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Factors Associated with Successful Smoking Cessation Program at Public Health Clinics in Perlis.

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Abstract

Cigarette smoking is widely recognized as the most preventable risk factor for non-communicable diseases. This study aimed to determine the prevalence of successful smoking cessation and to identify factors associated with successful smoking cessation for patients recruited in the Quit Smoking Clinics in Perlis. This is a retrospective study reviewing the Stop Smoking Service Registry records obtained from the Quit Smoking Clinics from July to December 2022. Success in quitting smoking was defined as abstaining from smoking for at least six months following the initial appointment. Multiple logistic regression was used to identify factors associated with successful quit smoking. A total of 165 patients enrolled in the Quit Smoking Clinics in Perlis. Most of the patients were male (n=160, 97.0%), married (n=146, 88.5%), and Malay (n=149, 90.3%). More than 40% of patients seeking guidance from the clinics were able to quit smoking successfully. Those who stay near the clinic (<5km) (adjusted OR=2.49, p=0.041), attempted to quit smoking previously (adjusted OR=3.98, p=0.009), started with nicotine replacement therapy (adjusted OR=4.99, p=0.001), attended the Quit Smoking Clinic for more than ten times (adjusted OR=18.20, p=0.043) were associated with a higher rate of successful smoking cessation. Furthermore, patients with lower nicotine dependence (Fagerstorm score 0-3) had lower odds of successful smoking cessation compared to those with a higher Fagerstorm score (p=0.024). This smoking cessation service should be extensively and sustainably operated to assist smokers who are ready to quit smoking.

Keywords: *nicotine replacement therapy; Perlis; quit smoking; quit smoking clinic.*

Introduction

Cigarette smoking is the most common form of tobacco use worldwide. In 2020, the World Health Organization (WHO) reported that approximately 22.3% of adults globally were current smokers [1]. Similarly, according to the National Health and Morbidity Survey (NHMS) conducted by the Ministry of Health Malaysia in 2019, more than one-fifth of Malaysian adults were tobacco smokers, with the average number of cigarettes smoked daily of about 12 sticks per day [2]. The prevalence of cigarette smoking has been a global concern due to its well-established association with numerous health problems.

Smoking is one of the major lifestyle factors influencing the health of human beings. Tobacco consumption is widely recognized as the single most preventable risk factor for a range of non-communicable diseases. It kills more than 8 million people a year on a global scale [3]. Chronic bronchitis, heart disease, lung disease, stroke and chronic obstructive pulmonary disease are just a few of the complications of smoking [1]. In addition, smoking increases the risk of developing tuberculosis and immune system problems [4]. In Malaysia, it is estimated that more than 20,000 deaths attributed to smoking occur each year. Approximately 2.9 billion MYR is spent on treating smoking-related conditions, including lung cancer, ischemic heart disease, and chronic obstructive pulmonary disease. [5]. Additionally, exposure to secondhand smoke can be harmful to nonsmokers, particularly young children, and pregnant women. Approximately 1.3 million premature deaths among nonsmokers have been linked to secondhand smoke exposure [1].

Only less than half (48.9%) of the current smokers tried to quit smoking in the past 12 months [2]. A review in 2016 found that smokers in Malaysia were more likely to continue smoking when they were stressed and addicted to nicotine [6]. Additionally, the most common barrier to quitting is difficulties in handling withdrawal symptoms [7]. In 2007, MPOWER was introduced by the World Health Organization to combat the global tobacco epidemic by reducing tobacco use and its associated health consequences [1]. One of the six MPOWER measures is providing support and resources to smokers to encourage and assist them in quitting smoking.

In Malaysia, the Quit Smoking Clinics are an intervention provided by the Ministry of Health to support smoking cessation [8]. The clinics are available at most healthcare institutions, including public hospitals and health clinics. The Quit Smoking Clinics provide psychological treatment, pharmacotherapy or a combination of both, to help smokers quit smoking. The non-pharmacotherapy intervention comprises counselling and support, whereas pharmacotherapeutic intervention consists of providing nicotine replacement therapy or non-nicotine drugs such as varenicline. The recruitment process for patients in quit smoking clinics in government clinic settings can involve both walk-in patients who are interested in quitting smoking and referrals from medical practitioners. Patients who join the Quit Smoking Clinics will be followed up for at least 24 weeks, monitored by a team consisting of a medical officer, a nurse, a medical assistant, a trained counsellor and a pharmacist where possible. During each visit, patients will undergo a physical examination, clinical assessment, and determination of nicotine addiction level, , followed by tailored treatment given in the form of counseling, with or without pharmacotherapy and physiotherapy.

Evidence shows that multiple factors contributed to successful quit smoking. However, factors that influence the success of smoking cessation vary in different localities in Malaysia [9-12]. Local cultural, social, economic, and healthcare factors can influence the success of smoking cessation efforts. Although there was a previous study conducted in Perlis [9] identifying factors associated with successful smoking cessation is public health clinic settings, the samples included were from 2017. Furthermore, the types of

pharmacotherapy interventions used were not explained in detail. Hence, this study aims to determine the prevalence of smoking cessation for patients recruited in the Quit Smoking Clinics in all public health clinics in Perlis from July to December 2022. Additionally, it aims to identify the factors associated with successful smoking cessation.

Methods

Study location and study design

Perlis is located in the North Peninsular of Malaysia, with an estimated population of 292,700 [13]. This is a retrospective study reviewing records of the Stop Smoking Service Registry obtained from the Quit Smoking Clinics from all public health clinics monitored by the Kangar District Health Office in Perlis.

Sample size estimation

The sample size was also calculated using OpenEpi sample size calculator version 3.01 software. According to a previous study, smoking cessation was categorized into two groups, success or failure after six months follow-up since recruitment [12]. Factors significantly associated with successful quit smoking in Besut, Malaysia, included the number of attended appointments, with the odds ratio of 5.33. For sample size calculation, the study's power was set at 80%, the confidence interval at 95%, and the ratio of unexposed to exposed in the study was standardised to 1.0. The calculated sample size was 128, with an additional 20% dropout rate, resulting in a final sample size of 160.

Data collection procedure

A universal sampling method was used to recruit all patients enrolled in the Quit Smoking Clinics in Perlis from July to December 2022. This cohort was chosen because nicotine replacement therapy began being administered in mid-June 2022 in all public health clinics in Perlis. The 11 public health clinics involved are: Klinik Kesihatan Kangar, Klinik Kesihatan Arau, Klinik Kesihatan Beseri, Klinik Kesihatan Kaki Bukit, Klinik Kesihatan Kampung Gial, Klinik Kesihatan Kuala Perlis, Klinik Kesihatan Kuala Sanglang, Klinik Kesihatan Simpang Empat, Klinik Kesihatan UTC, Klinik Kesihatan Padang Besar, and Klinik Kesihatan Chuping. The inclusion criteria were patients aged 18 years old and above enrolled on the Quit Smoking Clinic and followed up for at least six months. Records of patients with missing data or unavailable records were excluded.

Data were extracted from the Quit Smoking Clinics registry and patient file cards from the clinics involved. A standardized data collection form was formulated to assess patients' demographic data, comorbidities, smoking history, behaviour to quit (reasons to quit, readiness to quit, Fagerstrom Test for Nicotine Dependence, and number of appointments attended), types of treatment received and quit status. The Fagerstrom Test for Nicotine Dependence classifies nicotine dependence into three tiers determined by the cumulative score derived from the assessment (score 0-3 = low dependence, score 4-5 = moderate nicotine dependence, score 6-10 = high nicotine dependence). The outcome variable of interest was patients' self-reported status of quit smoking. Success in quitting smoking was defined as abstaining from smoking for at least six months following the initial clinic appointment. Relapse, in the context of smoking cessation, refers to the resumption of smoking after a period of abstinence. Reasons of relapse were also investigated in this study.

Data analysis

Skewness and kurtosis were used to evaluate the distribution of continuous data (age, BMI, and years of smoking) [14]. Then, the student t-test, Mann–Whitney U test, and chi-square test were performed in univariable analysis. For the downstream analysis, all variables of interest with $p < 0.25$ from the univariable analysis were included [15]. Multiple logistic regression was used to identify factors associated with successful

quit smoking by adjusting the confounding variables. The test of multicollinearity was performed by calculating variance inflation factor (VIF) to identify whether the variables in the model are highly correlated with each other. The value of VIF more than 5 indicates significant multicollinearity. A *p*-value of less than 0.05 was considered statistically significant. All analyses were performed using SPSS software version 21.0.

Ethics approval

This study was registered with the National Medical Research Register (NMRR ID-23-01837-KCY (IIR)) and received approval from the Medical Research and Ethics Committee. Prior to conducting the study, permission for data collection was obtained from the Kangar District Health Officer.

Results

Patients' characteristics and medical history

A total of 165 patients enrolled in the Quit Smoking Clinics in Perlis from July to December 2022 were recruited in the study. The mean age of the respondents was 50.26 (SD=16.47) years. The majority of the patients were male (n=160, 97.0%), married (n=146, 88.5%), and Malay (n=149, 90.3%). Regarding educational attainment, more than half (n=87, 52.7%) of the patients had secondary school education, while 28.5% (n=47) had attained a tertiary level. Only three patients were documented to have used illegal drugs or consumed alcohol, respectively. Patients' demographic information is shown in Table 1. Of the 165 patients, only four patients (2.4%) were diagnosed with asthma. Those who were diagnosed with diabetes mellitus, hypertension, and dyslipidemia were 23.6%, 36.4%, and 35.2%, respectively (Table 2).

Smoking history

Patients' smoking history is shown in Table 3. Approximately one-fifth (n=34, 20.6%) of the patients reported using tobacco leaves (*rokok daun*). A small portion of patients (n=13, 7.9%) reported using vape. The median age for starting to smoke daily was 20.0 (IQR=8.00). The mean duration of smoking was 29.0 (SD=15.9) years. The most commonly reported triggering factor for smoking was upon finishing a meal (n=97, 58.8%). Only 35 (21.2%) patients were documented to have made previous attempts to quit smoking.

Table 4 displays the behavior to quit and quit status of patients who attended the Quit Smoking Clinic. The most commonly reported reason to quit smoking was for health concerns. Assessment of readiness to quit revealed that the percentage of the patients at the precontemplation, contemplation, preparation, and action stage was 13.3%, 22.4%, 33.9%, and 54.5%, respectively. According to the Fagerstrom Test for Nicotine Dependence, 54.5% of patients were classified as minimally dependent (score 0-3), 17.6% moderately dependent (score 4-5), and 27.9% as highly dependent group (score 6-10). Only 3.0% of patients attended the scheduled appointments more than ten times. Nicotine replacement therapy (nicotine patch and/or gums) was administered to 34.5% of the patients, while the remaining received non-medical therapy (65.5%). Regarding quit status, 41.8% reported successful quitting, 44.2% of them failed the treatment, and 13.9% experienced smoking relapse after quitting.

Factors associated with smoking cessation

Table 5 displays the results of the univariable analysis on factors associated with successful smoking cessation. Alcohol use, tobacco leaves use, age start smoking daily, duration of smoking (years), previous attempt to quit smoking, triggering factors: after meal, readiness to quit, Fagerstorm score, treatment option, and number of attended appointment were significantly associated with the rate of successful smoking cessation. The results of multiple logistic regression, which examines factors associated with successful smoking cessation are presented

in Table 6. After adjusting for confounding variables, only five factors remain significantly associated with successful smoking cessation: distance from home to clinic, previous attempt to quit smoking, Fagerstorm score, treatment option, and the number of attended appointments. Patients who lived near the clinic (<5km) (adjusted OR = 2.49, p = 0.041), had previously attempted to quit smoking (adjusted OR = 3.98, p = 0.009), started with nicotine replacement therapy (adjusted OR = 4.99, p = 0.001), and attended the Quit Smoking Clinic for more than ten times were associated with a higher rate of successful smoking cessation. Additionally, patients with lower nicotine dependence (Fagerstorm score 0-3) had lower odds of successful smoking cessation compared to those with a higher Fagerstorm score (p=0.024).

Discussion

Quitting smoking is crucial for a variety of reasons, as smoking has profound health implications for both individuals and society. Smoking cessation remains a significant challenge worldwide. Nonetheless, our study showed that 41.8% of patients successfully quit smoking after six months of follow-up Quit Smoking Clinic in Perlis from July to December 2022. This rate is slightly higher than the findings from many local studies, which have reported successful quit rates ranging from 14.3% to 38.8% [9, 10, 12, 16]. However, direct comparison of the percentage of successful smoking cessation across different studies can be complicated due to several factors, including study design, settings, individual characteristics, duration to measure quitting status, and level of support provided. Many people require multiple attempts to quit smoking before achieving long-term success.

Successful smoking cessation is a complex process that involves various factors, including individual motivation, support systems, and specific strategies employed in the quit attempt. Consistent with the local studies, variables including age, gender, and medical history were not associated with the success of smoking cessation [9, 16]. Conversely, one study revealed that older individuals had a higher likelihood of successful smoking cessation [12]. Additionally, another study indicated that individuals with diabetes mellitus were more prone to quitting smoking successfully [10].

Individuals may benefit from trying different strategies or combinations of methods. Seeking support from healthcare professionals can improve the chances of successfully quitting smoking. It can indeed be challenging to compare the results of the current study when the treatment options were not clearly elaborated upon in previous local study [9]. Consistent with other studies, our study showed that utilising nicotine replacement therapy enhances the likelihood of effective smoking cessation [17, 18]. Nicotine Replacement Therapy (NRT) is a widely used and practical approach to help individuals quit smoking. It works by providing a controlled, lower dose of nicotine to reduce withdrawal symptoms (such as irritation, anxiety, and mood swings) and cravings associated with quitting [19]. Using nicotine replacement therapies, such as patches, gum, lozenges, or inhalers, can increase the chances of success as opposed to quitting without any assistance.

Many people require multiple attempts to quit smoking before achieving long-term success [20, 21]. Relapses are common, and perseverance is essential. Each attempt to quit provides an opportunity to practice and refine these coping skills, making them more effective [22]. In addition, the experience of quitting enables people to identify particular circumstances, feelings, or activities that trigger the craving to smoke, allowing them to develop coping mechanisms for these triggers in subsequent efforts. Quitting smoking requires the development of alternative coping skills to manage stress, anxiety, and other emotional triggers. Each quit attempt can contribute to an individual's overall motivation to quit. The desire for improved health, financial savings, and a better quality of life often grows with each

attempt, providing a powerful motivator for future success.

The Fagerstrom Test for Nicotine Dependence is a widely used tool to assess the level of nicotine dependence in individuals who smoke. The test includes questions about the number of cigarettes smoked daily, the urgency of the first cigarette in the morning, and other factors. The total score ranges from 0 to 10, with higher scores indicating a higher level of nicotine dependence [23]. Most studies suggest that those with lower levels of nicotine dependence may find it simpler to give up smoking than those with higher levels of dependence [24-26]. On the other hand, the current study found that those with higher Fagerstrom scores were more successful in smoking compared to those with lower scores. Quitting smoking is a complex process influenced by various factors, including psychological, behavioural, and social elements. Some individuals with high nicotine dependence may have higher success rates in quitting smoking. This can be attributed to several factors including stronger motivation to quit, appropriate support, counselling, and with the use of nicotine replacement therapy or medication.

The current study also found that proximity to a health clinic may contribute to a higher rate of successful quit attempts. Clinics often provide access to healthcare professionals with expertise in smoking cessation. These professionals can offer personalized guidance, counselling, and support tailored to an individual's needs and challenges. Regular follow-up with healthcare professionals can help individuals stay on track, address any difficulties, and make necessary adjustments to their quit plan [27]. Additionally, proximity to a clinic reduces travel time, making it more convenient for individuals to attend appointments when needed, which can positively impact their commitment to quitting.

The number of clinic appointments attended can significantly impact treatment outcomes across various health conditions, including successful smoking cessation. The recommended appointment schedule is once a week for the first month, every two weeks in the second and third months, once a month for the fourth to the sixth month, and three-monthly appointments for the following visits [28]. Clinic appointments offer opportunities for healthcare providers to educate patients about their condition, treatment plan, and the importance of adherence. Patients who understand the rationale behind their treatment are more likely to comply with recommendations, leading to better outcomes. Besides, regular interactions with healthcare providers help build a therapeutic relationship between the patients and the healthcare team [29]. Trust and open communication enhance the likelihood of patients following through with recommended successful smoking cessation.

Collecting data retrospectively comes with certain limitations. Retrospective data collection relies on existing records, which may be incomplete or contain inaccuracies. Some data, such as educational level and CO level, may be poorly recorded in this study. Hence, the study's outcome (smoking cessation status) was fully self-reported without biochemical verification. The findings of the study may be skewed in smoking behaviour due to recall bias and social desirability bias. Furthermore, the current study was limited to those seeking treatment at public health clinics, which may affect the generalizability of the information to those receiving treatment from private healthcare settings.

Conclusion

Exploration factors associated with successful smoking cessation in primary healthcare settings is essential for improving the Quit Smoking Clinic service in Perlis. The current study revealed that more than 40% of patients seeking guidance from the clinics were able to quit smoking successfully. Even though the current study did not specifically evaluate the effectiveness of the smoking cessation service, the finding is important when assessing the potential impact of extensively and sustainably

operating such services to assist smokers who are ready to quit smoking. Successful smoking cessation often requires a personalized approach that considers the individual's unique circumstances, level of addiction, and available support systems. Those who lived near the clinic, had made previous attempts to quit, were prescribed nicotine replacement therapy, attended clinics for more than ten visits and with higher levels of nicotine dependence were found to have successful smoking cessation outcomes.

Table 1. Patients' demographic data, n=165

Variable	Category	n (%)	Mean (SD)
Age (years)			50.26 (16.47)
Gender	Male	160 (97.0)	
	Female	5 (3.0)	
Ethnicity	Malay	149 (90.3)	
	Chinese	13 (7.9)	
	Indian	1 (0.6)	
	Others	2 (1.2)	
Marital status	Single	18 (10.9)	
	Married	146 (88.5)	
	Divorced	1 (0.06)	
Highest Education level	No formal education	6 (3.6)	
	Primary school	25 (15.2)	
	Secondary school	87 (52.7)	
	Tertiary education	47 (28.5)	
Occupation	Student	1 (0.6)	
	Unemployed	2 (1.2)	
	Employed	79 (47.9)	
	Self-employed	59 (35.8)	
	Retired	24 (14.5)	
Monthly income (RM)	<1000	25 (15.2)	
	1000-2000	51 ()30.9)	
	2000-3000	65 (39.4)	
	>3000	24 (14.5)	
Distance from home to clinic (km)	<5	72 (43.6)	
	5<distance≤10	44 (26.7)	
	10< distance≤15	36 (21.8)	
	15<distance≤20	8 (4.8)	
	>20	5 (3.0)	
BMI (kg/m^2)			25.89 (5.22)
Alcohol use	Yes	3 (1.8)	
	No	162 (98.2)	
Illicit drug use	Yes	3 (1.8)	
	No	162 (98.2)	

SD=Standard deviation

Table 2. Medical history, n=165

Variable	Category	n (%)
Asthma	Yes	4 (2.4)
	No	161 (97.6)
Diabetes mellitus	Yes	39 (23.6)
	No	126 (76.4)
Hypertension	Yes	60 (36.4)
	No	105 (63.6)
Dyslipidemia	Yes	58 (35.2)
	No	107 (64.8)
Heart disease	Yes	9 (5.5)
	No	156 (94.5)
Psychosis	Yes	1 (0.6)
	No	164 (99.4)

Table 3. Smoking history, n=165

Variable	Category	n (%)	Mean (SD)
Use of *rokok daun*	Yes	34 (20.6)	
	No	131 (79.4)	
Use of vape	Yes	13 (7.9)	
	No	152 (92.1)	
Age start smoking daily			20.0 (8.00)*
Years of smoking			29.0 (15.9)
Number of cigarettes per day	<5	16 (9.7)	
	6-10	72 (43.6)	
	11-15	22 (13.3)	
	16-20	31 (18.8)	
	>20	24 (14.5)	
Trigger factors for smoking (Yes)	After meal	97 (58.8)	
	Stress	47 (28.5)	
	In toilet	40 (24.2)	
	During festive	55 (33.3)	
	Friends	71 (43.0)	
	Live with smokers	6 (3.6)	
	When bored/sleepy	56 (33.9)	
	Watching TV	33 (20.0)	
Attempt to quit smoking previously	Yes	35 (21.2)	
	No	130 (78.8)	
Reason of relapse (n=35)	Craving	15 (42.8)(42.9)	
	Peer pressure	19 (54.3) (54.3)	
	Lack of support	1 (2.9) (2.8)	

*SD=Standard deviation; *Median (IQR)*

Table 4. Behavior to quit, n=165

Variable	Category	n (%)
Reason to quit	Health	155 (93.9)
	Finance	6 (3.6)
	Family	3 (1.8)
	Force	1 (0.6)
Readiness to quit	Precontemplation	22 (13.3)
	Contemplation	37 (22.4)
	Preparation	56 (33.9)
	Action	50 (30.3)
Fagerstrom score	0-3	90 (54.5)
	4-5	29 (17.6)
	6-10	46 (27.9)
Number of attended appointment	1-3	65 (39.4)
	4-6	80 (48.5)
	7-9	15 (9.1)
	≥10	5 (3.0)
Treatment option	Nicotine replacement therapy	57 (34.5)
	Non-medical therapy	108 (65.5)
Quit status	Successful	69 (41.8)
	Fail	73 (44.2)
	Relapse	23 (13.9)

Table 5. Univariable analysis on factors associated with successful smoking cessation, n=165

Variable	Category	Success n=69	Fail n=96	Test-statistics	*p*-value
Demographic data					
Age		53.13 (16.56)	48.20 (16.17)	t (163) = 1.914	0.057
Gender	Male	68 (42.5)	92 (57.5)	X^2 (1) =1.01[a]	0.401
	Female	1 (20.0)	4 (80.0)		
Ethnicity	Malay	62 (41.6)	87 (58.4)		
	Chinese	5 (38.5)	8 (61.5)	X^2 (3) =3.56[a]	0.358
	Indian	0 (0)	1 (100)		
	Others	2 (100)	0 (0)		
Marital status	Single	7 (38.9)	11 (61.1)	X^2 (2) =0.807[a]	0.831
	Married	62 (42.5)	84 (57.5)		
	Divorced	0 (0)	1 (100)		
Highest education level	No formal education	2 (33.3)	4 (66.7)	X^2 (3) =3.870[a]	0.285
	1^0 school	7 (28.0)	18 (72.0)		
	2^0 School	42 (48.3)	45 (51.7)		
	3^0 Education	18 (38.3)	29 (61.7)		
Occupation	Student	1 (100)	0 (0)	X^2 (3) =4.85[a]	0.232
	Unemployed	1 (50.0)	1 (50.0)		
	Employed	31 (39.2)	48 (60.8)		
	Self-employed	22 (37.3)	37 (62.7)		
	Retired	14 (58.3)	10 (41.7)		
Monthly income (RM)	<1000	9 (36.0)	16 (64.0)	X^2 (3) =2.89	0.410
	1000-2000	22 (43.1)	29 (56.9)		
	2000-3000	31 (47.7)	34 (52.3)		
	>3000	7 (29.2)	17 (70.8)		
Distance from home to clinic (km)	<5	24 (33.3)	48 (66.7)	X^2 (4) =8.62[a]	0.070
	5<distance≤10	22 (50.0)	22 (50.0)		
	10< distance≤15	19 (52.8)	17 (47.2)		
	15<distance≤20	1 (12.5)	7 (87.5)		
	>20	3 (60.0)	2 (40.0)		
BMI (kg/m^2)		25.63 (4.8)	26.08 (5.5)	t (163) = -0.539	0.591
Alcohol use	Yes	3 (100)	0 (0)	X^2 (1) =4.25[a]	0.071
	No	66 (40.7)	96 (59.3)		
Illicit drug use	Yes	1 (33.3)	2 (66.7)	X^2 (1) =0.09[a]	1.000
	No	68 (42.0)	94 (58.0)		
Medical history					
Asthma	Yes	2 (50.0)	2 (50.0)	X^2 (1) =0.113[a]	1.000
	No	67 (41.6)	94 (58.4)		
Diabetes mellitus	Yes	16 (41.0)	23 (59.0)	X^2 (1) =0.01	0.909
	No	53 (42.1)	73 (57.9)		
Hypertension	Yes	28 (46.7)	32 (53.3)	X^2 (1) =0.91	0.340
	No	41 (39.0)	64 (61.0)		
Dyslipidemia	Yes	28 (48.3)	30 (51.7)	X^2 (1) =1.53	0.216
	No	41 (38.3)	66 (61.7)		
Heart disease	Yes	4 (44.4)	5 (55.6)	X^2 (1) =0.03[a]	1.000
	No	65 (41.7)	91 (58.3)		

Psychosis	Yes	1 (100)	0 (0)	X^2 (1) =1.40[a]	0.418
	No	68 (41.5)	96 (58.5)		
Smoking history					
Use of *rokok daun*	Yes	20 (58.8)	14 (41.2)	X^2 (1) =5.09	0.024*
	No	49 (37.4)	82 (62.6)		
Use of vape	Yes	8 (61.5)	5 (38.5)	X^2 (1) =2.26	0.133
	No	61 (40.1)	91 (59.9)		
Age start smoking daily		18.00(9.5)	20.00 (7.0)	U (163) = 2570	0.098*
Years of smoking		32.54 (16.4)	26.52 (15.1)	t (163) = 2.44	0.016*
Number of cigarettes per day		19.78 (6.3)	21.41 (6.1)	t (163) = 1.49	0.137
Attempt to quit smoking previously	Yes	23 (65.7)	12 (4.3)	X^2 (1) =10.4	0.001*
	No	46 (35.4)	84 (64.6)		
Triggering factors					
After meal	Yes	47 (48.5)	50 (51.5)	X^2 (1) =4.26	0.039*
	No	22 (32.4)	46 (67.6)		
Stress	Yes	23 (48.9)	24 (51.1)	X^2 (1) =1.37	0.242
	No	46 (39.0)	72 (61.0)		
In toilet	Yes	16 (40.0)	24 (60.0)	X^2 (1) =0.07	0.789
	No	53 (42.4)	72 (57.6)		
During festive	Yes	21 (38.2)	34 (61.8)	X^2 (1) =0.45	0.503
	No	48 (43.6)	62 (56.4)		
Friends	Yes	32 (45.1)	39 (54.9)	X^2 (1) =0.54	0.462
	No	37 (39.4)	57 (60.6)		
Live with smokers	Yes	3 (50.0)	3 (50.0)	X^2 (1) =0.17[a]	0.695
	No	66 (41.5)	93 (58.5)		
Bored/sleepy	Yes	25 (44.6)	31 (55.4)	X^2 (1) =0.28	0.598
	No	44 (40.4)	65 (59.6)		
Watching TV	Yes	14 (42.4)	19 (57.6)	X^2 (1) =0.01	0.937
	No	55 (41.7)	77 (58.3)		
Readiness to quit	Precontemplation	5 (22.7)	17 (77.3)	X^2 (3) =11.20	0.011*
	Contemplation	14 (37.8)	23 (62.2)		
	Preparation	20 (35.7)	36 (64.3)		
	Action	30 (60.0)	20 (40.0)		
Fagerstrom score	0-3	27 (30.0)	63 (70.0)	X^2 (2) =11.72	0.003*
	4-5	15 (51.7)	14 (48.3)		
	6-10	27 (58.7)	19 (41.3)		
Treatment option	NRT	31 (53.4)	27 (46.6)	X^2 (1) = 4.97	0.026*
	Non-NRT	38 (35.5)	69 (64.5)		
No. of attended appointment	1-3	17 (26.2)	48 (73.8)	X^2 (3) = 12.57[a]	0.004*
	4-6	40 (50.0)	40 (50.0)		
	7-9	8 (53.3)	7 (46.7)		
	≥10	4 (80.0)	1 (20.0)		

*SD=standard deviation; t=t-statistic; U= U-statistic; *=p<0.05; All variables of p<0.25 were included for multivariable analysis; [a]= Fisher's exact test.*

Table 6. Multiple logistic regression on factors associated with successful smoking cessation, n=165

Variable	Category	Adjusted OR (95% CI)	*p*-value
Distance from home to clinic	<5km	2.49 (1.04, 5.97)	0.041*
	≥5km (R)		
Dyslipidemia	Yes	1.32 (0.556, 3.15)	0.527
	No (R)		
Use of *rokok daun*	Yes	2.51 (0.88, 7.12)	0.085
	No (R)		
Use of vape	Yes	3.52 (0.76, 16.29)	0.107
	No (R)		
Age start smoking daily		0.98 (0.92, 1.05)	0.644
Years of smoking		1.01 (0.98, 1.03)	0.414
Number of cigarettes per day		0.97 (0.93, 1.02)	0.313
Attempt to quit smoking previously	Yes	3.98 (1.41, 11.25)	0.009*
	No (R)		
Triggering factors: After meal	Yes	1.47 (0.59, 3.62)	0.407
	No (R)		
Triggering factors: Stress	Yes	0.43 (0.15, 1.20)	0.106
	No (R)		
Readiness to quit	Precontemplation	0.35 (0.08, 1.47)	0.153
	Contemplation	2.89 (0.6, 8.60)	0.086
	Preparation (R)		0.061
	Action	1.62 (0.45, 5.82)	0.456
Fagerstrom score	0-3	0.24 (0.07, 0.82)	0.024*
	4-5	0.48 (0.14, 1.65)	0.244
	6-10 (R)		0.077
Treatment option	NRT	4.99 (1.91, 13.06)	0.001*
	Non-NRT (R)		
No. of attended appointment	1-3 (R)		0.128
	4-6	2.22 (0.84, 5.87)	0.107
	7-9	1.48 (0.29, 7.66)	0.638
	≥10	18.20 (1.10, 32.44)	0.043*

*adjusted R^2=39.5%; OR=odds ratio; 95% CI=95% confidence interval; (R)=reference group; *=p<0.05.*

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