

Sexual Activity, Orgasm and Tampon Use Are Associated with a Decreased Risk for Endometriosis

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Key Words

Orgasm · Tampons · Endometriosis

Abstract

Objective: The purpose of the study was to determine if sexual behaviors, orgasm, tampon use, and douching during menstruation modify the risk of endometriosis.

Methods: A case-control study was conducted. Subjects (n = 2,012) consisted of members of the Endometriosis Association and friends not affiliated with the organization who completed mailed surveys. Data were analyzed using χ^2 , Fisher's exact test, t test, and regression analyses. **Results:** There was no difference between study groups concerning douching practices. However, cases were less likely than controls to report sometimes or often engaging in sexual behaviors during menstruation ($p = 0.002$, OR = 1.5), and sexual behaviors during menstruation that included orgasm ($p = 0.001$, OR = 1.5). Cases were also less likely than controls to report using only tampons ($p < 0.0001$, OR = 2.6). **Conclusion:** Sexual activity, orgasm, and tampon use during menstruation may confer protection against endometriosis.

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Introduction

Retrograde menstruation is widely accepted as playing a role in the etiology of endometriosis. Research has demonstrated the phenomenon of menstrual fluid backward flux [1], the viability of endometrial tissue in menstrual discharge [2], and the presence of endometrial tissue in peritoneal fluid found in the pelvic cavity [3]. There is ample epidemiological evidence as well. Endometriosis is primarily seen among women of reproductive age [4]. In addition, there is a higher incidence of endometriosis among women with prolonged menstruation, shorter cycles, or obstructed genital outflow tracts [5, 6].

The identification of factors that obstruct menstrual outflow or facilitate menstrual reflux would be worthwhile, since these factors may increase the amount of endometrial 'seeding' which occurs during menses. Olive and Henderson [7] found that cervical obstruction increases the likelihood of endometriosis by increasing the menstrual debris available to the pelvic cavity.

There are few studies which address the possible relationship between sexual behavior during menstruation and endometriosis. Filer and Wu [8] sought to determine if coital habits during menses are associated with increased risk for endometriosis and pelvic inflammatory disease. While no association with pelvic inflammatory

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disease was revealed, they found that infertility patients who frequently or occasionally engaged in coitus during menstruation were almost twice as likely to have endometriosis than those who did not report coital behavior during menses. Filer and Wu [8] proposed that this difference may be due to increased intrauterine pressure during orgasm, which assists in the transport of endometrial debris to an ectopic site. Darrow et al. [9] performed a study focusing on the belief that women with endometriosis typically delay childbirth. It was thought that orgasm and sexual penetration during menstruation may be contributing factors. In contrast to Filer and Wu [8], Darrow et al. [9] found no association between these factors and endometriosis.

The goal of the current study was to further investigate sexual behaviors and hygienic practices performed during menstruation as they relate to the development of endometriosis. Specifically, the frequencies of sexual activity and orgasm during menstruation, tampon use, and douching, were measured to determine if these variables are associated with an increased risk for the development of endometriosis.

Patients and Methods

A retrospective case-control study design was used. Cases were obtained from the Endometriosis Association based in Milwaukee, Wisc. This association possesses an international list of members who received mailed surveys included in the bimonthly newsletter. Surveys, which were anonymous, were mailed to 9,135 members.

Controls were recruited in two ways. First, not all members of the Endometriosis Association have endometriosis. Members also consist of doctors and other individuals with an interest in endometriosis. These members responding to the survey were designated as controls. Second, members were provided with a second survey to give to a female friend of similar age who, to their knowledge, did not have endometriosis. Members were also instructed not to give the survey to a relative. The majority of controls consist of this second group. The study was performed with the approval of the Human Investigation Committee at Yale University.

Instrumentation

Two survey forms were designed. Both forms included questions related to endometriosis history, menstrual history, sexual history, medical history, exercise history, smoking history, and religious, educational, and ethnic background. However, the introductory paragraphs differed. A red form was created for association members which provided information regarding the purpose of the survey, how to complete and return the survey, and what should be done with the second form. An orange form was created for friends of association members who do not have endometriosis. This form also covered the purpose of the study and instructions for completion and return of the survey.

The survey was pilot tested before use. Individuals completing surveys for this purpose were informed that surveys should not be returned. Information regarding the time taken to complete the survey and clarity of the questions was obtained and utilized to generate the final versions used in the study. The survey is available at the following web address: <http://info.med.yale.edu/obgyn/kliman/Endometriosis/Orgasm.html>.

Surveys were printed on forms that could be computer-scanned (National Computer Systems, Columbia, Pa.). The returned forms were processed using an OpScan-5, ink-read scanner programmed using Windows-based Scan Tools software (National Computer Systems).

Data Analysis Procedures

Three study groups were anticipated. These were association members with endometriosis (cases), association members who do not have endometriosis (controls) and 'friend controls' who do not have endometriosis (controls). An unexpected, 4th study group was also formed as a result of conducting the survey. These participants were friends of association members who had a history of endometriosis (cases). The ideal means for handling this group, as well as association members never diagnosed with endometriosis, would have been to omit the matched pairs which include these individuals. However, this was not possible for the current study since surveys were returned individually. Thus, although both groups were made up of a mixture of association members and non-members, the case and control groups were combined since all respondents answered all the study questions.

Statistical analyses were performed using SAS software for Windows (SAS Institute, Inc., Cary, N.C.). χ^2 , Fisher's exact, t test, and logistic regression analyses were used. Statistical significance was determined if $p < 0.05$. Family history, period length, cycle length, mean number of pregnancies, and those variables which could be analyzed with reference to the time period before diagnosis with endometriosis were included in the regression analysis. These other variables were history of heavy periods, IUD use, use of OCs, estrogen replacement therapy, surgery involving the fallopian tubes, hysterectomy, and smoking.

Results

A total of 2,033 surveys were received for a response rate of approximately 22%. Of these, 21 were not included because participants did not indicate whether they have a history of endometriosis, or they did not report the age of menarche. The final total of usable surveys was 2,012. There were 1,517 cases consisting of 1,450 (95.6%) association members, and 67 (4.4%) non-members. There were 495 controls consisting of 16 (3.2%) association members and 479 (96.8%) non-members.

Sociodemographic Analysis

Cases and controls were well-matched on sociodemographic variables, as shown in table 1. Statistical analyses showed that cases and controls were not significantly dif-

ferent with regard to age, religious preference, highest educational level attained, and ethnic background.

Menstrual History.

As shown in table 2 the mean age of menarche among cases was 12.4 ± 1.6 years, and 12.6 ± 1.4 years among controls. This difference was not found to be significant. Further, it was determined that only 4 individuals in the case group (0.3%) indicated that menarche occurred after endometriosis was diagnosed.

Controls were more likely to report having periods lasting 6 days or less compared to cases. And cases (19.3%) were more likely to report having periods that were 7 days or more compared to controls (11.5%). Cases were also more likely to report having irregular period lengths or not having a period in the last year compared to controls. These differences were found to be significant ($p = 0.001$).

A greater proportion of cases reported having cycles that were less than 24 days or irregular compared to controls. In contrast, the frequencies of cases reporting cycle lengths of 24–28, 29–32, or greater >32 days were less than among controls. Differences on reporting of cycle length were shown to be significant ($p = 0.003$).

Neither cases nor controls were significantly more likely to report having a history of less frequent periods or periods that stopped. However, when only cases who experienced stopped or less frequent periods before diagnosis were counted, controls (35.9%) were more likely to report this experience than cases (24.5%, $p < 0.0001$). Of those who reported having such experiences, there were no significant differences in the length of time these experiences occurred, but the mean age when these experiences first occurred was lower for cases than controls ($p = 0.02$).

Cases were significantly more likely to report ever having periods that were heavier than usual ($p < 0.0001$). Cases were also more likely to have experienced heavier periods for 1–3, 4–6, or >6 years, while controls were more likely to have experienced heavier periods for <1 year ($p < 0.0001$). The mean age at which cases first experienced heavier periods (24.6 ± 8.2 years) was earlier than among controls, whose mean age was 28.2 ± 9.9 years ($p < 0.0001$).

Is the Frequency of Sexual Activity Associated with Endometriosis?

As can be seen in table 3, there was no difference in reporting among cases and controls when asked if they had ever engaged in sexual activity during menstruation.

Table 1. Sociodemographic descriptors

Descriptor	Cases (n = 1,517) ^a	Controls (n = 495) ^a
Mean age, years	35.2 ± 7.0	35.5 ± 8.8
<i>Religious preference</i>		
None	232 (15.4%)	80 (16.3%)
Catholic	432 (28.7%)	140 (28.5%)
Jewish	67 (4.5%)	23 (4.7%)
Protestant	516 (34.3%)	163 (33.1%)
Other	259 (17.2%)	86 (17.5%)
<i>Highest educational level</i>		
Less than grade school to high school	163 (10.9%)	64 (13.0%)
Some college	717 (47.6%)	249 (50.7%)
Some graduate school	625 (41.5%)	178 (36.3%)
<i>Ethnic background</i>		
White	1,435 (95.1%)	468 (94.7%)
Black/African American	17 (1.1%)	6 (1.2%)
Non-Black Hispanic	25 (1.7%)	10 (2.0%)
Other	32 (2.1%)	10 (2.0%)

There was no significant difference between cases and controls for the 4 descriptors.

^a n varies for each descriptor.

Table 2. Menstrual history

Descriptor	Cases (n = 1,517) ^a	Controls (n = 495) ^a
Mean age at menarche, years	12.4 ± 1.6	12.6 ± 1.4
<i>Period length*</i>		
<3 days	41 (2.7%)	20 (4.1%)
3–4 days	252 (16.7%)	140 (28.3%)
5–6 days	569 (37.7%)	218 (44.1%)
>7 days	291 (19.3%)	57 (11.5%)
Irregular	91 (6.0%)	20 (4.1%)
No period in the last year	265 (17.6%)	39 (7.9%)
<i>Cycle length*</i>		
<24 days	89 (7.1%)	28 (6.2%)
24–28 days	591 (47.5%)	250 (55.1%)
29–32 days	287 (23.1%)	107 (23.6%)
>32 days	56 (4.5%)	22 (4.8%)
Irregular	221 (17.8%)	47 (10.4%)

* $p < 0.05$.

^a n varies due to missing responses.

Table 3. Sexual behaviors during menstruation

Behavior	Cases (n = 1,517) ^a	Controls (n = 495) ^a	p level odds ratio
<i>Any sexual activity during menstruation</i>			
Yes	1,154 (76.3%)	369 (75.1%)	NS
No	358 (23.7%)	122 (24.9%)	
<i>Sexual intercourse, masturbation, or any other sexual activity during menstruation</i>			
Never or rarely	878 (73.5%)	251 (65.4%)	0.002
Sometimes or often	316 (26.5%)	133 (34.6%)	OR = 1.5 CI = 1.2–1.9

NS = Not significant.

^a n varies with each behavior.

Table 4. Sexual behaviors during menstruation including orgasm

Behavior	Cases (n = 1,517) ^a	Controls (n = 495) ^a	p level odds ratio
<i>Orgasm during menstruation achieved through sexual intercourse, masturbation, any other sexual activity, or other behavior</i>			
Never or rarely	909 (77.0%)	261 (68.7%)	0.001
Sometimes or often	272 (23.0%)	119 (31.3%)	OR = 1.5 CI = 1.2–2.0

^a Less than n responded.

However, when responses to questions regarding specific sexual behaviors during menstruation were combined (i.e., sexual intercourse, masturbation, and ‘any other sexual activity’), significant differences in reporting were revealed ($p = 0.002$). Cases (26.5%) were less likely to report sometimes or often engaging in sexual behavior during menses compared to controls (34.6%).

Since there were several variables which were significantly related to endometriosis, logistic regression analyses were also performed to control for these variables. Family history, period length, cycle length, mean number of pregnancies, and those variables which could be analyzed with reference to the time period before diagnosis with endometriosis were included. These other variables were history of heavy periods, IUD use, use of OCs, estrogen replacement therapy, surgery involving the fallopian tubes, hysterectomy, and smoking. Data concerning the

mean number of children were not included because it is highly correlated with the mean number of pregnancies ($r = 0.76$). In addition, requesting the number of children does not include children that may have expired before the time the survey was completed.

Logistic regression analyses concerning sexual behaviors performed during menstruation were consistent with the results reported above. Never and rarely engaging in various sexual behaviors was positively associated with being a case, and negatively associated with being a control (odds ratio = 1.5, CI = 1.2–1.9). Thus, never or rarely engaging in sexual activities during menses is associated with an increased risk for endometriosis.

Is the Frequency of Orgasm during Menses Associated with Endometriosis?

When responses to questions regarding specific sexual behaviors during menstruation that included orgasm were combined (i.e., sexual intercourse, masturbation, ‘any other sexual activity’, and orgasm achieved ‘in any other way’), significant differences in reporting were revealed ($p = 0.001$; table 4). Cases (23.0%) were less likely to report sometimes or often engaging in sexual behavior that included orgasm compared to controls (31.3%).

Logistic regression analyses were also performed as described above. Never and rarely engaging in various sexual behaviors that include orgasm was positively associated with being a case, and negatively associated with being a control. This finding remained significant as in the univariate analysis (odds ratio = 1.5, CI = 1.2–2.0). Thus, never or rarely engaging in sexual activities that include orgasm during menstruation is perhaps associated with an increased risk for endometriosis.

Is Tampon Use Associated with Endometriosis?

Significant differences in tampon use were reported between cases and controls (table 5). Cases (31.3%) were more likely to report using only pads compared to controls (22.1%). Cases (11.6%) were less likely to report using only tampons compared to controls (20.9%). Only 1 of the participants reported not using pads or tampons, and approximately the same proportion of cases (57.0%) and controls (57.1%) indicated use of both pads and tampons.

Logistic regression analyses showed statistical significance. Pad use was positively associated with being a case, and tampon use was negatively associated with being a case (odds ratio = 2.6, CI = 1.9–3.5). Thus, women who used only pads had a greater than twofold likelihood of having endometriosis.

Table 5. Pad and tampon use

Behavior	Cases (n = 1,517) ^a	Controls (n = 495) ^a	p level odds ratio
Neither pads nor tampons	1 (0.1%)	0 (0.0%)	
Only pads	474 (31.3%)	108 (22.1%)	
Only tampons	175 (11.6%)	102 (20.9%)	
Pads and tampons	863 (57.0%)	279 (57.1%)	<0.0001 ^b OR = 2.6 CI = 1.9–3.5

^a Less than n responded.
^b Fisher's exact test.

Table 6. Douching behavior

Behavior	Cases (n = 1,517) ^a	Controls (n = 495) ^a	p level
Never	1,269 (84.2%)	400 (82.0%)	
When menstruating	4 (0.3%)	1 (0.2%)	
When not menstruating	224 (14.9%)	82 (16.8%)	
Both when menstruating and not menstruating	11 (0.7%)	5 (1.0%)	NS ^b

NS = Not significant.
^a Less than n responded.
^b Fisher's exact test.

Is Douching Associated with Endometriosis?

The majority of cases and controls never douche. No significant differences were revealed between cases and controls regarding douching during menstruation, when not menstruating, or both (table 6).

Discussion

This investigation was designed to examine sexual activity and hygienic practices during menstruation and their relationship to the development of endometriosis. As retrograde menstruation is currently believed to play a prominent role in the pathogenesis of this condition, it was hypothesized that tampon use, douching and sexual activity (especially with orgasm) at the time of menstruation would serve to enhance retrograde flow and heighten the chances of developing endometriosis.

A response rate of 22% was seen with this survey. Although this appears to be a relatively low rate of response, this figure is in line with that seen in single solicitation mail surveys. Fowler [10] noted that without fol-

low-up, a response rate of less than 30% can be expected for such instruments. Since follow-up was not possible for this study, an estimate of at least 1,000 returned surveys (approximately 10%) was expected. Admittedly, response bias is of concern when less than one quarter of those queried respond. No data were obtained from those not responding to determine if those returning their questionnaires represented a skewed sample. In addition, we were not in a position to assess the presence or absence of either remote or active endometriosis. We depended on the patient's own knowledge and assessment of her own health status. However, it must be emphasized that this study was not an experimental trial designed to test for a causal relationship. Rather, the purpose of this investigation was to determine the plausibility of several theoretical, but entirely untested hypotheses. To this end we have succeeded, as multiple hypotheses emerged as both plausible and worthy of further investigation. Interestingly, the findings that were obtained ran counter to those concepts that had caused us to initiate the study.

To our surprise, sexual behavior, orgasm and tampon use during menstruation were found to be less frequent

among women with endometriosis compared to controls. This remained true even after correcting for confounding variables via logistic regression. The reasons for these results remain speculative.

One possible explanation for the findings might lie in the limitations of the survey instrument. It is possible that the correlations found were due to another confounder not included in the questionnaire. For example, the survey did not include any questions regarding history of dyspareunia. It is entirely possible that painful intercourse at the time of menses dissuaded women with endometriosis from this practice. However, the survey attempted to deal with this issue by not querying current practices but rather practices from throughout the patient's experience during reproductive age. Unless such unasked confounders began at or around menarche, it is unlikely that they would represent the sole basis for our results.

If, however, there is a protective effect associated with sexual activities performed during menstruation and tampon use, then how does this effect occur? It may be that sexual intercourse induces more effective menstrual fluid clearance of the vaginal vault, which in turn may facilitate cervical outflow, as suggested in a study by Cutler et al. [11]. Further, the use of tampons may be more efficient at the removal of menstrual fluid compared to the use of pads. Orgasm during menses may also have the effect of increasing cervical outflow, rather than enhancing retrograde flow. Studies have shown that uterine contractility varies throughout the menstrual cycle. Research focusing on the measurement of intrauterine pressure during the menstrual cycle has shown that there are small, frequent, nonpropagated myometrial contractions from the end of menstruation to the mid-secretory phase. These gradually change from nonpropagated to propagated contractions from the midsecretory phase to the beginning of menstruation, and predominantly propagated contractions during menses [12]. This work also found that the direction of propagation during menses varies. It is possible for contractions to go up, down, or start in the midcorpus area and progress in each direction. In addition, tubal contractions have been found to be most active during the menses phase of the menstrual cycle [13], as well as during ovulation. Recently a study looking specifically at subendometrial contractility during menses in patients with and without endometriosis, showed that the patients with endometriosis had a retrograde pattern of contractility versus the antegrade pattern seen in the patients without endometriosis [14]. Still, due to the variations in frequency and direction of muscle contractions in the uterus and

fallopian tubes, one cannot be certain without further study what the nature of myometrial activity is when menses and orgasm are experienced concurrently.

An interesting side issue resulting from these findings involves the current controversy relating dioxin to endometriosis [15, 16]. Tampons contained dioxin and dioxin-like toxicants until the mid 1980s. It has recently been alleged that this exposure may well have led to an increase in the rate of endometriosis development. There is, however, no evidence to date that tampons have been a factor in the pathogenesis of this disease, and even the relationship between dioxin and endometriosis in humans remains unsubstantiated. In any event, the results of this study appear to contradict this theory: not only was tampon use not more frequent in women with endometriosis, in fact tampon use appeared to be significantly *less* frequent in women with endometriosis. Further study is necessary to determine if the lower use is perhaps in response to the perceived risk for endometriosis patients.

While unconfirmed, the results of this study raise intriguing possibilities for research pursuits evaluating the etiology and epidemiology of endometriosis. Clearly, more work needs to be done – a detailed investigation into the effect of sexual or hygienic activity on the development of endometriosis can now be focused and more tightly controlled. All appropriate confounders should be thoroughly evaluated in future studies, and prospective assessment may even be a possibility. In conclusion, we believe this study has raised interesting issues deserving further investigation.

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