

The Use of IUD, Passive Smoker and the Risks of Cervical Cancer: A Cross-Sectional Study at Female Workers in Surabaya City, Indonesia

Abdul Rohim Tualeka¹, Febi Dwirahmadi², Arief Wibowo³, Fransisca Anggiyostiana Sirait¹

¹Departement of Occupational Health and Safety, School of Public Health, Airlangga University, Indonesia,

²Centre For Environmetal and Population Health, School of Medicine, Griffith University, Queensland, Australia,

³Departement of Biostatistics and Population, School of Public Health, Airlangga University, Indonesia

ABSTRACT

Background: The number of cases of cervical cancer in the world increased every year. IUD users also increased as they feel more secure using IUDs. The purpose of this study was to determine the level of cervical cancer risk for IUD users.

Method: The research method was cross sectional study. Total respondents were 11 people who were career women with 6 respondents of IUD users and 5 respondents were not users of IUD. Cervical cancer risk test used IVA method. Independent variables studied were IUD users, passive smokers. The dependent variables studied were cervical cancer risk through IVA status and IUD aging complaints.

Result: Based on the results of the study, IUD users had a cervical cancer risk of 3.33 times compared to non-IUD users, IUD users always bleed 2.125 times compared with non-IUD users. IU-female passive smokers bleed 1.5 times compared with non-IUD users.

Conclusion: The conclusion of this study was that IUD can cause cervical cancer risk. Passive smoking can warn of cervical cancer risk.

Keywords: IUD, Cervical Cancer, Passive smoker.

INTRODUCTION

Cancer has become a global problem. According to the World Health Organization (WHO) in 2012, there are 14 million new cases and 8.2 million people died from cancer. Cervical cancer and breast cancer is a disease with the highest prevalence in Indonesia with 0.8 % and 0.5 %^[12]. Every year there are about 15 thousand

new cases of cervical cancer in Indonesia. WHO placed Indonesia as the country with the largest number of cervical cancer patients in the world. Cervical cancer also ranked first female killer in Indonesia. According to data Balitbang Ministry of Health in 2013 there are 347.792 people or about 1.4 % of the total population of Indonesia suffering from cancer^[6].

From various research reports, cervical cancer is closely related to the use of Intra Uterine Device (or hereinafter abbreviated as IUD). The results of the research by Sipra Bagchi, et al, about the effect of 33% of IUD users with 33.7% Cu have not been normal for cervical cytology to lead to cervical cancer^[7]. Based on research by Lassise DL, et al (1991) on Invasive cervical cancer and intra uterine device use, the use of IUD contraceptives can increase the incidence of cervical cancer since the introduction of IUDs in the

Corresponding author :

Abdul Rohim Tualeka

Occupational Health and Safety Department, School of Public Health, Airlangga University, Kampus C, Jalan Mulyorejo, Surabaya, 60115, Indonesia, Tel: +62 31 5920948 / +62 81 336 617 187, Fax: +62 31 5924618
E-mail: inzut.tualeka@gmail.com
fransiscaanggi@gmail.com

early 1990s^[1].

Research has been conducted by U. J. Koch on the effects of copper IUDs on cervical cytology and influences on trans-migration sperm migration, concluded that all IUDs acting as foreign bodies in the intrauterine cavity caused a sterile inflammatory response to the endometrium as long as the IUD remained ^[11]. This reaction is similar to other foreign body reactions. The typical symptoms of this reaction are leukocytosis in the fluid cavity of the uterus and cervix. Based on the results of the research Lekovich's, et al, on the Comparison of Human Papillomavirus Infection and Cervical Cytology in Women Using Copper-Containing and Levonorgestrel-Containing Intrauterine Devices against 36 IUD users found vaginal cleansing 70% of respondents containing copper with 95% confidence level (CI) 53.6 - 86.4% ^[2].

Based on research results Onur, et al, on the impact of copper-containing and levonorgestrel-releasing intrauterine contraceptives on cervicovaginal cytology and microbiological flora: A prospective study that colonization by *Candida* spp. and mycoplasma infection was diagnosed significantly more frequently after one year of use of Cu-IUD than in the baseline ^[5]. During the study period, women taking Cu-IUD complained significantly more frequently with vaginal discharge, pelvic pain, and increased menstrual flow.

In addition to the use of IUDs, an increased risk of cervical cancer is also triggered by cigarette smoke. Cigarette smoke contains chemicals such as CO, Cd, benzene can increase stress in women and increase the number of free radicals in the body. In the home environment, women as passive smokers have a risk of stress due to the dangers of cigarettes ^[9]. Stress in women using IUD will increase the acidity of the vagina thus increasing the Cu corrosion that allows Cu to react with glutathione, as well as free radical reactions with DNA as a trigger for cervical cancer.

From the development of research on cervical cancer, which has not been done is a study that looks at how IUD users are at risk of developing cervical cancer by analyzing the chemical mechanisms in the body. Also, factors that may increase the risk of cancer for IUD users such as exposure to secondhand smoke. This study will assess the level of cervical cancer risk for IUD users. Also examined the effect of passive smoking factor with

cervical cancer risk on IUD users.

MATERIAL AND METHOD

IUD cancer risk research used cross sectional method. The number of respondents 11 people consisting of 6 users of IUD and 5 people used other types of contraception. Respondents were career women working in both formal and informal sectors. The variables studied include independent variables and dependent variables. The independent variables include the use of IUD, passive smoking and the habit of cleaning the sex organs. The dependent variables studied were cervical cancer risk through IVA status and IUD user complaints.

Methods of data collection by interviewing respondents to know the toxicity using IUD, status as a passive smoker and complaints that were felt like vaginal bleeding. Cancer risk is known by using IVA method. Data analysis used statistic method Odd Ratio. From Odd ratio method with 2 x 2 cross tabulation can be known level of cancer risk of respondents who use IUD as well as variables that have contribution increase cervical cancer risk that was status of respondent as passive smoker.

FINDINGS/ RESULTS

Based on the research method, the results of the research can be described below.

Relation of IUD usage with status IVA

Table 1. Relationship of IUD Usage with Status IVA

Using IUD	Status IVA		Total
	Positive	Negative	
Yes	4 (66,7%)	2 (33,3%)	6 (100,0%)
No	0 (0,0%)	5 (100,0%)	5 (100,0%)
Total	4 (36,3%)	7 (66,7%)	11 (100,0%)

From the table above those who used IUD after tested IVA 66.7% have a positive IVA compared with respondents who do not use IUD. Based on the results of Odd ratio analysis obtained value 3.33 means IUD users suffer cervical cancer risk 3.33 times compared with respondents who do not use IUD.

Table 2. Relationship of IUD Use with Vaginal Bleeding

Using IUD	Vaginal bleeding		Total
	Yes	No	
Yes	3 (50,0%)	3 (50,0%)	6 (100,0%)
No	0 (0,0%)	5 (100,0%)	5 (100,0%)
Total	3 (27,3%)	8 (72,7%)	11 (100,0%)

From the table above those who used 50% IUD mentioned frequent vaginal bleeding and complaints around the vagina, compared with those who did not use no IUD (0.0%) mentioning bleeding and complaints around the vagina. Based on the results of Odd ratio analysis obtained value of 2.125, means IUD users suffer risk of complaints and bleeding 2.125 times compared with respondents who do not use IUD.

Table 3. The relationship of Passive Smokers to Vaginal Complaints and Bleeding

Passive smoker	Vaginal bleeding		Total
	Yes	Sometimes	
Yes	1 (33,3%)	2 (67,7%)	3 (100,0%)
No	2 (25,0%)	6 (75,0%)	8 (100,0%)
Total	3 (27,3%)	8 (72,7%)	11 (100,0%)

In the table above IUD users who live with smokers' families so that they become passive smokers 33.3% say that experiencing complaints and bleeding in the vagina, while 25% of respondents who are not passive smokers experience complaints and bleeding around the vagina. Based on Odd Ratio analysis results obtained a value of 1.5 which means IUD users as passive smokers have a risk of vaginal bleeding 1.5 times compared with those who do not use IUD.

DISCUSSION

a. IUD and IVA

IUD users experienced a positive risk of IVA 3.33

times compared with respondents who did not use IUD. Material IUDs are composed of polyethylene and copper plastics. Planting IUDs in the cervix to prevent the entry of sperm cells into the female ovum. Copper includes positively charged and polar metals [9]. During menstruation the level of blood acidity will increase, so also when the woman stress the acidity level of blood will also increase. As the level of blood acidity increases it will be able to corrode copper so that copper can be corroded and dissolved in blood or fluid in the uterus.

Based on the results of Lekovich's research, et al, on the Comparison of Human Papillomavirus Infection and Cervical Cytology in Women Using Copper-Containing and Levonorgestrel-Containing Intrauterine Devices against 36 IUD users found vaginal cleansing 70% of respondents containing copper with 95% confidence level (CI) 53.6 - 86.4% [2]. From the results of this research indicates that the blood and the results of vaginal cleansing contain Cu which is the corrosion of Cu metal that is planted in the womb.

Cu can finally passively diffuse into the blood and is distributed to the body's cells including the cervical cells. Copper can eventually bind to glutathione in the body producing GSCu which causes a decrease in glutathione concentration in the body. Reaction mechanism as follows:



Note: GSH = The formula of glutathione chemical compounds

Based on the results of Lekovich's research, et al, on the Comparison of Human Papillomavirus Infection and Cervical Cytology in Women Using Copper-Containing and Levonorgestrel-Containing Intrauterine Devices against 36 IUD users found vaginal cleansing 70% of respondents containing copper with 95% confidence level (CI) 53.6 - 86.4% [2]. From the results of this research indicates that the blood and the results of vaginal cleansing contain Cu which is the corrosion of Cu metal that is planted in the womb.

The decreasing of glutathione concentration in cervical cells causes decreased glutathione function in cervical cells. The occurrence of decreased glutathione function in the cervical cells will cause free radicals

(ROS), which every day to attack the body, including in the cervical cells, both entering through food, drink and air will be free to react with DNA in the cervical cells. Sehigga, causing DNA adduct in vaginal uterine cells as the forerunner of cervical cancer. The chemical reaction mechanism of adduct DNA is shown below:



The chemical mechanism of cervical cancer due to Cu above is reinforced by several reports of cervical cancer IUD research results. Based on the results of Sipra Bagchi's research, et al, about the effect of 33% of IUD users with an unusual 33.7% Cu in cervical cytology to cervical cancer [7]. Based on the findings of Lassise DL, et al, on Invasive cervical cancer and intrauterine device use, the use of IUD contraceptives to increase cervical cancer has been considered since the introduction of IUDs in the early 1900s [1].

Based on research results published in the journal AKPERGSH LPPM Nursing Academy Giri Satriya Husada Wonogiri obtained research results that IUD users respondents 33.34% cervical cancer [3]. Based on the results of the study Octava Prima Arta, et al, published in the journal Nexus published by the Faculty of Medicine, State University of Sebelas Maret entitled "The Relationship between the Use of Intrauterine Device (IUD) and the incidence of Cervical Cancer in Dr.Moewardi Hospital" concluded that the users of IUD has a cervical cancer risk of 12.7 times compared with those not using an IUD [4].

b. IUD and Complaints and Bleeding

IUD users experienced the risk of complaints and bleeding 2,125 times compared with respondents who did not use the IUD. Materially, the IUD is composed of polyethylene and copper type plastic. Planting IUDs in the cervix to prevent the entry of sperm cells into the female ovum. However, with frequent friction-friction on the cervix so that menyebabkan inflammation and bleeding. Based on the results of Onur E, et.al, on the impact of copper-containing and levonorgestrel-releasing intrauterine contraceptives on cervicovaginal cytology and microbiological flora: A prospective study that colonization by *Candida* spp. and mycoplasma infection was diagnosed significantly more frequently after one year of use of Cu-IUD than in the baseline [5].

c. Passive Smokers With Bleeding

Based on Odd ratio analysis results obtained a value of 1.5 which means IUD users as passive smokers experience the risk of complaints and bleeding 1.5 times compared with those who do not use IUD. Passive smokers, ie people who do not smoke but have to inhale cigarette smoke. This condition can increase stress on them. This is because they are uncomfortable, stress is in one room with smokers.

In people who are increasingly stressed, it will cause their hormones higher cortisol which will affect the higher the level of blood acidity. With the higher acidity of the blood to add acidity to the cervical cells so that the more strongly mengkorosi the copper in the womb cells. The stronger the corrosion it will cause more inflammation in the uterus IUD users.

Based on research results Onur, et al, on the impact of copper-containing and levonorgestrel-releasing intrauterine contraceptives on cervicovaginal cytology and microbiological flora: A prospective study that colonization by *Candida* spp. and mycoplasma infection was diagnosed significantly more frequently after one year of use of Cu-IUD than in the baseline [5].

CONCLUSION

Based on the discussion then the conclusions obtained from this research is First, IUD can cause cervical cancer with level 3,33 times compared with that do not use IUD. Secondly, the use of IUD can cause various health complaints and bleeding with risk level 2,125 times compared to non IUD users. Third, Passive smokers participate in increased risk of IUD users experiencing complaints and bleeding with a risk level of 1.5 times compared with non-passive smokers.

REKOMENDATION

Further research is needed to reduce the risk of cancer due to IUD use. It is important to do risk communication to patients who want to use IUD as their contraceptive choice. Awareness needs to be made to the public so that smoking is not done in the house so as not to give exposure to cigarette smoke to other family members who do not smoke.

Conflict of Interest: All authors have no conflicts of interest to declare.

Source of Funding: This is an article “The Use of IUD, Passive Smoker and The Risks of Cervical Cancer: A Cross-Sectional Study at Female Workers in Surabaya City, Indonesia” that was supported by School of Public Health, Airlangga University, Indonesia, 2017.

Ethical Clearance: Taken from Public Health Faculty Committee of Airlangga University, Indonesia..

REFERENCES

1. Lassi DL, Savitz DA, Hamman RF, Barón AE, Brinton LA, Levines RS. 1991. Dec. Invasive cervical cancer and intrauterine device use. *Int J Epidemiol.* 865-70. NCBI. USA.
2. Lekovich, Jovana P. MD; Amrane, Selma MD; Pangasa, Misha MD; Pereira, Nigel MD; Frey, Melissa K. MD; Varrey, Aneesha MD; Holcomb, Kevin MD. 2015. May. Comparison of Human Papillomavirus Infection and Cervical Cytology in Women Using Copper-Containing and Levonorgestrel-Containing Intrauterine Devices. *Obstetrics & Gynecology: May 2015 - Volume 125 - Issue 5 - p 1101–1105.* USA.
3. Mintarsih, A. 2016. Hubungan Pemakaian IUD dan Kanker Servik, *Jurnal AKPERGSH LPPM.* Wonogiri.
4. Octa P.A. 2012. Hubungan Pemakaian Alat Kontraversi dalam Rahim dan Kejadian Kanker Servik di RSUD Dr. Mawardi. UNS. Solo.
5. Onur Erol, Serap Simavli, Aysel Uysal Derbent, Aylin Ayrim & Hasan Kafalı. 2014. The impact of copper-containing and levonorgestrel-releasing intrauterine contraceptives on cervicovaginal cytology and microbiological flora: A prospective study. *Journal The European Journal of Contraception & Reproductive Health Care* Volume 19, 2014 - Issue 3. USA.
6. Riset Kesehatan Dasar. 2013. Badan Litbangkes Kementerian Kesehatan RI & Data Penduduk Sasaran, Pusdatin. Kementerian Kesehatan RI: Jakarta.
7. Sipra Bagchi, Shanti Sah, Tanu Agrawal. 2016. Effect of intrauterine copper device on cervical cytology and its comparison with other contraceptive methods. *International Journal of Reproduction.* 2016 Aug; 5(8): 2795-2798. Available from www.ijrcog.org.India. 2017.
8. Tualeka, A.R. 2013. Toksikologi Industri. Graha Ilmu Mulia. Surabaya.
9. Tualeka, A.R. 2014. Analisis Risiko. Graha Ilmu Mulia. Surabaya.
10. Tualeka, A.R. 2015. Toksikologi Industri Logam Berat. Graha Ilmu Mulia. Surabaya.
11. U. J. Koch. 1985. Effects of copper IUDs on cervical cytology and influences on transtubal sperm migration. *Biomedical Aspects of IUDs* pp 25-44. USA.
12. WHO. 2015. Cancer. <http://www.who.int/mediacentre/factsheets/fs297/en/> (Accessed on November 10, 2017).