

Comparison of Sexual Dysfunction in Women Using Depo-Medroxyprogesterone Acetate (DMPA) and Cyclofem

Giti Ozgoli¹, Zohre Sheikhan^{1*}, Mahrokh Dolatian¹, Masoumeh Simbar¹, Maryam Bakhtyari², Malihe Nasiri³

1- The Research Centre for Safe Motherhood, Department of Midwifery and Reproductive Health, Faculty of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

2- Department of Clinical Psychology, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

3- Department of Biostatistics, Faculty of Paramedic, Shahid Beheshti University, Tehran, Iran

Abstract

Background: Sexual affairs are one of the physiological needs affecting human health. Sexual functioning disorders can reduce individual's capabilities and creativities. Sexual relations are in the center of women's quality of life. The most important family planning is to prevent unintended pregnancies. Injectable contraceptives protect women exposed to many complications and mortality due to unintended pregnancies, with tolerable effects on other aspects of women's life. An important aspect of women's life is sexual health. This study aimed to compare sexual function of women using DMPA with women using Cyclofem presented to health centers affiliated to Shahid Beheshti University of Medical Sciences in Tehran, Iran in 2013.

Methods: This descriptive-comparative study was conducted on 240 women in health centers in Tehran, Iran. They were selected by multistage sampling. The data was collected using a questionnaire completed by interviewing. The questionnaire had 2 parts, demographic characteristic section and Female Sexual Function Index (FSFI). Data was analyzed by descriptive statistics, independent T-test, U-test, Chi-square, Fisher exact test. The p-value less than 0.05 were applied for all statistical tests as significance level.

Results: The difference in sexual function between Cyclofem and DMPA groups was insignificant, but in terms of sexual desire in DMPA users better than and sexual pain them less than in Cyclofem users, the difference between the groups was significant ($p < 0.05$).

Conclusion: In introducing hormonal contraceptive methods, health workers should emphasize their adverse effects on sexual function. Women who use Cyclofem and DMPA should be aware that they may experience some changes in libido and sexual pain.

Keywords: Cyclofem, DMPA, Sexual dysfunction.

To cite this article: Ozgoli G, Sheikhan Z, Dolatian M, Simbar M, Bakhtyari M, Nasiri M. Comparison of Sexual Dysfunction in Women Using Depo-Medroxyprogesterone Acetate (DMPA) and Cyclofem. *J Reprod Infertil.* 2015;16(2):102-108.

* Corresponding Author:
Zohre Sheikhan, The
Research Centre for Safe
Motherhood, Department
of Midwifery and
Reproductive Health,
Faculty of Nursing and
Midwifery, Shahid
Beheshti University of
Medical Sciences, Niayesh
Highway, Vali-asr Street,
Tehran, Iran
E-mail:
zsheikhan@gmail.com

Received: Jun. 20, 2014

Accepted: Nov. 18, 2014

Introduction

Sex is an important aspect of quality of life that affects both physical and psychological aspects. According to a report by American Center for Health, 43% of women had unfavorable sexual function, and 2% were unable to experience orgasm (1). Sexual dysfunction in German women was reported to be 38% (2), and in Turk-

ish women 48.3% (3). In Austria, 9.1% of women had sexual desire disorders, 20% had sexual arousal disorder, 20% had orgasm disorder, and 12.8% had pain (4). In another study, a third of women had no sexual desires, and a fourth had not experienced orgasm (5). In Iran, sexual dysfunctions are wide ranging, from 17.8% to 74.6% (6-8). This is

such an important problem that accounts for 88% of divorces (6). Women suffer from sexual dysfunction more than men. In fact, sexual relationship is central to quality of women's life, and it reflects the psychosocial and life aspects (9). Different factors such as health, emotional problems, stress, and hormones affect sexual function (10).

Furthermore, unintended pregnancies can be a serious threat to mother's and child's health, since a large number of them are terminated using dangerous methods that result in mother's death or disability (11). Nearly 80 million out of 210 pregnancies worldwide are unintended. According to studies in Iran, a third of pregnancies are unintended (12). Injectable contraceptives are safe and effective options to prevent unintended pregnancy. Currently, there are two types of contraceptives available, monthly progestin only and combined contraceptive injections. Progestin compounds are extraordinarily efficient, but have significant side-effects. This is just as effective as sterilization, and more effective than oral and barrier contraceptive methods (13). Since menstrual irregularities in users of this method are attributed to estrogen deficiency, addition of an estrogen part to injectable products is said to regulate menstruation (14) and reduce side-effects (15). With a growing usage (16), Cyclofem is another type of combined injectable hormonal contraceptive. Cyclofem combination formula is hormonal and it is injected monthly. In the United States, this drug is known with its brand name Lunelle (17). The efficacy of this method is 99.8% in the first year (18). This rate of efficacy is similar to that of sterilization in women (19). The use of hormonal injectable contraceptives is a highly effective method, and it is favored because of its simplicity and non-interference with sexual intercourse. Sex hormones such as estrogen and progesterone can impose different effects on women's sexual behaviors and functions through vaginal tissue and the central nervous system (20). Studies indicate that hormones used in contraceptive methods have contradictory effects on sexual function (17). Some reports reveal the effect of hormones, and conversely, some report lack of the effect (21-22). The emergence of sexual disorders is one of the most important adverse effects that may occur during the use of hormonal methods of contraception. In some cases, disorders will even lead to the discontinuation of the method. Although sexual adverse effects that lead to discontinuation are controversial, studies show that there is no con-

sistent pattern for sexual effects of hormonal contraceptive methods (23). Women using hormonal contraceptive methods have experienced positive, negative or no effects on their libido (21). In a study, 87% of women had to discontinue hormonal contraceptive methods because of emotional complications, exacerbated premenstrual syndrome (PMS), and decreased libido and sexual excitement (24). In another study, sexual intercourse disorders were the reason for discontinuation of hormonal contraceptive methods (25). Currently, there are effective methods for regulating fertility, but none is definitely without complications (26). In choosing contraceptive methods, women are faced with many challenges, including benefits and side-effects (27). Although, in Iran, Cyclofem has been available for a short time, conflicting results have been observed in relation to its side-effects. This study aimed to compare sexual function of women using DMPA with women using Cyclofem presented to health centers affiliated to Shahid Beheshti University of Medical Sciences in Tehran, Iran in 2013.

Methods

This descriptive-comparative study was conducted in health centers affiliated to Shahid Beheshti University of Medical Sciences in Tehran, Iran, between May and November 2013. Participants were selected by multistage sampling. The area of health care centers related to Shahid Beheshti University of Medical Sciences in Tehran was divided into four zones, namely North, South, West and East, and then two centers were selected from each zone randomly. Eligible women presented to the above health centers were selected for participation in study, so 240 subjects were divided into two equal groups of 120 each (Figure 1).

DMPA ampoule (Caspian Tamin pharmaceutical Co., Iran) containing 150 mg of medroxyprogesterone acetate, and Cyclofem ampoule (Iran Hormone, Iran) containing 25 mg of medroxyprogesterone acetate and 5 mg of estradiol cypionate, injected in monthly intervals, was administered in health centers.

Data collection tool was a questionnaire, completed by the researchers through interviews. Because of the impact of depression and anxiety on sexual function, the 28-item General Health Questionnaire (GHQ-28) was first completed and was scored in Likert scale. Subjects scoring 22 marks or more were excluded (N=21). The questionnaire, Female Sexual Function Index (FSFI), is

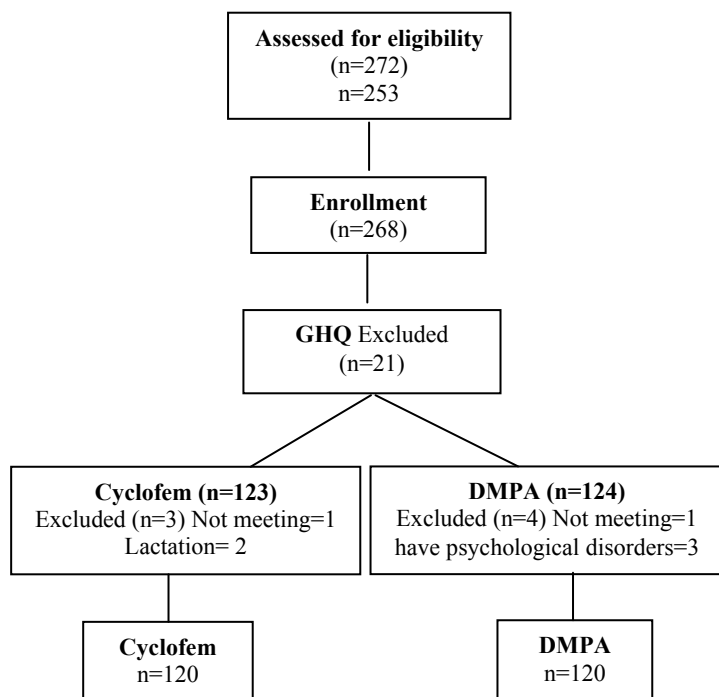


Figure 1. Flow diagram showing numbers of women in each group

used in various studies (28-29). In this study, it contained 19 questions with 5 options (0-5), with 2 questions on sexual desire, 4 on arousal, 4 on vaginal lubrication, 3 on orgasm, 3 on pain, and 3 on sexual satisfaction, designed in Likert scale, and evaluated sexual function over the past 4 weeks. Maximum score was 36, and scores less than 28 indicated unfavorable sexual functions. In each area, the highest score was 6. Internal consistency was ensured using Cronbach's alpha coefficient ($\alpha=0.81$). For reliability, test-retest method was used with a 10-day interval ($r=0.83$). Another questionnaire contained 33 questions on demographic details.

Only eligible women presented to health centers affiliated to Shahid Beheshti University of Medical Sciences in Tehran were selected. After explaining objectives of the study, the first condition for participation in study was obtaining consents of women and their spouses, and subjects were included in the study if they were so inclined. The participants were assured that all their information was confidential, and that they did not need to mention their names on the questionnaires. This study was approved by Ethics Committee (No: 312/770, Dated 2012/12/7). All ethical issues-informed consent, conflict of interest, plagiarism, misconduct, data fabrication and/or falsification,

double publication and/or submission, redundancy, etc.-have been considered carefully by the authors. The respondents were anonymous and participated willingly and voluntarily in this study. Study inclusion criteria were Iranian nationality, minimum 3 month use of contraceptive methods, no lactating, no addiction of women or their spouses, no known psychological disorders in women or their spouses, no use of antidepressants by women or their spouses, the normal life of women over the 6 months prior to study, no particular adverse life events such as death of a dear one, incurable diseases in family members, changes of residence, retirement of spouse, or loss of job by women or their spouse. To analyze data, descriptive statistics, T-test, U-test, Chi-square, Fisher exact test and SPSS 16 software were used. The significance level of p-value less than 0.05 was applied for all the statistical tests.

Results

This study was conducted on 240 women, and their demographic details are presented in table 1. Mean age of participants was 28.26 ± 5.08 years in Cyclofem group and 28.63 ± 7.16 in DMPA group. The mean age of marriage in participants was 18.55 ± 3.62 years in Cyclofem group and 19.58 ± 3.66 years in DMPA group. In Cyclofem group, the length of marriage was 8.70 ± 4.89 years and 10.37 ± 6.15 in DMPA group with a statistically significant difference between the two groups. Mean age of first conception was 21.12 ± 4.84 years in Cyclofem group and 19.76 ± 4.88 in DMPA group. Mean of gravidity was 2.15 ± 1.22 in Cyclofem group and 1.83 ± 0.96 in DMPA group. Mean of duration of using contraception was 50.32 ± 7.83 months in Cyclofem group and 47.65 ± 6.98 months in DMPA group. Menstruation status in Cyclofem group was regular (85%) but in DMPA group was irregular (46.7%). In Cyclofem group, there were no adverse effects in 84.2% of women, but in DMPA group there were no adverse effects in 60% of women. In Cyclofem group, the level of education was high school diploma in 60% of women, while the level of education was high school diploma in 46.6% of women in DMPA group. In Cyclofem group, 100% of women were Muslim while in DMPA group 97.7% of women were Muslim.

Sexual function in women using DMPA was favorite (60.8%) and 65.8% in women using Cyclofem. The difference in sexual function between Cyclofem and DMPA groups was not significant,

Table 1. Distribution of women who used Cyclofem and DMPA by their characteristics

Variable	Cyclofem n=120	DMPA n=120	p-value
Mean age (year) *	28.26±5.08	28.63±7.16	NS ^a
Mean age of marriage (year) *	18.55±3.62	19.58±3.66	NS ^a
Mean duration of marriage (year) *	8.70±4.89	10.37±6.15	p<0.05 ^a
Mean age of first conception (year) *	21.12±4.84	19.76±4.88	NS ^a
Mean of gravidity *	2.15±1.22	1.83±0.96	NS ^a
Mean duration of use of contraception (months) *	50.32±7.83	47.56±6.98	NS ^a
Menstruation status **			
Regular	102 (85)	26 (21.6)	
Irregular	17 (14.2)	56 (46.7)	NS ^b
Amenorrhea	1 (0.8)	38 (31.7)	
Adverse effects of contraception **			
No	101 (84.2)	72 (60)	
Yes	19 (15.8)	48 (40)	NS ^b
Education **			
Illiterate	2 (1.7)	12 (10)	
Primary school	12 (10)	14 (11.7)	
Secondary school	28 (23.3)	26 (21.7)	NS ^b
High school	72 (60)	56 (46.6)	
Above	6 (5)	12 (10)	
Religion **			
Muslim	120 (100)	117 (97.5)	
Other	0 (0)	3 (2.5)	NS ^b

a: Independent t-test; b: Chi squer test

* M±SD, ** n (%)

Table 2. Comparison of sexual function in two groups (120 women in each group)

Domain	Cyclofem n=120	DMPA n=120	p-value
Desire *	3.60 (3.0-4.8)	3.60 (2.4-5.4)	0.018 ^a
Arousal *	4.20 (3.6-4.8)	4.20 (3.6-4.5)	0.837 ^a
Lubrication *	5.25 (4.5-6.0)	5.10 (3.9-6.0)	0.273 ^a
Orgasm *	4.80 (4.0-6.0)	5.20 (3.6-6.0)	0.816 ^a
Pain *	6.00 (5.2-6.0)	5.20 (4.0-6.0)	0.002 ^a
Satisfaction *	4.80 (3.6-6.0)	5.20 (4.8-6.0)	0.267 ^a
Total **	29.53 (4.23)	29.78 (5.48)	0.239 ^b

a: Mann-whitney test; b: Independent t-test

* Median (IQR), ** M±SD

but in terms of sexual desire and sexual pain, the difference between the groups was significant (p<0.05) (Table 2).

Discussion

In this study, there was a significant difference in sexual desire between DMPA and Cyclofem groups, and mean sexual desire score in women using DMPA was higher than Cyclofem. One of the mechanisms of hormonal contraceptive methods is to

suppress or prevent the release of LH and FSH from the pituitary gland, resulting in increased levels of SHBG. In decreased libido, the testosterone level is bound to SHBG and free testosterone declines. This trend is intensified by an increase in estrogen (30). The first stage in sexual response cycle may be the desire stage. Women begin or consent to a sexual relationship for many different reasons that include desire to increase emotional intimacy with sexual partnership. Sexual desire leads to arousal to have sexual relationship. Sexual feelings may start through internal and external sexual innuendos, and depend on neuroendocrine function. Neurotransmitters, peptides, and many hormones moderate desire and motivation. Sexual response is hastened by norepinephrine, dopamine, oxytocin, serotonin, and is inhibited by prolactin and GABA. Yet, it has been found that biological factors do not function independently of environmental factors. Dopamine and progesterone that act upon receptors in hypothalamus increase sexual behaviors (17). Clayton (2003) argues that perhaps sexual hormones such as dopamine and serotonin in contraceptives affect

neurotransmitters and cause a change in sexual desire, with an unknown mechanism (31). Berek (2011) believes women's sexual desire is affected by their psychological status, beliefs and values, expectations, sexual preference, priorities and environmental conditions. Sexual desire is at its peak between 20 and 40 years of age, and declines beyond that (17). Another finding in this study was the significant relationship between the two contraceptive methods in the pain area. Mean score of pain in women using Cyclofem was higher than in women using DMPA. Nijland et al. (2008) admits reduced estrogen level, causing reduced blood supply to vagina, affects lubrication and results in a painful intercourse (32). Van lunsen and Laan (2004) believes that hormonal balance is necessary for initiating and continuing sexual function. Estradiol, nitric oxide, and polypeptides have an important effect on vaginal epithelium and lubrication, and estrogen has a major role in effectiveness of these factors (33). Sufficient levels of estradiol are necessary for maintaining vaginal lubrication and preventing dyspareunia. In the present study, estradiol level in women using Cyclofem was not measured. However, in a study by Modelska et al. (2004), the improvement in sexual function due to the effect of estradiol level was demonstrated (34). Schaffir et al. (2010) argues that estradiol level had no effect on dyspareunia and lubrication score in women studied, and believed that, because of effects of progesterone on vaginal epithelium in women using DMPA, estradiol level was tangibly low, and may even cause suppression of estrogen. On the other hand, many women using DMPA, had amenorrhea, which may have affected their sexual desire or sexual enjoyment, through unexpected bleeding (28). In family planning counseling, the effects of hormonal methods on women's sexual function and menstrual patterns and their adjustment with the methods should be considered. In both groups, there was a statistically significant difference between the duration of marriage in women which is consistent with studies of Barrientos and Dario (2006) (35). Berek (2011) argues that sexual desire, interest, and arousal are immensely influenced by mental health and feelings of sexual partner on the occasion of relationship. Other factors affecting sexual response include duration and quality of sexual relationship and personal-psychological factors (17). In this study, spouses' sexual dysfunction was not inves-

tigated. With aging of spouse, erectile and ejaculatory dysfunction increases, and daily fatigue, work and stress can affect sexual function of men. Study results showed satisfactory level of sexual function in women using DMPA and Cyclofem, with insignificant difference between them. Our study was in agreement with previous studies (3, 20, 28, 36-37). Sexual function is very complicated and is affected by many factors, including the person's lifestyle, interpersonal relationships and cultural conditions. Berek (2011) argues that sexual response occurs through complex mediating psychological, social, environmental, and biological factors (hormonal, vascular, muscular, and nervous) (17). Despite numerous studies, mechanisms of sexual disorders in hormonal contraceptive methods are still unknown and they cannot be predicted for all women (38). Basson (2006) believes that despite sexual disorder symptoms, women can enjoy pleasant sexual relations by increasing their knowledge in this regard (39). It is worth noting that women that are not afraid of unintended pregnancies may enjoy sexual relationships more and score higher in sexual function.

In Iran, as one of the traditional and religious communities, sexual affairs are ambiguous. Lack of training and providing information on sexual affairs are the main concerns in Iranian women.

Cyclofem and DMPA may be used as highly effective, safe and convenient methods for long term reversible contraception. Satisfaction from a method is often influenced by frequency of side effects and the outcomes on individuals' health (40).

Clearly, according to reproductive rights, women have the rights to experience a safe and enjoyable sexual relationship.

Conclusion

In introducing hormonal contraceptive methods, health workers should emphasize their adverse effects on sexual function so that in addition to preventing negative outcomes such as unintended pregnancy, they can improve the quality of sexual relations and sexual satisfaction with increasing people's awareness. Women who use Cyclofem and DMPA should be aware that they may experience some changes in dimensions of libido and sexual pain. Discontinuation of hormonal contraceptive methods because of this reason depends on the severity of complications.

Acknowledgement

Authors thank Shahid Beheshti University of Medical Sciences, Tehran, Iran and all the women who took part in this research.

Conflict of Interest

The authors declare no conflict of interest.

References

- Gonzalez M, Viafara G, Caba F, Molina E. Sexual function, menopause and hormone replacement therapy (HRT). *Maturitas*. 2004;48(4):411-20.
- Korda JB. [Female sexual dysfunction]. *Urologe A*. 2008;47(1):77-89. German.
- Oksuz E, Malhan S. Prevalence and risk factors for female sexual dysfunction in Turkish women. *J Urol*. 2006;175(2):654-8.
- Ponholzer A, Roehlich M, Racz U, Temml C, Madersbacher S. Female sexual dysfunction in a healthy Austrian cohort: prevalence and risk factors. *Eur Urol*. 2005;47(3):366-74.
- Panzer C, Wise S, Fantini G, Kang D, Munarriz R, Guay A, et al. Impact of oral contraceptives on sex hormone-binding globulin and androgen levels: a retrospective study in women with sexual dysfunction. *J Sex Med*. 2006;3(1):104-13.
- Foroutan SK, Jadid Milani M. Prevalence of sexual dysfunction in patients referred to the Family Justice Center. *Daneshvar J*. 2008;16(78):39-44.
- Nik-Azin A, Nainian MR, Zamani M, Bavojdan M R, Bavojdan MR, Motlagh MJ. Evaluation of sexual function, quality of life, and mental and physical health in pregnant women. *J Family Reprod Health*. 2013;7(4):171-6.
- Bolhari J, Ramezanzadeh F, Abedinina N, Naghizadeh MM, Pahlavani H, Saberi M. The survey of divorce incidence in divorce applicants in Tehran. *J Family Reprod Health*. 2012;6(3):129-37.
- Ojanlatva A, Makinen J, Helenius H, Korkeila K, Sundell J, Rautava P. Sexual activity and perceived health among Finnish middle-aged women. *Health Qual Life Outcomes*. 2006;4:29.
- Biddle AK, West SL, D'Aloisio AA, Wheeler SB, Borisov NN, Thorp J. Hypoactive sexual desire disorder in postmenopausal women: quality of life and health burden. *Value Health*. 2009;12(5):763-72.
- Sitruk-Ware R, Nath A, Mishell DR Jr. Contraception technology: past, present and future. *Contraception*. 2013;87(3):319-30.
- Morrone C, Myer L, Moss M, Hoffman M. Preferences between injectable contraceptive methods among South African women. *Contraception*. 2006;73(6):598-601.
- Canto de Cetina TE, Luna MO, Cetina Canto JA, Bassol S. Menstrual pattern and lipid profiles during use of medroxyprogesterone acetate and estradiol cypionate and NET-EN (200 mg) as contraceptive injections. *Contraception*. 2004;69(2):115-9.
- Nathirojanakun P, Taneepanichskul S, Sappakitkumjorn N. Efficacy of a selective COX-2 inhibitor for controlling irregular uterine bleeding in DMPA users. *Contraception*. 2006;73(6):584-7.
- Guazzelli CA, Jacobucci MS, Barbieri M, Araujo FF, Moron AF. Monthly injectable contraceptive use by adolescents in Brazil: evaluation of clinical aspects. *Contraception*. 2007;76(1):45-8.
- Bortolotti de Mello Jacobucci MS, Guazzelli CA, Barbieri M, Araujo FF, Moron AF. Bleeding patterns of adolescents using a combination contraceptive injection for 1 year. *Contraception*. 2006;73(6):594-7.
- Berek JS. *Berek & Novak's Gynecology*. 15th ed. Philadelphia: Lippincott Williams & Wilkins; c2012. Chapter 11, Sexuality, sexual dysfunction and sexual assault; p. 270-305.
- Cavazos-Rehg PA, Krauss MJ, Spitznagel EL, Schootman M, Peipert JF, Cottler LB, et al. Type of contraception method used at last intercourse and associations with health risk behaviors among US adolescents. *Contraception*. 2010;82(6):549-55.
- Ruminjo JK, Sekadde-Kigundu CB, Karanja JG, Rivera R, Nasution M, Nutley T. Comparative acceptability of combined and progestin-only injectable contraceptives in Kenya. *Contraception*. 2005;72(2):138-45.
- Wallwiener M, Wallwiener LM, Seeger H, Mueck AO, Zipfel S, Bitzer J, et al. Effects of sex hormones in oral contraceptives on the female sexual function score: a study in German female medical students. *Contraception*. 2010;82(2):155-9.
- Davis AR, Castano PM. Oral contraceptives and libido in women. *Annu Rev Sex Res*. 2004;15:297-320.
- Witting K, Santtila P, Jern P, Varjonen M, Wager I, Hoggund M, et al. Evaluation of the female sexual function index in a population based sample from Finland. *Arch Sex Behav*. 2008;37(6):912-24.
- Schaffir J. Hormonal contraception and sexual desire: a critical review. *J Sex Marital Ther*. 2006;32(4):305-14.
- Sanders SA, Graham CA, Bass JL, Bancroft J. A prospective study of the effects of oral contraceptives on sexuality and well-being and their rela-

- tionship to discontinuation. *Contraception*. 2001;64(1):51-8.
25. Sabatini R, Cagiano R. Comparison profiles of cycle control, side effects and sexual satisfaction of three hormonal contraceptives. *Contraception*. 2006;74(3):220-3.
 26. Hubacher D, Lopez L, Steiner MJ, Dorflinger L. Menstrual pattern changes from levonorgestrel subdermal implants and DMPA: systematic review and evidence-based comparisons. *Contraception*. 2009;80(2):113-8.
 27. Gold MA, Bachrach LK. Contraceptive use in teens: a threat to bone health? *J Adolesc Health*. 2004;35(6):427-9.
 28. Schaffir JA, Isley MM, Woodward M. Oral contraceptives vs injectable progestin in their effect on sexual behavior. *Am J Obstet Gynecol*. 2010;203(6):545.e1-5.
 29. 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(2):191-208.
 30. Hussein M, Mahran DG, Farouk OA, El-Assal MA, Fathallah MM, Romih MS. Bone mineral density in women of a low socioeconomic level using DMPA for contraception in rural Upper Egypt. *Int J Gynaecol Obstet*. 2010;110(1):31-4.
 31. Clayton AH. Sexual function and dysfunction in women. *Psychiatr Clin North Am*. 2003;26(3):673-82.
 32. Nijland EA, Weijmar Schultz WC, Nathorst-Boos J, Helmond FA, Van Lunsen RH, Palacios S, et al. Tibolone and transdermal E2/NETA for the treatment of female sexual dysfunction in naturally menopausal women: results of a randomized active-controlled trial. *J Sex Med*. 2008;5(3):646-56.
 33. van Lunsen RH, Laan E. Genital vascular responsiveness and sexual feelings in midlife women: psychophysiologic, brain, and genital imaging studies. *Menopause*. 2004;11(6 Pt 2):741-8.
 34. Modelska K, Litwack S, Ewing SK, Yaffe K. Endogenous estrogen levels affect sexual function in elderly post-menopausal women. *Maturitas*. 2004;49(2):124-33.
 35. Barrientos JE, Paez D. Psychosocial variables of sexual satisfaction in Chile. *J Sex Marital Ther*. 2006;32(5):351-68.
 36. Auslander BA, Rosenthal SL, Fortenberry JD, Biro FM, Bernstein DI, Zimet GD. Predictors of sexual satisfaction in an adolescent and college population. *J Pediatr Adolesc Gynecol*. 2007;20(1):25-8.
 37. Asghari Roodsari A, Khademi A, Akbari D, Hamed E, Tabatabaieifar SL, Alleyassin A. Female sexual dysfunction in married medical students. *McGill J Med*. 2005;8(2):104-8.
 38. Wiebe ER, Brotto LA, MacKay J. Characteristics of women who experience mood and sexual side effects with use of hormonal contraception. *J Obstet Gynaecol Can*. 2011;33(12):1234-40.
 39. Basson R. Sexual desire and arousal disorders in women. *N Engl J Med*. 2006;354(14):1497-506.
 40. Aladag N, Filiz M, Topsever P, Apaydin P, Gorpe-lioglu S. Satisfaction among women: differences between current users of barrier (male condom) and non-barrier methods. *Eur J Contracept Reprod Health Care*. 2006;11(2):81-8.