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In this issue . . .

Menstrual Cycle

Long Menstrual Cycles among Adolescents Found to be Predictive of Insulin Resistance and Obesity

Research demonstrates a relationship between long menstrual cycles, coronary heart disease, and type 2 diabetes among adult women.[1] Not understood is whether this association exists among female adolescents, and if long menstrual cycles among them are predictive of obesity and endocrine disorders later in life. Researchers therefore set out to determine if reported incidences of menstrual cycles longer than 42 days during ages 14-19 are predictive of obesity and endocrinopathy at age twenty-five.[2]

Researchers were able to enroll 370 girl participants from Cincinnati, Ohio into a longitudinal study conducted by the National Heart, Lung, and Blood Institute. The parent study was designed to investigate risk factor correlates of obesity with cardiovascular disease. These 370 Ohio girls had measures of sex hormones at age 14 and at least five annual reports of menstrual cycles from age 14-19 years. The same 370 girl participants were assessed for obesity and endocrinopathy at age 25, with measures of insulin, glucose, insulin resistance (IR), body mass index (BMI) and waist circumference. Of these 370 girls, 269 had zero annual reports of delayed menstrual cycles greater than 42 days; however, 101 had at least one report of menstrual cycles greater than or equal to 42 days in length.

The researchers found that at age 25 the BMI and waist circumference were significantly higher among girls who reported three or more menstrual cycles greater than 42 days in length than girls who reported 0-2 long menstrual cycles. They also found that blood glucose levels and IR at age 25 were significantly higher among girls reporting three or more long menstrual cycles compared to those who reported 0-2. The number of annual menstrual cycles greater than or equal to 42 days were predictive for change in body weight, waist circumference, and BMI. The researchers suggested that health professionals test adolescent girls (with three or more menstrual cycles longer than 42 days), for underlying metabolic syndrome and/or polycystic ovarian disease. They also suggested that those who have long menstrual cycles should be managed with exercise, diet, and insulin sensitizers.

Comments

The authors mentioned that a limitation of this study was that a report of delayed menstruation did not reveal what is going on metabolically with the adolescent girl participants. The results of this study provided further evidence of why the menstrual cycle could be considered a vital sign for young women. Health professionals who teach adolescents how to chart fertility will have a better diagnostic assessment tool for assessing adolescent and young women's health.

Sources

1. G. Gast et al., **Menstrual Cycle Characteristics and Risk of Coronary Heart Disease and Type 2 Diabetes**, *Fertility and Sterility* 94 (2010): 2379-2381.

2. J. A. Morrison, C. J. Glueck, S. Daniels, P. Wang and D. Stroop, **Ramifications of adolescent menstrual cycles ≥ 42 days in young adults**, *Fertility and Sterility* (2011, e-published ahead of print).

Metformin is Not a Recommended Treatment for PCOS among Adolescents but is Recommended for Preventing PCOS among Girls

Two studies were recently published that examined the management of polycystic ovarian syndrome (PCOS) among girls and adolescents. Both groups of females are difficult to manage due to lack of sound clinical studies for treating PCOS among these groups and to the immaturity of girls and adolescents. The first study was conducted by researchers from the United States (primarily Penn State College of Medicine) who wanted to determine if the addition of metformin to lifestyle modification enhanced the treatment of polycystic ovary syndrome (PCOS) (See Ladson et al., 2011). The researchers hypothesized that metformin treatment along with lifestyle management would be superior in reducing serum testosterone levels (as an important biomarker of PCOS). They were able to obtain and randomize 22 volunteer adolescents into a lifestyle modification group plus metformin and a lifestyle group with a placebo. All participants had met the National Institute of Health diagnostic criteria for PCOS, were between 13 and 18 years, and had a BMI greater than 27 kg/m^2. Lifestyle management included a required amount of exercise per week (i.e., 150 minutes) and a weight loss diet (i.e., 500 calories below replacement). Before initiating treatments, they measured serum testosterone levels, the number of acne lesions, weight, and administered a PCOS lifestyle questionnaire. The metformin treatment included a 5-day stepped up approach to 500 mg four times a day. Measurements were conducted at baseline and monthly for a total of six months. The metformin group had one drop-out from the study protocol and the lifestyle plus placebo group had 3 drop-outs. Both the researchers and participants were blind as to whether participants received metformin or the placebo.

The researchers found that although there was a significant improvement in testosterone (T) levels among the metformin group at three months of therapy, at six months there was no difference. However, there was a significant improvement in reduced acne lesions. The metformin group did experience significantly more adverse events, i.e., abdominal pain and diarrhea. There was no significant difference in weight loss between the two groups. The researchers concluded that their study did not support the addition of metformin to lifestyle when treating adolescents with PCOS. They indicated that although there were some metabolic improvements with metformin, these improvements were dampened by gastrointestinal

problems. They did admit that the number of participants was too low to make definitive recommendations.

The second study was conducted by Spanish researchers (Ibanez et al., 2011). These researchers speculated that the development of PCOS starts before puberty (especially among girls with precocious pubarche and low birth weight) and that by providing early metformin therapy they may prevent the development of this disease. To test this hypothesis they provided early metformin therapy to 19 girls age 8-12 and compared them with late metformin therapy for 19 girls age 13-14. They followed all of the 38 girl participants from age 8 until age 15, and measured multiple outcomes, including height, weight, hirsutism, menstrual cycle variability, abdominal fat, PCOS, and multiple endocrine-metabolic measures. They found that at age 15, the early-metformin girls were taller and had less abdominal fat than the late treated girls. Furthermore, hirsutism, oligomenorrhea, androgen excess and PCOS were 2-8 fold more prevalent in the late treated girls. They concluded that the early treatment of low birth weight and precocious pubarche girls with metformin helped to prevent or delay the onset of PCOS and PCOS type symptoms. They felt that the time window for preventing PCOS or PCOS symptoms might be more critical during late childhood than in early adolescents.

Comments

Both of these studies had small numbers of participants so the results are only preliminary. Both studies point out the need for early intervention of PCOS and that the menstrual cycle could be the vital key in early identification of girls at risk.

Sources

1. G. Ladson, W. C. Dodson and S. D. Sweet, et al., **Effect of metformin in adolescents with polycystic ovary syndrome undertaking lifestyle therapy: a pilot randomized double-blind study**, *Fertility and Sterility* 95 (2011): 2595-2598

2. L. Ibanez, A. Lopezx-Bermejo, M. Diaz, M. V. Marcos and F. de Zegher, **Early metformin therapy (age 8-12 years) in girls with precocious pubarche to reduce hirsutism, androgen excess, and oligomenorrhea in adolescence**, *Journal of Clinical Endocrinology and Metabolism* (2011, e-published ahead of print).

Long Menstrual Cycles Associated with Risk of Gestational Diabetes

Studies have shown that there is a risk of cardiovascular disease and type 2 diabetes mellitus (T2DM) among women who have a history of long menstrual cycles. What is not known is whether long menstrual cycles are associated with gestational diabetes mellitus (GDM). Also unknown is whether GDM is associated with women who are overweight or obese pre-pregnancy. Researchers therefore, sought to determine the association of age at menarche, long and irregular menstrual cycles, pre-pregnancy weight gain, and adult weight gain with risk of GDM (Dishi et al., 2011).

Participants for this study were women attending two prenatal care clinics in Seattle, Washington. The participants had initiated prenatal care before 16 weeks gestation and were at least 18 years old. Of the 5,053 eligible women, 4,000 were enrolled in the study and 3,490 were included into the analysis, i.e., some women had incomplete data or already had T2DM. Reproductive and medical histories were conducted on the participants along with body weight, weight at age 18 and several structured questions on the menstrual cycle, i.e., when they had their first period, how long after menarche did they have irregular menstrual cycle lengths, their usual cycle length, and whether they currently have irregular menstrual cycles. Diagnosis of GDM was made with a 3 hour oral glucose challenge test.

The researchers found that 185 participants or 5.3% of the total developed GDM. They also discovered that women with longer menstrual cycles (>36 days) had a higher risk for developing GDM than women who had normal length menstrual cycles (25-30 days in length). There was no association of early menarche or irregular menses with GDM risk. However, those women who were either over weight or who gained at least 5 kg or more in adulthood had a 4-5 fold higher risk to develop GDM when compared with women with normal length menstrual cycles and non-obese women or those who gained less than 5 kg into adulthood. They suggested that a menstrual cycle history may help identify women with increased risk for GDM.

Comments

This study provides another reason why the menstrual cycle can be considered a vital sign for young women. A fault of the study is that they used recall for menstrual cycle length. Better data can be provided from women who prospectively chart their menstrual cycles and who include natural indicators of fertility. A study that looks not only at the length of the menstrual cycle but also at the phases of the menstrual cycle in association of GDM risk would be of interest.

Source

M. Dishi, D. A. Enquobahrie, D. F. Abetew, C. Qiu, C. B. Rudra and M. A. Williams, **Age at menarche, menstrual cycle characteristics and risk of gestational diabetes**, *Diabetes Research and Clinical Practice* (2011, article in press).

Fertility/Infertility

High Sperm Concentrations Found in Pre-Ejaculatory Fluid

Many of the instruction systems of Natural Family Planning (NFP) and fertility awareness based methods (FABM) of family planning caution couples when using NFP/FABM that genital to genital contact or the use of withdrawal could result in pregnancy if used during the estimated fertile phase of the menstrual cycle. This instruction is based on the assumption

that there can be high concentrations of sperm in the pre-ejaculatory fluid. The evidence for high concentration of sperm in pre-ejaculatory fluid has been a topic of conversation among NFP/FABM health professionals as to whether good evidence existed for this phenomenon.

Non-NFP health professionals and researchers are also interested in this question, since the presence of sperm in pre-ejaculatory fluid also affects the efficacy of the use of withdrawal and condom-based genital foreplay. Of note is that according to the National Survey of Family Growth, about 60% of women of reproductive age in the United States have reported ever-use of withdrawal as a method of family planning. Researchers, therefore, set out to determine if there is viable sperm in pre-ejaculatory fluid and whether this is a risk to the use of withdrawal and having unintended pregnancies (Killick et al., 2011).

Researchers were able to recruit 28 volunteers who were instructed to produce samples of pre-ejaculatory fluid by masturbation at an infertility clinic. The volunteers were instructed to touch the tip of their penis with a petri dish prior to masturbation. Participants were also instructed to void a number of times before producing the samples so that there were no sperm present from previous ejaculations. Technicians at the clinic then viewed the sample under a microscope within two minutes of the produced sample. With this method, the volunteers were able to produce 40 samples, with up to 5 per volunteer.

The researchers discovered that 11 of the 27 participants (41%) produced samples of pre-ejaculatory fluid with spermatozoa. In ten of these cases (37%) they found motile sperm. However, those participants who did not have any sperm in the pre-ejaculatory fluid did not have any sperm in any of the samples they produced. The researchers concluded that a major proportion of men leak viable sperm into their pre-ejaculatory fluid. They recommended that before couples have any genital contact that a condom should be applied.

Comments

It should be noted that the use of masturbation to produce these samples would be unethical and immoral. The sample could be produced ethically within the foreplay of married couples with an act of intercourse that does not use withdrawal or condoms. At the same time, this research validates NFP instructions that advise couples not to have genital to genital contact, hand to genital contact (during the fertile phase when avoiding pregnancy), or withdrawal when using NFP.

Source

S. R. Killick, C. Leary, J. Trussell and K. A. Guthrie, **Sperm content of pre-ejaculatory fluid**, *Human Fertility* 14 (2011): 48-52.

Biomarker of Stress Found to Be Associated with Lower Fecundity

Couples trying to achieve pregnancy and who fail to do so often feel stressed due to the ups and downs of their expectations from menstrual cycle to menstrual cycle. A common recommendation for these couples, provided by the lay public and health care providers alike, is to just relax. Although the recommendation is not evidenced based, the assumption is that stress is making the ability to conceive worse. This assumption is based on experiences of couples who give up trying to conceive, adopt a child and then find themselves pregnant. Researchers sought to determine if there is any biological evidence for the reduction of fertility in a stress cycle (Louis et al., 2011).

Three-hundred and seventy-four women (between 18 to 42 years) who were seeking to become pregnant were recruited for the study through media campaigns in the United Kingdom from 2005-2006. The participants were instructed to use an electronic hormonal fertility monitor, that measured the luteinizing hormone (LH) surge in the urine, and to collect a sample of their saliva on day 6^{th} of their menstrual cycles for 6 menstrual cycles or until they became pregnant. The saliva samples were tested for cortisol and α-amylase levels. The participants were asked to take a pregnancy test on the day after a menses was missed with a urinary home pregnancy test. Of the 374 women participants, 274 (73%) had at least one menstrual cycle with an LH surge and a completed salivary test. Of these women, 175 (64%) became pregnant. The pregnant women contributed 345 cycles of data. Women participants who did not get pregnant contributed 290 cycles of data. Although there were no differences in the mean cortisol or α-amylase levels between the pregnant and non-pregnant participants, the researchers did find that higher α-amylase levels (but not cortisol levels) were negatively associated with fecundity in the first menstrual cycle (odds ratio of 0.85; 95% confidence interval = 0.67-1.09) when adjusted for couples ages, intercourse frequency and alcohol consumption. Furthermore, there was a reduction of probability of pregnancy from an act of intercourse on each day of the fertile window. The authors concluded that the negative relationship between stress and fecundity was due to stress affecting the sympathetic medullar pathway.

Comments

Although the authors found a reduction in fecundity with higher levels of α-amylase during the first menstrual cycle among the participants, this reduction was not found in subsequent cycles. They speculated that this was due to a reduction in statistical power to determine differences. I would be more confident in the results with a measure of cortisol and α-amylase on more than just one day of the menstrual cycle. Furthermore the researchers did not differentiate between chronic and acute stress and how best to measure those differences.

Source

G. M. Buck Louis, K. J, Lum, R. Sundarum, Z. Chen, S. Kim., C. D. Lynch, E. F. Schisterman and C. Pyper, **Stress reduces conception probabilities across the fertile window: evidence in support of relaxation**, *Fertility and Sterility* (2011): 2184-2189.

Contraception and Abortion

Past Use of Oral Contraceptives Associated with Deep Infiltrating Endometriosis

Research evidence is mixed as to whether the use of oral hormonal contraceptives (OC) can cause or facilitate endometriosis. Part of the reason for the mixed results is that, in previous studies, the extent of the endometriosis was not histologically staged and reasons for use of OC among the research participants was not specified. Since OCs are often prescribed to treat dysmenorrhea, especially among adolescents and young adults, researchers sought to determine the association of OC use for treating dysmenorrhea (and other reasons) with histologically determined endometriosis classified as superficial peritoneal endometriosis (SUP), ovarian endometrioma (OMA), or deep infiltrating endometriosis (DIE) (Chapron et al., 2011).

The researchers conducted a cross-sectional study of 1,267 patients who were surgically explored (by laparoscopy or laparotomy) for various medical reasons. Of these patients, 566 had no visual lesions of endometriosis and 565 had visual lesions. Of the 565 with lesions, 410 had histologically proven endometriosis. Those diagnosed to have endometriosis were histologically graded as to SUP, OMA, and DIE. They found 47 patients (11.4%) with SUP, 120 patients (29.3%) with OMA, and 243 patients (59.3%) with DIE. All patients were assessed as to past use of OC, reasons for use of OC, and duration of use.

Results of the study indicated that those with ever use of OC for any reason had an increased prevalence of endometriosis when compared with never users of OC (i.e., a 211% increased risk with an OR = 3.11; 95% CI 2.18-4.45, $p < 0.0001$). They did not find an increased prevalence of endometriosis with current use of OC. They also found an increased incidence of both SUP and DIE with ever use or past use of OC compared to never use of OC. A remarkable finding was that when OC was prescribed for treating dysmenorrhea the increased risk of DIE was very high (i.e., OR = 16.2, 95% CI = 7.8-35.3) in comparison to women who never used OC. Even when OC was prescribed for other reasons, there was an increased risk. Age at first use of OC and years of use did not increase the risk. The authors emphasized that these results did not constitute cause and effect. They concluded that past use (but not current use) of OC use in conjunction with treating dysmenorrhea is associated with endometriosis and in particular DIE.

Comments

The authors called for prospective research studies to help determine whether the use of OCs to treat dysmenorrhea is actually causative. This study provides another reason physicians and other prescribers should hesitate about use of OC to treat dysmenorrhea, especially among adolescents and young adults. A previous study by the same authors did find a link between treating dysmenorrhea among adolescents and later development of DIE.

Source

C. Chapron, C. Souza, B. Borghese, M. C. Lafay-Pillet, P. Santulli, G. Bijaou, F. Goffiner and D. de Ziegler, **Oral contraceptives and endometriosis: the past use of oral contraceptives for treating severe primary dysmenorrhea is associated with endometriosis, especially deep infiltrating endometriosis**, *Human Reproduction* 26 (2011): 2028-2035.

Postpartum U.S. Women Choose Sterilization over IUDs for Family Planning

Researchers from the United States Center for Disease Control and Prevention conducted a study to determine the rates of intrauterine devices (IUD) and tubal sterilization among U.S. women (Whiteman et al., 2011). They did this by accessing data from the 2001-2008 Nationwide Inpatient Sample of approximately 1,000 hospitals and identified delivery records with the codes for IUD insertion and tubal sterilization. They discovered that the IUD insertion rate was 0.27 per 10,000 deliveries but 770.67 per 10,000 deliveries for tubal sterilization. They also found that this comparison rate existed for all age groupings. The use of sterilization increased with age, but at least 15% of tubal sterilizations occurred among women 24 years or younger and 42.4% among those 29 years or younger. These rates were higher among those without adequate health insurance or those who had cesarean sections. The authors had a concern that younger women might have regrets later on over sterilization. They also felt that there is a lack of knowledge of the availability of IUDs rather than sterilization and that some physicians are reluctant to insert IUDs for fear of infections.

Comments

These rates are not surprising since female sterilization is second most frequent used method of family planning among women between the age of 15-44 in the United States. Sterilization becomes number one most frequent used method when including the male partner. Sadly, sterilization is the number one family planning method among some sub-groups, like Hispanic women. These high rates minimally indicate that a large group of men and women have not been taught to value and live with their fertility.

Source

M. K. Whiteman, S. Cox and N. K. Tepper, et al., **Postpartum intrauterine device insertion and postpartum tubal sterilization in the United States**, *American Journal of Obstetrics and Gynecology* (2011, online ahead of print; also in *Contemporary OB/GYN*).

Most (75%) European Women Want to Be Informed of Post-Fertilization Effects of Contraceptive Methods

Multiple factors inform a sexually active woman's choice in the type of family planning method she wishes to use, including efficacy, health risks, ease of use, expense, and availability, to name a few. Past studies have indicated that women, especially those who accept that human life begins at fertilization, wish to also know the mechanism of action of the various types of contraceptive methods. Researchers set out to determine knowledge of mechanisms of action of family planning methods among European women and to determine their wish to have health providers inform them of potential post-fertilization effects (Lopez-del Burgo et al., 2011).

European researchers hired a marketing firm to randomly select women between the ages of 18-49 years in five countries, i.e., Germany, France, the United Kingdom (UK), Sweden and Romania. They were able to obtain 1,137 participants who were administered a 31 item questionnaire about the mechanisms of family planning methods, and in particular whether they acted before fertilization, after fertilization, and after implantation. There was no indication as to how many women refused to complete the questionnaire. The mean age of the participants was 32.4 years.

The researchers discovered that the participants were able to correctly identify the mechanisms of action of condoms, sterilization, and abortion with regard to whether they acted pre-fertilization, post fertilization, or post implantation. Only 2% of the participants were correct in all of the mechanisms of action for hormonal contraception and intra-uterine devices. Most (73%) of the participants wanted to be informed as to whether the family planning method worked post fertilization or (75%) post implantation. The authors concluded that there was low knowledge of the mechanisms of action of many of the methods of family planning. They recommended that health professionals provide women with this knowledge so that they can be better decision makers about family planning methods.

In a related study using the same participants and the same questionnaire, researchers sought to determine who has the most influence in making decisions about family planning methods, i.e., the woman herself, her health care provider, and/or her sexual partner (de Irala et al., 2011). They found that the physician/health care provider was the most influential in making the decision to use hormonal contraception and the intra-uterine device. Partner influence was more apparent when methods were chosen that required partner cooperation, such as use of the male condom and fertility awareness based methods. The authors advocated including both women and their male sexual partners in making family planning decisions.

Comments

A limitation of this study was that the participants (although randomly selected) might not have represented the entire population of interest. The poorer, less educated, and newer immigrant might not have been able to respond, since the questionnaire was at quite a high reading level for comprehension. The researchers also were not able to determine whether or not respondents were cohabitating. Of interest was that the "none" category was the most frequent response for religion at 43%, followed by other Christian at 36% and Catholic at 14%. France (55%), the UK (61%), and Sweden (60%) had the highest levels of responding to "none" for religion. Only 1% of the participants listed modern fertility awareness based methods as their method of family planning.

Sources

1. C. Lopez-del Burgo, M. T. Mikolajczyk, A. Ororio, S. Carlos, T. Errasti and J. de Irala, **Knowledge and beliefs about mechanisms of action of birth control methods among European women**, *Contraception* (2011, e-published ahead of print).

2. J. de Irala, A. Osorio, S. Carlos, and C. Lopez-del Burgo, **Choice of birth control methods among European women and the role of partners and providers**, *Contraception* (2011, e-published ahead of print).

Common Form of Hormonal Contraception Increases Cardiovascular Risk

One of the most common forms of combined oral hormonal contraception (OC), i.e., 35 µg of ethenyl estradiol combined with 0.18 – 0.25 mg of norgestimate, supposedly has little effect on carbohydrate metabolism among normal weight women, especially after the amount of estrogen has been lowered in these types of pills. What is not known is the effect of this combined hormonal contraception on obese women. Since obesity has become epidemic in the United States and because obesity is related to insulin resistance, impaired glucose tolerance, and diabetes, researchers wished to determine and compare the influence of hormonal contraception on insulin sensitivity among lean and obese women (Cheang et al., 2011). They also sought to see if this type of OC had a differential effect on blood pressure and lipid profiles.

The researchers were able to obtain 48 volunteer women between the ages of 18-40 years without any health problems and who had normal length menstrual cycles. These volunteer women had glucose (fasting and 2-hour glucose tolerance tests), lipid profiles, weight, and blood pressure taken on day one of their menstrual cycles and, at that time, were provided with a 6 month supply of the combined hormonal OC (i.e., Ortho Tri-Cyclen). They were also measured with the same tests during pill use cycles 3 and 6. Of the 498 participants, 29 women were able to complete the study, with 15 in the lean group, i.e., those with a basal metabolic index (BMI) less than 25 and 14 in the obese group with a BMI greater than 30.

At baseline, the obese group had higher blood pressure, BMI, and metabolic syndrome risk factors and, as expected, more insulin resistance. At six months of OC use, there was no

significant change in the insulin indicators, or anthropometrics, but the total cholesterol, low-density–lipoprotein, high-density lipoproteins, and triglycerides were significantly increased among all the participants. They also found that from baseline to six months of use of combined OC, the lean and obese women exhibited statistically significant different trends in insulin sensitivity indexes. The biggest change discovered was the approximately 20mg/dL increase in low-density lipoproteins among both the lean and obese groups. The researchers mentioned that this study was limited by the relatively small number of women participants and that women were on OCs for a relatively short time period.

Comments

It is curious that the authors did not discuss the implications of the study's results for clinical practice. In past studies, one of the authors has mentioned that OCs were not the best treatment for polycystic ovarian syndrome, metabolic syndrome, and pre-diabetes—because the treatment might make it worse. I wonder if the muted response was due to the politics of contraceptive use in the U.S. and the over reliance on OCs for solving women's metabolic health problems.

Source

K. I. Cheang, P. A. Essah, S. Sharma, E. P. Wickham and J. E. Nestler, **Divergent effects of a combined hormonal oral contraceptive on insulin sensitivity in lean versus obese women**, *Fertility and Sterility* (2011, e-published ahead of print).

Medical Students at Loyola University Find Family Planning Education Inadequate

The American College of Obstetricians and Gynecologists supports comprehensive preclinical education on family planning for medical students that includes information on contraception and abortion. Furthermore, the Association of Professor of Gynecology and Obstetrics (APGO) have set standards for medical students on the topics of contraception and abortion. The rationale is many women in the United States (US) seek these "legal" reproductive services and medical students should be knowledgeable about them. However, providing education about contraception and abortion in a faith based medical school and in particular a Catholic Jesuit medical school might be problematic, since both contraception and abortion are contrary to the Catholic faith. A professor of obstetrics and gynecology from the Loyola Medical Center and colleagues at Columbia University, University of Texas, and the University of New Mexico wished to determine the level of satisfaction with contraception and abortion education in preclinical education at Loyola University Health Systems and Stritch School of Medicine (Guiahi et al., 2011).

The primary author of this study designed and piloted a questionnaire to assess the adequacy and amount of preclinical education content and clinical training in contraception and

abortion among medical students. The questionnaire included questions on whether medical students would accept their patients' decision to have an abortion, whether their current medical school provided adequate preclinical training in contraception, sterilization and abortion, and whether they would prefer more education in abortion, sterilization and contraception during their preclinical education. The survey also included special questions for fourth year medical students, i.e., did they feel they had adequate clinical training in abortion, sterilization and contraception in their clinical years, and whether they would prefer more training on these procedures in their obstetrics and gynecology (OB/GYN) clerkship.

The researchers administered the questionnaire to 140 second year students during an in-class lecture period and to 133 fourth year students via an online survey tool. They obtained an 80.6% return rate, i.e., 220 out of 273 questionnaires, of which 52.8% were female, 80% Caucasian, 45.4% Catholic, 31.5% Christian, 46.3% listed themselves as Democrats, 57.5% considered themselves "pro-choice" and 29.9% "pro-life." Over 90% of the total group of respondents agreed that they would accept a patient's decision to have an abortion even if that decision differed from theirs. Most felt that their pre-clinical education in contraception (59.5%), sterilization (72.5%), and abortion (77.9%) was inadequate and most students preferred more education in these three areas (73.9%, 68.6%, and 65.2% respectively). The pro-choice students were more likely to feel there was inadequate education on these topics than other students. A majority of fourth year students, however, felt that they had adequate training for contraception (69%), but inadequate in sterilization (54.8%) and abortion (71.4%). Approximately half of the fourth year students desired more abortion training during their clerkship. The authors stated the results showed that the majority of students felt their education and training in contraception, sterilization and abortion was inadequate. They also indicated that current education on these topics would not meet the APGO standards for medical education. As a follow-up to this research, the first author was provided permission to give an optional lecture titled "The Well Woman Visit" for the preclinical medical students and the 4th year students were invited to a special workshop on these topics with the OB/GYN residents.

Comments

Although all students at a Catholic faith-based medical school should be knowledgeable about the topics of contraception, sterilization, and abortion, it is not appropriate for that school to provide clinical training in those areas. I find it remarkable that the medical school admissions board from Loyola does not look for a better fit of students for their Catholic faith based medical school. There are many non-Catholic medical schools in the U.S. that provide that type of clinical training. If the five Catholic medical schools provided alternatives, like a strong program in Natural Family Planning methods then they would provide needed diversity in medical education and truly reflect their Catholic mission.

Source

M. Guiahi, K. Maguire, Z. T. Ripp, R. W. Goodman and K. Kenton, **Perceptions of family planning and abortion education at a faith-based medical school**, *Contraception* (2011, e-published, ahead of print).

Catholic and Catholic Hospital Based Obstetrician-Gynecologists Less Likely to Provide Abortion Services

Although abortion is one of the most common outpatient surgical procedures, a frequent observation made in family planning and obstetric journal articles is that there are not enough healthcare professionals providing abortion services. An often cited statistic is that 87% of the counties in the United States do not have an abortion provider. There are many reasons provided why there are relatively few abortion providers including personal religious beliefs, institutional religious policies, and lack of obstetric residency programs with abortion training. Researchers at the University of Chicago recently conducted a survey study to determine the prevalence of abortion services among obstetrician-gynecologists (OB/GYNs) in the United States (U.S.) and to determine the correlates of religion and other demographics on the prevalence of abortion services (Stulberg et al., 2011).

Researchers conducted the survey by obtaining a random list of 1,800 practicing OB/GYNs younger than 65 from the American Medical Association's master file. They mailed the physicians a survey tool that contained demographic questions and two questions on abortion. The researchers also mailed follow-up reminders. The abortion questions were whether the OB/GYNs encountered patients who seek abortion and whether they would provide abortion services. The survey questionnaire included items about the respondents' religion and importance of religion in their life. The researchers were able to obtain 1,031 useable responses for a 66% return rate.

The study discovered that 97% of the respondents encountered patients who requested abortion services but that only 14% provided those services. Abortion services were more likely to be provided by younger (35 or younger) Jewish female OB/GYNs who reside in the Northeast or West of the U.S. Abortion services were less likely to be provided by Evangelical Protestants, Catholics, those OB/GYNs who rated their religion as important, and those who resided in Catholic Healthcare facilities. The authors concluded that access to abortion services was limited by the willingness to provide services, especially in rural communities and in the South and Midwest.

Comments

Previous survey research in 2002, estimated that approximately 22% of OB/GYNs provided abortion services. The authors indicated that the decline to 14% could be a result of having a different sample of OB/GYNs and a different sampling technique. They also pointed out that the questionnaire was only to OB/GYNs and not family physicians who might be providing these services. Furthermore, the questionnaire did not differentiate between medical and surgical abortions. An ethical quandary that was pointed out by the authors was that the

Ethics Committee of the American College of Obstetricians and Gynecologists issued a committee opinion that it was unethical for OB/GYNs to not refer for abortion services. They pointed out that many OB/GYNs do not feel they are obligated to do so.

Source

D. B. Stulberg, A. M. Dude, I. Dahlquist and F. A. Curlin, **Abortion provision among practicing obstetrician-gynecologists**, *Obstetrics and Gynecology* 118 (2011): 609-614.

Use of Nonaspirin Nonsteroidal Anti-Inflammatory Drugs during Pregnancy Is Associated with Risk of Spontaneous Abortion

Evidence that the use of nonaspirin nonsteriodal anti-inflamatory drugs (NSAIDs) during pregnancy might be associated with an increased risk for spontaneous abortion has been mixed. Furthermore, researchers have not determined if there are dosage levels related to the risk of spontaneous abortion with NSAIDs. Therefore Canadian researchers sought to determine and quantify the risk (if any) of NSAIDs with a cohort of pregnant women.[1]

The researchers used a case-control nested study design and were able to obtain prospectively collected information from an ongoing registry of pregnancies in Quebec, Canada. The registry had 4,705 women participants (between the ages of 15-45) who had a documented spontaneous abortion that occurred from the start of pregnancy through the 20th week of gestation. The registry also had data on physician based diagnosis and recording of any prescriptions that were filled by the patient. Of interest for this study was any prescription for nonaspirin NSAIDs, the dosage prescribed, and the reason given for the prescription. The researchers matched 10 randomly selected control participants that had the same gestational age with a matched case that had a spontaneous abortion (i.e., 40,750 controls). The researchers also collected information on potential confounders, such as socio demographic variables and comorbidities that existed during the year before pregnancy.

The researchers found that 352 women (7.5%) who had filled one or more prescriptions for NSAIDS during pregnancy had an early spontaneous abortion. In comparison there were 1,213 (2.6%) who did not have a spontaneous abortion. After adjusting for confounders, they discovered that the use of nonaspirin NSAIDS during pregnancy resulted in a significant 2.4 fold increase in the risk of spontaneous abortion (OR = 2.43, 95% CI = 2.12=2.79) based on 4,705 cases of which 352 were exposed. When they analyzed use of NSAIDS in the two weeks immediately before the spontaneous abortion, the risk was higher with an OR = 3.47, 95% CI = 2.01-6.00. Although they found that all types of NSAIDS were associated with an increased risk, they did not find a dosage related risk. The researchers speculated that NSAIDs probably interfered with the physiological mechanism that suppresses the uterine synthesis of prostaglandins. They concluded that nonaspirin NSAIDS should only be used with caution during pregnancy and that more research is needed on the mechanism of action.

Comments

The authors pointed out that they were unable to control for over the counter use of NSAIDs but that the only type available over the counter in Canada is ibuprofen. They did not control for smoking or BMI. Of interest is that a recent study on the use of an over-the-counter medicine—Meloxicam—another type of NSAID (i.e., a cyclooxygnase-2, or COX-2, inhibitor) can prevent or delay follicular rupture. A recent pilot study on the use of Meloxicam for the possible use as an emergency contraceptive was recently published.[2] In that study, 27 volunteer women who were sterilized were provided either 15 or 30 mg of Meloxicam per day for 5 consecutive days during the late follicular phase of the menstrual cycle (i.e., when it was determined through serial transvaginal ultrasound that the dominant follicle had reached a size of 18 mm in diameter). The study was a cross over design in which the participants crossed over to either the use of 15 or 30 mg of Meloxicam for the first menstrual cycle, followed by a resting cycle and then another cycle with 5 days of either 15 or 30 mg of Meloxicam based on the opposite dose that they had the first cycle. The participants were monitored by ultrasound for follicular growth, and with serum blood levels of luteinizing hormone (LH), progesterone, and estrogen estradiol (E_2). The authors found that the drug either prevented follicular rupture or interfered with the ovulatory process and what they called "ovulatory dysfunction" with the majority of menstrual cycles. The 30 mg dose was more effective. Ovulation occurred in only two of the cycles treated with 30 mg doses. Overall, dysfunctional ovulation occurred in only 11 of 22 of the menstrual cycles treated with 15 mg of Meloxicam but with 20 of 22 with 30 mg. Dysfunctional ovulation included a delayed ovulation greater than 24 hours after the LH surge. Of note is that the drug did not interfere with cycle length, luteal phase length, or with the LH or E_2 levels. In other words, the drug did not interfere with hormonal cycling or menstrual cycle parameters. Furthermore, there were few side effects, the drug is available over the counter and it is relatively cheap. The authors speculated that this drug might be an alternative drug for use as an emergency contraceptive. The drug might also be used morally as an emergency contraceptive in Catholic hospitals and by Catholic physicians for rape cases, if it does not interfere with the luteal phase and implantation of a developing embryo.

Sources

1. H. R. Nakhai-Pour, P. Bory, O. Sheehy and A. Berard, **Use of nonaspirin nonsteriodal anti-inflammatory drugs during pregnancy and the risk of spontaneous abortion**, *Canadian Medical Association Journal* (2011, e-published ahead of print).

2. C. Jesam, A. M. Salvatierra J. L. Schwartz and H. B. Croxatto, **Suppression of follicular rupture with meloxicam, a cyclooxygenase-2 inhibitor: potential for emergency contraception**, *Human Reproduction* 25 (2010): 368-373.

Under the Microscope: Use of NFP for Sex Selection and Family Balance

Having a baby boy over a baby girl is valued in many countries due to cultural and economic reasons. In some countries such as India and Korea, the ratio of baby boys over girls has become a demographic problem. The use of ultrasound imaging of the fetus and subsequent abortion, when the "wrong" sex is detected, are the usual immoral tools in this process. What about a moral method of helping couples to select the sex of their child? In Africa, this question was posed due to the size of large African families that are often the result of female babies arriving before a male baby when most African parents desire a male child. When a woman is unable to have a baby boy there is also a risk of divorce and promiscuity. There is some anecdotal evidence that use of the Billings Ovulation Method (BOM) of Natural Family Planning and targeting intercourse before, on, or right after the Peak day of cervical mucus could enhance the ability of having a boy or girl. The theory is that the Y chromosome bearing sperm (that produces a male baby) is more motile and shorter lived than the slower X bearing female oriented sperm. The Y sperm would beat the female sperm to the waiting ovum. Changes in cervical mucus however, can enhance the slower female sperm if intercourse occurs before the Peak mucus sign. The rules for sex selection are: have intercourse on the days before the Peak in the mucus sign to enhance the chance of having a female baby; or, have intercourse on Peak, or soon after, to enhance the chance of having a male baby.

After experiencing anecdotal success, pro-life and pro-life family BOM promoters in Nigeria decided to prospectively test the proposed sex selection method.[1] They were able to recruit 99 volunteer couples who were taught the BOM and when to have intercourse for sex selection. A key to success is to correctly determine the Peak day of cervical mucus as defined as the last day of slippery type mucus. The Peak day is determined retrospectively, i.e., the mucus dries up and there is no slippery sensation. The drying of the mucus is a result of the post ovulatory rise in progesterone.

The volunteer participants agreed to declare their sex preference and provide a chart with the days of intercourse to the researchers before the birth of the baby. Once the baby was born the sex was recorded. A group of BOM experts were shown the charts and intercourse patterns and from that were able to predict the sex of the pending baby. The BOM experts were blind to the identity of the couple and the desired sex of the baby.

The BOM African researchers found that of the 99 couple volunteers, 94 gave birth to a child of their preferred sex – i.e., a 95% success rate – only 5 couples did not have a child of their desired sex. Furthermore, male selection success was 96.3% (i.e., 78 out of 80 pre-selected a male) and female was 88.9% correct (i.e., 16 out of 18 wanting a female child). There was only one user selection failure – i.e., the couple had an intercourse pattern for a boy and had wanted a girl. The authors concluded that with use of the Pre-Peak rules of intercourse for female babies and Post-Peak for male babies that couples using the BOM can predict the sex of their child with a high degree of confidence.

Although the findings of this study are fascinating, I am not confident in them. First of all, the Peak day of cervical mucus is not precise in identifying the actual day of ovulation – the actual day of ovulation is plus or minus three days or more around the Peak day of mucus. To be fair, the authors indicate that timing is based on the characteristics of the mucus and not the day

of ovulation. I wonder if the quality and/or quantity of the externally observed cervical mucus in relation to the estimated day of ovulation might have an association with the sex of the offspring. In other words, does the quality of the cervical mucus have any influence on the filtering or facilitation of the X, female sperm, or slowing of the Y, male sperm? The author also indicates that the sex ratio of baby boys to girls in Nigeria is 1.06 to 1.00 females – this is hardly an indication that families are only seeking boy babies – this sounds more like a healthy natural selection ratio since the normal ratio ranges from 1.03 to 1.07 male babies to 1.00 female baby, i.e., the 1.06 falls within that range of normal.

Previous studies on sex selection through the timing of intercourse were not as successful. For example, researchers conducted a study to determine if sex ratio was related to the timing of intercourse in relation to the day of ovulation, the estimated length of the follicular phase of the conception cycle, or by the planned or unplanned status of the pregnancies.[2] This prospective study was conducted by researchers at Johns Hopkins, Georgetown and Baylor University. They included as participants all women who became pregnant from 1987 to 1994 while using NFP as taught in five centers located in Chile, Colombia, Italy and the United States. There were 947 singleton births during that time period, of which 477 were boys and 470 were girls. This yielded a sex ratio of 101.5 males per 100 females, which was not significantly different from the expected ratio of 105 males to 100 females as found in previous studies. The researchers also observed no association between the timing of intercourse and the sex ratio or evidence to show that intercourse around the time of ovulation results in a predominance of female babies or later intercourse with male babies. Nor did they find any consistent association between follicular phase length or planning status of the pregnancy and the sex ratio.

Their findings both confirm and contradict findings from previous studies, most noticeably, the recent studies by Wilcox, Weinberg and Baird which involved a prospective study of 221 women who were planning a pregnancy and recorded daily urine samples for LH surge detection and diaries of the time of intercourse.[3] As in the Gray et al study, the Wilcox, Weinberg, and Baird group did not find a sex ratio difference in association with the timing of intercourse but did find an excess of males in cycles with shorter follicular phases. Gray et al., stated that the differences might be due (but not probably) to the imprecision in the estimation of the day of ovulation through the mucus peak or shift in basal body temperature, the self-reporting of the actual day of intercourse, and the determination of which act of intercourse resulted in conception. They concluded that manipulating the time of intercourse in relation to the estimated day of ovulation or the length of the follicular phase cannot be used to preselect the sex of the baby. No recommendation for future research in this area was provided by the authors.

Prenatal sex selection for balancing families

A closely related topic to sex selection by timing of intercourse is the ability of couples to accurately predict the sex of their baby as early as 7 weeks in utero by use of pre-natal sex identification. This has become a hot topic this past year due to a study published in the *Journal of the American Medical Association* (*JAMA*) and to reports of unbalanced sex ratios (favoring males) in the United States and other countries.[4] The *JAMA* study involved a systematic review on the validity and accuracy of recently developed fetal sex determination procedures and kits

that are based on cell-free fetal DNA that is found in maternal blood or urine. The presence of a cell-free circulating Y chromosome DNA sequence in the plasma of pregnant women has been known since 1997. Since then, many groups and companies have developed this technology and have made it readily available, even directly to the consumer. The benefit of these kits and methodologies is that they are non-invasive, fairly inexpensive, readily available, and seem to be as good as or better than ultrasound in determining the sex of the baby. Researchers decided to examine the accuracy, sensitivity and validity of this methodology (and the kits that use this methodology) by doing a systematic literature review.

Researchers were able to identify 859 English language articles in the scientific literature from 1997 until April of 2011 that involved sex selection with cell-free fetal DNA methods on human participants (by use of the PubMed search engine). Reviewing the abstracts from these articles, they were able to eliminate 713 irrelevant articles. They reviewed in full the remaining 146 articles and excluded 72 with insufficient data. Of the remaining 74 articles they excluded 17 due to methodological flaws. The remaining 57 provided 80 data sets that involved samples from pregnant women bearing 3,524 singleton male and 3,017 singleton female fetuses. There are actually two refined methods for testing cell-free DNA sequences, the polymerase chain reaction (PCR) and the real-time quantitative polymerase chain reaction (RTQ-PCR). The authors found that, at less than 7 weeks gestational age, the sensitivity and specificity in determining the correct sex was 86.8/% for the PCR and 92.4% for the RTQ-PCR. At 7-20 weeks of gestation, however, the sensitivity of the PCR increased to 94.2% and for the RTQ-PCR to 96.8%. Greater than 20 weeks of gestation yielded sensitivities for the two methods at 97.5% and 98.7% respectively. The RTQ-PCR had test specificity at 98% sensitivity of 95% at 7-20 weeks and 99.1% at greater than 20 weeks of gestation. These tests were blood based. They did not find the urine tests very accurate or reliable. The researchers concluded that the performance of the RTQ-PCR cell-free DNA method on blood samples at 7 weeks or later was high and could be used in clinical settings for early detection of fetuses at risk for sex-linked disorders.

This technology is advertised directly to the consumer by companies manufacturing and marketing these tests. Some of the companies will not send the kits to couples who want to use the test for family sex balancing. It is not clear how this would be prevented. There is no problem about couples wanting to know the sex of their baby. The problem is use of abortion when they feel that they want a boy instead of a girl or vice versa. Whether couples are using this new technology, ultrasound technology, pre-implantation genetic disease testing through IVF, amniocentesis, or chorionic villous sampling to determine the sex of the embryo or fetus, there seems to be a misuse for sex selection.

Examples of probable sex selection abuse and subsequent abortions occur in India, China and Korea and among some ethnic groups in the United States. A recent study in India, based on population based data sets, found that the ratio of girls to boys with second-order births was 906 per 1,000 boys in 1990 and 806 girls to 1,000 boys in 2005, an annual decline of 0.52%.[5] They also speculated (after adjusting for girl mortality rates) that sex selection abortions ranged from 1.2-4.1 million in the 1990s and from 3.1-6.0 million in the 2000s. A study based on National Center for Health Statistics birth certificates, found that the sex ratio among third-order births to

U.S. Asian Indians were 126 males to 100 females, among U.S. Chinese 111 males to 100 females and a 109 male to 100 female ratio among U.S. Koreans.[6] This study suggests prenatal sex selection and the use of abortion as the means to regulate family sex balance.

There have been declarations by physicians and professional organizations that prenatal sex selection methods should not be used for family sex balance and only for identifying gender linked disorders.[7,8] As was stated by one physician, gender is not a disorder or disease. To be consistent with that thinking, then neither is fertility or pregnancy. Others are more consistent in their ethical beliefs and indicate that although sex selection might result in imbalances in sex ratios in some countries, that ultimately couples and women should have reproductive freedom and have the right to use those tests for pre-natal sex selection.[9]

Although there are questions about the validity of the findings from the African study on the use of the Billings Ovulation Method and timing intercourse for selecting a baby girl or boy, there is a moral difference between that method and prenatal sex selection. The biggest difference is that prenatal sex selection involves the life of an existing human embryo or fetus, i.e., a developing human being. The intent of pre-natal sex selection is not just the curiosity of what is the sex of the developing baby, but rather (as evidence shows) that if it is not the desired sex then abortion is pursued. With the use of the Billings Ovulation Method of sex selection, the acts are done before there is any existing baby and there is no intent for abortion. Furthermore, the intent is not much different than what couples do "naturally" all of the time when they say that they are "trying for a baby boy or girl." It would be great if the results of the Billings sex selection by the timing of intercourse worked as well as it did as presented in the African study, since then it could be promoted in countries where a certain sex is desired. If used instead of prenatal sex selection, it could save many baby girls from being aborted around the world.

1. L. McSweeney, **Successful sex pre-selection using Natural Family Planning**, *African Journal of Reproductive Health* 15 (2011): 79-84.

2. R. Gray, J. Simpson and A. Bitto, et al., **Sex ratio associated with timing of insemination and length of the follicular phase in planned and unplanned pregnancies during use of natural family planning**, *Human Reproduction* 13 (1998): 1397-1400.

3. C. Weinberg, D. Baird and A. Wilcox, **The sex of the baby may be related to the length of the follicular phase in the conception cycle**, *Human Reproduction* 10 (1995): 304-307; A. Wilcox, C. Weinberg and D. Baird, **Timing of sexual intercourse in relation to ovulation. Effects on probability of conception, survival of the pregnancy, and sex of the baby**, *New England Journal of Medicine* 333 (1995): 1517-1521.

4. S. A. Devaney, G. E. Palomaki, J. A. Scott and D. W. Bianche, **Noninvasive fetal sex determination using cell-free fetal DNA**, Journal of the American Medical Association, 306 (2011): 627-636.

5. P. Jha, M. A. Kesler, R. Kumar, R., et al., **Trends in selective abortions of girls in India: analysis of nationally representative birth histories from 1990 to 2005 and census data from 1991 to 2011**, *The Lancet* 377 (2011):1921-1928.

6. J. F. Egan, W. A. Cambell, A. Chapman, A. A. Shamshirsaz, P. Gurram and P. A. Benn, **Distortions of sex ratios at birth in the United States: evidence for prenatal gender selection**, *Prenatal Diagnosis* 31 (2011): 560-55.

7. A. T. Thiele and B. Leier, **Towards an ethical policy for the prevention of fetal sex selection in Canada**, *Journal of Obstetrics and Gynecology Canada* 32 (2010): 54-57.

8. M. E. Hylha, P. P. Kirkinen, K. I. Puura and E. I. Tomas, **Fetal sex determination: obstetricians' attitudes in antenatal screening units in Finland**, *Scandinavian Journal of Public Health* 38 (2010): 756-760.

9. R. Macklin, **The ethics of sex selection and family balancing**, *Seminars in Reproductive Medicine* 28 (2010): 315-321.