cessation service. The participants in this study were selected using a convenience sampling technique.

The sample size was estimated from the number of parameters for estimation, and the degrees of freedom are equal to the number of parameters (relationships between variables). For a given number of variables, equaling 36 in the regular smoking cessation model, every variable has an error term which is usually related to at least one other variable. Therefore, twice the number of observed variables were used to estimate the degrees of freedom. By following MacCallum et al.'s table of minimum sample size [18], the sample size was projected to be approximately 305 with a power of 0.80 ( $\alpha=0.05$ ,  $\epsilon_0=0.05$ ,  $\epsilon_a=0.08$ ). In addition, the total sample size was increased by 25% to account for potential drop-outs. Therefore, the current study had a total sample of 421 Thai male alcohol-dependent smokers (drug dependence treatment centers:  $n=210$ , general hospitals:  $n=106$ , and smoking cessation services:  $n=106$ ).

Ethics approval for this study was sought and obtained from The Human Research Board of the Royal Thai Navy Medical Department number RLM 006/56 and The Ethics Review Committee

Research Board of the Princess Mother National Institute on Drug Abuse Treatment (PMNIDAT).

### Instruments

A self-report questionnaire was used to discriminate between the two groups, 'quitter' and 'non-quitter,' among participants.

**Smoking cessation** was measured using the question: "have you smoked a cigarette in the last 7 days?" An answer of "no" indicated that the participant has successfully stopped smoking for seven days (Seven-day point prevalence abstinence: Quitter) and answer of "yes" indicated that the participant has not stopped smoking for seven days (Non-quitter).

**The Fagerstrom Test for Nicotine Dependence (FTND)** consists of 6-items which measure nicotine dependence in adults using five score-levels: very high dependence (scores of 8-10), high dependence (scores of 6-7), medium dependence (score of 5), low dependence (scores of 3-4) and very low dependence (scores of 0-2). The reliability (Cronbach's Alpha) of the instrument was 0.78 in this research study.

**The Severity of Alcohol Dependence Questionnaire (SADQ)** [19] was translated and back-translated into a Thai version by the researcher. This questionnaire measures the severity of alcohol dependence using questions covering the following five aspects of dependency syndrome: 1) physical withdrawal symptoms, 2) affective withdrawal symptoms, 3) relief drinking, 4) frequency of alcohol consumption, and 5) speed of onset of withdrawal symptoms. Each question is rated on a four-point scale: Almost never – 0, Sometimes – 1, Often – 2, Nearly always – 3, with a score of 45 or higher indicating "very severe dependence," a score of 31-44 indicating "severe dependence," a score of 20-30 indicating "moderate dependence," a score of 4-19 indicating "mild dependence," and a score of 0-3 indicating "no dependence." The reliability (Cronbach's Alpha) of the instrument was 0.91 in this research study.

The Processes of Change Questionnaire, PCQ [20], Decisional Balance Questionnaire, DBQ [21], and Self-Efficacy Questionnaire, SEQ [22], for smoking were translated and back-translated into Thai versions by Siriwong et al. [23]. The reliabilities (Cronbach's Alpha) of these instruments were 0.95 for the PCQ, 0.88 for the DBQ, and 0.90 for the SEQ in this research study.

**The Process of Change Questionnaire (PCQ)** is a 40-item questionnaire assessing ten processes, on a five-point Likert scale, of current frequency of use in the past month, including consciousness raising,

dramatic relief, environmental re-evaluation, social liberation, self re-evaluation, stimulus control, helping relationships, counter conditioning, reinforcement management, and self-liberation, with scores ranging from 40 to 200 points.

**The Decisional Balance Questionnaire (DBQ)** is a 20-item questionnaire assessing participants' views about ten positive aspects ('pros') and ten negative aspects ('cons') of smoking. Participants rated how important each statement was to them on a 5-point Likert scale from (1) "Not Important" to (5) "Extremely Important." A sample 'pro' of smoking read, "After not smoking for a while, a cigarette makes me feel great," and a sample 'con' of smoking read "I'm foolish to ignore the warnings about cigarettes," with scores ranging from 20 to 100 points.

**The Self-Efficacy Questionnaire (SEQ)** is a 20-item questionnaire assessing self-efficacy in refraining from smoking in various situations. The scale consists of three situational factors: positive/social, negative/affective, and habit/addictive. Participants were asked to indicate how confident they were that they could avoid smoking in each situation using a Likert scale that ranged from 0 (not at all confident) to 5 (extremely confident), with scores ranging from 20 to 100 points, and higher scores indicating greater self-efficacy.

In this study, the content validity of each questionnaire was approved by five experts in the area of smoking cessation and three experts in the area of alcohol dependence, and the reliability of each questionnaire was tested to establish internal consistency for each questionnaire (Cronbach's alpha,  $\alpha > 0.70$ ), on thirty alcohol-dependent smokers with similar characteristics to the participants.

### Data analysis

The research data was analyzed employing SPSS (Statistical Product and Service Solutions) for Windows Version 17 for descriptive statistics, Chi-square tests, and a Discriminant Analysis stepwise method technique. The independent variables were severity of alcohol dependence, nicotine dependence, processes of change, self-efficacy and decisional balance.

## RESULTS

### General characteristics of the population

The participants in this study consisted of 421 male alcohol-dependent smokers. The overall ages of the participants ranged from 18 to 67 years (mean=38.94years, SD=10.23) and approximately half had completed primary education (46.1%).

**Table 1** Demographic characteristic (n=421)

Demographic	Quitter (N=142)		Non-quitter (N=279)	
	Number	Percentage	Number	Percentage
<b>Age (years)</b>	Min=18, Max=67, Mean=38.94, SD=10.23		Min=18, Max=65, Mean=39.30, SD=9.64	
<b>Education</b>				
Primary/High school	58	40.85	136	48.75
Certificate	44	30.99	79	28.31
Bachelor degree	36	25.35	59	21.15
Higher than bachelor degree	3	2.11	1	0.36
Missing (N=5, 1.19%)				
<b>Health status</b>				
No disease	95	66.90	198	70.97
Have disease	47	33.10	81	29.03
<b>Severity of alcohol dependence</b>				
Low dependence	24	16.90	16	5.73
Mild dependence	80	56.33	157	56.27
Moderate dependence	23	16.20	58	20.79
Severe dependence	13	9.15	37	13.26
Very severe dependence	2	1.41	11	3.94
<b>Stage of change smoking cessation behavior</b>				
Pre contemplation	0	0	144	51.61
Contemplation	0	0	63	22.58
Preparation	0	0	72	25.81
Action	142	100	0	0

**Table 2** Smoking characteristics among male alcohol dependent smokers (n=421)

Smoking Characteristics	Quitter (N=142)		Non-quitter (N=279)	
	Number	Percentage	Number	Percentage
<b>Age at smoke initiation (years)</b>	Min=13, Max=35, Mean=18.85, SD=3.73		Min=13, Max=35, Mean=18.94, SD=3.69	
<b>Duration of smoking</b>	Min=2, Max=51, Mean=20.09, SD=10.59		Min=2, Max=49, Mean=20.36, SD=10.47	
<b>Type of smokers</b>				
Regular smokers			240	86.02
Occasional smokers			39	13.97
<b>Number of cigarette per day (cigarettes)</b>				
≤ 10	142	100	159	56.99
11-20	0	0.00	92	32.97
21-30	0	0.00	23	8.24
≥ 31	0	0.00	5	1.79
<b>Time to first cigarette</b>				
< 5 min	0	0.00	126	45.16
6-30 min	0	0.00	80	28.67
31-60 min	0	0.00	24	8.60
> 60 min	142	100	49	17.56
<b>Nicotine dependent Level</b>				
Very low dependence	142	100	73	26.16
Low dependence	0	0.00	92	32.97
Medium dependence	0	0.00	7	2.51
High dependence	0	0.00	45	16.13
Very high dependence	0	0.00	62	22.22

Differences between the two groups, 'quitter' and 'non-quitter,' were observed in terms of health status, severity of alcohol dependence, and stage-of-change for smoking cessation behavior. Further details regarding the demographic characteristics of participants are presented in Table 1.

### Smoking status

As shown in Table 2, the alcohol-dependent smokers who participated in this study began smoking at the mean age of 18.85 years, with a maximum age of 35 years, and a minimum age of 13 years. No significant difference in age was

**Table 3** All variables by smoking status (Quitter and Non-quitter)

Variables	Quitter (N=142)		Non-quitter(N=279)	
	Mean	SD	Mean	SD
Decisional balance (1-4)	2.90	.81	2.74	.57
Self efficacy (1-4)	3.52	.99	2.71	.67
Process of change behavior (1-4)	3.05	.85	2.81	.62
Severity of alcohol dependence (0-4)	1.22	.88	1.53	.93
Nicotine dependence (0-4)	.04	.36	1.75	1.54

**Table 4** Standardized canonical discriminant function coefficients

Variable	Function 1
Decisional balance	-.173
Self efficacy	-.334
Nicotine dependence	.909

found between the 'quitter' and 'non-quitter' groups. Analysis of smoking frequency was focused on the 'non-quitter' group. A large percentage of participants in this group were regular smokers who consumed at least one cigarette everyday (86.02%), while 13.97% were occasional smokers who smoked cigarettes less frequently than once a day. More than half of the non-quiters smoked up to ten cigarettes per day (56.99%), and almost half smoked their first cigarettes in the morning, less than five minutes after waking (45.16%). Most of the non-quitter participants (32.97%) were classified in the 'low nicotine dependence' level by the FTND test.

#### Discriminant analysis

Discriminant analysis was used to classify the two groups 'quitter' and 'non-quitter' among Thai male alcohol-dependent smokers. One function was produced based on the 421 participants with valid data, and the overall analysis correctly classified 88.1% of the cases (83.5% of 'quitter', 92.7% of 'non-quitter'). The function was significant, with a Wilk's test value of 0.439, and  $\chi^2 = 343.67$ ,  $p < 0.001$ . Further details for each of the variables are presented in Table 3.

Table 4 displays the standardized canonical discriminant function coefficients, which show that nicotine dependence, self-efficacy and decisional balance were the discriminating variables for differentiation between the 'quitter' and 'non-quitter' groups. Male alcohol-dependent smokers in the 'quitter' group showed lower levels of nicotine dependence, higher levels of self-efficacy, and higher decision-making abilities than those in the 'non-quitter' group.

#### DISCUSSION

The results from this study demonstrate significant

differences between 'quitter' and 'non-quitter' smoking groups regarding certain specific variables. The 'quitter' group participants showed significantly lower levels of nicotine dependence, higher levels of self-efficacy, and higher decision-making abilities than those in the 'non-quitter' group. These findings are consistent with previous studies regarding levels of nicotine dependence [24, 25, 26], self-efficacy [27, 28, 29, 30], and decisional balance [21, 31, 32]. In fact, level of nicotine dependence is associated with smoking cessation in that smokers with a high level of nicotine dependence are more likely to experience nicotine cravings that will stimulate them to smoke. Alcoholic smokers in particular were found to be more dependent on nicotine, and had more internal (affective) barriers to smoking cessation than smokers with no history of alcohol dependence [24]. In addition, numerous studies present alcohol-dependent smokers as scoring higher on the FTND test, and meeting a greater number of DSM nicotine dependence criteria than smokers with no history of alcohol dependence. Furthermore, several studies have demonstrated that smokers with alcohol dependence have a higher level of nicotine dependence. This relationship could be explained by the finding that nicotine appears to have a more potent reinforcement effect in smokers who have alcohol dependence [24]. Moreover, Leed-Kelly et al. [25] found that the Fagerstrom Test for Nicotine Dependence score was a predictor for smoking cessation among recovering alcoholics.

A high level of self-efficacy was found to be related to smoking cessation among the participants in this study. This finding agrees with Manfredi et al.'s [27] study which found that situational self-efficacy increases self-confidence towards stopping smoking. As a result, smokers may have to learn how to refrain from smoking in specific, negatively-

affecting situations so as to build a more generalized confidence, which in turn will increase their ability to quit smoking successfully. Similarly, a study by Boardman et al. [33] shows that smokers with low situational self-efficacy and confidence in their ability to quit smoking were less likely to succeed in smoking cessation than those who had high self-efficacy. Furthermore, Martin et al. [30] investigated the predictors of smoking cessation in patients who were previously participating in residential treatment for alcohol dependence, and their results showed self-efficacy to be among the predictors of smoking cessation in alcohol-dependent smokers ( $r=0.49$ ,  $p<0.0001$ ).

Decisional balance is a measure of the importance of reasons and concerns relating to making changes in behavior. The Decisional Balance Questionnaire used in this study assessed participants' perceived utilitarian gains and losses to self, gains and losses to others, and approval and disapproval from self and important others with regards to smoking. Those individuals who continued to smoke (non-quiters) despite exposure to cessation intervention appeared to have more positive beliefs about smoking, which perhaps outweighed the benefits of smoking cessation for these individuals.

The results of this study showed that the two factors, processes of change and severity of alcohol dependence, cannot discriminate between the 'quitter' and 'non-quitter' groups among Thai male alcohol-dependent smokers. Regarding processes of change, the lack of discrimination may be due to the fact that the mean scores of all processes of change (both of experimental processes and behavioral processes) were analyzed together. The processes of change variable may prove to be significant when experimental processes and behavioral processes are analyzed separately. A previous study by Fava et al. [28] found that the set of experimental processes of change tended to increase in the early stages of change (pre-contemplation, contemplation, and preparation stages), whereas the set of behavioral processes tended to increase in the later stages of change (action and maintenance stages). In addition, Schumann et al. [34] found that the three cognitive-affective processes of change (experimental processes) could be predicted to peak in the contemplation or preparation stages (pre-abstinence) rather than in the action or maintenance stages (abstinence). From these previous studies, it appears to be likely that the 'quitter' may follow the specific processes of change for achieving and maintaining smoking cessation, while the 'non-quitter' may follow other processes of change.

Future studies should either analyze the sets of experimental and behavioral processes separately, or analyze all ten sub-dimensions of processes of change for their ability to discriminate between the 'quitter' and 'non-quitter' groups.

The severity of alcohol dependence variable was not able to discriminate between the 'quitter' and 'non-quitter' groups, which did not support the hypothesis. This finding can possibly be explained by the observation that alcohol-dependent smokers who were interested in quitting smoking perhaps displayed a high level of alcohol dependence because they were ready to change their behavior, or because they were interested in stopping smoking. This is supported by Ellingsstad et al. [23], who found that alcohol abusers who were interested in quitting smoking cigarettes while in treatment for alcohol dependence responded differently to treatment when compared with those who did not desire to stop smoking, and as such this may have influenced their ability to successfully address both problems simultaneously. Moreover, a report by Batel et al. [35] found that there was a significant relationship between severity of alcohol dependence and nicotine dependence. Consequently, alcohol and nicotine dependence may reciprocally influence and increase the severity of one another. Further research is necessary to evaluate the relationships between severity of alcohol dependence, level of nicotine dependence, intention to stop smoking, and intention to deal with dual cessation (both of drinking and smoking), in order to gain greater understanding of the factors influencing smoking cessation in the alcohol-dependent smoker population.

## CONCLUSION

The three variables that could significantly discriminate between the 'quitter' and 'non-quitter' groups among Thai male alcohol-dependent smokers were nicotine dependence, self-efficacy, and decisional balance. Based on the results from this study, it is recommended that Thailand health policy makers should provide tailored support for smoking cessation among alcohol-dependent smokers, especially in alcohol consumption cessation clinics. Such support would encourage this population to achieve the cessation of both smoking and drinking with higher success rates than would be achieved through addressing drinking cessation and smoking cessation separately.

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