

# Individual, Social and Psychological Characteristics of Smoking Cessation Behaviors: A Systematic Review

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## Abstract

About two thirds of active smokers want to quit smoking, yet not many people finally succeed in smoking cessation. Smoking cessation involve complex behaviors associated with individual, social and psychological characteristics as the key factors. Our objective is to review the studies about smoking cessation behavior correlated issues in order to find effective interventions of smoking cessation program. Terms and keywords pertinent to individual, social and psychological characteristics of smoking cessation behavior were used in a search of the electronic databases. Searches were limited to English language, included papers were: a) had clearly report the predictor variables related to smoking cessation behaviors, b) exclusively represent nation/s of study population, c) the time frame for the analysis was limited from 1998 to 2018. A result of 116 individual studies were retrieved at first and reviewed. After further inspection of references from the collected studies, 9 studies were approximately selected that met all inclusion criteria. The final studies consisted of five cross-sectional study and four cohort studies, conducted from different countries. There were several characteristics related to smoking cessation behavior including on levels of nicotine dependence, self-efficacy, smoking restriction and involve other smokers environment, motivation and educational background. Adjusted interventions due to those specific behaviors are needed in order to make more effective smoking cessation programs. Therefore, this study may provide new perspective for encouraged to decrease the amount of smokers worldwide through smoking cessation program.

**Keywords:** smoking cessation, behavior, smoking cessation predictors, quit smoking

## 1. Introduction

Smoking is one of the most public health issues yet to be solved worldwide (Goto, 2007). There is increasingly evidence of the harm to physically health by both active and passive tobacco smoking (McGhee, 2006). Tobacco smoking as the major factor attributed to non-communicable diseases incidence also becoming the most related cause of disease burden which are known to cause various cancers, respiratory, cardiovascular diseases and low birth weight (AL-Doghether, 2004; U.S. Department of Health and Human Services, 2014). It is estimated that death cause by smoking will escalate from 6.4 million in 2015 and 8.3 million in 2030 (Mathers, 2006). Currently, smoking is widely mentioned as the most unhealthy behavior in community.

Healthy behaviors are important requirements of health and disease, but general population find it difficult to perform these behaviors (Giles, 2016), including for smokers. Furthermore, smoking cessation and intention to quit involve complex behaviors associated with high addiction. Although the prevention of smoking initiation is important, the cessation of tobacco use is more urgent to prioritize (Gellert, 2012; Kim, 2014). Smoking-cessation interventions are a cost effective method to reduce the economic and health consequences of smoking. However, approximately two thirds of active smokers want to quit smoking, but not many people fully succeed (Centers for Disease Control and Prevention, 2011; Torchalla, 2011). Thus any clinical trials of innovative methods to change

smoking cessation behavior aimed at quitting smoking are a high priority.

Current studies have explored smoker preferences in smoking in order to adapt the interventions to their individual needs (Regmi, 2018). Findings suggest that individual, social and psychological characteristics are the key determinants of smoking cessation behavior. These determinants can be intervened to increase the likelihood of success (Salloum, 2015). There is a need to gather information on smoker characteristics and their smoking cessation behaviors that affect the success of quitting smoking. Identifying the preferences and behavior of other smokers might help patients to choose an appropriate intervention that is more fit with patient preference and may increase the success rate of the cessation program (Baker, 2015).

Studies of smokers' behavior has been a focus of health economics research for many years (Goto, 2007) but commonly have been inconclusive, resulting in too few individual studies being analyzed, and the data of these methods yield have been inadequately informative (Siahpush, 2003). Besides that, available studies of smoking cessation behaviors were separated between individual, social and psychological characteristics. Therefore, our objective is to review the studies about smoking cessation behavior correlated issues. The areas of application were smoking cessation and smoking behavior to tobacco use. The application of this result study may explain smoking cessation behavior has the potential to establish specific related interventions for effective tobacco cessation programs.

## 2. Methods

This research is a systematic review to find out the individual, social and psychological characteristics related to smoking cessation behaviors of several related studies. There were 3 main steps to gain the data; first we identify and select related research about our topic. Second, we assess the retrieved research that met all eligibility criteria. Then third, we made the review and data extraction for each study.

### 2.1 Study Identification

Three electronic databases (PubMed, Science Direct, and Cochrane Database of Systematic Reviews) and Google Scholar were initially searched in June 2018. We conducted a systematic literature search for published studies in English that included the individual, social and psychological characteristics related to smoking cessation behaviors prior to recent years (1998-2018). Key words used for the search were as follows: individual OR social OR psychological AND smoking cessation OR smoking cessation behavior. Only articles that had explicitly defined measures those variables of interest were included, shown in Table 1.

Table 1. Inclusion and exclusion criteria for the reviewed articles

Inclusion Criteria	Exclusion Criteria
1. Published in the English language	1. Review articles, letters and comments
2. Time frame year from 1998 - 2018	2. Report related with smoking cessation behaviors from any intervention (behavioral or medical)
3. Report predictor variables related to smoking cessation behaviors	
4. Exclusively represent nation/s of study population	
5. Available in full-text	

### 2.2 Study Quality Assessment

About 116 studies were initially collected and reviewed. After further tracking of references from the retrieved studies (due to full-text cannot be accessed by Universitas Gadjah Mada database, English language of the full-text were not available, report related with any intervention (behavioral or medical) to smoking cessation behavior, and duplicate topic of the articles), only 9 studies were finally analyzed that met all eligibility criteria. The PRISMA diagram of retrieved studies is shown in Figure 1.

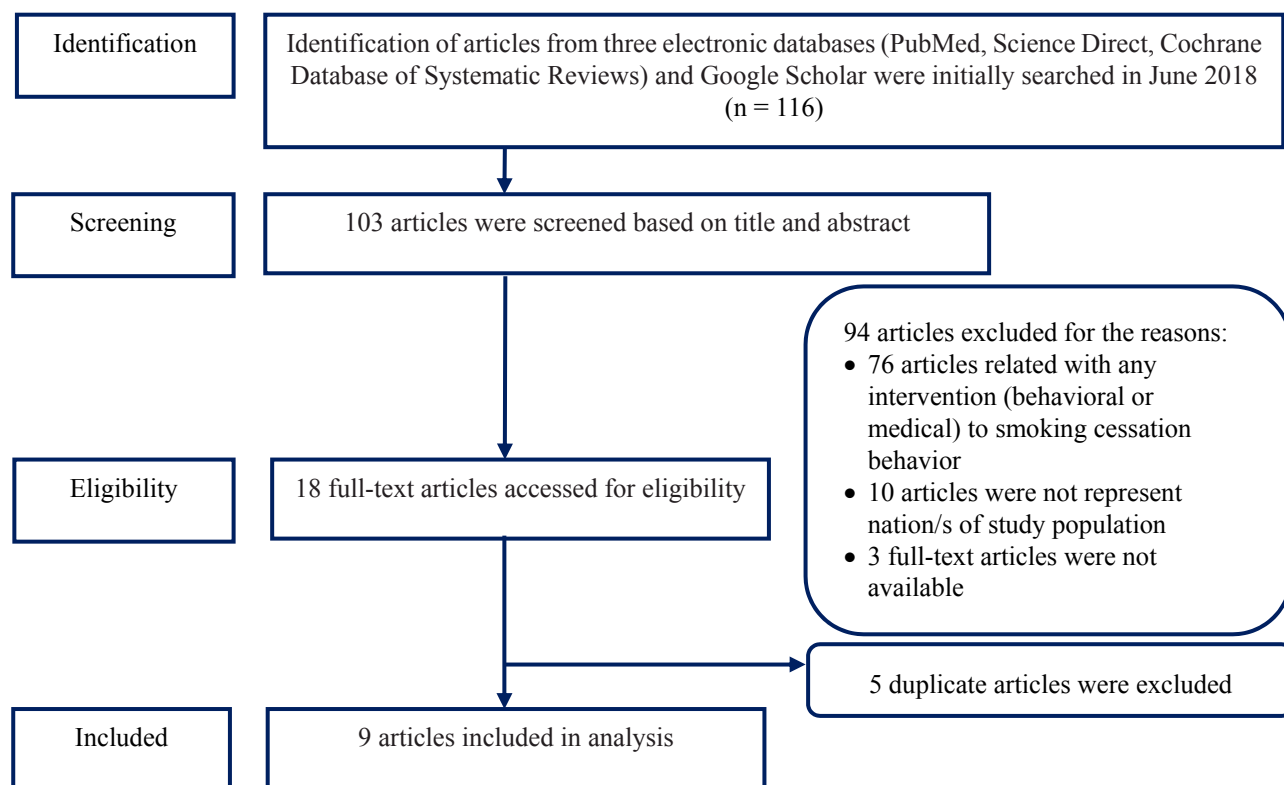


Figure 1. PRISMA diagram of retrieved studies

### 2.3 Data Extraction

Data were independently extracted by two independent researchers. Data extraction form included details of study design, research sample, countries, and selection of variables, instruments, approach and the result of each study. Non-agreement or any dissimilarity on the data extraction was resolved by discussion among the authors.

## 3. Results

### 3.1 Details of Selected Studies

The retrieved studies consisted of varied number of population and all conducted from different countries. Two studies were conducted in developing countries (Bangladesh and Thailand). The other seven studies were conducted in high income countries: Australia, USA, Denmark, Chicago, Japan and one study were conducted with population in multiple countries (Australia, Canada, UK, and USA). Mostly, 5 studies were published in the last ten years. We found a variety of sample characteristics within studies: one study was conduct for type 2 diabetes mellitus patients, one in patients with hypertension, one for mental illness and the rest were in healthy subjects. Four studies were published in sites that concerns on smoking addiction; four were published in a general public health and health technology assessment journal; and only one study published from nursing journal. The summary of characteristics of included studies can be seen in Table 2.

Table 2. Summary characteristics of included studies

Characteristic	Studies (n)
<i>Country of origin</i>	
Australia	2
USA	1
Denmark	1
Bangladesh	1
Thailand	1

Chicago	1
Japan	1
Multiple countries	1
<i>Year of Publication</i>	
1998 – 2002	2
2003 – 2007	2
2008 – 2012	2
2012 – 2016	3
<i>Smoking related disease sample</i>	
Type 2 diabetes mellitus	1
Hypertension	1
Mental illness	1
Healthy smokers	6
<i>Source of publication</i>	
Addiction/tobacco/nicotine-related journals	4
Nursing journal	1
Public health/epidemiology journal	2
Health science and technology assessment journal	2

### 3.2 Methodological Characteristics

The retrieved studies consisted of five cross-sectional study and four cohort studies. Most studies used multivariate logistic regression (8/9) as the correlation study analysis method and only one study used binary logistic regression models. The design sources variety between each study, like the Statistical Analysis System (SAS), STATA, SUDAAN, ITC-4 and SPSS. For the study approach, three studies reported used face-to-face structured interviews, two studies used mixture of face-to-face interview and self-administered questionnaire, one via self-administered questionnaire, one study administered survey via the internet online survey or email, one study conducted telephone interviews, and the remaining one administered face-to-face survey. The methodological characteristics for selected studies of this paper reported in Table 3.

Table 3. Methodology of selected studies

Study	Sample size	Population	Design Country	Method	Design source	Approach
Siahpus et al., 2003	2,526	Smokers aged 14 years and older	Australia	Cross-sectional study with multivariate logistic regression	STATA	Face-to-face interview and self-administered questionnaire
Hyland et al., 2006	6,682	Adult current smokers	Australia, Canada, UK, and USA	Prospective cohort study with multivariate logistic regression	ITC-4	Face-to-face structured interviews
Morimoto et al., 2010	441	Male ever-smokers with DMT2	Japan	Cross-sectional study with multivariate analysis	SPSS Japan Inc. v. 15.0	Face-to-face interview and self-administered questionnaire

Clark et al., 1998	1,501	Smokers aged 18 years or older	Chicago	Prospective cohort study with multiple logistic regression analyses	Unclear	Telephone interviews
Tindle and Shiffman, 2011	2,040	Current smokers	USA	Cross-sectional with multivariable logistic regression analyses	SUDAAN v. 10	Web-based online survey
Abdullah et al., 2015	1,861	Adult smokers daily	Bangladesh	Prospective cohort study with binary logistic regression models	SAS v. 9.4.	Face-to-face survey
Jianvitayakij et al., 2014	266	Men with hypertension who smoked cigarettes	Thailand	Cross-sectional with multiple logistic regression analysis	Unclear	Face-to-face structured interviews
Metse et al., 2016	754	Smokers admitted to four psychiatric inpatient facilities in Australia	New South Wales (NSW), Australia	Cross-sectional descriptive study with multivariable logistic regression analyses	SPSS Statistics v. 22	Face-to-face structured interview
Osler and Prescott, 1998	2,554	Men and women smokers aged 30–60 years	Copenhagen, Denmark	Cohort study with multivariate regression analysis	STATA	Self-administered questionnaire

### 3.3 Individual, Social and Psychological Characteristics of Smoking Cessation Behavior

The selected studies were conducted for different objective/outcome measurements like seeing association of socio-demographic, behavioral and social environmental selected factors with successful quit smoking while another study conducted to find out the individual-level predictors of smoking cessation behaviors, psychosocial characteristics, and other factors of successful cessation differ with levels of motivation to quit for smokers who had and had not ever tried to quit.

From individual level predictors, lower levels of addiction on nicotine were the main factor that estimated future cessation among those that made a quit effort (Hyland, 2006). Frequency of someone smoking also become one of predictor variables of smoking cessation behavior which intermittent smokers were more likely than daily smokers to make a quit attempt (Tindle & Shiffman, 2011). Perceived self-esteem in smoking cessation and concern about the health harm of smoking also became two determinants of smoking cessation for patients with hypertension (Jianvitayakij, 2014).

In term of social characteristics, the results of the Siahpus et al (2003) (Siahpush, 2003) study show that respondents who lived where smoking was not permitted and few or none of their friends smoked have greater odds of having quit smoking. In another hand, respondents who working outside the home which has no smoking restriction and those who not ready to quit within 6 months or earlier were less likely to have made a quit attempt in Abdullah et al (2015) study (Abdullah, 2015).

Meanwhile from psychosocial characteristics, ever smokers with high Free Child score and low educational background were more likely to currently smoke (Morimoto, 2010). Those who had tried to stop smoking were about twice as likely to think to quit, attempt to quit and actually quit smoking (Clark, 1998). Participants (with mental illness) who not living with other smokers and perceiving their health provider to be supportive was more likely to have quit for a longer duration (Metse, 2016). Osler and Prescott, (1998) reported smokers motivated to quit smoking are more likely to stop smoking and remain abstinent than smokers with no such motivation (Osler M and Prescott, 1998). The resume of the result of selected studies of this paper reported in Table 4.

Table 4. Data extraction of selected studies

References	Outcome measurements	Predictor variables	Main findings	Recommendation	Strengths and limitations
Siahpus et al., 2003	Association of socio-demographic, selected behavioral and social environmental factors with successful smoking cessation	Health risk, households with smoking restrictions, social environment (smoker friends or relatives), education	Respondents who lived where smoking was not permitted (OR =5.3, 95% CI: 3.7–7.5) and few or none of their friends smoked (OR = 4.1, 95% CI: 2.7–6.2) have greater odds of having quit smoking	Take into account the social contexts in which smoking behavior takes place	Uncertain about the temporal variables (social-environment)
Hyland et al., 2006	Individual-level predictors of smoking cessation behaviors	Intention to quit, duration of past quit attempts, smoking attitudes, nicotine dependence, age	Lower levels of nicotine dependence were the main factor that predicted future cessation among those that made a quit attempt (p<0.05)	NM	Involvement of multiple countries, representative samples, fluctuation rate of result
Morimoto et al., 2010	Psychosocial characteristics of smoking cessation behavior in DMT2 patients	Egogram (five ego states : the Critical parent, Nurturing parent, Adult, Free child and Adapted child).	Ever smokers with high Free Child score (OR = 3.12, 95% CI: 1.97-4.97), low educational background (OR=3.02, 95% CI: 1.73-5.28) more likely to currently smoke	There is a need to develop a smoking cessation program and strong family support for patient DMT2 with high “Free Child” scores and low education level.	Non-representative sample, does not prove causal relationship
Clark et al., 1998	Psychosocial characteristics of smokers who had and had not ever tried to quit	Planning to quit, attempting to quit, and quitting smoking	Those who had tried to quit were about twice as likely to plan to quit, attempt to quit and actually quit smoking (95% CI)	The potential importance of targeting intervention according to whether or not smokers have made a prior quit attempt.	Generalization of sample does not use specific time frame and stage of quit trial
Tindle and Shiffman, 2011	Smoking cessation behavior among intermittent smokers (ITS) versus daily smokers (DS)	Personal characteristics, quit attempts, quit success, and use of quit aids among groups	All ITS were more likely than were DS to make a quit attempt (OR = 1.60, 95% CI = 1.42-1.80)	External cues may play a particularly significant role in the difficulties that ITS have with quitting.	NM

Abdullah et al., 2015	Factors associated with smoking cessation behavior in adult	Socio-demographic characteristics as well as behavioral, cognitive, attitudinal, environmental and motivational measures	Respondents who working outside the home (OR= 0.62) and made a quit attempt not so recently (6 months ago or earlier, OR= 0.23, p<0.001) were less likely to have made a quit attempt	Population based smoking cessation programs should take into consideration in the design of smoking cessation interventions	Periodical observation, limited to daily smokers only, limited follow up time analysis risk.
Jianvitayakij et al., 2014	Factors and social support for smoking cessation that predict smoking cessation behaviour among male smokers with hypertension (HT)	Personal information, nicotine dependence, the perceived risks and benefits, the self-efficacy inventory, and the partner interaction.	Perceived self-efficacy in smoking cessation and concern about the harm of smoking became two significant predictors of smoking cessation (OR = 1.71, 95% CI = 1.28-2.29)	Smoking cessation programs for smokers with HT may include measures to enhance self-efficacy and emphasize the harmful effects of smoking	Non-representative sample, cross cultural issues from instruments different language
Metse et al., 2016	Smoking and environmental characteristics associated with recent quitting behaviour and motivation	Physical and social environmental characteristics	Participants not living with other smokers (OR = 2.02) and perceiving their psychiatrist to be supportive was more likely to have quit for a longer duration (OR = 2.83, 95 % CI: 1.64 - 4.88, p < 0.001)	Modifiable characteristics of the physical and social environment should be considered in smoking cessation interventions for persons with a mental illness.	Large and diverse sample of smokers with a mental illness, relatively high consent rate, overestimation
Osler and Prescott, 1998	Determinants of successful cessation differ with levels of motivation to stop	Psychosocial, behavior, and health factors	Smokers motivated to stop are more likely to quit and remain abstinent than smokers with no such motivation (OR = 2.28, 95 % CI: 1.33–3.77)	Factors predict cessation irrespective of smokers' baseline motivation to stop should be considered in setting up smoking cessation programs	High rates of loss to follow up

NM: Not mentioned.

#### 4. Discussion

Tobacco smoke is the leading cause of preventable diseases and premature mortality worldwide. Effective intervention need to involve not only smokers who intend to quit but also their supportive family, friends, and implementing smoke-free area policies that support individual cessation. Current smoking cessation guidelines suggest that treatment should include both behavioral intervention and pharmacotherapy (e.g. nicotine replacement therapy) (Roberts, 2013). There is also a need regular treatment or intervention due to relapse

occurrence. For this reason, the psychosocial dimension of the addiction should be treated (Koyun and Eroğlu, 2014).

Nevertheless, intensive interventions combined behavioral treatment with pharmacotherapy, long-term abstinence rates have only at range 20–35% success rate (Alterman, 2001). Such evidences of constantly low abstinence predict the need for creating new and more innovative tobacco cessation programs. Socio-economic characteristics, smoking-related behaviors, and worksite environments significantly affect smoker capability to quit.

Our review findings from individual characteristics, lower levels of nicotine dependence (Hyland, 2006), frequency of intermittent smokers of someone smoking (Tindle & Shiffman, 2011), and smokers who perceived self-efficacy in smoking quit attempt and concern about the health consequences of smoking (Jianvitayakij, 2014) were the main predictors of smoking cessation behavior that likely predicted succeed of future cessation among those that made a quit attempt. Therefore, it is important to gather information on smoker characteristics that influence the success of cessation (West, 2017). Smoking quit-line from various health providers should be organized to treat cessation relaps and to improve strategies to increase public awareness on smoking harm (Lee & Kahende, 2007).

Meanwhile for social characteristics, respondents who lived where smoking was not permitted with few or none of their friends smoked have greater odds of having quit smoking (Siahpush, 2003) but who working outside the home which has no smoking restriction and those who made a quit attempt less than 6 months or earlier were less likely to have made a quit attempt (Abdullah, 2015). For this term, effective smoking cessation program may need to let in family members (Lee and Kahende, 2007). Restricted availability and regulations at the working places also increase the likelihood of cessation rate as in Hammar and Carlsson (2005) study result show the substantial role of self-efficacy; smokers who have higher intention to quit are more likely to abstinent if a stricter regulation is implemented (Hammar & Carlsson, 2005).

In psychosocial characteristics, low educational background were more likely to currently smoke (Morimoto, 2010) but those who had tried to quit (Clark, 1998) and smokers that already motivated (by themselves and support others) to quit are more likely to stop smoking and remain abstinent than smokers with no such motivation (Metse, 2016; Osler & Prescott, 1998). One of strategy which smokers received advice from their family or who perceive the health risks are more likely to reach abstinent (Hammar & Carlsson, 2005).

Effective interventions can generate long-term impact on cessation compared to smokers without treatment. Whatever the intervention may give to the smokers, there should be notice that a need of regular treatment or intervention due to relapse occurrence. A massive strategy by providing cessation quite-line in all health facilities could potentially enhance the coverage including those who are initially unwilling to quit (Baker, 2015). It should be noted also that each of those smoking cessation behaviors does not stand alone. Individual may have several behavioral characteristics at once that can support or decrease the success of the intervention.

Potential limitations need to be addressed in interpreting the findings of this review. The heterogeneity of the studies' method made it hard in summarizing the review, so we are suggest to do analyzing for the accurate and particular method of related studies in the near future, if possible. The result study may different and vary across regions because it was general factors of smoking cessation behavior for people in certain places and specific conditions, hoping it gave an overview for other countries about their possible/effective smoking cessation programs. Further research is needed on the smoking cessation behavior of populations with other special conditions in order to recommend a more comprehensive cessation intervention according to those needs.

## 5. Conclusions

Smoking cessation behaviors are different for each individuals and specific populations. Adjusted interventions due to those specific behaviors are needed in order to make more effective smoking cessation programs. Therefore, it can provide new perspective for encouraged to decrease the amount of smokers worldwide through smoking cessation program.

## Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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