Conference Paper

# The Risk of Cervical Cancer from Smoking in Indonesia

**Besral and Ivan Arif Pratama**

Department of Biostatistics and Population Studies, Faculty of Public Health, Universitas Indonesia, Depok, Indonesia

## Abstract

Cervical cancer is cancer frequently strikes women around the world. One of the factors precipitating these cancers is smoking. The proportion of smokers among Indonesian women has been increased every year for the past ten years. This study aimed to assess Indonesian women's risk of developing cervical cancer from smoking. A cross-sectional study design was used, using Basic Health Research data for the year 2013 that were collected from 33 provinces in Indonesia. 216,797 female respondents over 20 years old were selected randomly. The prevalence of cervical cancer in this sample is 120 per 100,000 women over 20 years old (95% CI = 100–140 per 100,000). Multivariate logistic regression shows that women who smoke daily have a 2.3 times greater risk of suffering from cervical cancer than women who have never smoke. Women who are ex-smokers but who previously smoked every day have a 9.6 times greater risk of suffering from cervical cancer than women who have never smoke. Other risk factors are being 50 or older (OR 3.0), having a history of abortion (OR 1.6), having had sex before the age of 18 (OR 1.6). Having a low or mid-level economic status decrease the risk of cervical cancer (OR 0.4 or 0.6). Using birth control pills also decrease the risk of cervical cancer (OR 0.2). Smokers and ex-smokers have similar high risks of developing cervical cancer. It is recommended that women avoid tobacco or cigarette consumption from an early age. The dangers of various diseases, including cervical cancer, is potentially life threatening. Strong government policies are needed to avoid the dangers of teen smoking.

**Keywords:** Cervical cancer, smokers, ex-smokers, GOTGOT Indonesia

Corresponding Author:
Besral
besral@ui.ac.id

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## 1. INTRODUCTION

Cancer is the uncontrolled growth of cells or tissues that do not die off when they should. A WHO report from 2012 states that about 80% of cancer deaths occur in middle income countries and developing countries such as Indonesia. According to 2013 data

from Indonesia Basic Health Research (Riskesdas), the prevalence of cancer is 140 per 100,000 women and it is the $7^{th}$ highest among all cause of death (5.7%) [6].

Cancer control programs are carried out for all types of cancer, but at this time in Indonesia, the only two cancers prioritized are cervical cancer and breast cancer. Cervical cancer is a cancer that occurs in the cervix. According to the WHO, cervical cancer frequently strikes women around the world. Based on data from the WHO (2012), the estimated incidence of cervical cancer in Indonesia alone was 170 per 100,000 women.

Cervical cancer is caused by the infectious disease agent Human Papillomavirus (HPV), but there are many other factors that can increase the risk of this disease. One of these factors is smoking. In Indonesia, the prevalence of smoking has increase from 27% (year 1995), to 34.2% (year 2007), 34.7% (year 2010), and 36.3% (year 2013). The purpose of this study is to determine the effect of smoking on the risk of cervical cancer in Indonesia in 2013, taking into account various other risk factors, such as age, age at first sexual encounter, the history of abortion, the history of contraceptive pill use, and the economic status.

## 2. METHODS

The design of this study was cross-sectional, using secondary data from Basic Health Research (Riskesdas) for the year 2013. The population considered in this study was Indonesian women over 20 years old. The study sample consisted of Indonesian women over 20 years old who were selected for the Riskesdas 2013 survey from 33 provinces and 497 districts or cities. The sample inclusion criteria required that participants be women over 20 who had been married or had lived with a partner and who had at any point had sexual intercourse. The smoking and cervical cancer variables were measured through interviews using a structured questionnaire. The analysis method used of multivariate logistic regression models that take risk factors into account for weighting and complex samples.

## 3. RESULTS

Of 216,797 respondents, the incidence of cervical cancer is 120 per 100,000 women aged 20 or older. The types of smokers considered in this study were respondents who either currently smoked every day or occasionally, formerly smoked every day

Table 1: Distribution of cervical cancer and smoking behavior among women aged 20 or older in Indonesia in the year 2013 (n = 216,797)

| Cervical Cancer Diagnosis | n | % |
|---|---|---|
| No | 216,521 | 99.90 |
| Yes | 276 | 0.12 |
| Smoking Behavior | | |
| Smoking every day | 3,083 | 1.20 |
| Smoking occasionally | 2,019 | 0.91 |
| Ex-smoker, every day | 405 | 0.19 |
| Ex-smoker, occasionally | 1.148 | 0.65 |
| Non-smoker | 210,142 | 97.00 |

Table 2: Results of multivariate logistic regression analysis on smoking-related cervical cancer risk in Indonesia, adjusted for socio economic and biological variables

| Independents Variables | Odds Ratio | 95% CI Odds Ratio | P value |
|---|---|---|---|
| Non-smoker | 1.0 | | |
| Smoking everyday | 2.3 | 0.8–6.2 | 0.102 |
| Smoking occasionally | 0.8 | 0.2–3.9 | 0.816 |
| Ex-smoker, every day | 9.6 | 2.1–43.8 | 0.004 |
| Ex-smoker, occasionally | 1.6 | 0.3–7.3 | 0.572 |
| First sexual encounter before the of 18 | 1.6 | 1.1–2.3 | 0.025 |
| Wealthy | 1.0 | | |
| Middle-class | 0.6 | 0.4–0.9 | 0.007 |
| Poor | 0.4 | 0.2–0.7 | 0.002 |
| Used contraceptive pills | 0.2 | 0.1–0.5 | <0.001 |
| Aged 50 or older | 3.0 | 2.1–4.4 | <0.001 |
| Have a history of abortion | 1.6 | 1.0–2.4 | 0.037 |

or occasionally. It is known that out of 216,797 respondents, 97% did not smoke, 1.2% smoked every day, 0.9% smoked occasionally, and about 0.9% were ex-smokers.

Based on the results of multivariate logistic regression where the dependent variable was cervical cancer, the main independent variables was smoking status, and the confounding variables were age, age at first sexual encounter, history of abortion, history of birth control pill use, and socio-economic status, women who smoked daily had a 2.3 times higher risk of cervical cancer compared to women who had never

smoked after considering the confounding variables. However, ex-smokers who previously smoked every day had a 9.6 times higher risk of cervical cancer than women who had never smoked.

The risk of cervical cancer in women over the age of 50 was 3.0 times higher than that in women under 50. The risk of cervical cancer for women whose first sexual encounter took place before the age of 18 was 1.6 times higher than that for women who first had sex at or after the of 18. Women with a history of abortion had a 1.6 times higher risk than those without such history. Women who had used birth control pills had a 0.2 times lower risk compared to women who had not. The risk of cervical cancer in women of poor socio-economic status was 0.4 times lower and in women of middle-class socio-economic was 0.6 times lower than that in women of high socio-economic status.

## 4. DISCUSSIONS

Based on these results, we known that the incidence of cervical cancer in women aged 20 or older who had been married or had lived with a partner was 120 per 100,000 women. Samples were obtained based on the Riskesdas inclusion criteria that subject be a woman over 20 years old who had been married or had lived with a partner and had at some point had sexual intercourse. The incidence of cervical cancer in this survey is lower compared to that found in other surveys, such as WHO (2012) and MoH (2013), which estimate that cervical cancer in Indonesian is 170 and 140 per 100,000 in the female population. The differences in these results can be attributed to the method of the survey and the sampling error that be used. Because the incidence of cervical cancer is high enough to require the availability of treatment equipment and hospital care, the cost of treatment for this cancer is quite high. It is to be hoped that the government will focus on the handling and prevention of this disease and immediately address it.

This study shows that there is a significant relationship between smoking and the risk of cervical cancer. The risk of cervical cancer in women who smoke daily is 2.3 times higher than that in women who have never smoked after controlling for age, socio-economic status, used of birth control pills, history of abortion, and age of first sexual encounter. The results of this study are consistent with Gunnel et al. (2006), whose results showed that smokers' risk group was exposed to a 1.7 times greater risk of cervical cancer than non-smokers. Also consistent are the results of a meta-analysis using data from 9 studies by Sood (1991). These results showed that between

a group of smokers and a group of non-smokers, the incidence of cancer was 1.46 times higher in the smoking group.

Women who do not smoke now but previously smoked every day (ex-smokers) have a 9.6 times greater risk of cervical cancer than those who have never smoke. The fact that the group that does not currently smoke has a higher risk of cervical cancer than those who currently smoke may be due to formerly active smokers becoming motivated to quit because of health problems, including being diagnosed with cervical cancer. This thinking is in accord with the Theory of Planned Behavior (TPB) proposed by Fishbein and Ajzen (1980). One of the elements of this theory is that people exhibit a positive response when negative justification is provided. By this theory, people who suffer from cervical cancer respond with a negative attitude toward the precipitating factor, smoking, and as a result begin to stop smoking.

Smoking is already a risk factor for cervical cancer. Damage caused by carcinogens from nicotine metabolites can be found in the mucus of the cervix uteri. The mucus contains nicotine and other substances in cigarettes that will reduce the durability of the uterine cervix. In addition to the co-carcinogen viral infection Human Papilloma Virus, these substances facilitate the mutation of cells. These conclusions are based on Taiwanese case-controlled study of young women with cervical cancer. Smoking is also considered a risk factor for cervical cancer in older women. This can be attributed to the fact that the duration of smoking is an important factor influencing the level of carcinogenicity absorbed by the body [2]. Therefore, the group that does not currently smoke but previously smoked every day showed the highest cervical cancer risk (9.6 times than that of non-smokers). This is due to the length of time before the impact of smoking become apparent. Therefore, the impact of respondents not currently smoking tobacco is that it appears to prevents the symptoms of cervical cancer and the progression of the disease from getting worse.

The prevalence of cervical cancer in women 50 or older was 3.0 times higher compared to that in women under 50. These results are in line with the results of a case-control study by Kaarthigeyan (2012) in southern Mexico, which showed that 53% of cervical cancers occur in women more than 50 years of age, 41% in women aged 35–49 years, and 6% in women less than 34 years old. The reproductive age is the age range of possible exposure, influenced by various predictive factors, such as risky sexual intercourse, childbirth, exposure to cigarette smoke, and various unhealthy lifestyles.

Age at first sexual encounter is also a risk factor for cervical cancer. Those whose first sexual encounter took place before the age of 18-year were at a 1.6 times higher risk of cervical cancer than those whose first encounter occurred at the age 18 or

older. Women who begin sexual relations at a young age will increase their risk of cervical cancer. Because cervical columnar cells are more sensitive to metaplasia during adulthood, women who have sex before the age of 18 are at a 5 times greater risk of cervical cancer [9]. The results of this study are consistent with the case-control study by Reis et al. (2011) in Turkey. Women who have sex at or before the age of 16 increase their risk of cervical cancer by 58 time. Other study by Louie et al. (2009) showed that women whose age at first sexual encounter was less than or equal to 16 have a 2.3 times higher risk of cervical cancer than those whose age of first sexual encounter was more than 16.

This study also found that the use of birth control pills decrease the risk of developing cervical cancer by 80% (OR equal 0.2). These results contrast with the results of Moreno at el. (2002) which showed that women who use oral contraceptives for 5–9 years have a 2.82 times greater risk of developing cervical cancer. The differences could be influenced by a measurement bias, since this study did not measure the duration of contraceptive pills used. Those who use contraceptive pills for less than 5 years are not at risk of cervical cancer. Thus, the development of cancer in the group not using contraceptive pills could be due to other factors, such as the use of other hormonal contraceptives. According to Irianto (2012), in the use of hormonal contraceptives, including those containing the hormone progesterone, the hormone serves to thicken the cervical mucus and inhibit the uterus's ability to receive a fertilized egg. Dry conditions will affect the condition of the mucus during intercourse. These conditions will lead to exposure to the HPV during sexual intercourse.

Social and economic factors also affect the incidence of cervical cancer as measured in this study. Women of poor socioeconomic status have a 60% lower risk (OR equal to 0.4) and those of middle socioeconomic status have a 40% lower risk (OR equal to 0.6) developing cervical cancer than those of high socioeconomic status. This research contrasts with the research Parikh et al. (2003), which showed that women in the lower socioeconomic groups had a 1.56 times higher risk of cervical cancer and that women in the middle socioeconomic group had a 1.41 times higher the risk of cervical cancer than those in the high socioeconomic group. Those of low socioeconomic status are at a higher risk of cervical cancer, because access to health care is generally low and awareness of the need for preventive examination is also low in this group.

The limitation of this study is that, because it used secondary data analysis, it was not able to control for all potential confounding variables such as family history of cancer or cervical cancer, parity, and number of sexual partners. However, the strength

of this study is its sampling coverage, as it included all women over 20 years old in Indonesia, spread over all 33 provinces and all 497 districts.

## 5. CONCLUSIONS

Smokers and ex-smokers have a similar high risk of cervical cancer in Indonesia, the risk was increase by 2.3 for smokers and by 9.6 for ex-smokers. Women are recommended to avoid tobacco and cigarette consumption from an early age. The danger of various diseases, including the threat of cervical cancer, is potentially life threatening. Strong government policies are needed to avoid the dangers of teen smoking.

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