Characteristics of Women Who Experience Mood and Sexual Side Effects With Use of Hormonal Contraception

Ellen R. Wiebe, MD, FCFP,[1] Lori A. Brotto, PhD, R Psych,[2] Jacqueline MacKay, BSc[3]

[1]Department of Family Practice, University of British Columbia, Vancouver BC

[2]Department of Obstetrics and Gynaecology, University of British Columbia, Vancouver BC

[3]Department of Family Practice, University of British Columbia, Vancouver BC

Abstract

Objective: To describe the characteristics of women who experience sexual and mood side effects associated with use of hormonal contraception, and to compare them with women who do not.

Methods: We conducted a questionnaire survey of women presenting for primary care or to a reproductive health clinic. The women were asked if they had specific side effects with use of hormonal contraception in the domains of sexual desire, arousability, or irritability. The characteristics of women who reported such symptoms were compared with those who did not.

Results: Of the 1311 women recruited (mean age 28 years), 978 (77%) had previously used hormonal contraception. Of these women, 482 (51%) said they had at least one mood side effect and 358 (38%) said they had at least one sexual side effect. Using logistic regression, we found that women complaining of mood side effects were more likely to be unmarried ($P = 0.02$) and to be Caucasian or South Asian ($P = 0.002$) than women without such complaints. Women complaining of sexual side effects were more likely than those without sexual side effects to be younger ($P = 0.04$), to have more education ($P = 0.04$), and to be Caucasian or South Asian ($P = 0.07$). Women who complained of sexual side effects were also more likely than others to complain of mood and physical side effects ($P < 0.001$).

Conclusion: Understanding the characteristics of women who report mood and sexual side effects with use of hormonal contraception may be useful when counselling women about contraception. It is important for women to choose contraception that not only is effective but also does not complicate their emotional and sexual lives.

J Obstet Gynaecol Can 2011;33(12):1234–1240

Key Words: Hormonal contraceptives, mood, sexual, side effects

Competing Interests: None declared.

Received on June 20, 2011

Accepted on September 7, 2011

Résumé

Objectif : Décrire les caractéristiques des femmes qui connaissent des effets indésirables liés à la sexualité et à l'humeur en association avec l'utilisation d'une contraception hormonale, et les comparer avec les caractéristiques des femmes qui n'en connaissent pas.

Méthodes : Nous avons mené une enquête par questionnaire auprès de femmes qui cherchaient à obtenir des soins primaires ou qui consultaient une clinique de santé génésique. Nous avons demandé à ces femmes si elles connaissaient, dans le cadre de leur utilisation d'une contraception hormonale, des effets indésirables particuliers en ce qui a trait à la libido, à l'excitabilité ou à l'irritabilité. Les caractéristiques des femmes qui ont signalé de tels symptômes ont été comparées à celles des femmes qui n'en ont pas signalés.

Résultats : Parmi les 1 311 femmes dont la participation a été sollicitée (âge moyen : 28 ans), 978 (77 %) avaient déjà utilisé une contraception hormonale. Parmi ces femmes, 482 (51 %) ont affirmé avoir connu au moins un effet indésirable lié à l'humeur et 358 (38 %) ont affirmé avoir connu au moins un effet indésirable lié à la sexualité. Au moyen d'une régression logistique, nous avons constaté que les femmes ayant connu des effets indésirables liés à l'humeur étaient plus susceptibles de ne pas être mariées (P = 0,02) et d'être de race blanche ou sud-asiatique (P = 0,002) que les femmes n'ayant pas connu de tels effets. Les femmes ayant connu des effets indésirables liés à la sexualité étaient plus susceptibles d'être plus jeunes (P = 0,04), de présenter un niveau de scolarité supérieur (P = 0,04) et d'être de race blanche ou sud-asiatique (P = 0,07) que les femmes n'ayant pas connu de tels effets. Les femmes ayant connu des effets indésirables liés à la sexualité étaient également plus susceptibles que les autres d'avoir connu des effets indésirables physiques et liés à l'humeur (P < 0,001).

Conclusion : La compréhension des caractéristiques des femmes qui signalent des effets indésirables liés à la sexualité et à l'humeur, en association avec l'utilisation d'une contraception hormonale, pourrait s'avérer utile dans le cadre du counseling sur la contraception. Il est important que les femmes puissent choisir une contraception qui est efficace, tout en n'entravant pas leur vie sexuelle et affective.

INTRODUCTION

Sexual and mood side effects may be significant problems for women using hormonal contraception. In the general population of women of reproductive age who have ever used contraception, 29% said they had discontinued oral contraceptives because of dissatisfaction with the method.[1] In the 2002 Canadian Contraception Study, 59% of women had changed their method of contraception, and 20% of these women had switched because of side effects.[2]

Whether or not mood and sexual side effects of hormonal contraception are important reasons for discontinuation is controversial. A review of studies over 30 years of oral contraceptive side effects concluded that there was no consistent pattern of effect to suggest a hormonal or biological determinant.[3] Another review stated that women using oral contraceptives may experience positive, negative, or no effects on libido.[4] A study of 79 women in stable committed relationships found that only 38% had continued oral contraceptive use one year later; 47% had discontinued, and 14% had switched to another preparation.[5] Reasons for discontinuation or switching contraceptive methods were assessed using logistic regression. Emotional side effects, worsening of premenstrual syndrome, decreased frequency of sexual thoughts, and decreased psychosexual arousability accounted for 87% of cases. A study comparing side effects and continuation rates of three different hormonal contraceptives found that the crucial points influencing acceptability, compliance, and continuation were poor cycle control and disturbance of coitus due to vaginal dryness and loss of desire.[6] In a study of 1086 German medical students, hormonal contraception was related to lower sexual functioning scores (as assessed by the Female Sexual Function Index[7]), especially desire and arousal.[8] A double-blind, placebo-controlled study with 150 women who had been surgically sterilized showed a decrease in sexual desire with use of hormonal contraceptives.[9]

The Physician's Desk Reference, a commonly used drug reference publication in the United States, reports under "full drug label information" for hormonal contraceptives that associated mood changes have been reported and are believed to be drug-related, and that changes in libido have been reported and a causal association has been neither confirmed nor refuted.[10] The Compendium of Pharmaceuticals and Specialties, a commonly used drug reference publication for professionals in Canada, describes an incidence of < 1% for mood and sexual side effects in hormonal contraceptive users.[11] An online source of drug information for physicians, *UpToDate,* does not mention either mood changes or loss of libido in the list of hormonal contraception side effects.[12]

The purpose of this study was to determine the characteristics of women who reported mood and/or sexual side effects with previous hormonal contraceptive use. The participants were women presenting for primary care at a number of clinics and doctors' offices and women presenting for insertion of an IUD or pregnancy termination. We wished to compare the characteristics of women who had sexual and mood side effects with use of hormonal contraception with those of women who did not have those side effects.

METHOD

In order to represent a wide range of women, as well as women especially in need of contraception, we recruited women from primary care, including rural and urban offices and a university health clinic, as well as women presenting to an urban abortion and contraception clinic for insertion of an intrauterine device (IUD) or pregnancy termination.

At primary care clinics and private doctors' offices, reception staff or a research assistant in the waiting room gave the questionnaire to any woman who appeared to be between the ages of 15 and 50. At the abortion/contraception clinic, women were given a questionnaire in the waiting room by reception staff, together with the medical questionnaires usually completed by patients arriving for their first appointment. The staff made clear which forms were for the clinic (mandatory) and which were for the study (optional).

Questionnaires were available in English, Chinese, and Punjabi (the three most commonly spoken languages in the area). The questionnaire asked women if they had ever used hormonal contraception and, if so, whether they had ever had physical, sexual, or mood/irritability side effects from using hormonal contraception.

The questionnaire was designed by the investigators to capture specific negative effects of hormone use on mood and sexual experience; the questions on sexual side effects were adapted from the Sexual Interest and Desire Inventory–Female[13] and the questions on mood were adapted from the Irritability Questionnaire.[14] The questionnaire was pilot tested with 10 patients who complained of sexual and/or mood side effects from hormonal contraception, and was subsequently further refined. The questions related to mood and sexual side effects are shown in Table 1.

The data were entered into SPSS version PASW 18 (IBM Corp., Armonk NY), and descriptive statistics were prepared to identify the proportion of women presenting for primary care, IUD insertion, or pregnancy termination who had experienced these side effects with past use of hormonal contraception. The women who had side effects were compared with the women who did not have side effects with respect to age, education, ethnicity, and obstetrical experience. Chi-square tests were used for categorical variables. Two-sample *t* tests and one-way analysis of variance were used for interval variables. Logistic regression was used to assess predictors of these side effects.

This project was approved by the University of British Columbia Behavioural Research Ethics Board.

RESULTS

A total of 1318 women completed questionnaires; seven questionnaires had missing responses, leaving 1311 for analysis. Of those, 978 respondents (75%) had previously used hormonal contraception: 221 of those recruited from primary care, 221 of those seeking IUD insertion, and 559 of those seeking pregnancy termination. During the recruitment period (January to October 2009) approximately 511 women were seen requesting IUD insertion and 1564 women were seen requesting abortion. The number of eligible women presenting during the study period (March to June 2010) to the 18 different primary care sites throughout the province is unknown. Of the women who had previously used hormones, 489 (50%) said they had had at least one mood side effect on at least one hormone preparation and 367 (38%) said they had had at least one sexual side effect on at least one preparation. The self-reported ethnicity of these women was white/Caucasian in 66% (663), East Asian in 17% (161), South Asian in 8% (71), and "other" in 9% (88).

Among the three groups of women (primary care, seeking IUD insertion, and seeking abortion) who had used hormonal contraception, the primary care group were older (mean age 31 vs. 28 and 29 years, respectively), had a higher proportion of Caucasians (70% vs. 58% and 75%, respectively), and were more likely to be married (42% vs. 22% and 25%, respectively). The 333 women who had never used hormonal contraception were less likely to be Caucasian ($P < 0.001$), more likely to have children ($P = 0.003$), and had less education ($P = 0.001$) (Table 2). There was no significant difference between the women presenting for abortion or primary care with respect to the number of mood or sexual side effects reported ($P = 0.9$ and 0.3, respectively). Women presenting for IUD insertion were more likely to report side effects than women presenting either for primary care or for abortion ($P = < 0.001$).

Table 1. Reported side effects, attributed to contraceptives, that stopped with cessation of contraceptive use

Crying more easily
Feeling depressed or sad
Feeling angry or more easily irritated
Feeling more anxious than usual
Feeling less interested or motivated to have sex
Having less sexual desire, fantasies, or thoughts
Feeling less easily aroused (sexually excited, wet, or quick or able to have orgasms when touched sexually by self or partner)
Having more pain or dryness during sex

Women who complained of sexual side effects were more likely also to complain of mood and physical side effects ($P < 0.001$) (Table 3). Women who complained of mood side effects were more likely to be younger ($P = 0.03$), unmarried ($P < 0.001$), nulliparous ($P < 0.001$), Caucasian or South Asian, and presenting for IUD insertion rather than for primary care or abortion ($P = 0.002$) (Table 4).

After logistic regression, being unmarried, presenting for IUD insertion, and ethnicity remained significant associations with adverse mood effects ($P < 0.001$, $P = 0.004$, and $P = 0.002$, respectively). Women complaining of sexual side effects were more likely to have more education ($P = 0.03$), to be unmarried ($P = 0.02$,) and to be nulliparous ($P = 0.004$). Caucasian and South Asian women reported having more sexual side effects than East Asian women ($P = 0.02$) (Table 5). Using logistic regression, age ($P = 0.04$) and education ($P = 0.04$) remained significant associations; being Caucasian or South Asian were not significantly associated ($P = 0.07$).

There were no significant differences in side effects between the different hormonal contraceptives, but 15% of women did not remember which hormonal contraceptive preparation they had used.

DISCUSSION

Women who complain of mood or sexual side effects with use of hormonal contraception may have different physiological reactions to hormones. In a previous study, East Asian women had a lower rate of mood and sexual side effects than Caucasian and South Asian women.[15] This may be related to differences in hormone pharmacokinetics

Table 2. Characteristics of women who had previously used hormonal contraceptives (n = 978)

	Primary care n = 198	Abortion n = 559	IUD n = 221	*P*
Age*†	31 ± 8.8	28 ± 6.5	29 ± 6.8	< 0.001
Years education*‡	16 ± 2.6	15 ± 2.5	16 ± 2.3	< 0.001
Total pregnancies*§	1.1 ± 1.6	2.4 ± 4.2	1.1 ± 1.3	0.015
Total births*§	0.7 ± 1.0	0.7 ± 1.0	0.6 ± 0.9	0.35
Married, n (%)‖¶	83 (42)	138 (25)	47 (22)	< 0.001
Ethnicity, n (%)‖#				
White/Caucasian	137 (70)	322 (58)	165 (75)	0.001
East Asian	41 (21)	118 (21)	26 (12)	
South Asian	8 (4)	57 (10)	11 (5)	
Other	11 (6)	60 (11)	18 (8)	
Mood side effects*,**	0.9 ± 1.4	0.9 ± 1.4	1.6 ± 1.7	< 0.001
Sexual side effects*,**	0.7 ± 1.3	0.6 ± 1.2	1.1 ± 1.6	0.003

*Mean ± SD: comparisons were conducted by one-way analysis of variance

†6 missing answers for age

‡23 missing answers for education

§22 missing answers for obstetrical history

‖Percent (n): comparisons were conducted by chi-square test of independence.

¶15 missing answers for relationship status

#10 missing answers for ethnicity

**There was no significant difference between abortion and primary care groups by one-way analysis of variance (*P* = 0.9 and 0.3).

Table 3. Reported physical, mood, and sexual side effects from previous use of any hormonal contraceptives (n = 978)

Physical side effects, n (%)		Mood side effects, n (%)		Sexual side effects, n (%)	
Acne	109 (11)	Crying more easily	331 (34)	Less interest in sex	286 (29)
Nausea	138 (14)	Depressed or sad	361 (37)	Less desire and sexual thoughts	242 (25)
Breakthrough bleeding	127 (13)	Angry or irritated	385 (39)	Less arousability	243 (25)
Weight gain	276 (28)	Anxious	255 (26)	Pain or dryness with sex	190 (19)

The margin of error at the 95% confidence level for each reported percentage is not more than 3 percentage points.

in East Asians.[16,17] In a study of finger length, the 2D:4D ratio was predictive of sexual side effects from oral contraceptives.[18] This indicates a potential physiological difference causing some women to be more susceptible to these side effects. The role of testosterone in female sexual arousal is inconsistent, but there is likely a sub-group of women who have heightened sensitivity to changes in levels of sex-hormone–binding globulin and testosterone.[19] Estrogen-containing hormonal contraceptives increase levels of sex-hormone–binding globulin, leading to a reduction in free testosterone levels; this effect is greater in formulations with higher estrogen content.[20] Our finding that women who were more educated and unmarried complained more of sexual side effects may be related to higher expectations related to sexual pleasure. In a randomized controlled trial of women in Scotland and the Philippines, Scottish women had a higher baseline rate of sexual thoughts and a higher rate of sexual side effects from hormonal contraception.[9] This could be a physiological effect, but it may also be related to cultural and religious issues leading to lower expectations about sex in the women from the Philippines. In our study, complaints of mood side effects were related to complaints of sexual side effects. We may assume that mood and sexual satisfaction are linked, but it is also likely that women with low mood would have more complaints in general.

Table 4. Characteristics of women who experienced mood side effects from hormonal contraceptives (n = 978)

	Any mood side effects n = 489	No mood side effects n = 489	*P*
Age*†	28 ± 6.8	29 ± 7.6	0.01
Years education*‡	15 ± 2.5	15 ± 2.8	0.70
Married, n (%)§‖	105 (39)	164 (61)	< 0.001
Any births, n (%)§¶	154 (43)	207 (57)	< 0.001
Recruited in, n (%)§			0.001
Primary care	87 (44)	111 (56)	
Abortion clinic	268 (48)	291 (52)	
IUD clinic	134 (61)	87 (39)	
Ethnicity, n (%)§#			
White/Caucasian	331 (53)	293 (47)	< 0.001
East Asian	67 (36)	118 (64)	
South Asian	45 (59)	31 (41)	
Other	47 (51)	45 (49)	

*Mean ± SD: comparisons were conducted by two-sample t tests

†6 missing answers for age

‡23 missing answers for education

§Percent (n): comparisons were conducted by chi-square test of independence

‖15 missing answers for relationship status

¶22 missing answers for obstetrical history

#10 missing answers for ethnicity

Table 5. Characteristics of women who experienced sexual side effects from hormonal contraceptives (n = 978)

	Any sexual side effects (n = 367)	No sexual side effects (n = 611)	*P*
Age*†	28 ± 6.4	29 ± 7.6	0.07
Years education*‡	15 ± 2.6	15 ± 2.6	0.09
Married, n (%)§‖	87 (32)	182 (68)	0.02
Any births, n (%)§¶	116 (32)	245 (68)	0.01
Recruited in, n (%)§			
Primary care	72 (36)	126 (64)	0.16
Abortion clinic	200 (36)	359 (64)	
IUD clinic	95 (43)	126 (57)	
Ethnicity, n (%)§#			
White/Caucasian	249 (40)	376 (60)	0.02
East Asian	51 (28)	134 (72)	
South Asian	32 (42)	44 (58)	
Other	35 (38)	57 (62)	

*Mean ± SD: Comparisons were conducted by two-sample t tests

†6 missing answers for age

‡23 missing answers for education

§Percent (n): comparisons were conducted by chi-square test of independence.

‖15 missing answers for relationship status

¶22 missing answers for obstetrical history

#10 missing answers for ethnicity

Our questionnaire was designed to capture as many of these sexual and mood side effects attributable to any type of hormonal contraception as possible, so it could be expected that our reported rates would be higher than those of studies of a single product, or those that employ scales of general sexual dysfunction or psychiatric symptoms. In a study of women who began using hormonal contraception after pregnancy termination, 18% did not finish their first month of use.[15] Other studies of contraception side effects would usually not include women who stopped using hormonal contraception before completing their first month, and these women would be very unlikely to participate in future hormonal contraception research trials. Our finding of high rates of sexual and mood side effects is consistent with reports of women in stable relationships, in which 87% of those who changed or stopped using hormonal contraceptives in the first year did so because of mood or sexual side effects.[5]

How questions are asked about side effects makes a difference. In a previous study of nulliparous women using an IUD, open-ended questions revealed fewer emotional and sexual side effects than specific questions.[21] Physicians have reported that they found patients were more likely to reveal sexual side effects if asked specifically.[22] There is a similar problem with use of selective serotonin reuptake inhibitor antidepressants; rates of sexual side effects in users vary widely (from 0% to 58%) from one study to another.[23]

IUD users reported the highest rate of hormone-related side effects, and it is likely that the choice to use an IUD may often be related to previous problems with other contraceptive methods. We had anticipated that the women seeking abortion would also report higher rates of side effects, but there were no significant differences between women seeking abortion and primary care patients. About one third of Canadian women have at least one pregnancy termination, and these women probably represent the larger population of fertile sexually active women.[24]

The lack of significant differences reported between different hormonal contraceptive preparations is similar to the findings in a study of German medical students currently taking oral contraceptives, but is not consistent with the findings of an RCT comparing three different oral contraceptive preparations, which found fewer sexual side effects in users of the preparation with the lowest dose of ethinyl estradiol.[6,8] In our study, 15% of women said they could not remember which oral contraceptive preparation they were using when they experienced side effects; thus, faulty recall may have been a limitation in this study.

It is likely that some women may have misattributed mood and sexual symptoms to hormonal contraception when other causes unrelated to hormonal contraceptive use may have been present. There are high placebo effects in sexual enhancement, and this may interfere with women's ability to differentiate drug side effects from other causes.[25] However, women's memories of their experiences are still important, because it is these memories and perceptions (or misperceptions) that influence their decisions regarding future contraception. The advantages of retrospective observational studies such as ours are that the data are based on real-world observations (empirical data), and the breadth of coverage of people or events means that the findings are more likely than some other approaches to be generalizable to a population.[26] The disadvantages of this approach include the limitations of relying on recollection of a remote event. Randomized placebo-controlled prospective trials are limited by a much greater selection bias, as fewer women, particularly women who have had side effects on previous hormonal contraceptives, are willing to participate in such trials. It is important to conduct both types of research to gain a more complete understanding of the extent of this problem. We cannot generalize the rates of side effects to the general population because the sample was drawn only from primary care, university health centres, and reproductive health clinics, and will therefore be biased.

We did not screen participants by asking about previous sexual dysfunction, mood disorders, or clinical depression, because we wished to focus on the side effects reported by patients, namely mood lability and irritability. We also deliberately omitted questions about global sexual satisfaction because this has been shown to be more closely associated with the quality of a woman's relationship than with her use of hormones.[27,28]

CONCLUSION

Understanding more about which women report mood and sexual side effects with hormonal contraception may be useful when counselling women about contraception. It is likely that both physiological susceptibility and psychosocial and cultural issues affect which women complain of these side effects. It is important that women choose contraception that not only is effective but also does not complicate their emotional and sexual lives. It is a major challenge for clinicians to provide the information women need to make choices without unduly discouraging them from using the most effective methods. More research is needed to determine the best way to inform women about potential risks and benefits of hormonal contraception.

ACKNOWLEDGEMENTS

This research was supported by the Vancouver Foundation through a BC Medical Services Foundation grant to the Community Based Clinical Investigator Program at the UBC Department of Family Practice and the Department of Family Practice at Vancouver General Hospital. Statistical consultation was provided by Dr Jonathan Berkowitz.

REFERENCES

1. Moreau C, Cleland K, Trussell J. Contraceptive discontinuation attributed to method dissatisfaction in the United States. Contraception 2007;76:267–72.
2. Fisher W, Boroditsky R, Morris B. The 2002 Canadian contraception study: part 1. J Obstet Gynaecol Can 2004;26:580–90.
3. Schaffir J. Hormonal contraception and sexual desire: a critical review. J Sex Marital Ther 2006;32:305–14.
4. Davis AR, Castano PM. Oral contraceptives and libido in women. Annu Rev Sex Res 2004;15:297–320.
5. Sanders SA, Graham CA, Bass JL, Bancroft J. A prospective study of the effects of oral contraceptives on sexuality and well-being and their relationship to discontinuation. Contraception 2001;64:51–8.
6. Sabatini R, Cagiano R. Comparison profiles of cycle control, side effects and sexual satisfaction of three hormonal contraceptives. Contraception 2006;74:220–3.
7. Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, et al. The female sexual function index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther 2000;26:191–208.
8. Wallwiener M, Wallwiener L, Seeger H, Mueck AO, Bitzer J, Wallwiener CW. Effects of sex hormones in oral contraceptives on the female sexual function score: a study in German female medical students. Contraception 2001;82:155–9.
9. Graham CA, Ramos R, Bancroft J, Maglaya C, Farley TM. The effects of steroidal contraceptives on the well-being and sexuality of women: a double-blind, placebo-controlled, two-centre study of combined and progestogen-only methods. Contraception 1995;52:363–9.
10. Physicians' Desk Reference. 63rd ed. Montvale (NJ): Thomson Reuters; 2009:3315.
11. CPS 2010. Compendium of pharmaceuticals and specialties: the Canadian drug reference for health professionals. 45th ed. Ottawa: Canadian Pharmacists Association; 2010.
12. Martin KA, Douglas PA. Risks and side effects associated with estrogen-progestin contraceptives. UpToDate [database online] 2011. Available at: http://www.uptodate.com/index. Accessed September 27, 2011.
13. Clayton AH, Segraves RT, Leiblum S, Basson R, Pyke R, Cotton D, et al. Reliability and validity of the sexual interest and desire inventory-female (SIDI-F), a scale designed to measure severity of female hypoactive sexual desire disorder. J Sex Marital Ther 2006;32:115–35.
14. Craig KJ, Hietanen H, Markova IS, Berrios GE. The irritability questionnaire: a new scale for the measurement of irritability. Psychiatry Res 2008;159:367–75.
15. Wiebe ER, Trouton K, Fang ZA. Comparing continuation rates and side effects of hormonal contraceptives in East Asian and Caucasian women after abortion. Contraception 2008;78:405–8.
16. Aldercreutz H, Gorbach SL, Goldin BR, Woods MN, Dwyer JT, Hamalainen E. Estrogen metabolism and excretion in Oriental and Caucasian women. J Natl Cancer Inst 1994;86:1076–82.
17. de Visser SJ, Uchida N, van Vliet-Daskalopoulou E, Fukazawa I, van Doorn MB, van den Heuvel MW, et al. Pharmacokinetic differences between Caucasian and Japanese subjects after single and multiple doses of a potential combined oral contraceptive (Org 30659 and EE). Contraception 2003;68:195–202.
18. Oinonen KA. Putting a finger on potential predictors of oral contraceptive side effects: 2D:4D and middle-phalangeal hair. Psychoneuroendocrinology 2009;34:713–26.
19. Bancroft J. The endocrinology of sexual arousal. J Endocrinol 2005;186:411–27.
20. Strufaldi R, Pompei LM, Steiner ML, Cunha EP, Ferreira JA, Peixoto S, et al. Effects of two combined hormonal contraceptives with the same composition and different doses on female sexual function and plasma androgen levels. Contraception 2010;82:147–54.
21. Wiebe ER, Trouton KJ, Dicus J. Motivation and experience of nulliparous women using intrauterine contraceptive devices. J Obstet Gynaecol Can 2010;32:335–8.
22. Wiebe ER, Kaczorowski J, MacKay J. Doctors learn about drug side effects from their patients: physicians and residents knowledge, experience and practice related to mood and sexual side effects from hormonal contraception. Can Fam Physician. In press.
23. Haberfellner EM. A review of the assessment of antidepressant-induced sexual dysfunction used in randomized, controlled clinical trials. Pharmacopsychiatry 2007;40(5):173–82.
24. Statistics Canada. Induced abortions by province and territory of report. Available at: http://www40.statcan.ca/101/cst01/health40a-eng.htm. Accessed August 23, 2011.
25. Schoen C, Bachmann G. Sildenafil citrate for female sexual arousal disorder: a future possibility? Nat Rev Urol 2009;6:216–22.
26. Kelley K, Clark B, Brown V, Sitzia J. Good practice in the conduct and reporting of survey research. Int J Qual Health Care 2003;15:261–6.
27 Dennerstein L, Lehert P, Burger H. The relative effects of hormones and relationship factors on sexual function of women through the natural menopausal transition. Fertil Steril 2005;84:174–80.
28. Meston CM, Buss DM. Why humans have sex. Arch Sex Behav 2007;36:477–507.