Young People in the United States Are Often Misinformed About the Proper Use of Condoms

American adolescents commonly have misconceptions about proper condom use, according to a study of more than 15,000 U.S. teenagers.[1] Between 15% and 52% of young people respond incorrectly when questioned on whether space should be left at the tip of a condom during use, on whether petroleum-based lubricants can be used safely with latex condoms and on whether lambskin condoms protect better than latex against transmission of HIV. In general, older adolescents, females and those with sexual experience are about 10–30% less likely than others to have misconceptions about proper condom use.

To assess the prevalence of three misconceptions teenagers have about correct condom use and whether these misconceptions vary with certain characteristics, the researchers analyzed data collected by the 1995 National Longitudinal Study of Adolescent Health. Survey participants were asked to answer "true," "false" or "I don't know" in response to the following three statements: "When putting on a condom, it is important to have it fit tightly, leaving no space at the tip"; "Vaseline can be used with condoms, and they will work just as well"; and "Natural skin (lambskin) condoms provide better protection against the AIDS virus than latex condoms." Researchers used logistic regression to analyze the answers in relation to respondents' age, race, gender, religious affiliation, sexual experience, experience with condoms and perceived knowledge of condom use.

In all, 16,677 young people aged 15–21 participated in the study's interview survey. The study population was almost equally composed of males and females. Nearly 61% of participants were white, 23% were black and the remainder belonged to other racial groups; 18% were Hispanic. Eighty-seven percent of respondents reported a religious affiliation. Forty-seven percent of adolescents reported having had sexual intercourse; of these, 29% reported having had four or more lifetime partners and 28% reported ever having used a condom.

In examining the prevalence of misconceptions, the investigators divided the sample into three groups: sexually experienced adolescents who had ever used condoms, sexually experienced teenagers who had never used condoms and sexually inexperienced respondents. They further divided each group by gender. Using chi-square analyses, they found that sexually experienced young people, regardless of whether they had used condoms, were less likely to have misconceptions about the need to leave space at the top of a condom during use (33–35% of females and 39–40% of males) than were their sexually inexperienced peers (52% of females and 45% of males). Similarly, misconceptions about the use of Vaseline with latex condoms were less prevalent among teenagers who had had sex (27–28% of females and 32–34% of males) than among those who had not (33% of females and 35% of males). All three groups, however, were equally likely to have misconceptions about the relative effectiveness of lambskin and latex condoms (15–20% of females and 21–24% of males). All gender differences were statistically significant.

Teenagers' perceptions of their knowledge of proper condom use did not necessarily correspond to their actual knowledge. Adolescents with experience using condoms who believed that they knew how to use them correctly were no more likely to respond accurately to the three statements than were those with sexual experience who had never used condoms or those without sexual experience. Perceived knowledge related to actual knowledge in the following instances: among males with sexual experience but no experience using condoms, in regard to lambskin versus latex condoms; among females with sexual experience but no experience using condoms, in regard to using Vaseline with latex condoms; and among males and females without sexual experience, in regard to leaving space at the tip of a condom during use.

Using logistic regression analysis, the researchers calculated teenagers' relative odds of having misconceptions about proper condom use. They found that teenagers who reported a religious affiliation were significantly more likely than those who did not to have misconceptions in regard to leaving space at the tip of a condom and whether lambskin is more protective than latex (odds ratios, 1.2 for each). Also, teenagers who reported being unsure about proper condom use were more likely than those who considered themselves highly knowledgeable to have misconceptions in regard to leaving space at the tip of a condom and whether Vaseline can be used with latex condoms (1.2 and 1.1, respectively).

Teenagers with sexual experience and those having four or more lifetime sexual partners were less likely than others to have misconceptions about whether to leave a space at the tip of a condom during use (0.7 and 0.8, respectively). Black teenagers, females and adolescents with sexual experience were less likely than others to have misconceptions about whether it is safe to use Vaseline with latex condoms (0.8–0.9). Female teenagers and those with four or more lifetime sexual partners were less likely than others to have misconceptions about whether lambskin condoms are as effective at preventing transmission of HIV as latex (0.8 for each). Older teenagers were less likely than younger ones to have misconceptions about each of the three statements (0.9 for each).

The researchers note, "The adolescents of this study unknowingly had misconceptions. This finding indicates that asking the target audience if they already know about STD / HIV / pregnancy prevention as an educational needs assessment strategy may not be wise." They add that "prevention education should be provided even if the target audience believes it is already knowledgeable."—*J. Rosenberg*

Reference

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Multiple Factors, Including Genetic and Environmental Components, Influence When Menopause Begins

Half of women reach natural menopause (i.e., not resulting from surgery) by 51.4 years of age, according to a large, multicenter study.[1] Women who smoke, who have not graduated from college, who are formerly married, who are unemployed and who have had heart disease all reach natural menopause sooner than other women. On the other hand, women who have taken the pill, Japanese American women and women who have ever given birth all experience a delay in reaching natural menopause relative to other women. This study of roughly 15,000 women from five racial and ethnic groups, which controlled for a wide range of potentially confounding variables, represents the largest such study to be conducted so far in the United States.

The data come from the cross-sectional component of the Study of Women's Health Across the Nation, which was conducted in 1995–1997 at seven clinic sites—in Boston; Chicago; Detroit; Los Angeles; Newark, New Jersey; Oakland; and Pittsburgh. The researchers recruited women aged 40–55 from five ethnic or racial groups: blacks, non-Hispanic whites, Chinese Americans, Japanese Americans and Hispanics.

Participants were divided into five menstrual-status categories—four specific menopausal categories (surgical amenorrhea, natural postmenopause, perimenopause and premenopause) and a fifth category that included women whose menopausal status could not be determined because they were currently taking hormones. The investigators compared these groups according to a range of demographic, lifestyle and health factors,* and conducted bivariate analyses and multivariate proportional hazards regression analyses to determine how these factors affected the risk of reaching natural menopause.

Of the 15,154 women whose menstrual status was known, the majority—58%—were still menstruating: Thirty percent were premenopausal (i.e., they had menstruated predictably in the past three months), and 28% were perimenopausal (had menstruated within the past year, but not predictably in the past three months). Fourteen percent were naturally postmenopausal (had stopped menstruating for at least one year without surgery), 20% had had surgery that ended menstruation (either hysterectomy or oophorectomy) and 7% were currently taking hormones.

Since in the bivariate analyses women's menstrual status varied significantly by all 13 demographic, lifestyle and health factors examined, these variables—along with the woman's current age and the specific clinic site—were entered in the multivariate analysis. As data were missing on some covariates, the final sample size for multivariate analysis was 14,620 women.

Once all potentially confounding variables were controlled for, the overall median age at natural menopause was 51.4 years. Five factors were significantly and independently associated with a lower age at menopause—smoking more than 10 cigarettes a day; not having graduated from college; being separated, widowed or divorced; being unemployed; and having a history of heart disease. For example, net of all factors, women who had a history of heart disease reached menopause 1.4 years earlier than those without such a history (median age of 50.0 years vs. 51.4), and women who smoked 10–19 cigarettes a day reached menopause sooner than those who had never smoked (50.2 years vs. 51.4 years).

Three factors were significantly and independently associated with a later age at natural menopause. Japanese American women were 0.4 years older than white women at the time of natural menopause (median of 51.8 years vs. 51.4). Women who had taken the pill reached natural menopause later than those who had never used the pill (51.6 vs. 51.0), and women who had had a live birth stopped menstruating later than women who had never had a child (51.3 vs. 51.2). The researchers theorize that oral contraceptive use and childbirth may delay age at menopause by reducing ovulatory cycles earlier in life, thus preserving oocytes and leading to later menopause; age at menopause was not affected by the duration of pill use, however.

The amount of physical activity women engage in, a history of diabetes or high blood pressure, body mass index and current economic hardship (i.e., inability to pay for basics) did not affect the age at which women reach natural menopause, once all demographic, lifestyle and health factors were considered in the analysis.

Results of the proportional hazards analysis indicated the extent to which women's characteristics affected their risk of having reached natural menopause in any given period of time. The largest differentials found were associated with smoking and educational attainment: Women who smoked 10 or more cigarettes a day were nearly twice as likely to have stopped menstruating as those who had never smoked (adjusted hazard ratio, 1.7), and women who had gone no further than high school were 1.5 times as likely to have reached menopause as those who had gone to graduate school. Other factors that increased women's likelihood of having reached menopause were having attended but not graduated from college, being formerly married, being unemployed and having a history of heart disease (1.2–1.4). The risk of having reached menopause was reduced by about 20–30% among ever-users of the pill, women who had had a live birth and Japanese Americans (0.7–0.8).

The researchers acknowledge that their study is limited by the time constraints of a cross-sectional survey, which prevented women from giving more complete details, especially regarding the precise timing of major events, such as the month of their final menstrual period (data were available on the year of that event only); thus, estimates of age at menopause may be inaccurate by up to one year in either direction. Another shortcoming is the study's need to use a variety of sampling techniques to achieve sufficient samples of minority women.

Despite these limitations, however, the investigators assert that their study represents one of the largest conducted to date among a multiethnic, community-based sample of women. They conclude that their robust findings suggest that multiple factors, including possible genetic and environmental components, contribute to a "likely complex mechanism" that determines the onset of menopause.—*L. Remez*

*These included six demographic factors (race or ethnicity, education, employment, marital status, parity and ability to pay for basics such as food and shelter); two lifestyle factors (smoking and physical activity); and five health-related factors (body mass index; oral contraceptive use; and history of high blood pressure, diabetes or heart disease).

Reference

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Thai Men Who Patronize Prostitutes Place Their Wives at Risk of HPV-Associated Cervical Cancer

For Thai women, infection with human papillomavirus (HPV) type 16 or 18 is the most important factor in the progression of precancerous cervical lesions to invasive cancer; the risk of cancers associated with these viral types rises with decreasing age at first intercourse and with increasing numbers of pregnancies.[1] The great majority of women with cervical cancer have had intercourse only with their husbands, and their risk of cancer is strongly related to the frequency of their husbands' visits to prostitutes as young men; according to the investigators, most are therefore likely to have acquired carcinogenic types of HPV from their husbands.[2] These are the major findings of three interrelated studies—two involving women with cervical cancer and one involving commercial sex workers in Bangkok and husbands of a subgroup of women with cervical cancer and controls from the first two studies.

All participants in the first two studies were recruited from Siriraj Hospital in Bangkok. Women with newly diagnosed precancerous lesions or invasive cervical cancer were eligible if they had been admitted to the hospital between September 1991 and September 1993, had been born after 1929 and had lived in Thailand for at least one year before their interview. These women were matched to other hospitalized women without either of these cervical abnormalities, on the basis of date of admittance to the hospital, five-year age-group and area of residence. Investigators interviewed all participating women to obtain information regarding their use of contraceptives, sexual behavior, medical history, tobacco and alcohol use, and socioeconomic status. Blood samples and cervical scrapings were analyzed to detect markers for sexually transmitted diseases and to identify specific types of HPV. For the third study, the investigators interviewed and obtained biologic samples from a subset of the husbands of women with invasive cancer and of control women, as well as commercial sex workers in one brothel and one massage parlor in Bangkok.

Cofactors in HPV-Related Cervical Cancer

To investigate risk factors for specific types of invasive cervical cancer, the investigators analyzed data from 232 women with invasive cervical cancer and 291 controls.[3] They also examined tissue samples from cases to classify tumors as either squamous or adenomatous. They then compared women with each type of tumor to controls, and compared cases with each of two strains of HPV (HPV-16 and HPV-18) to controls with no evidence of HPV. All odds ratios were adjusted for age using logistic regression analysis.

Women with squamous and adenomatous cancers were much more likely than controls to be infected with a carcinogenic type of HPV (79% and 76% vs. 3%). HPV-16, the most common carcinogenic type in this sample, occurred nearly twice as often in women with squamous tumors as in those with adenomatous tumors (60% vs. 33%), and was rare among controls (2%). HPV-18 was much more strongly associated with adenomatous cancers (43%) than with squamous ones (14%), and was not detected in any of the controls. Women with squamous and adenomatous cancers did not differ significantly with regard to any other risk factors.

The risk of both tumor categories increased as age at first intercourse declined: For example, compared with women who had first had sex at age 24 or older, those who had done so at ages 17–18 had three times the odds of developing an HPV-16–related tumor (odds ratio of 3.1) and more than four times the odds of having an HPV-18–related tumor (4.6). Women's pregnancy history also influenced their risk: Those who had experienced three or four pregnancies had a higher risk of developing both types of tumors than did women who had been pregnant only once or twice (odds ratios of 2.1 for HPV-16–related tumors and 4.1 for HPV-18–associated tumors).

Women with a Pap smear in the previous 12 months were at much lower risk for both HPV-16–related and HPV-18–related tumors (odds ratios of 0.2 and 0.1, respectively) than were women who had never had a Pap smear, while women who had ever had a chest X ray were at lower risk (0.6 and 0.4) than those who had not. The odds of HPV-16–related cancer were significantly lower for women who had ever attended school (0.5) or used an IUD (0.4) than for women without those characteristics. Among women who had been pregnant, those with a history of spontaneous abortion had an elevated risk of HPV-18–related cancer (2.2).

Each of the associations with HPV-16–related cancer remained after the effects of other factors had been accounted for; the number of women with HPV-18–related tumors was too small to permit a similar analysis. No significant association was observed between either tumor category and number of sexual partners; use of oral contraceptives; smoking; or prior infection with herpes simplex virus type 1 or 2, syphilis or hepatitis B.

The investigators note that the association between early age at first intercourse and HPV-16–related and HPV-18–related tumors may be confounded by the sexual habits of the women's husbands and that the reduced risk of cancer related to HPV-16 observed among IUD users is probably the result of cervical cancer screening at the time of IUD insertion or removal. They also point out that school attendance and chest X rays are most likely markers for important protective socioeconomic factors that have yet to be identified. The investigators conclude that "the similarity in risk factors for cervical carcinomas with HPV-16 and HPV-18 DNA provides strong evidence that the same cofactors operate to enhance the carcinogenicity of these two viral types."

Progression to Invasive Cancer

To investigate risk factors for progression from precancerous lesions to invasive cervical cancer, the investigators analyzed data from 190 women with invasive squamous-cell cancer and 291 matched controls, and from 75 women with precancerous lesions and 124 matched controls.[4] They compared cases to controls to determine the factors associated with each type of cervical abnormality. They then examined the risk of invasive disease associated with each factor in relation to the risk of precancerous lesions to identify factors associated with progression to invasive cancer. All logistic regression results were adjusted for age.

The women with invasive cancer and their controls were somewhat older (median age, 43–45 years) than the women with precancerous disease and their controls (37–38 years). The proportions of women with invasive and precancerous disease reporting vaginal bleeding were similar (65% and 63%), as were the proportions reporting no specific symptoms (33% and 31%). Women with precancerous lesions were much more likely than controls to be infected with any type of HPV (77% vs. 10%), any carcinogenic type of HPV (57% vs. 6%), HPV-16 (38% vs. 5%) or HPV-18 (8% vs. 1%).

Women with invasive disease were significantly more likely than those with pre-

cancerous lesions to test positive for any HPV type (odds ratio of 2.7), any cancer-causing type of HPV (3.5), HPV-16 (4.2) or HPV-18 (4.0), indicating that HPV infection is a significant factor in the progression to invasive disease. No factor other than HPV infection had a significantly stronger association with invasive cancer than with precancerous lesions.

The Role of Husbands and Sex Workers

More than 90% of the women with cervical cancer and the controls participating in these studies reported only one lifetime sexual partner. To investigate the possible role of husbands in women's risk for HPV and cervical cancer, investigators interviewed and obtained serum samples from the husbands of 50 of the 175 women with squamous-cell cervical cancer who reported one lifetime sexual partner, and the husbands of 98 of the 272 monogamous controls.[5] Penile scrapings were obtained from 57 husbands of women with precancerous lesions or invasive disease and 68 husbands of controls. The association found in previous research between Thai men's sexual contact with prostitutes and their wives' risk of cervical cancer was confirmed in this study and suggests that the men acquire carcinogenic HPV from prostitutes and transmit the infection to their wives.

To determine the prevalence of carginogenic HPV and high-grade precancerous lesions among commercial sex workers, the researchers interviewed and obtained blood samples and cervical smears and scrapings from 170 female massage parlor workers and 84 female brothel workers in Bangkok.

Women whose husbands reported more than 280 lifetime visits to prostitutes had more than three times the risk of invasive disease as women whose husbands reported no visits (odds ratio of 3.2). The husband's annual number of visits before the age of 30 and his use of condoms less than 10% of the time during these visits were also associated with an elevated risk of invasive cancer.

On average, the brothel workers interviewed were much younger than massage parlor workers (median age of 19 vs. 30 years) and were more likely to be infected with each of nine carcinogenic types of HPV tested. For example, among 20–24-year-old women, the prevalence of HPV-16 was 18% for brothel workers and 10% for massage parlor workers.

High-grade precancerous lesions were found in 8% of brothel workers and 4% of massage parlor workers. Women who had high-grade lesions were more likely than those who did not to test positive for HPV-16 (odds ratio of 19.2).

While acknowledging that the response rate among husbands was low, the investigators note that their findings are consistent with those from studies with higher response rates and provide "direct evidence for the role of husbands as vectors of HPV transmission from prostitutes."—*A. Hirozawa*

References

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Exposure to Multiple Risk Factors Linked to Delivery Of Underweight Infants

Women commonly engage in or are exposed to multiple risk factors during pregnancy, and these risk factors have a cumulative, perhaps synergistic effect on their risk of delivering an infant who is small for gestational age.[1] According to an analysis of data from a multistate U.S. survey, between 5% and 57% of women engage in or are exposed to risk factors, such as smoking, inadequate weight gain and various types of stress, during pregnancy. Those who have four or more risk factors are between two and four times as likely to deliver an infant who is small for gestational age as women without exposure to any risk factors.

To understand the association between multiple risk factors during pregnancy and the risk of bearing an underweight baby, researchers analyzed data collected in 1997 by the Pregnancy Risk Assessment Monitoring System, which surveys women with recent deliveries on their behaviors and experiences during pregnancy. Questionnaire responses from 19,331 women in 13 states with survey response rates of 70% or more were examined for the following specific risks: cigarette smoking, alcohol use, inappropriate maternal weight gain, timing of entry into prenatal care, unintentional pregnancy, physical violence, partner-associated stress, emotional stress, traumatic stress and financial stress. Data collected from birth certificates were also used. Researchers estimated gestational age by calculating the time between the date of last menstruation and the date of birth. Infants' birth weights were determined, and a designation of small for gestational age was given to infants in the 10th or lower percentile of birth weight for gestational age by gender.

Of the respondents, 77% were white, 19% were black and 4% categorized themselves as belonging to other races. The majority of women were married, were between 20 and 34 years of age, had a high school education or greater, and had more than one child. Forty-six percent were enrolled in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), and 39% received prenatal care services that were covered by Medicaid.

Between 31% and 57% of the women surveyed reported that they had gained less than or more than the recommended amount of weight during pregnancy; that they had experienced partner-associated, emotional or financial stress; or that they had not intended to become pregnant. Between 14% and 23% had smoked cigarettes, experienced traumatic stress or entered into prenatal care late or not at all; 5–6% had drunk alcohol or experienced physical violence during pregnancy. Of the total sample, 3% delivered infants who were underweight at birth.

Approximately 10% of all women surveyed were not exposed to any of the risk factors studied. Nineteen percent were exposed to one risk factor, 21% to two, 19% to three, 14% to four, 10% to five and 7% to six or more. Certain demographic factors were linked to increased exposure to multiple risk factors during pregnancy. Black women, women younger than 25, women without a high school education, unmarried women, women with two or more children, and those enrolled in WIC or Medicaid were more likely than others to engage in or be exposed to multiple risk factors during pregnancy.

After controlling for age, race, education, marital status, parity, WIC and Medicaid enrollment, and state of residency using multivariate analysis, the researchers found that women exposed to

multiple risks were significantly more likely than women exposed to no risks to deliver an infant who was small for gestational age. Women with four risk factors were twice as likely as those with none to have an infant who was underweight at birth (odds ratio, 2.1). Women with five risk factors and those with six or more were almost four times as likely to have an infant who was small for gestational age as women without any risks or exposure (odds ratios, 3.5–3.8).

Despite the study's limitations, such as recall bias and the assumption that each risk factor is of equal weight, the researchers conclude that women do engage in or are exposed to multiple risks during pregnancy and that "the results indicate a need for care providers to assess an array of risks to devise appropriate and timely intervention strategies." They add, "Early recognition and assessment of not only individual behaviors but also multiple-risk behaviors and exposures are recommended along with strategies for targeting pregnant women in prenatal care and other health care settings to promote healthy pregnancies and better birth outcomes."—*J. Rosenberg*

Reference

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Patch Is as Effective as Pill; Weekly Dosing Schedule May Improve Compliance

Women who wear an adhesive patch that delivers a combination hormonal contraceptive through the skin are no more likely to become pregnant than women who use a combination oral contraceptive, according to a study of more than 1,400 women at 45 clinics in the United States and Canada.[1] In addition, women's compliance with using the patch is significantly higher than that with using the pill (88% vs. 78%). While the patch is comparable to the pill in cycle control, some adverse reactions, such as breast discomfort and painful menstruation, are significantly more common among women who use the patch.

Between October 1997 and June 1999, researchers recruited women aged 18–45 from 39 clinics in the United States and six in Canada. Women were eligible to participate in the study if they were in good health and sexually active. Women could not participate if they had contraindications to hormone use, were pregnant, or had been pregnant or lactating within the past 42 days. The researchers randomly assigned participants to use either the patch (812 women) or an oral contraceptive (605). For each cycle of use, women assigned to the patch group used one seven-day patch weekly for three consecutive weeks and discontinued use for one week (always changing the patch on the same day of the week); women in the oral contraceptive group used a daily oral contraceptive for 21 days and a placebo for seven days. Women participated in the study for either six or 13 cycles.

Researchers instructed the women to apply the patch to the buttocks, upper outer arm, lower abdomen or upper torso, excluding the breast. If a patch became partially or completely detached, women were to replace it with a new patch and wear it for the remainder of the week. The patch is designed to be wearable during bathing and swimming.

Women received physical and gynecologic exams before and after study participation; they were given a pregnancy test upon early withdrawal from the study or 10 days after the end of their last scheduled cycle. Those who became pregnant were classified into four groups: those who conceived prior to study participation; those who conceived after their last cycle in the study; those who experienced a method failure; and those who had not complied with instructions for using their method (user-failure).

The researchers measured contraceptive efficacy by calculating overall and method-related Pearl Indices (numbers of pregnancies occurring per 100 person-years of use) and cumulative probabilities of pregnancy. Blood tests, evaluations of vital signs, clinic personnel's observations and women's self-reports were used to assess the occurrence of adverse side effects. The investigators also assessed cycle control (breakthrough bleeding and spotting), method compliance and patch adhesion on the basis of information women recorded in daily diaries.

The women in both groups had similar demographic characteristics and histories of oral contraceptive use. Their mean age was 28, and about nine in 10 were white. In each group, nearly one-quarter of women had not used oral contraceptives in the two months before entering the study, and slightly more than half had used oral contraceptives in their last menstrual cycle.

Five women who used the patch became pregnant—four as a result of method failure and one as a result of noncompliance. Seven women who used the pill became pregnant—four as a result of method failure and three as a result of noncompliance. The overall and method-related Pearl Indices were numerically lower among women who used the patch than among women who used the pill, but the differences were not statistically significant. The overall Pearl Index was 1.2 pregnancies per 100 person-years among women who used the patch and 2.2 among women who used the pill. For method failure, the Pearl Indices were 1.0 and 1.3, respectively. The probabilities of pregnancy also were similar among women who used the patch and those who used the pill (1–2% over 13 cycles).

Overall, the researchers found no significant difference in women's experience with breakthrough bleeding with the two methods. Women who used the patch had significantly more breakthrough bleeding or spotting than women who used the pill in cycle one (18% vs. 11%) and cycle two (12% vs. 8%) because of a difference in spotting only, but for cycles 3–13, the two groups did not differ.

The types of adverse reactions women reported were generally similar between the two groups. Headaches and nausea were the most common side effects, reported by about one in five women in each group. Only about 2% of women in each group experienced a serious adverse event, such as abdominal pain, vomiting, migraine, dehydration or depression.

While a significantly greater proportion of women who used the patch than of women who used the pill reported breast discomfort (19% vs. 6%), the difference was limited to cycles one and two. A larger proportion of women who used the patch than of women who used the pill reported painful menstruation (13% vs. 10%); a significantly higher proportion of women using the patch than of those using the pill discontinued their method for this reason (2% vs. 0.2%). The same was true for women who experienced headache: While the occurrence of headache was not different between the two groups, 2% of women who used the patch discontinued it because of headaches, compared with 0.3% of women who used the pill. Twenty percent of women who used the patch experienced mild or moderate skin reactions at the application site, and 3% of women discontinued use for this reason.

The proportion of women who demonstrated perfect compliance with the dosing schedule of their contraceptive was significantly larger among women using

the patch (88%) than among women who used the pill (78%). Five percent of all patches used had to be replaced because they became partially (3%) or completely (2%) detached.

The investigators note that "contraceptive compliance is clearly related to contraceptive efficacy" and that problems with women's compliance with instructions for using oral contraceptives have been well documented in other research. They speculate that because the patch's "weekly dosing was associated with significantly better compliance than is observed with daily dosing regimens," women's use of the patch could result in lower contraceptive failure rates. However, they recommend further research to determine whether that would occur.—*B. Brown*

Reference

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Douching Raises Infection Risk, but Only for Women Without Bacterial Vaginosis

Women with symptoms of pelvic inflammatory disease (PID) who have douched recently are nearly twice as likely as those who have not practiced douching to have an upper genital tract disease, according to findings from a large, multisite clinical study.[1] Douching is more common among women with bacterial vaginosis than among those without this condition, which has been suspected of facilitating the link between douching and upper genital tract inflammation (endometritis) or infection (chlamydia or gonorrhea). However, the association between douching and upper genital tract disease is statistically significant only among women who do not have bacterial vaginosis.

The study included women aged 14–37 attending 13 clinical sites (emergency departments, clinics and sexually transmitted disease units) in the eastern, southern and central United States in 1996–1999. Women were eligible to participate if they had signs of PID (discomfort for 30 days or more, organ tenderness during a pelvic examination, an excess number of white blood cells in vaginal secretions or cervical discharge). In addition to being screened for endometritis, upper genital tract infection and bacterial vaginosis, participants completed an interview that covered their background characteristics, douching habits and other factors related to the risk of upper genital tract disease. A total of 654 women were included in the analyses.

Women with endometritis or upper genital tract infection (roughly half of the cohort) were significantly more likely than those with neither type of disease to be younger than 20 (30% vs. 20%) and black (79% vs. 63%), and to smoke (49% vs. 40%) or use cocaine (5% vs. 2%). They were less likely than others to have any postsecondary education (18% vs. 30%) and to report a history of PID (26% vs. 35%).

Roughly two-fifths of participants had douched in the month before they enrolled in the study. In initial analyses, women who had douched more than once a month were significantly more likely than those who had not douched at all to have upper genital tract disease (odds ratio, 1.6). Women who had douched within the previous six days also had increased odds of disease, when compared with those who had not douched (1.8). The reason that women douched, the product used and the frequency of douching among women who had douched recently were not associated with the risk of endometritis or upper genital tract infection.

When the researchers used logistic regression to adjust for background and other risk factors (including a history of PID, having a new partner, smoking and using cocaine), women who had douched within the past six days retained an elevated risk of upper genital tract disease (odds ratio, 1.7). The odds were also raised for those who had douched more than once in the previous month (1.5), but the increase was only marginally significant. Because nationally representative survey data indicate that black women are more likely than white women to douche, the researchers performed separate analyses to measure the association between douching and upper genital tract inflammation or infection for black women only. Resulting odds ratios were similar to those for the overall cohort, but they did not achieve statistical significance.

Some 345 women had bacterial vaginosis, and 51% of them douched, a significantly higher proportion than found among women without this condition (28–36%). Contrary to the investigators' expectations, douching was not significantly associated with upper genital tract disease among those with bacterial vaginosis. However, among the remainder of the cohort, women who had douched within the past month and those who had douched within the past six days were twice as likely as those who had not douched to have an inflammation or infection (odds ratios, 1.8 and 2.3, respectively). Similarly, while douching was not associated with the risk of upper genital tract disease in women with gonorrhea or chlamydia, women with neither of these conditions had an increased risk if they had douched at all in the previous month (1.5), if they had douched more than once (2.4) and if they had douched recently (2.1).

Speculating as to why douching raises the risk of upper genital tract infection only in women without preexisting disease, the researchers suggest that "inciting upward bacterial movement" may initiate inflammation or infection but not exacerbate conditions that developed independent of douching. They conclude that their findings "add to the growing literature suggesting that douching might relate to PID."—*D. Hollander*

Reference

1. Ness RB et al., Douching and endometritis: results from the PID Evaluation and Clinical Health (PEACH) Study, *Sexually Transmitted Diseases*, 2001, 28(4):240–245.

Risk of HIV Transmission Is Raised by High Viral Load, Presence of Genital Ulcers

On average, each time a monogamous, heterosexual couple in which one partner is HIV-positive has intercourse, the probability that the virus will be transmitted to the uninfected partner is 0.11%, according to an analysis of data from rural Rakai, Uganda.[1] The probability rises significantly as the infected partner's viral load (the amount of virus in the blood) increases, and it is elevated if the HIV-positive partner has genital ulcers. Although some researchers have hypothesized that viral subtype is a factor in HIV infectivity, no such relationship was evident in this population.

The data on which the analysis was based came from an AIDS prevention study conducted in 1994–1998, for which researchers gathered information from more than 15,000 men and women aged 15–59. At follow-up visits every 10 months, participants were asked to provide blood and urine samples, and women were asked for a self-collected vaginal swab; all samples were tested for HIV and a variety of other sexually transmitted diseases (STDs). In addition, participants completed interviews in which they were asked about their background characteristics and sexual be-

havior, including their number of partners, use of condoms and usual frequency of intercourse with each partner.

At the end of the study, the investigators identified couples in which one partner had been HIV-positive and the other HIV-negative at enrollment. To assess the probability of infection associated with various factors, they used data from the 174 couples in which both partners reported that they were monogamous and that the uninfected partner was monogamous throughout follow-up.

In 77 couples, the woman had been infected with HIV at enrollment, and in 97, the male had been the infected partner. The HIV-positive men and women had a median age of 29 and a median viral load of 12,476 copies per mL. By the end of the study, 27% of infected women and 18% of infected men had transmitted the virus to their partners. Participants reported having intercourse an average of 8.9 times per month; a high level of agreement between partners' reports supports the reliability of this information.

Using Poisson regression, the investigators estimated rate ratios of HIV transmission, controlling for the HIV-infected partner's sex, age, viral load, and STD symptoms and diagnoses. These calculations revealed no significant difference between men and women in the risk of transmission. While rate ratios also did not vary significantly by age, results of chi-square testing showed a significant trend toward a lower risk of transmission as an infected partner's age increased.

The risk of transmission climbed sharply and steadily as viral load increased: Compared with men and women whose viral load was less than 1,700 copies per mL, those with a viral load of 1,700–12,499 copies per mL were 16 times as likely to transmit the virus (rate ratio, 16.1); the rate ratio rose to 27.7 for individuals with a viral load of more than 38,500 copies per mL. An infected individual with genital ulcer disease was at increased risk of transmitting the virus (2.6), but no other STD-related factors were associated with the risk.

Overall, the probability of HIV transmission was 0.11% per act of intercourse. The probability was higher for individuals younger than 30 (0.13–0.17%) than for those aged 30 or older (0.06–0.09%), and it rose as viral load increased (from 0.01% at the lowest level to 0.23% at the highest). The age pattern was the same regardless of viral load, and the viral load pattern was the same regardless of age. Similarly, the probability of transmission was higher among those with genital ulcers (0.41%) than among those without (0.11%), and this pattern held across levels of viral load. Infected women appeared to be more likely than infected men to transmit the virus (0.13% vs. 0.09%); the researchers note that while this difference was not statistically significant, it is consistent with incidence data from Rakai and with findings on transmission in other developing countries. No difference in the probability of transmission was detected between the two virus subtypes that are responsible for the HIV epidemic in Uganda.

While previous studies have examined the probability of HIV transmission per act of intercourse in the United States, Europe and Thailand, the researchers note that theirs was the first to do so in Sub-Saharan Africa, and their overall finding was similar to those from the earlier work. Given this similarity and the fact that different strains of HIV are prevalent in these various settings, the investigators conclude that the rapid spread of the virus in parts of Africa is unlikely to be attributable to characteristics of a particular subtype that facilitate transmission. Commenting on the association they found between the probability of transmission and viral load (which is consistent with results of other research indicating increased transmission among people with compromised immune systems), they suggest that interventions aimed at lowering viral load could reduce transmission.—*D. Hollander*

Reference

1. Gray RH et al., Probability of HIV-1 transmission per coital act in monogamous, heterosexual, HIV-1-discordant couples in Rakai, Uganda, *Lancet*, 2001, 357(9263): 1149–1153.