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Association Between Health Behaviours during Menstruation and Endometriosis

Public Health Section

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ABSTRACT

Introduction: Endometriosis is characterised by implantation of endometrium outside the uterine cavity. There are numerous risk factors for this disease.

Aim: To study the association between health behaviours during menstruation and endometriosis as one of the various risk factors for this disease.

Materials and Methods: This case-control study recruited 555 women visiting a hospital in North West of Iran. The case group comprised 185 women of reproductive age with confirmed diagnosis of endometriosis through laparoscopy or laparotomy. The control group comprised 370 women without endometriosis visiting the hospital for other health problems. Data were collected using a researcher-made questionnaire; included socio-demographic and health behaviours characteristics based on previous studies. Univariate analysis was performed using the chi-squared test, and multivariate analysis was done using conditional logistic regression.

Results: Based on multivariate logistic regression, the health behaviours of the two groups during menstruation were significantly different. Taking hot baths {OR (95% CI)=4.78 (2.22 to 10.30); p>0.001} and performing vaginal washing {OR (95% CI)=7.20 (1.32 to 39.22); p=0.022}, during menstruation increased the risk of endometriosis approximately five and seven times in those women who stated they took hot baths and performed vaginal washing during menstruation compared to those who stated they did not. Moreover, the chance of developing endometriosis was about two times higher in women who used cloth menstrual pad during menstruation than those who did not {OR (95% CI)=1.97 (1.12 to 3.44); p=0.017}. There was a significant difference between the two groups in terms of the average number of days in which they used cloth menstrual pad and the average number of cloth menstrual pad used per day.

Conclusion: Based on the results, there is a relationship between taking hot baths and performing vaginal washing during menstruation as well as using cloth menstrual pad during menstruation and endometriosis.

Keywords: Case-control study, Laparotomy, Retrograde menstruation, Vaginal washing

INTRODUCTION

Endometriosis is defined as the overgrowth of endometrial tissue outside the uterine cavity [1,2]. The prevalence of endometriosis in the general population is estimated at 7-10% [3-5]. Endometriosis appears as a multicausal disease but little is known about its exact aetiology [6,7]. Although no theory can cover all the manifestations of endometriosis, the theory of retrograde menstruation is both intuitively attractive and supported by multiple lines of scientific evidence [4]. It is assumed that the level and volume of retrograde menstruation play a significant role in the emergence and progression of endometriosis [5]. Since retrograde menstruation is considered the major aetiology for the development of endometriosis [6], the identification of factors that obstruct menstrual outflow or facilitate menstrual reflux would be worthwhile [7].

It is believed that some health behaviours such as vaginal washing, swimming, using saunas and whirlpool bathtubs with or without tampons, and bathing during menstruation may increase the risk of retrograde menstruation and the movement of the endometrial tissue to other areas of the body, thereby increasing the risk of endometriosis [6].

Lack of proper education, misinformation, shame, or avoiding the issue of genital hygiene reduce the awareness of menstrual health [8].

So far, few studies have investigated the correlation between health behaviours during menstruation and endometriosis. The results of a case-control study in the USA to determine the relationship between sexual behaviours, orgasm, and health-related behaviours during menstruation and the risk of endometriosis showed that a greater percentage in the control group reported the use of tampons. The odds of endometriosis were two times higher in the case group which only used sanitary napkins. There was no statistically significant difference between the two groups in terms of performing vaginal douching during menstruation [6]. A case-control study was conducted in Belgium to examine the individual and environmental risk factors associated with endometriosis. The results showed no difference between groups regarding the use of tampons and sanitary napkins during menstruation [9]. The results of a study in Iran on 441 infertile women showed that the prevalence of endometriosis according to laparoscopy findings was about 18.6% [10]. Based on the noted contradictory results and the recommendations in these studies for further research as well because of women unawareness [8] of complications due to lack of genital hygiene during menstruation; the present study aimed to answer the question whether some health behaviours during menstruation can be a risk factor for endometriosis.

MATERIALS AND METHODS

This case-control study recruited women with and without endometriosis aged 20-50 years in 2017 from April to December. The participants in the case group were selected from among women with endometriosis visiting a hospital over the past two years who had undergone laparoscopy and open surgery with a histologic diagnosis of endometriosis and information from medical

files in the hospital. Participants in the control group were selected from women of reproductive age (20-50 years) visiting the same centre for other problems, e.g., vaginitis or a medical visit, in whom the absence of endometriosis was confirmed by a gynaecologist based on their signs and symptoms, and considering inclusion and exclusion criteria.

Inclusion criteria: Age of 20-50 years; diagnosis of endometriosis by open surgery or laparoscopy and histologic diagnosis of endometriosis or the presence of endometrioma (case group); being Iranian; being married; absence of endometriosis (control group); willingness to participate; no history of infertility (control group); no history of tubectomy (control group).

Exclusion criteria: Being menopausal (amenorrhea for over a year); endometriosis in the surgical site or the involvement of remote areas, e.g., lungs or brain; suspected of endometriosis or endometrioma (control group); having Polycystic Ovarian Syndrome (PCOS); breast, ovarian, or endometrial cancer; the presence of chronic pelvic pain; having any life-threatening disease.

The sample size was calculated based on the results of a pilot study on 150 participants and considering an Odds Ratio to be detected about 1.8, was determined as n_1=185 (case group), n_2=370 (control group), and n=555 (total) (with the case-to-control ratio of 1:2).

Data Collection

This study was confirmed by the Ethics Committee of Tabriz University of Medical Sciences (Ethics Code: 5/D1003687). Afterwards, data collection was started in Alzahra hospital, Tabriz, which is referral gynaecology and midwifery hospital in NorthWest Iran. By reviewing medical records, those with a confirmed histologic diagnosis of endometriosis through laparoscopy or open surgery were identified over the past two years and their addresses and telephone numbers were extracted from their records. They were contacted via telephone and briefed about research objectives and method, inclusion and exclusion criteria were checked, and they were invited to participate in the study. For those who were willing to take part, questionnaires were filled in by the researchers through interviews. After sampling was done in the case group, control group members were selected through purposive sampling from those visiting the gynaecology clinic of the same centre for other problems, e.g., vaginitis or a medical visit, and did not have endometriosis as diagnosed based on symptoms by a gynaecologist colleague. Research objectives and method were explained to them. For those who were willing to participate, inclusion and exclusion criteria were checked, and in case they met the criteria, they were recruited and questionnaires were completed by the researcher through interviews. Informed consent forms were obtained from all participants, and those in case and control groups were matched for age ±2 years.

DATA COLLECTION TOOLS

Data were collected by the researcher through interviews and using researcher-made questionnaires based on previous studies, highlighting socio-demographic and health behaviours characteristics.

The socio-demographic characteristics questionnaire included questions on age; level of education, level of income, occupation, and endometriosis in first-degree relatives (mother, sisters, and aunts); smoking and alcohol use.

The health behaviour questionnaire included questions on the use of cloth menstrual pads, tampons, sanitary napkins, bathing, genital washing, vaginal washing, and swimming with or without tampons during menstruation.

To determine the content and face validity of the questionnaires, they were given to 10 faculty members and corrections were applied based on their opinions.

STATISTICAL ANALYSIS

Data were analysed in SPSS 21.0 software. Socio-demographic and health behaviours characteristics during menstruation were described using descriptive statistics including frequency (percentage). To determine the association between health behaviours during menstruation and endometriosis, chi-squared test was used in the univariate analysis, and conditional logistic regression was employed in the multivariate analysis to control confounding variables (level of education, level of income, occupation, cycle length, cycle interval, pregnancy number). As no woman in the control group reported a history of this disease in her first-degree relatives; so the family history was not included in the multivariate regression as a confounding factor. Sensitivity analysis was also used to control participants who used both cloth menstrual pads and sanitary napkins during menstruation. In this analysis, the odds ratio and confidence interval was set at 95%, and p<0.05 was considered significant.

RESULTS

In this study, 185 women with endometriosis and 370 women without endometriosis were analysed. Mean age of participants was 35.21±7.09 years in the case group and 35.28±7.03 years in the control group. In terms of educational level; the percentage of academic women in the case group was twice as high as in the control group. Moreover, 32 (17.3%) women in the case group and 10 (2.7%) women in the control group were employed. In the case group, 13 (7%) women reported a history of endometriosis in their mothers and sisters, and 7 (3.8%) women reported this in their aunts, while no woman in the control group reported a history of this disease in her first-degree relatives. Only one woman in the control group had a history of smoking, and no one in either group had a history of alcohol use [Table/Fig-1].

Social-demographic characteristic	Case n=185 N (%)	Control n=370 N (%)
Age (years)	35.21 (7.09)[§]	35.28 (7.03)[§]
Education		
Illiterate/Primary	57 (30.8)	129 (34.9)
Guidance/High school	37 (20.0)	82 (22.2)
Diploma	39 (21.1)	107 (28.9)
Academic	52 (28.1)	52 (14.1)
Occupation		
Housewife	153 (82.7)	360 (97.3)
Employed	32 (17.3)	10 (2.7)
Adequacy of monthly income		
Weak	42 (22.7)	79 (21.4)
Average	102 (55.1)	197 (53.2)
Good/Very good	41 (22.2)	94 (25.4)
The history of first-degree relatives		
Yes	20 (10.8)	0
No	165 (89.2)	370 (100.0)

[Table/Fig-1]: Comparison of demographic and social characteristics in case and control groups.
Mean±SD[§]; Only one woman in the control group had a history of smoking, and no one in either group had a history of alcohol use.

Based on the multivariate logistic regression analysis, the odds of developing endometriosis was about two times higher in those who used cloth menstrual pads during menstruation than those who did not {OR (95% CI)=1.97 (1.12 to 3.44); p=0.017}. There was a significant difference between case and control groups in terms of mean days of using cloth menstrual pads based on the multivariate logistic regression analysis. Thirty-four participants in the case group (77.3%) and 25 participants in the control group (40.3%) used cloth menstrual pads for more than five days during menstruation {OR (95% CI)=6.99 (1.16 to 41.93); p=0.033}. There

was also a significant difference between the two groups in terms of the average number of cloth pads used per day; 16 participants in the case group (36.4%) and 12 in the control group (19.4%) used more than three cloth menstrual pads per day during menstruation {OR (95% CI)=6.48 (1.30 to 32.23); p=0.022}.

Based on the multivariate logistic regression analysis there was no significant difference between two groups regarding the use of sanitary napkins and the average number of days in which they used sanitary napkins as well as the average number of sanitary napkins used per day after analysing the data; respectively {OR (95% CI)=1.45 (0.56 to 3.76); p=0.436}, {OR (95% CI)=0.59 (0.32 to 1.07); p=0.085}, {OR (95% CI)=0.65 (0.41 to 1.03); p=0.068}.

Because 76 participants (13.7%) in case and control groups used both cloth menstrual pads and sanitary napkins during menstruation, authors performed sensitivity analysis. Like multivariate logistic regression analysis the results of sensitivity analysis showed that the odds of developing endometriosis were about two times higher in those who used cloth menstrual pads during menstruation than those who did not {OR (95% CI)=1.96 (1.07 to 3.61; p=0.029}, and there was no significant difference between case and control groups in terms of using sanitary napkins during menstruation {OR (95% CI)=1.30 (0.49 to 3.48); p=0.591}.

Based on multivariate logistic regression analysis there was a significant difference between case and control groups in terms of bathing during menstruation {OR (95% CI)=1.74 (1.03 to 2.94); p=0.037}. Moreover, there was a significant difference between the two groups in terms of water temperature in the bathroom based on the multivariate logistic regression analysis. The odds of developing endometriosis were approximately five times higher in women who took hot baths during menstruation than those who did not {OR (95% CI)=4.78 (2.22 to 10.30); p>0.001}. Thirty-four participants in the case group (22.2%) and 15 in the control group (5.5%) reported taking hot baths during menstruation. Ten women in the case group (5.4%) and two in the control group (0.5%) performed vaginal washing during menstruation. Based on multivariate logistic regression analysis there was a significant difference between case and control groups in terms of vaginal washing {OR (95% CI)=7.20 (1.32 to 39.22); p=0.022}.

Only one woman in each group reported using tampons in the swimming pools during menstruation. Four women in the case group and one in the control group reported swimming in pools without tampons during menstruation. Also, two participants in the case group reported swimming without tampons often/sometimes; two participants in the case group reported rarely swimming without tampons during menstruation, and one woman in the control group reported rarely swimming without a tampon during menstruation.

All the data mentioned above are shown in [Table/Fig-2,3].

Health behaviours during menstruation	Case n=185 N (%)	Control n=370 N (%)
Use of cloth menstrual pad		
Yes	44 (23.8)	62 (16.8)
No	141 (76.2)	308 (83.2)
Use of cloth menstrual pad**		
Yes	39 (23.8)	54 (17.1)
No	125 (76.2)	261 (82.9)
Average number of days for using cloth menstrual pad (day)		
<5 days	10 (22.7)	37 (59.7)
>5 days	34 (77.3)	25 (40.3)
Average number of cloth menstrual pad per day (number)		
<3 numbers	28 (63.6)	50 (80.6)
>3 numbers	16 (36.4)	12 (19.4)
Average length of use of cloth menstrual pad per hour (hour)		
<8 hours	25 (56.8)	30 (48.4)
>8 hours	19 (43.2)	32 (51.6)
Use of sanitary napkins		
Yes	176 (95.1)	348 (94.1)
No	9 (4.9)	22 (5.9)
Use of sanitary napkins pad**		
Yes	155 (94.5)	294 (93.3)
No	9 (5.5)	21 (6.7)
Average number of days for using sanitary napkins (day)		
<5 days	53 (30.1)	160 (46.0)
>5 days	123 (69.9)	188 (54.0)
Average number of sanitary napkins per day (number)		
<3 numbers	98 (55.7)	228 (65.5)
>3 numbers	78 (44.3)	120 (34.5)
Average length of use of sanitary napkins (hour)		
<8 hours	139 (79.0)	252 (72.4)
>8 hours	37 (21.0)	96 (27.6)
Sanitary napkins replacement		
Quite wet	128 (72.7)	236 (67.8)
With the least wet	48 (27.3)	112 (32.2)
Bathing		
Yes	153 (82.7)	275 (74.3)
No	32 (17.3)	95 (25.7)
Bathing position		
Standing	135 (88.2)	248 (90.2)
Sitting	18 (11.8)	27 (9.8)
Water temperature while bathing		
Hot water	34 (22.2)	15 (5.5)
Warm water	119 (77.8)	260 (94.5)
External genital washing		
Yes	151 (81.6)	309 (83.5)
No	34 (18.4)	61 (16.5)
Vaginal washing		
Yes	10 (5.4)	2 (0.5)
No	175 (94.6)	368 (99.5)

[Table/Fig-2]: Comparison of health behaviours during menstruation in case and control groups based on bivariate test.
**Frequency of participants after removing (n=76) who used both cloth menstrual pads and sanitary napkins during menstruation.

DISCUSSION

The aetiology and pathogenesis of endometriosis are not well-understood, and the theory of retrograde menstruation has a broader acceptance than other theories. Thus, it is believed that some health behaviours such as using tampons and douches or vaginal washing during menstruation may increase the chance of developing endometriosis. Therefore, it is important to identify the predisposing factors of retrograde menstruation. This study was the first in Iran to investigate the correlation between endometriosis and health behaviours (vaginal washing and swimming with or without tampons) during menstruation as predisposing factors of retrograde menstruation. The results of multivariate regression analysis indicated that the risk of developing endometriosis was about twice higher in women who used cloth menstrual pads during menstruation than those who did not. Moreover, women with endometriosis used cloth menstrual pads for more than five days and more than three times a day.

Variables	Unadjusted		Adjusted	
	OR (CI 95%)*	p†	OR (CI 95%)*	p†
Use of cloth menstrual pads	1.55 (1.01-2.39)	0.048	1.97 (1.12-3.44)	0.017
Use of cloth menstrual pads‡	1.50 (0.94-2.39)	0.083	1.96 (1.07-3.61)	0.029
Average number of days for using cloth menstrual pads (day)	5.03 (2.11-11.99)	<0.001	6.99 (1.16-41.93)	0.033
Average number of cloth menstrual pads per day (number)	2.38 (0.98-5.74)	0.053	6.48 (1.30-32.23)	0.022
Use of sanitary napkins	1.23 (0.55-2.74)	0.602	1.45 (0.56-3.76)	0. 436
Use of sanitary napkins‡	1.23 (0.55-2.75)	0.614	1.30 (0.49-3.48)	0.591
Average number of days for using sanitary napkins (day)	0.50 (0.34-0.74)	<0.001	0.59 (0.32-1.07)	0.085
Average number of sanitary napkins per day (number)	0.66 (0.45-0.95)	0.029	0.65 (0.41-1.03)	0.068
Sanitary napkins replacement	1.26 (0.84-1.88)	0.249	1.53 (0.94-2.49)	0.083
Bathing	1.65 (1.05-2.58)	0.028	1.74 (1.03-2.94)	0.037
Water temperature while bathing	4.95 (2.59-9.44)	<0.001	4.78 (2.22-10.30)	<0.001
Vaginal washing	10.5 (2.27-48.49)	0.003	7.20 (1.32-39.22)	0.022

[Table/Fig-3]: Comparison of health behaviours during menstruation in case and control groups based on bivariate and multivariate logistic regression.
Conditional logistic regression was employed in the multivariate analysis to control confounding variables: level of education, level of income, occupation, cycle length, cycle interval, pregnancy number.
*95% confidence interval/†p-value ‡Sensitivity analysis after removing (n=76) who used both cloth menstrual pad and sanitary napkins during menstruation.

Furthermore, the risk of endometriosis was approximately two times higher in those women who stated they took bath during menstruation and five times higher in women who took a hot bath during menstruation compared to those who state they did not.

The chance of developing endometriosis was approximately seven times higher in those women who had vaginal washing during menstruation compared to those who state they did not.

The reason for these results is unclear because no studies have been conducted on this issue so far. A possible answer may be that the absorption capacity of cloth menstrual pads is lower than sanitary napkins with absorbent materials, increasing the probability of retrograde menstruation due to blood stasis in the vagina.

Although there are studies that demonstrate the effect of hot baths on decreasing dysmenorrhea and dyspareunia associated with endometriosis [2,4], there is no study that shows the effect of hot baths as a predisposing factor of endometriosis during menstruation. It seems that taking hot baths and the presence of steam may be predisposing factors, increasing the chance of retrograde menstruation during menstruation. Studies have proved the effect of hot baths on muscle relaxation [7]. Therefore, the relaxation of the wall of uterine vessels might lead to an increase in menstrual bleeding, which is a major risk factor for endometriosis and increases the flow of retrograde menstruation [6,11]. Iranian traditional medicine does not support bathing during menstruation, and it is believed to be associated with many complications for women, especially in those days when the volume of bleeding is high. All these subjects may increase retrograde menstruation but their mechanisms are unclear and further studies are required.

So far, few studies have focused on the correlation between some health behaviours and endometriosis. A case-control study conducted by Meaddough EL et al., in the United States investigated the effect of sexual activity, orgasm, and health behaviours during menstruation on endometriosis [6]. The findings showed the majority of participants in the two groups never performed vaginal douching. This finding is not consistent with the findings of the present study. In the present study, case and control groups were significantly different in terms of performing vaginal douching or vaginal washing during menstruation based on multivariate logistic regression analysis, but the confidence interval was very wide, probably due to the low number of participants reporting vaginal washing during menstruation so that definitive conclusion is not possible. This study showed a negative correlation between the use of tampons during menstruation and endometriosis and a positive correlation between the use of sanitary napkins and endometriosis. Meaddough EL et al., concluded that tampons may be more absorbent than sanitary napkins [6]. This is of course not proven yet since few studies have been conducted on the presence of toxic substances such as dioxin in sanitary napkins and tampons or the toxicity of dioxin and its correlation with endometriosis [9,12,13]. In a case-control study conducted by Heilier JF et al., in Belgium, the results indicated no significant difference between the two groups regarding the use of tampons and sanitary napkins [14]. A study by Darrow SL et al., showed that using tampons for over 14 years increases the risk of developing endometriosis by four times [15]. However, several studies reported no statistically significant difference between case and control groups regarding the use of tampons [14,16]. In the present study, there was no significant difference between case and control groups in the use of sanitary napkins based on the multivariate regression analysis. Also, few participants reported the use of tampons, which is perhaps due to the cultural differences as Iranian women are not familiar with a tampon and its usage.

In this study, an attempt was made to select women with and without endometriosis based on specialised and precise diagnosis. Furthermore, factors were examined while controlling confounding variables.

In the present study, the case groups were selected from women with confirmed diagnosis of endometriosis through laparoscopy or laparotomy, but the control group were selected from women in whom the absence of endometriosis was confirmed by a gynaecologist based on their signs and symptoms, and considering inclusion and exclusion criteria. The criterion for the definite diagnosis of endometriosis is histologic diagnosis through laparoscopy or laparotomy therefore future studies may choose to select both case and control participants from women in whom the presence or absence of endometriosis is confirmed by laparoscopy or laparotomy. Also, in the present study to determine the content and face validity of the questionnaires, they were given to 10 faculty members and corrections were applied based on their opinions. Authors recommend performing further studies with more validated questionnaire on this topic.

LIMITATION

In this study validity of the questionnaire was only confirmed through face and content validity qualitatively and the quantitative indices such as Content Validity Index (CVI) and Content Validity Ratio (CVR) weren't calculated. Also, considering the criterion for the definite diagnosis of endometriosis is histologic diagnosis through laparoscopy or laparotomy, one of the other limitations of this study is that the control group wasn't selected based on histologic diagnosis. Thus, future studies should be done selecting both case and control participants from women in whom the presence or absence of endometriosis is confirmed by laparoscopy or laparotomy.

CONCLUSION

Based on the results of this study and owing to an increased prevalence of endometriosis compared to the past as well as considering the numerous complications of endometriosis, e.g., infertility, it seems logical to recommend that healthcare teams

and those in charge in healthcare centres educate women of reproductive age about the observance of health behaviours during menstruation. Nevertheless, further studies are required.

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REFERENCES

[1] Hart R. ABC of subfertility: unexplained infertility, endometriosis, and fibroids. BMJ. 2003;327(7417):721.
[2] Marnach ML, Casey PM, editors. Understanding women's sexual health: A case-based approach. Mayo Clin Proc; 2008.
[3] Parazzini F, Esposito G, Tozzi L, Noli S, Bianchi S. Epidemiology of endometriosis and its comorbidities. Eur J Obstet Gynecol Reprod Biol. 2016:1-5.
[4] Phillips NA. Female sexual dysfunction: evaluation and treatment. Am Fam Physician. 2000;62(1):127-48.
[5] Witz CA, Burns WN. Endometriosis and infertility: is there a cause and effect relationship? Gynecol Obstet Invest. 2002;53:2-11.
[6] Meaddough EL, Olive DL, Gallup P, Perlin M, Kliman HJ. Sexual activity, orgasm and tampon use are associated with a decreased risk for endometriosis. Gynecol Obstet Invest. 2002;53(3):163-9.
[7] Srinivasan AK, Kaye JD, Moldwin R. Myofascial dysfunction associated with chronic pelvic floor pain: management strategies. Curr Pain Headache Rep. 2007;11(5):359-64.
[8] Woodward PJ, Sohaey R, Mezzetti Jr TP. Endometriosis: radiologic-pathologic correlation. Radiographics. 2001;21(1):193-216.
[9] Koninckx P, Braet P, Kennedy S, Barlow D. Dioxin pollution and endometriosis in Belgium. Hum Reprod Update. 1994;9(6):1001-2.
[10] Chaichian S, Mehdizadehkashi A, Najmi Z, Mobasseri A, Jahanloo A, Mohabbatian B, et al. Clinical Predictive Factors for Diagnosis of Endometriosis in Iranian Infertile Population. Journal of Minimally Invasive Surgical Sciences. 2015;4(3).
[11] Mcleod BS, Retzloff MG. Epidemiology of Endometriosis:: An Assessment of Risk Factors. Clin Obstet Gynecol. 2010;53(2):389-96.
[12] Rier SE, Martin DC, Bowman RE, Becker JL. Immunoresponsiveness in endometriosis: implications of estrogenic toxicants. Environ Health Perspect. 1995;103(Suppl 7):151.
[13] Scialli AR. Tampons, dioxins, and endometriosis. Reprod Toxicol. 2001;15(3):231-8.
[14] Heilier JF, Donnez J, Nackers F, Rousseau R, Verougstraete V, Rosenkranz K, et al. Environmental and host-associated risk factors in endometriosis and deep endometriotic nodules: a matched case-control study. Environ Res. 2007;103(1):121-9.
[15] Darrow SL, Vena JE, Batt RE, Zielezny MA, Michalek AM, Selman S. Menstrual cycle characteristics and the risk of endometriosis. Epidemiology. 1993:135-42.
[16] Lamb K, Berg N. Tampon use in women with endometriosis. J Community Health. 1985;10(4):215-25.

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