Research Article

Determinants of Smoking Cessation in Palu City, Indonesia

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Abstract. Indonesia has one of the largest tobacco epidemics in Southeast Asia. According to the World Health Organization, smoking-related illnesses kill about 200,000 Indonesians annually. In Central Sulawesi, 26.1% are daily smokers and 6.0% are former smokers. The data show that a future burden of tobacco related disease can be predicted if people still smoke. The objective of this study was to determine the factors related to smoking cessation in adults (aged 20-59 years old) in Palu City, Indonesia. The Health Belief Model was used as a conceptual framework to guide the study. This was a cross-sectional study and it was conducted with 183 adults. Data were collected by face-to-face interview using a structured questionnaire. Data were analyzed by using descriptive statistics, Chi-square, and logistic regression. The results revealed that significant predictors of smoking cessation included the perceived severity about the consequences of smoking (OR = 4.49, $p < 0.001$), attempts to quit (OR = 0.93, $p < 0.001$), and advice from peer/family/physician (OR = 0.32, $p < 0.001$), with R2 = 0.38. Health care providers can use the findings from this study as an evidence base to develop health promotion and prevention programs to encourage adults to quit smoking and so avoid developing diseases related to smoking. Furthermore, enhancing smoking cessation efforts in young smokers can significantly improve the health of the public.

Keywords: smoking cessation, adults, Health Belief Model

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1. Introduction

Tobacco use is one of leading causes of premature mortality around the world. World Health organization (WHO) reported that the tobacco epidemic is amongst the biggest world's public health threats killed nearly six million people per year. More than five million of those deaths were the result of direct tobacco use, while more than 600.000 were the results of non-smokers being exposed to second hand-smoke [1]. Globally 5% of all deaths were from communicable diseases, and 14% of all deaths were non-communicable diseases among adults aged 30 years and most of the cases were attributable to tobacco. For the communicable diseases, tobacco use comprised 7% of all deaths due to tuberculosis and 12% of deaths due to lower respiratory infections.

Within non-communicable diseases, tobacco use comprised 10% of all deaths from cardiovascular diseases, 22% of all cancer deaths, and 36% of all deaths from disease of the respiratory system. Death from people who died from tobacco-related disease was 71% due to lung cancer deaths and 41% of all chronic obstructive pulmonary disease were more likely to occur among adults [2].

In Indonesia the prevalence of smoking among adults were 67% of male and 3% of female. In 2013, basic health survey conducted by The Health Department of Republic Indonesia showed that prevalence of smoker increased from 34.2% in 2007 to 36.3% in 2013. 64.9% of men and 2.1% of women still smoked cigarettes in 2013. Central Sulawesi is one of provinces in Indonesia that has the prevalence of smoking status 26.2% of daily smoker, 4.5% of occasional smoker, 4.4% of former smoker, and 64.9% of non-smoker [3]. The data shows that in Central Sulawesi, the prevalence of smoker people is still higher than the former smokers. It can be predicted of the future burden of tobacco related to disease, such as lung cancer, cardiovascular diseases, and disease of the respiratory system if the people still smoke. Therefore, health promotion of smoking cessation to help the smokers to quit smoking is needed in Central Sulawesi province.

Several studies have been conducted by focusing their study on factors predicting smoking cessation in adult people. The study reported that personal factors, social environment, prior attempts [4, 5], smoking expectancies, health risk knowledge and risk perceptions were associated with smoking cessation [6]. People who had more positive belief on physical and social consequences of smoking and who had mostly smoking friends were less likely to be successful in quitting smoking [7]. Although there has been one systematic review of predictors of smoking cessation, it did not differentiate predictors of a quit attempt from predictors of the outcome of the quit attempt [8]. However, informal reviews have seen different factors involved [9]. Understanding the determinants of stopping smoking is important to improve interventions.

The perception of health risk is one of strong influencing decisions to quit smoking. The one belief that quitting is difficult can be barrier for people who tried to quit. Adults are concerned about the long-term mortality effects of smoking and these concerns influence their intention to quit smoking. Adult's knowledge of the risk of secondhand smoke also influences their intention to quit, but this knowledge appear to be more closely linked with mortality risk of smoking and concern about other risk behavior [10]. Despite the health risk related to smoking, people continue to smoke [11].

Health Belief Model (HBM) aims to explain and predict health behaviors. For example the HBM suggests that individuals will take action to change behavior if they consider themselves as susceptible to outcomes of that behavior (e.g. lung cancer due to

smoking), if the behavior has serious consequences (e.g. death), if they believe a specific course of action will reduce their susceptibility or seriousness consequently. HBM is good model for addressing problem behaviors that evoke health concerns. HBM has been used to help developing messages that are likely to persuade an individual to make a healthy decision [12].

Smoking is related to individual behavior. The HBM is simultaneous process used to encourage healthy behavior among individuals who put themselves at risk of developing negative health outcomes. A person must evaluate their perceptions of susceptibility and severity of developing a disease. Then, it is necessary to feel threatened by these perceptions. Environmental factors can also influence cues to action such as advice from other, antismoking norms such as the regulation about smoking. Lastly the benefits to change must be weighed against the barriers to change behavior in order to determine that taking action will be worthwhile. Despite the health risk related to smoking, people continue to smoke [11]. Health Belief Model (HBM) aims to explain and predict health behaviors. For example, the HBM suggests that individuals will take action to change behavior if they consider themselves as susceptible to outcomes of that behavior (e.g. lung cancer due to smoking), if the behavior has serious consequences (e.g. death), if they believe a specific course of action will reduce their susceptibility or seriousness consequently. HBM is good model for addressing problem behaviors that evoke health concerns. HBM has been used to help developing messages that are likely to persuade an individual to make a healthy decision [12].

Palu City is the capital of Central Sulawesi Province. During 2009 the composition or structure of the population age nearly 66. 30% were in the age group 0-34 years. This shows that the majority of Palu City's population was the young people. Seemingly the population is in the reproductive and risk age. Riskesda reported in 2013 that in Central Sulawesi the highest proportion of active smokers at the age of 30 to 34 years old (33.4%), and aged 35 to 39 years old (32.2%). According to the gender, the highest proportion of daily smokers was the male than female smokers (47.5% vs. 1.1%). Palu City has the Governor regulation known as "No Smoking Area", but the implementation of it has not been maximized yet. This proves that smoking in the public area is allowable, even though posters of "No Smoking" are also around. This situation is influenced by the lack of awareness of smokers, and also can increased the people's exposure to smoke from tobacco as secondhand smoke.

Based on previous studies, several gaps in smoking cessation among adults were identified that in Palu City the number of male smoker still higher than the former smoker in the reproductive age, and the behavior of smoker still need improved because proved

that most of smoker smoking in the public area, although the regulation was there it was not maximized implemented, also studies on factors influence smoking cessation showed inconsistent finding. Therefore, this study was needed conducted to determine smoking cessation among adult in Palu City using the HBM as conceptual framework. The result of this study would be useful as baseline data for local government, health professional and other stakeholders, also the result of factors predictor of smoking cessation could be used to developing smoking cessation intervention to help the people in who still smoking to cessation smoking successfully particularly in Palu City, Indonesia.

2. Methods and Equipment

2.1. Methods

The design of this study was a descriptive cross sectional study to describe and determine the factors related smoking cessation.

2.2. Population, sample and sampling

Data were collected from 183 adults used multistage sampling. In stage 1, four sub-districts were selected based on regions of Central Sulawesi province, one village in each of West Palu, East Palu, South Palu, and North Palu. In stage 2, the aisle was selected randomly from each village. In stage 3, the household and participants as a sample were selected by using purposive sampling method. The selection of the individual participants followed the inclusion criteria. The selection of the participants was based on the number of proportions of each village of sub-district in Palu city. The inclusion criteria were as follows: (1) Male, (2) Current smoker and former smoker, (3) Able to speak and write in Indonesia Language, (4) in range age 20–59-year-old, (5) Able to participate voluntarily. The exclusion criteria were as follows: (1) People who have diagnosed illness related smoking., (2) People who are sick and cannot be invited to interview.

2.3. Instruments

In this study, the instruments used consisted of several parts of questionnaire. The questionnaire was developed in English based on the literature review of factors related

to smoking cessation behavior and some of questions were adopted from the original authors with modification by researcher to fit with this research. The English version of questionnaire was translated into Indonesia Language. Smoking among adult were measured by using questionnaire adopted from Maxwell [13] and some of the question had been modified to fit with this research. The questions of perception of individual. The scores of items summed and classified in the 3 levels as follow: highly (80% and above of the total scores), moderately (60%-79% of the total scores), lowly (below 60% of the total scores) developed by Rakinaung [14] Cues to action as stimulus must occur to trigger the appropriate health behavior such as smoking cessation [15]. Cue to action in this study include advice from other (peer/family/physician). The question measured by developed questionnaires based on National Adult Tobacco Survey Questionnaire 2009-2010 (NATS). Attempt to quit smoking was measured by using Treatment Self-Regulation Questionnaire (TSRQ) [16].

In this research, 3 experts tested the instrument for the contents validity to determine clarity and relevance of content. The questionnaire in English version was translated into Indonesian Language. Then, the researcher met the experts who knowledgeable in smoking research and community. The experts examined the questionnaires by evaluating the clarity and relevance of the question items by using Content Validity Index Items (CVI-I). The experts were asked to rate each item's clarity and relevancy by using 4-point rating scale: 1 = not relevant, 2 = need revising the question, 3 = quite relevant with a bit revision, 4 = highly relevant. The experts rated items as 3 to 4. Some items of questionnaire were relevant but some still needed some revisions, which some words in the questionnaire had to be added to make questions clearer. After that, the questionnaire was re-translated into English to make sure that each item's meaning was similar. For the reliability of instrument, the questionnaires in Indonesian language version were applied on 30 adults in 1 village of one sub-district in Palu City, which had similar characteristics with the samples. The reliability of questionnaire was examined by utilizing Cronbach's Alpha. For a newly developed instrument a Cronbach's Alpha 0.70 was considered acceptable [17]. The result of The Cronbach's Alpha from this study were in considered acceptable (Cronbach's Alpha of perceived susceptibility: 5 items; $\alpha = 0.71$, perceived severity: 10 items; $\alpha = 0.79$, perceived benefit: 10 items; $\alpha = 0.84$, perceived barrier: 7 items; $\alpha = 0.78$ and cue to action: 3 items; $\alpha = 0.73$). The questionnaire was corrected according to the contents and suggestions from the experts. According to the CVI-I, the items of the questionnaire were valid.

2.4. Data Collection

The researcher used multistage sampling to select the location from region of Central Sulawesi, the sub-districts, each village from sub-district, and the aisle from each village. The researcher could not make a sampling frame to determine the participants based on the inclusion and exclusion criteria, since there was no reported the data of current or former smoker. Therefore, a total of 183 males were selected by using purposive sampling method based upon inclusion and exclusion criteria, which the researcher start from each aisle that selected and stopped at every household to asking the owner whether there is current or former smoker in the home. If there were current or former smoker who had met the inclusion criteria, researcher would ask the participant to making a decision on their willingness to participate in this study. When the participant agreed to participate, the researcher explained the objective of the study and they had understood the details of data collection. The participant filled out the questionnaires after signing the informed consent. There was less than minimal risk involved like feeling tired and discomfort in this study. In completing the questionnaires, the participant was given approximately 30-40 minutes. However, if the participant felt unpleasant and uncomfortable during answering the question, they were able to stop answering the question. In this study all of participant were completed the whole questions.

2.5. Data Analysis

Descriptive statistic was used to describe independent and dependent variable. Bivariate analysis was used to examine the relationship between independent variable and dependent variable. All tests were 2-sided with *p*-value less than 0.05 was considered as statistically significant. Binary Logistic regressions were used to determine predictors to smoking cessation since the dependent variable was dichotomous. This study was used both Enter Method and Stepwise to find out the best model of this study. However, the best model which is good fit for this study was Enter Method. The analysis for this study was to identify, from the selected predictors, what variables that were statistically significant as predictors of smoking cessation. The Hosmer and Lemeshow Test (chi-square = 5.369, df = 8, p = 0.717) indicated that the model is a good fit.

2.6. Ethical Considerations

Approval to conduct the study was obtained from the Ethical Review Board (ERB) Committee for Research Involving Human Research Subjects, Boromarajonani College of Nursing NopparatVajira, Bangkok, Thailand (No. 26/2558).

3. Results

3.1. Sample characteristics

The age of participants ranged from 20 to 56 years old. The 183 participants in this sample displayed a median of age is 27 (IQR = 22 – 32). The majority of participants were young smoker (69.9%) and most (94.5%) of participants had high school degree. The majority of participants were single (62.8%) and monthly income below standard of regional salary (61.7%) ranged from Rp. 300,000 to Rp. 7000,000 with median income Rp.1,500,000 (IQR= Rp. 1000,000 – Rp. 2000,000). The duration smoking of participants ranged 1 year to 37 years with median 9 (IQR = 10 – 16). The majority of participants were smoking over 5 years (86.3%) and most (66.1%) of the participants were smoking 1 to 20 cigarettes daily ranged from 0 to 48 with median 10.00 (IQR = 6 – 14) (table 1).

3.2. Perceived susceptibility to disease related smoking

Descriptive analysis of perceived susceptibility to disease related smoking among adult are presented in Table 2. There five questions to measure the opinion would be occur if the individual still smoking. The total score was 35, range from 8 – 34. The level of perceptions was classified into three levels according to 60%, 60%-79%, and 80% cut of point of the total score. The distribution shows that the large number (51.9%) of participants is moderately susceptible to disease related smoking with median 24 (IQR = 20 - 27).

3.3. Perceived severity about consequences of smoking

Descriptive analysis of perceived severity about consequences of smoking among adult are presented in Table 3. There are ten questions to measure the consequences will occur if the individual still smoking. The total score is 50, range from 12 – 50. The level of perceptions was classified into three levels according to 60%, 60%-79%, and 80% cut of point of the total score. The distribution shows that the large number (47.0%) of

participants are moderately severity about consequences of smoking with median 35.8 (IQR = 32 - 40).

3.4. Perceived Benefits to smoking cessation

Descriptive analysis of perceived benefits of smoking cessation among adult are presented in Table 4. There are ten questions to measure the consequences will occur if the individual stop smoking. The total score is 50, range from 10 – 50. The level of perceptions was classified into three levels according to 60%, 60%-79%, and 80% cut of point of the total score. The distribution shows that the large number (57.4%) of participants are high perceived benefits of smoking cessation with median 40 (IQR = 36 - 44).

3.5. Perceived Barriers to stop smoking

Descriptive analysis of perceived barriers to stop smoking among adult are presented in Table 5. There are seven questions to measure the barrier will faced if the individual stop smoking. The total score is 35, ranged from 7 – 35. The level of perceptions was classified into three levels according to 60%, 60%-79%, and 80% cut of point of the total score. The distribution shows that the large number (50.8%) of participants is low perceived barriers to stop smoking with median 21 (IQR = 18 - 24).

3.6. Cue to action

The total of participants is 183 adults. The large number of participants (56.3%) received advice to smoking cessation from peer/family/physician. (Table 6)

3.6. Attempt to quit

The majority of participants (85.8%) have high motivation to attempt to quit smoking. (Table 7)

3.7. Smoking cessation

The total participants are 183 adults. The majority of participants (71.0%) do not smoking cessation. (Table 8)

3.8. Factors determine of smoking cessation among adults in Palu City, Indonesia.

Logistic regression was used to determine predictors of smoking cessation. Table 9 shows the result of the full model of logistic regression which all specified independent variables were included. B values are the logistic coefficient that can be used to create a predictive equation. Exp. (B) or Odds Ratio (ORs) presents the effect of corresponding independent variable. Out of eleven variables, three were found to be significantly predicting smoking cessation. These factors included perceived severity about consequences of smoking (OR= 4.49, $p < 0.01$), advice from peer/family/physician (OR= 0.32, $p < 0.01$), and attempt to quit (OR= 0.93, $p < 0.01$). Other factors did not contribute significantly to the predictive ability of the model included age, level of education, marital status, income, duration of smoking, perceived susceptibility, perceived benefits, and perceived barriers.

Table 9 shows that the strongest predictor of smoking cessation among adult in Palu City, Indonesia was perceived severity ($p < .00$) with OR = 4.49. This means that participant who had perceived high severity would raise the odd of smoking cessation by 4.49 times compare with the participant who had perceived low severity. The second predictor of smoking cessation was attempting to quit ($p < .00$) with OR = 0.93. This means that participant who had attempt to quit with high motivation would reduce the odd of smoking cessation by 0.93 times compared with the participant who had low motivation to smoking cessation. The third predictor of smoking cessation was advice from peer/family/physician ($p < .00$) with OR = 0.32. This means that the participant who received advice from peer/family/physician would reduce the odd of smoking cessation by 0.32 times compared with the participant who did not received advice to smoking cessation.

4. Discussion

Based on the results, This study found that variable of attempt to quit as a predictor of smoking cessation among adults in Palu City, Indonesia. The variable attempt to quit was reported as the second predictor of smoking cessation ($p < .00$) with OR = 0.94. This means that participant who had attempted to quit with high motivation would reduce the odd of smoking cessation by 0.94 times compared to the participant who had low motivation to smoking cessation. Attempt to quit among smokers was influenced by the motivation to quit smoking. Higher motivation to quit and past attempts were expression

Table 1: Descriptive statistics of Participants (n=183)

Variables	Frequency	Percentage
Age (years)		
20 - 30 years old (young smoker)	128	69.9
31 – 59 years old (older smoker)	55	30.1
Min-Max 20-56 (Median= 27, IQR= 22 - 32)		
Level of education		
< High school degree	10	5.5
≥ High school degree	173	94.5
Marital status		
Single	115	62.8
Married	68	37.2
Income		
Low income	113	61.7
High income	70	38.3
Min-Max Rp.300,000-Rp.7000,000 (Median = Rp.1,500,000, IQR= Rp.1000,000 – Rp.2000,000)		
Duration of smoking		
< 5 years	25	13.7
≥ 5 years	158	86.3
Min-Max 1-37 (Median= 9.00, IQR= 10 - 16)		
The numbers of cigarette per day		
No smoking	53	29.0
Smoking		
1-20 cigarettes	121	66.1
> 20 cigarettes	9	4.9
Min-Max 0-48 (Median= 10.00, IQR= 6 - 14)		
> 20 cigarettes	9	4.9
Min-Max 0-48 (Median= 10.00, IQR= 6 - 14)		

Table 2: Distribution Perceived Susceptibility to disease related smoking (n-183)

Level of perception	Frequency	Percentage
Low (< 21)	50	27.3
Moderate (21 -27)	95	51.9
High (≥ 28)	38	20.8
Median, IQR = 24, 20 - 27		
Min-Max = 8 - 34		

of smoker's eagerness to quit smoking [5]. Study by Michie *et al* (2011) explained that opportunity could influence motivation as can capability. Opportunity is defined as all the factors that lie outside the individual that make the behavior possible or prompt it. This study show that participant who were high motivation but still smoking, it might

Table 3: Distribution Perceived Severity about consequences of smoking (n=183)

Level of perception	Frequency	Percentage
Low (< 30)	31	16.9
Moderate (30 -39)	86	47.0
High (≥ 40)	66	36.1
Median, IQR = 37, 32 - 40		
Min-Max = 12 - 50		

Table 4: Distribution Perceived benefits of smoking cessation (n=183)

Level of perception	Frequency	Percentage
Low (< 30)	16	8.7
Moderate (30 -39)	62	33.9
High (≥ 40)	105	57.4
Median, IQR = 40, 36 - 44		
Min-Max = 10 - 50		

Table 5: Distribution Perceived barriers to stop smoking.

Level of perception	Frequency	Percentage
Low (< 21)	93	50.8
Moderate (21 – 27)	72	39.3
High (≥ 28)	18	9.8
Median, IQR = 21, 18 - 24		
Min-Max = 7 - 35		

Table 6: Number and percentage of cue to action (n = 183).

Variables	Frequency	Percentage
Advice from peer/family/physician		
No advice	80	43.7
Advice from peer/family/physician	103	56.3

Table 7: Number and percentage of attempt to quit (n = 183).

Variables	Frequency	Percentage
Attempt to quit		
Low motivation	26	14.2
High motivation	157	85.8

Table 8: Number and percentage of smoking cessation (n = 183).

Variables	Frequency	Percentage
Smoking cessation		
No	130	71.0
Yes	53	29.0

Table 9: Predictors of smoking cessation among adults in Palu City, Indonesia

Factors	B	S.E	Wald	Sig.	Exp (B)
Age	0.62	0.69	3.33	0.37	1.86
Level of education	0.47	0.88	0.04	0.58	1.61
Marital status	0.35	0.70	0.21	0.61	1.42
Income	0.07	0.55	0.20	0.89	1.08
Duration of smoking	-0.03	0.59	0.15	0.95	0.96
Perceived susceptibility	-0.20	0.44	0.12	0.65	0.81
Perceived severity	1.50	0.50	8.99	0.00	4.49
Perceived benefits	0.39	0.46	1.99	0.39	1.48
Perceived barriers	-0.17	0.41	0.37	0.66	0.83
Advice from peer/family/physician	-1.11	0.40	6.31	0.00	0.32
Attempt to quit	-0.06	0.01	9.22	0.00	0.93
Constant	4.10	1.41	8.28	0.00	60.59
Nagelkerke R^2= 0.38 (38%)					
The Chi-square for Hosmer-Lemeshow = 5.369 with significant level = 0.717**Method** = Enter					

related with less of opportunity to change new behavior to smoking cessation (e.g. external factors: friends smoker or environment)

5. Conclusion

The study highlighted that smoking cessation had a significant relationship with the number cigarette per day, advice from peer/family/physician, perceived severity about consequences of smoking, perceived benefit of smoking cessation and attempt to quit. The predictors of smoking cessation were perceived severity about consequences of smoking, attempt to quit, and advice from peer/family/physician. The result of this study can be used as in evidence to develop health promotion and prevention program to adult related with smoking cessation to avoid the develop disease related smoking.

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Conflict of interest

The author have no conflict of interest to declare.

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