

THE EFFECT OF PASSIVE SMOKING ON THE INCIDENCE OF PRIMARY DYSMENORRHEA

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ABSTRAK

Dismenore primer adalah gangguan ginekologis yang umum terjadi pada wanita usia reproduksi. Dismenore primer merupakan nyeri haid yang terjadi tanpa adanya kelainan panggul. Studi sebelumnya telah menemukan hubungan antara merokok dan prevalensi dismenore primer Tujuan dari penelitian ini adalah untuk meneliti hubungan antara paparan asap tembakau lingkungan dan terjadinya dismenore primer pada wanita. Penelitian ini merupakan penelitian observasional analitik, dengan pendekatan kohor retrospektif dan teknik sampling paparan tetap. Peneliti melakukan wawancara tatap muka dengan menggunakan kuesioner untuk mengumpulkan informasi. Penelitian dilaksanakan di 3 kecamatan kota Surakarta, yakni kecamatan Jebres, Lawean dan Pasar Kliwon. Sebanyak 120 orang wanita berpartisipasi dalam penelitian ini, dibagi menjadi 60 perempuan perokok pasif dan 60 wanita non perokok. Data dianalisis dengan SPSS 17,0 untuk Windows. Hasil dari penelitian ini menunjukkan prevalensi dismenore primer yang lebih rendah (p kurang dari 0.001) pada kelompok wanita tidak terpapar dibandingkan pada kelompok wanita yang terpapar. Pada kalangan wanita yang tidak terpapar asap rokok, 33,3% diantaranya mengalami dismenore primer, sedangkan pada kalangan wanita yang terpapar asap rokok, 91,7% diantaranya mengalami dismenore primer. Hasil chi square (X^2) pada penelitian ini ialah 43,556 ($p.0.05$). Diantara siklus paparan asap tembakau lingkungan, terdapat hubungan dosis-respon yang positif dan signifikan antara paparan asap tembakau dan peningkatan kejadian dismenore di dalam studi kohor ini. Kesimpulan, terdapat perbedaan yang signifikan dalam tingkat insiden dismenore primer antara wanita yang merokok pasif dan wanita yang tidak merokok. Dengan rasio odds 23 yang berarti bahwa wanita perokok pasif memiliki risiko 23 kali lebih besar untuk menderita dismenore primer dibanding dengan wanita bukan perokok.

ABSTRACT

Primary dysmenorrhea is a common gynecologic disorder in women of reproductive age. Primary dysmenorrhea can be defined as painful menstruation that occurs without pelvic abnormalities. Previous studies have found an association between current cigarette smoking and prevalence of primary dysmenorrhea. The purpose of this study was to examine the relationship between the exposure to environmental tobacco smoke (ETS) and the occurrence of primary dysmenorrhea among women. This was an observational analytic study, retrospective with cohort approach and fixed-exposure sampling techniques. The researchers conducted face-to-face interviews using a questionnaire to gather information. The study held in 3 districts in the city of Surakarta, including Jebres, Lawean and Pasar Kliwon. A total of 120 women participated in this study, divided into 60 passive smoking women and 60 women who do not smoke. Data were analyzed with SPSS 17.0 for Windows. The result showed that the prevalence of primary dysmenorrhea was lower (p less than 0.001) at unexposed women than at exposed women. Among women who were not exposed to smoke, 33.3% of them had primary dysmenorrhea, whereas among women exposed to smoke, 91.7% of them had primary dysmenorrhea. The result of chi square (X^2) in this study was 43.556 ($p.0.05$). Among ETS-exposed cycles, there is a positive dose-response relationship and significant correlation between ETS exposure and increased incidence of dysmenorrhea in the study cohort. In conclusion, there are significant differences in the incidence rates of primary dysmenorrhea among passive smoking women and women who do not smoke. With the odds ratio 23, which means that passive smoking women have 23 greater risk for primary dysmenorrhea compared with non-smoking women.

Keywords: primary dysmenorrhea, passive smoking

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INTRODUCTION

Menstrual disorder is an event that has been experienced by almost all adolescents during the menstrual history. Seventy-five percent of women on the stage of late adolescence are associated with menstrual disorders. Cakir et al. in Sianipar (2009) found that dysmenorrhea

is menstrual disturbance with the greatest prevalence (89.5%), followed by menstrual irregularity (31.2%), and extension the duration of menstruation (5.3%).

Dysmenorrhea is menstrual pain in such circumstances where great, forcing the patient to rest and leave the work or its way of life everyday, for several hours or

several days. (Simanjuntak, 2007). According to Harlow in Anurogo (2008), primary dysmenorrhea can be caused by: 1) first menstruation at the age of less than 12 years, 2) a long menstrual periods, 3) severe menstrual flow, 4) having a family history who also have primary dysmenorrhea, 5) overweight and 6) smoking. Smoking is a negative behavior, which is harmful to health. A cigarette burns at high temperatures (900oC) will produce smoke tobacco which contains over 4000 chemical materials, many of them are toxic and dangerous. Cigarette smoke can be divided into two, namely the main smoke and side stream smoke. (Sidartha, 2009).

Passive smokers are those non-smokers who inhale cigarette smoke and the emissions from burning tobacco because of being around smokers. Passive smokers are three times more dangerous than active smokers. This is caused by the levels of harmful compounds in the body of passive smokers is a larger number, because the poison is sucked through the cigarette smoke from active smokers are not filtered. Also the side stream smoke which inhaled by passive smokers is the result of combustion with low temperature, this condition makes the combustion becomes less complete and releases more chemical materials. (Syahdrajat, 2007). Chen et al., (2000) proved that the nicotine in women significantly reduced the effect of endometrial blood flow, and increased spending on prostaglandin F2-alpha is common in women with dysmenorrhea. This may explain the relationship between passive smoker and primary dysmenorrhea.

Based on the description above is well known that smoking has an important role in incidence of primary dysmenorrhea, especially cigarette smoke exposure received by passive smoker. Therefore, this study was conducted to determine the amount of cigarette smoke exposure received by passive smoker affects the incidence of primary dysmenorrhea. This research is expected to provide scientific information about the impact of passive smoking on the incidence of primary dysmenorrhea. Through this research will also increase the active smokers awareness about the dangers of smoking in public places, thus will indirectly reducing the incidence of primary dysmenorrhea.

MATERIALS AND METHODS

This study was an observational analytic with retrospective cohort method. This research was conducted at 3 districts, including Jebres, Lawean dan Pasar Kliwon. Source population in this study was all women in Districts Jebres, Lawean dan Pasar Kliwon. This study used 60 women from the group exposed to

smoke and 60 women of the group not exposed to smoke. The sample in this study was conducted by purposive sampling in which every eligible study included this study. This type of purposive sampling that will be used is fixed-exposure sampling.

The independent variables in this study were passive smokers, whereas the dependent variable was primary dysmenorrhea. Controlled external variable include gynecological disorder, using of hormonal contraceptives and menarche less than 12 years. Uncontrolled external variables include psychology, diet and genetics. The instrument was a questionnaire with the help of interviews. Data were analyzed using Chi Square - SPSS 17 for Windows, to prove whether passive smoking is associated with increased incidence of primary dysmenorrhea. In this study, a multivariate logistic regression analysis was also used to analyze the external variables which are not restricted.

RESULTS

Characteristics of Research Sample

Table 1. Characteristics of research sample (continuous data)

Variables	N	Mean	SD	Min	Max
Sample Age (yrs)	120	20.58	3.58	16.00	34.00
Age of menarche (yrs)	120	13.40	1.10	11.0	16.00

(Primary Data, 2010)

Table 1 shows the characteristics of research subjects (continuous data). The average age of the sample is 20 years, with the youngest aged 16 years and the oldest 34 years. The average age at first menstruation sample is 13 years old. There are samples that experienced menarche at a young age, that is 11 years old, but there is also a sample who having menarche at the age of 16 years.

Table 2 shows that in this study there are 75 women who have primary dysmenorrhea and 45 women who do not have primary dysmenorrhea. In Table 4.2, we also can know that in this study from 120 women who participated as samples, only 4 samples using hormonal contraceptives. The least a representative sample of confounding variables using hormonal contraceptives were also found in samples with age of menarche less than 12 years. There are only 2 samples that experienced menarche when younger than 12 years from a total of 120 samples. In Table 3 we can see the significant dose-response relationship between exposure to environmental tobacco smoke and the increase incidence of primary dysmenorrhea in women.

Table 2. Characteristics of research sample (categories data)

Variable	N	Percent
Status primary dysmenorrheal		
- Without primary dysmenorrhea	45	37.5 %
- Primary dysmenorrhea	75	62.5 %
Total	120	100 %
Use of hormonal contraception		
- Not using hormonal contraception	116	96.7%
- Using hormonal contraception	4	3.3 %
Total	120	100 %
Age of menarche		
- ≥ 12 years	118	98.3 %
- < 12 years	2	1.7 %
Total	120	100%

(Data Primer, 2010)

Table 3. Distribution of primary dysmenorrhea by number of cigarret smoke exposure which estimated through the number of cigarrete per day.

	Primary dysmenorrheal		Total	OR	P
	No	Yes			
0 cigarrete	30 (51.7 %)	28 (48.3%)	58 (100%)	1.0	-
1–11 cigarretes	10 (43.5%)	13 (56.5%)	23 (100%)	1.4	0.252
≥ 12 cigarretes	5 (12.8%)	34 (87.2%)	39 (100%)	7.3	< 0.001
Total	45 (37.5%)	75 (62.5%)	120 (100%)		

(Primary Data, 2010)

Chi Square Analysis

Table 4. Distribution of primary dysmenorrhea by status smokers

	Primary Dysmenorrhea			OR	95% CI	X ²	P
	No	Yes	Total				
Non – Smokers	40	20	60	22	7.6 – 63.6	43.56	< 0.001
(%)	66.7%	33.3%	100%				
Passive Smokers	5	55	60				
(%)	8.3%	91.7%	100%				
Total	45	75	120				
(%)	37.5%	62.5%	100%				

(Primary Data, 2010)

Based on Table 4, it is known that primary dysmenorrhea (based on total percentage) is more experienced by passive smokers women compared with non- smokers women. From 60 respondents female non-smoker, 33.3% of respondents (20 people) of them have primary dysmenorrhea and 66.7% of others respondents (40 people), do not have primary dysmenorrhea. While in 60 respondents passive smokers women, 91.7% (55 people) of them have primary dysmenorrhea, and 8.3%

of others respondents (5 people) do not having primary dysmenorrhea. Table 4 also shows that there is a very statistically significant correlation between passive smoking with the incidence of primary dysmenorrhea ($p < 0.001$) and by looking at the odds ratio 22, can be said that women are passive smokers have 22 times greater risk to suffer from primary dysmenorrhea compared with women non-smokers (OR = 22% CI = 7.6 to 63.6).

Multiple Logistic Regression Analysis

Table 5. The result of multiple logistic regression analysis about the effect of passive smokers against risk of primary dysmenorrhea, with the control effect of hormonal contraceptive use and age of menarche

Variables	OR	p	Confidence Interval 95%	
			Lower Limit	Upper Limit
Status Passive Smokers				
- No	1.0	-	-	-
- Yes	23	<	7.8	67.2
Hormonal Contraception		0.001		
- No	1.0		-	-
- Yes	0.4	-	0.1	5.9
Age of Menarche		0.519		
- ≥ 12 years	1.0		-	-
- < 12 years	2.0	-	1.1	33.8
		0.630		

(Primary Data, 2010)

The results of logistic regression analysis on the effect of passive smoking on the incidence of primary dysmenorrhea, by controlling the influence of hormonal contraception and age of menarche as confounding factors (adjusted analysis) in Table 4.5 shows the result of the absence of a statistically significant relationship between hormonal contraceptive use with primary dysmenorrhea ($p = 0.519$) as well as age of menarche with primary dysmenorrhea ($p = 0.603$). Since there is no statistically significant relationship between confounding variables with the dependent variable, multivariate analysis cannot be done and the existence of two confounding variables can be ignored.

DISCUSSION

This study aimed to determine the effect of passive smoking on the incidence of primary dysmenorrhea. Other factors which suspected can affect the results of this study is the use of hormonal contraception and the first menstruation at the age of less than 12 years. In this study, two factors were not restricted from participating analyzed sampling time but, it was intended to make it easier to get a sample when doing research.

Table 4 gave an overview of the incidence of primary dysmenorrhea based on the status of cigarette exposure in women. The table showed that there is a significant relationship between passive smoking with the incidence of primary dysmenorrhea ($p < 0.001$). Even Table 4.4 shows that passive smoking women have 22 times greater risk of suffering from primary dysmenorrhea than women non-smokers ($OR = 22\%$ $CI = 7.6$ to 63.5). This was consistent with the hypothesis of this study that passive smoking increases the

incidence of primary dysmenorrhea. These results were also consistent with the cohort study that performed by Chen et al (2000) with a total sample of 165 women. Research shows that the exposed of cigarette smoke to women increases the risk of primary dysmenorrhea ($OR = 2.4\%$, $CI = 0.9$ to 6.1).

The mechanism underlying the effect of passive smoking on the incidence of primary dysmenorrhea could be explained by several theories in previous studies. In compound in cigarettes there is an alkaloid present very significant, in which nicotine is 90% -95% of the total alkaloids. In the body, nicotine is a vasoconstrictor, which can result in reduced endometrial blood flow 30% until 40% (Chen et al 2000.). Vasoconstriction of blood vessels causes ischaemia, which can stimulate prostaglandin expenditure to maintain local homeostasis (Sugimoto, 2007).

Increased levels of prostaglandins are spending correlates well with the degree of pain (Anton, 2009). Prostaglandins cause an increase in uterine activity and stimulation of pain nerve fibers terminals. The combination of higher levels of prostaglandins and the increase of sensitivity to intra-uterine myometrium causes pressure to 400 mmHg and a great myometrial contraction. (Junizar et al, 2001.)

We could see the significant dose-response relationship between exposure to environmental tobacco smoke and the increase incidence of primary dysmenorrhea in women (Table 3). It can be seen by looking at the increase in the value of the odds ratio from 1.4 in women who are not exposed to a 1 -11 cigarettes per day to 7.3 in women who are exposed to 12 or more cigarettes per day.

It could be argued that women exposed to 1 - 11 cigarettes a day have a risk 1.4 times more likely to suffer from primary dysmenorrhea compared with women not exposed (OR = 1.4, $p = 0.0252$). Who's in women who are exposed to 12 units or more cigarettes per day had a higher risk, which is 7.3 times more likely to suffer from primary dysmenorrhea compared with women not exposed (OR = 7.3, $p < 0.001$). This was consistent with research conducted by Dorn et al., (2009) in which, the risk of dysmenorrhea was two times higher in women who are exposed to 10-30 cigarettes per day and this risk increases with increasing duration of smoking.

Table 5 gave an overview of the results of multiple logistic regression analysis on the effect of passive smoking on the risk of primary dysmenorrhea, by controlling the influence of the use of hormonal contraceptive and age of menarche as confounding factors (adjusted analysis). On the table, there is a significant relationship between passive smoking with the incidence of primary dysmenorrhea ($p < 0.001$) after controlling for confounding variables and also to show that passive smoking women have 23 times greater risk of suffering from primary dysmenorrhea than women non-smokers (OR = 23% CI = 7.8 to 67.2).

Table 5 also showed that there was no significant relationship between use of hormonal contraceptives with primary dysmenorrhea ($p = 0.519$). It means in this study the use of contraception was not an influence factor of the occurrence of primary dysmenorrhea. These results were different from studies Latthe et al (2005) which stated that the use of hormonal contraceptives proved significant ($p < 0.001$) lower risk of primary dysmenorrhea.

The same results were also found at the age of menarche confounding variables are less than 12 years. In Table 5 shows that the relationship between age of menarche and the incidence of primary dysmenorrhea was not statistically significant. These results were different from studies Mijanovic (1990) which stated that women with age of menarche less than 12 years, proved highly significant (Chi Square = 44.45, p less than 0.001) increased the risk of primary dysmenorrhea. Greatest frequency of primary dysmenorrhea is estimated at their first menstruation at age 11.

This difference may be caused by a number of respondents that use of hormonal contraception and respondents with age of menarche less than 12 year in this study were few. In this study, only four respondents used hormonal contraception and 2 respondents

experienced menarche less than 12 years. This condition could not be able to represent the confounding factors.

CONCLUSION

1. There was a statistically significant relationship between passive smoking with the incidence of primary dysmenorrhea. This relationship is indicated by an odds ratio of 23 (OR = 23%, $p < 0.001$).

2. There was a dose-response relationship between exposure to cigarette smoke significantly and increase incidence of primary dysmenorrhea in women non-smokers.

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