

## ORIGINAL ARTICLE

**Influence of Passive Smoking on Smoking-Attributable Disease**Kurnia Dwi Artanti<sup>1,2</sup>, Santi Martini<sup>1,2</sup>, Sri Widati<sup>1,3</sup>, Hario Megatsari<sup>1,3</sup><sup>1</sup> Tobacco Control Support Center, East Java<sup>2</sup> Department of Epidemiology, Faculty of Public Health, Universitas Airlangga, Surabaya, East Java, Indonesia<sup>3</sup> Department of Health Promotion and Behavior Sciences, Faculty of Public Health, Universitas Airlangga, East Java, Indonesia**ABSTRACT**

**Introduction:** The prevalence of smoking-attributable diseases is growing in Indonesia, as is the number of smokers. Many people are not aware of the dangers of passive smoking with regard to smoking-attributable diseases. The purpose of this research is to analyze the influence of passive smoking on smoking-attributable diseases. **Methods:** This study used descriptive observational research with a case-control design and was carried out by one of the hospitals in Blitar, Indonesia. It lasted from August to December 2017. The three most diseases that are considered smoking related: stroke, coronary heart disease, and chronic obstructive pulmonary disease. Proportional random sampling was conducted, and analysis was done by calculating the prevalence ratio. **Results:** There was 266 participant. The most smoking-attributable disease was stroke, affecting 103 participant (38.7%). The results of this study showed that passive smokers were 7 times more likely to develop a smoking-attributable disease ( $p = 0,000$ ;  $OR = 6.96$  ;  $95\% CI = 3.16 < OR < 5.31$ ). Active smokers were three times more likely to develop a smoking-attributable disease ( $p = 0.00$ ;  $OR = 3.39$ ;  $95\% CI = 1.84 < OR < 6.24$ ). **Conclusion:** Passive smoking has a heavy association on the evidence of smoking-attributable disease, which highlights the importance of creating regulations regarding smoke-free areas to reduce the number of passive smokers both at home and at places of work.

**Keywords:** Smoking-attributable disease, Passive Smokers, Active Smokers, Risk factors cardiovascular disease.

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**INTRODUCTION**

Non-communicable diseases (NCDs) such as heart disease, stroke, cancer, diabetes mellitus, chronic injury, and obstructive pulmonary constitute 68% (38 million) of deaths worldwide(1). According to the WHO, deaths due to NCDs are predicted to continue to increase around the world; the largest increase will occur in low and middle-income countries. stroke, coronary heart disease and diabetes was two-thirds (70%) cause of death NCDs from the global population(2). Additionally, the incidence of diseases caused by cigarette-smoking is growing in Indonesia, along with an increasing number of people who smoke. According the 2015 Global Youth Tobacco Survey (GYTS) for teenagers (12–14 years old), in Indonesia, 36.2% of boys and 4.3% of girls who currently use tobacco(3). The prevalence of smoking in the population aged 10–18 years increased from 7.2% (according to Basic health research 2012) to either 8.8% (according to the National Health Indicator Survey

2016) or 9.1% (according to Basic health research 2018) (4). There were more than 7.1 million smoking-related deaths worldwide (5.1 million men, 2 million women) in 2016. Most of these deaths (6.3 million) were caused by smoking, followed by passive smoking (884,000) (5). NCDs remains a major cause premature mortality and rising health care cost. Global Burden Disease Study 2019 found that The global trends for disability-adjusted life years (DALYs) increased significantly from 1990 to 2019 (6).

Previous studies have found that passive smoking is associated with smoking-attributable diseases (4,(7). Other study found that Passive smoking emerged as a strong risk factor for myocardial infarction (MI). MI was one of smoking attributable disease. In that study, passive smoke exposure was related with higher level of triglyceride, total cholesterol: HDL-cholesterol ratio and LDL cholesterol (8). There are systematic review saw that passive smoking were associated with significantly increase risks of type 2 diabetes (9). This means that most people are not aware of danger that passive smoking poses with regard to smoking-attributable diseases. In Indonesia, there was still limited research that discuss the impact of passive smoking on smoking-related

disease. The purpose of this research was to analyze the influence of passive smoking on smoking-attributable diseases in Blitar district.

## MATERIALS AND METHODS

This research consisted of a descriptive observational study employing a case control study design. The research was carried out at one of the hospitals in Blitar district and took place from August to December 2017.

### Population

The population of this study was the entire >18-years-old population of the Blitar Regency, East Java province, Indonesia. The location of the study was the Wlingi Blitar Hospital. Three of the most common diseases that were categorized as smoking-attributable were stroke, coronary heart disease, and chronic obstructive pulmonary disease (COPD). The diagnosis of smoking-attributable disease was based on secondary data obtained from the hospital at which the study was conducted. Patients were selected based on the three highest number diseases in previous period. Patients were taken every twofold from the patients who came to the hospital. Department that include this research consist of The stroke department, Cardiology department and Pulmonology department. The case samples were patient that diagnose minimal one or more smoking – attributable disease, while control samples were hospital visitor who did not suffer from diseases that were categorized as smoking-attributable disease.

### Variables

This study included both independent and dependent variables. Independent variables included the participant's characteristics (i.e., age and sex) and smoking status. Smoking status refers to whether participant were active or passive smokers. Active smokers are those who smoke regularly, either daily or occasionally. Active smoking are those who have ever smoked daily or occasionally. There were no limitation how long smoking duration. Ever Passive smokers were those who are exposed to secondhand smoke, either at home or at work. Definition never smoking was people never smoking or never exposure to second-hand smoke both at home and at work. The dependent variables were the individuals who have been diagnosed with a smoking-attributable disease.

The sampling method used in this study was proportional random sampling based on patients taken from both outpatient and inpatient care. Primary data collection was carried out using a questionnaire, while secondary data was obtained from the participant's medical records. The questionnaire used in this study was adopted from Basic Health Research and research on non-communicable diseases. All participants were given an explanation prior to filling the questionnaires in. Participants who were willing to participate in this

study were required to give informed signed consent. This study was approved by the Ethics Commission of Faculty of Public Health Universitas Airlangga (certificate number: 536-KEPK). The data were analyzed and interpreted to test the hypothesis by a computer program with univariable and bivariable analyses. A chi-square test was used to see the correlation between the independent variables and dependent variables. The significance of the study is if  $p$  value  $< 0.05$

## RESULTS

There were 266 participants, of which 200 (75.2%) had smoking -related disease, with stroke affecting 103 of these. Mostly characteristic of participant this study base on the age of 17–55 years is many as 124 (46.6%) participant. Majority of male were 153 (57.5%) participant of which 133 participant had smoking related disease. The most common of the smoking-attributable diseases was stroke (103 participant, 38.7%), 46 with COPD, 45 with Coronary heart disease and six participant had more than one SAD (Table I). Based on statistical testing, this study found that men had a 4.5 times higher risk of developing a smoking-attributable disease ( $p = 0.000$ ; OR = 4.56; 95% CI = 2.502 < OR < 8.33).

The active smoker category included 112 (86.2%) of its 130 participant who had an SAD. Based on statistical testing, active smokers had a three times higher risk of developing a smoking-attributable disease ( $p = 0.00$ ; OR = 3.39; 95% CI = 1.84 < OR < 6.24). The passive smoker category included 71 (75.2%) of its 88 participant who had an SAD. Based on statistical testing, Ever passive smokers were 7 times more likely to develop a smoking-attributable disease ( $p = 0,000$ ; OR = 6.96 ; 95% CI = 3.16 < OR < 5.31). (Table II).

**Table II: Distribution of frequency based on respondents' characteristics**

Characteristic	n	Percentage (%)
<b>Age</b>		
17–55 years	124	46.6
56–69 years	87	32.7
>70 years	55	20.7
<b>Sex</b>		
Male	153	57.5
Female	113	42.5
<b>Smoking Attributable Disease (SAD)</b>		
Stroke	103	38.7
COPD	46	16.9
CAD	45	17.3
Mixed (more than one disease)	6	2.3
Non-SAD	66	24.8
Total	266	100

**Table II: Analysis of risk variables for smoking-attributable diseases**

Risk factors	Smoking-attributable Disease				Total		<i>P-value</i>	OR	95% CI
	Yes		Not		n	(%)			
	n	(%)	n	(%)					
<b>Sex</b>									
Male	133	86.9	20	13.1	153	57.5	0.000	4.56	2.50–8.33
Female	67	59.3	46	40.7	113	42.5			
Total	200	75.2	66	24.8	266	100			
<b>Age Group</b>									
17 - 55	80	64.5	44	35.5	124	46.6	0.000	1.73 29.70	1 0.94 – 3.19 3.97 – 222.10
56 – 69	66	75.9	21	24.1	87	32.7			
>70	54	98.2	1	1.8	55	20.7			
Total	200	75.2	66	24.8	266	100			
<b>Active smoker</b>									
Yes	112	86.2	18	13.8	130	48.9	0.000	3.39	1.84 – 6.24
No	88	64.7	48	35.3	136	51.1			
Total	200	75.2	66	24.8	266	100			
<b>Passive smoker</b>									
Yes	71	79.8	18	20.2	89	65.4	0.000	6.96	3.16– 5.31
No	17	36.2	30	63.8	47	34.6			
Total	88	75.2	48	24.8	136	100			

## DISCUSSION

Men were found to have a higher risk of presenting SADs than women. Some studies have shown the same results (10,11). It could be related with prevalence of male smokers is high in Asian countries—around 65.4%, while women constitute only 7.8% of Asia's smokers (10,11). The differences in the smoking prevalence between men and women found in some study (12,13). Stigma around cigarette smoking by women still exist in some region (10). But in the Eastern Mediterranean, and South-East Asia, women were at least 50 % more likely to be exposed to cigarette smoke (14). Women and young population have been exposed from second hand smoke (10). Research carried out in the United States has also shown that there is a heavy association between smoking with Coronary Heart Disease that cause mortality in young adults (15,16).

Passive smoking is related to smoking-related health problems. Exposure to passive smoking might have a negative impact on children's health, maternal health, neurocognitive function, and educational achievement (17). Passive smoking was associated with increase levels of total cholesterol, triglyceride and ratio total cholesterol: high density lipoprotein cholesterol compared with individuals not exposed to passive smoking (8). The Tromso study found that the effect of passive smoking in men may be explained by their own active smoking. It was different in women. The women

that living with smoker > 30 years after the age of 20 increased the myocardial infarction risk by 40 % (18). In 2014, the U.S. Surgeon General published a report that included a section on secondhand smoke exposure and stroke risk. The main conclusions were that the estimated increase in risk for stroke from exposure to secondhand smoke is about 20-30% (19).

Passive smoke exposure occurs mainly in public places and workplaces (20,21). Research at Malta saw that Exposure to passive smoking increased the risk of MI (aOR 3.2 (95% CI 1.7 to 6.3)), with the OR being higher for individuals exposed to passive smoking in a home rather than in a public setting (aOR 2.0 (95% CI 0.7 to 5.6) vs aOR 1.2 (95% CI 0.7 to 2.0)) (8). Other study found that urban areas have greater effects of smoking and passive smoking than in rural areas (20,21). The duration of exposure to passive smoking also affects the occurrence of smoking-attributable disease (8).

A study conducted in East Java saw that exposure to smoking was a risk factor for developing such smoking-attributable diseases as stroke, coronary heart disease, and lung cancer in CHD patients (22-24). Another study found that smoking at an early age have seven times higher risk cancer than none. (OR = 7.01, 95% CI: 2.07–23.73 for ≤19 years) (25).

A Systematic review and Meta-analyses from SmokeHaz found that among adult smoker increased risks of COPD

(RR, 4.01; 95% CI, 3.18-5.05; 22 studies), exposure to passive smoking for at least 1 h/d was associated with a 1.44-fold (44%) increased risk of COPD compared with non-smokers (RR, 1.44; 95% CI, 1.02-2.01)(26). Other meta analyses saw that The pooled relative risks (RR) for never smokers exposed to SHS in comparison with those unexposed were 1.18 [95% confidence interval (CI): 1.10-1.27] for all-cause mortality (12 studies), and 1.23 (1.16-1.31) for CVD (38 studies) (27).

## CONCLUSION

In summary, we found that the passive smoking was the highest influence on the prevalence of smoking-attributable disease. It is important to controlling the effect to passive smoking. Regulations regarding smoke-free areas are put in place to reduce the number of passive smokers both in the home and at places of work.

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