Contraception and Sexuality

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4.1   Introduction

Access to safe and effective contraception is a critical issue for both sexual and social health. Indeed, successful control of fertility leads women to important benefits from personal, economic, and cultural autonomy to the psychological and physical well-being and, consequently, to a better quality of their relationship with their partner [1].

Contraception was expressly designed to enhance and improve sexual activity, freeing it from the concern of an unwanted pregnancy. On the other hand, some essential issues related to contraceptive use, such as sexual acceptability and the impact on sexual experiences, preferences, and practices, have been poorly explored. Few recent studies have suggested that contraception can affect women's sexual function having a wide range of positive and negative effects, exerting their influence on several domains of female sexuality (desire, arousal, orgasm, and enjoyment). However, it is important to stress that satisfaction with sexual activity depends on a multitude of factors that extend beyond sexual function itself. In fact, while social and cultural variables may influence female sexuality in the modality and timing of sexual expression, sexual behavior could be affected by both hormonal changes and the use of hormonal contraception [2]. Some authors have suggested that female sexual interest increases during the periovular phase of the menstrual cycle in women who use reliable non-hormonal contraception [3].

A growing number of reports in the literature have recently focused on sexual aspects of contraception, especially hormonal contraception and its association with libido. However, a holistic approach is needed to understand the complexity of aspects related to women's sexuality and their link with contraception. More

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attention towards these topics could promote both women's sexual well-being and a more widespread contraceptive practice.

In this chapter, we will discuss female sexuality starting from the biological aspects that characterize women in their cyclic physiology, as organic, social, and psychological. In this context, we will focus on the different methods of contraception and their impact on female sexuality, according to the most recent literature reports.

4.2 Findings on Women's Sexuality Across the Menstrual Cycle

For several decades, evolution-minded theories on human sexuality have been almost always based on the assumption that women have lost their estrus, a distinct phase of female sexuality occurring near ovulation, characterized by an enhanced receptivity in terms of sexual motivation [4]. However, recent evidence and theories have suggested that the loss of estrus in humans has not really occurred [5]. Findings on women's sexuality across the menstrual cycle have reported an increase in female sexual desire and activity over the follicular phase, with a mid-cycle peak, followed by a postovulatory decline [3, 6–8].

From an evolutionary point of view, women's sexual motivation during the fertile phase of the menstrual cycle provides a powerful tool to understand the consistency of sexual behaviors with the finalistic purpose of reproduction; thus, women would have evolved rather in another sense, in order to conceal their cyclic fertility or, in our terms, their estrus [9] (Gildersleeve 2014). Other authors have specifically investigated the frequency of sexual activity in both single and partnered women using an effective barrier contraception, observing a clear rise 3–4 days before the LH peak and a second increase before the menstrual period [7]. Changes in sexual activity from the follicular phase to menses seem to reflect the monthly cyclic changes of all ovarian steroids, even if the increase of both the total testosterone and free androgen index during the periovulatory phase is relatively small compared with those observed during other menstrual phases [3]. Interestingly, authors have suggested that estrogens and progesterone have an excitatory and inhibitory effect, respectively, on female sexual desire but did not support a role for testosterone [6]. In a large-scale international study, conducted on 20,000 sexually active couples adopting contraceptives (with the exclusion of hormonal and rhythm methods), it was observed that the frequency of sexual intercourse was lower during menses, but no significant differences were found among other phases of the menstrual cycle [10]. Despite several studies having pointed in the direction of ovarian hormones in the prediction of female sexual desire, evidence about the influence of the menstrual cycle itself on sexual behavior has not been completely clarified. Indeed, cyclic changes in female sexual interest may be masked by the relatively constant sexual desire of the partner or other non-biological dynamics [8]; these factors could explain the difficulties to demonstrate hormonal influences on female sexuality. Moreover, according to some recent findings, there could be different behaviors in

sexual activity between single women and those with a partner [3]. Indeed, women without a stable relationship tend towards an increase in sexual activity during the periovulatory phase, while those with a partner are less likely to report differences across the menstrual cycle. Such correlations could indicate that the model of human sexual behavior is closer to the biological one, especially when it is free from relational influences.

Sexual activity is certainly influenced by the social and cultural context. For example, avoidance of sex during menses is widespread across the world. Current social attitudes often tend toward a high frequency of sexual activity in the evening when people are less inhibited or most frequently on Saturday [3]. Interestingly, some authors argued that menstrual avoidance can lead to a "heaping" of postmenstrual sexual activity without there being any hormonal influence [11, 12], and the combination of menses-associated avoidance, weekend-associated preferences, and associated changes in behaviors (such as sleep and stress) may override hormonal influences making sexual activity independent from ovulation [2].

4.3 Combined Oral Contraceptives (COCs) and Female Sexuality

Over the past half century, a plethora of scientific reports about social and cultural aspects related to the pill has been written [13]. Some authors have argued about the social impact of "the pill" and its role on the so-called sexual revolution supporting that, at least in the first phase, it was misunderstood [14, 15]. The story of the development itself is controversial. It began with the collaboration of two scientists who were conducting experiments on the use of progesterone for two different purposes: John Rock who aimed to use it as a treatment for infertility and Gregory Pincus who wanted to block ovulation. At that time, experimentation for the purpose of contraception was illegal; thus, the pill was approved by the FDA to treat menstrual disorders and it was available only for married women. In 1960, it was approved as a contraceptive, and only in 1972 was it freely available for all women, accompanied by the onset of many ethical and social concerns, as pointed out by a story published in the *U.S. News & World Report* and asking "Can its availability to all women of childbearing age lead to sexual anarchy?"

Despite all the ethical and social controversies and the scientific debate on side effects, the pill has nowadays a well-established role in medical practice [16]. Combined hormonal contraception (CHC) is an affordable and reversible method of birth control, available with a variety of formulations, regimens, and doses of administrations. It is used by over 100 million women worldwide who have gained a remarkable control of their fertility with respect to other methods, such as the male condom [17].

A wide number of studies have examined the effects of COCs, focusing on efficacy and safety in terms of side effects such as nausea, weight gain, and bleeding irregularities; however, few investigated the impact on female sexual function [3, 18].

The vast majority of studies on sexuality in COC users have primarily focused on changes in sexual desire after starting or switching to hormonal contraception [19, 20]. Some authors have suggested that a proportion of women using oral contraceptives report impairment of their sexual interest or response, which may be attributed to the pill [21]. However, findings from studies comparing pill users versus women using non-hormonal methods have shown contrasting results [20].

In a recent systematic review of 36 studies, involving more than 13,000 women, no significant effects on sexual desire with the use of COCs were reported [22]. On the other hand, several studies have shown an association between the use of COCs and changes of sexual function, particularly sexual desire and arousal, frequency of sexual activity, and orgasm achievement but not enjoyment with sexual activity [19, 23, 24]. It is far from clear whether these changes are direct hormonal effects of the oral contraceptive, secondary to pill-induced mood changes, or are primarily psychological reactions towards fertility control or other unrelated factors [25]. The lack of robust evidence highlights the complexity of the female sexual function and focuses on the need for a holistic approach in order to achieve an appropriate understanding.

From a biological standpoint, COCs are known to lower the endogenous levels of free or bioavailable testosterone [21]. This could occur by two mechanisms as follows: oral COCs can increase sex hormone-binding globulin (SHBG) with a consequent decrement in free testosterone (FT); alternatively, they can directly act on the ovary, suppressing androgen production [26, 27]. According to recent studies, CHCs might reduce the blood levels of free testosterone below a critical threshold, potentially leading to, at least in a group of susceptible women, complaints of decreased sexual desire [25, 28]. Evidence supporting or refuting this "desensitization hypothesis" is currently lacking [29]. Differences in terms of anti-androgenic effects and impact on sexuality could be attributed in part to the known effects of estrogen on SHBG synthesis and in part to the androgenic or anti-androgenic activity of the involved progestin [25].

Furthermore, some pathological conditions can have a negative impact on female sexuality, among these the most common are undoubtedly PCOS and endometriosis. COCs have a widely recognized role as effective treatment for these conditions, but their role on sexuality has been poorly assessed. However, they have been associated with an improved sexual function due to the reduction of specific symptoms, such as chronic pelvic pain and deep dyspareunia in women with endometriosis [30] and amelioration of the body image and self-esteem in women with PCOS, due to the reduction of hirsutism and acne [31]. Moreover, extended or continuous regimens of administration have been associated with additional positive changes in a variety of sexual acceptability factors, from sexual function and libido to a reduction in dysmenorrhea, duration of withdrawal bleeds, and breast tenderness [25, 28]. Finally, some studies have focused on the factors that affect women's sexual arousal, finding that fears about unwanted pregnancy had a very negative impact, particularly if the partner did not share these concerns [32]. Women with a clear desire to avoid pregnancy are likely to get benefits in their sexuality by effective methods that make them feel secure about preventing conception. COCs are a highly effective

form of contraception; they help to eliminate anxiety related to the fear of pregnancy, encouraging a more relaxed and enjoyable sexual experience [33].

During the past few decades, due to the increased attention on side effects of hormonal contraceptives, many strategies have been carried out to improve the tolerability of COCs [34]. In order to decrease the impact on metabolism, we have seen a constant reduction of the ethinylestradiol (EE) dosage to 30, 20, and also 15 µg.

Despite a reduction of side effects, a high rate of discontinuation has been reported because of the effects on mood and sexuality. In fact, during the usage of oral contraceptives containing EE 15 µg, women could experience lower sexual desire, arousal, and sexual activity than before starting contraception [35]. Some women could also experience dyspareunia, referring it as related to a decrease in sexual thoughts and fantasies. As previously discussed, the reduction of libido could be explained by the increase in SHBG and the consequent low FT; notably, this effect seems to persist even when the EE dose is reduced [36–39]. On the other hand, the low peripheral dose of EE could be involved in the reduction of vaginal lubrication and, consequently, in experience arousal disorders [35, 40, 41].

In conclusion, the concept of variable sensitivity to sexual steroids should be emphasized and COCs should be tailored to subjective needs. Moreover, another important aspect in contraceptive counseling is related to women's expectations about the effects of COCs on their sexual activity. In the majority of cases women expect an improvement in sexuality with COC use, while a worsening or the lack of changes could lead to discontinuation.

4.4 Vaginal Ring

The contraceptive vaginal ring (CVR) represents a suitable option because of its non-contraceptive benefits in women with indications for CHC who experience sexual dysfunctions with the oral route [42]. It was developed to improve women's compliance and acceptability eliminating the need of a daily intake with the advantage of a route that avoids the first liver passage [43]. Moreover, the vaginal route provides therapeutic hormone levels with low daily doses and a more stable absorption compared with traditional COCs [44].

The etonogestrel (ENG)/EE combined vaginal ring has been shown to be a valid low-dose contraceptive, releasing daily 15 µg of EE and 120 µg of ENG, to ensure an optimal cycle control, with a low incidence of irregular bleeding and withdrawal bleeding. Despite the low dismissing of EE, few reports comparing CVRs with COCs have shown better effects on women's sexuality in the CVR group [45]. The improvement in sexual function in women using CVRs could be related to more stable circulating levels of exogenous hormones. In addition, findings from recent studies have supported the hypothesis that the increased local concentration of EE in the vagina, associated with the CVR, results in the improvement of vaginal wetness and reduction of dyspareunia [46]. Another important effect of the local activity of a CVR is the increase in the number of lactobacilli of the vaginal flora, which can lead to an increased leukorrhea with protective effects against vaginal

colonization by pathogens [47]. Moreover, CVRs could exert a further positive effect on sexual interest and fantasy, as well as on the psyche of the woman and her partner, evidenced by their greater complicity and satisfaction. The presence of a foreign body in the vagina may have a stimulating effect on both partners, more psychical than physical, since only a few couples report feeling it during intercourse [48]. However, studies evaluating CVRs and their effects on sexual function have shown conflicting results. In a randomized study, vaginal ring users had better results related to desire and sexual satisfaction compared with COC users [41]. Sexual desire was also found to be higher in ring users compared with a desogestrel-containing combined COC and a desogestrel-only [49]. A prospective study on women using a vaginal ring in an extended regimen found an improvement in sexual function and a reduction of sexual distress after 60 days of use [50]. On the contrary, in an open-label randomized trial, it was observed that CVR was responsible for a decreased libido more frequently than a COC with 30 μg EE and 3 mg DRSP [51]. Finally, a recent study evaluated sexual function and quality of life (QoL) in healthy women who used a new CVR, manufactured with a new polymer composition and containing EE 3.47 mg and ENG 11.00 mg. Results have shown an improvement in sexuality, the reduction of adverse events, and a better QoL in the new CVR group, compared to the EE 2.7 mg/ENG11.7 mg CVR group [42].

4.5   Progestin-Only Pill (POP)

The most common POPs used in Europe contain low doses of desogestrel. Evidence from clinical trials on POPs has demonstrated no effects on breastfeeding performance and no harmful consequences related to exposure in infants below 6 weeks of age [52]. Evidence from a placebo-controlled, double-blind study compared CHC and POP users has shown that POPs were not associated with adverse events and had no impact on female sexuality. Overall, the available data provides reassurance that progestin-only contraceptives are unlikely to have a major impact on sexual desire [53]. Some studies have supposed a suppressing role for progestins on sexual interest, thoughts, and fantasies, mainly related to the use of triphasic pills, compared with monophasic pills, where the only difference in pill composition was a lower dose of progestin in the triphasic regimen [54]. Another hypothesis is that a particular type of progestin—and not the dose—may be responsible for the effect on sexual function. Studies comparing a levonorgestrel-containing combined contraceptive with a desogestrel-containing one have shown different impacts on SHBG concentrations [55]. Moreover, it has been suggested that desogestrel-containing combined pills may exert positive effects on libido [56]. The question of whether a different dose or the type of progestins could differently affect female sexuality deserves additional research.

4.6   Intrauterine Devices

Thanks to their high contraceptive efficacy and forgettable nature, long-acting reversible contraceptives (LARC) are widely used methods in current family planning programs and policies [57]. To date, LARCs are the best option for women with a history of discontinuation of short-acting reversible (SARC) methods, such as oral, patch, or vaginal combined hormonal contraceptives or non-hormonal contraceptives [58].

In Europe and the USA, a growing interest on intrauterine devices (IUDs) with the advantages of extended use (from 3 to 5 years depending on the device) and a better continuation rate compared to the shorter-acting methods has been observed. IUDs are the most effective form of LARC, demonstrating to be safe and showing a neutral effect on overall women's metabolic and biological function. The levonorgestrel intrauterine system (LNG-IUS) is one of the most used IUDs; in this system LNG is released at the endometrial level, with a very low passage in the blood circulation, resulting in a good balance between effectiveness and metabolic impact [59]. However, sexual acceptability is an important issue that may influence satisfaction and continuation of IUDs. Patients' most commonly cited reasons for discontinuation within the first 12 months include cramps, pain, and bleeding [60], but also the perception that IUDs could negatively affect sexuality—for example, the IUD string can disturb a partner's sexual experience [61]. On the other hand, the absence of systemic hormonal effects makes this IUD neutral on sexual libido compared to other hormonal methods [62].

Several studies have investigated the QoL and sexuality in women using the LNG-IUS, demonstrating an improvement in all the domains of QoL after LNG-IUS placement. Another important reported aspect was the increase in the frequency of sexual activity and the reduction of dysmenorrhea [63]. By contrast, a recent study on healthy women using IUDs as a contraceptive method has reported no change of QoL and sexual life after 12 months [64].

Other studies [63, 65] have confirmed that both frequency of sexual activity and sexual enjoyment are positively related to the satisfaction with a contraceptive method. High levels of satisfaction have been reported in women on LARCs who previously had unintended pregnancies by using an SARC [63], as well as a better QoL [66, 67]. Moreover, some recent studies that have analyzed the effects of LNG-IUS in women affected by sexual dysfunctions have supported a significant improvement of sexual desire, arousal, orgasm, and overall sexual function. According to this finding, LARC methods appear to be a reasonable alternative for women who experience sexual dysfunction with oral hormonal contraceptive use [20].

Finally, IUDs were thought not to be suitable for young women until evidence showed the sexual acceptability and safety of this contraceptive method. Moreover, thanks to its static placement inside the uterus, it has no impact on sex with the advantages of increasing spontaneity and enjoyment during sexual intercourse and reduced sexual inhibition. Despite the high acceptability and tolerability, IUDs could be associated with side effects such as bleeding and cramping. However, the majority of authors agree that IUDs are suitable for every women's choice [65]. In

the circumstances of spontaneous expulsion or uterine cramps, an accurate investigation on the presence of any other symptoms and on sexual acceptability should be performed in order to advise IUD substitution or the use of another LARC.

4.7   Progestin-Only Contraceptive Implant

Progestin-only contraceptive implant (POI) is a subdermal device containing a total of 68 mg of ENG, which is released daily at low doses 25–70 µg on the subdermal tissue of the arm. It is classified as an LARC, having the advantage of being discreet and easy to use [68–70]. The device is usually placed on the internal side of the non-dominant arm and provides an effective contraception for 3 years, ensuring optimal compliance. As we observed for other contraceptive methods, sexual acceptability in subdermal implant users has been poorly investigated. Authors have observed that POIs do not negatively affect libido and sexual function, while an improvement of QoL after 6 months of use has been reported [71]. A recent multicenter clinical trial has shown that POIs have a safe metabolic profile and bleeding pattern that was similar to that observed for IUDs. However, unscheduled bleeding commonly decreased within 6 months of use and it was not perceived as a concern. Relevant advantages on sexual function were also detected: a significant increase in sexual pleasure, personal initiative, orgasm frequency and intensity, and satisfaction, together with a significant decrease in anxiety and discomfort [72]. Another potential advantage of POIs compared to IUDs is the absence of cramps and interference on the partner's sexual pleasure—as the device has a subdermal placement; thus, it could be considered a suitable option in those cases in which the IUD is poorly tolerated.

Finally, it has been shown that androstenedione blood levels in POI users were comparable to those observed in women not using hormonal contraception and more elevated to those detected in women using different CHCs (vaginal ring and three different oral contraceptives). Such a finding encourages the hypothesis that the maintenance of physiological androgen levels, associated with the confidence of contraceptive efficacy, may explain the positive impact on sexual function [73].

4.8   Condom

Sexual satisfaction partly reflects what women think of their contraceptive method when asked about particular dimensions of sexuality. Given male condoms' undeniable presence during sex, it may come to mind more than other methods affecting sexual pleasure. Findings from an exploratory study have suggested that women using male condoms as the main contraceptive method were significantly more likely to report a decrease in sexual pleasure. However, when sexual satisfaction was more broadly investigated, primarily condom users did not show any impairment, and "dual users" (mainly women using condoms and the pill) had the highest sexual satisfaction scores [74]. The link between a contraceptive method and

decreased pleasure is more likely to change contraceptive practices and, potentially, sexual risk. Even if male condoms are not associated with relative sexual dissatisfaction, the sexual attributes that women give to condoms are likely to alter attitudes and practices. If women consider male condoms as an interference for sexual pleasure, they may be less inclined to use them during the full duration of intercourse. In a recent qualitative study, women reported that condoms "cover up" sensation and exacerbate vaginal dryness, which led them to use condoms intermittently or not at all [75].

Another emerging concept is the eroticization of safety. It has been reported that women could not "let go" sexually unless properly protected from unwanted pregnancy and disease. Consequently, in women and men for whom avoiding pregnancy and/or disease is imperative, an effective prophylaxis is an eroticizing precondition, as contraception is considered to take advantage of the educational and professional opportunities afforded to them [75].

4.9 Conclusion

In order to start a contraceptive method, a careful evaluation of contraindications and potential associated risks is necessary. Based on this preliminary assessment and according to the woman's preference, a variety of methods could be recommended, taking into consideration the impact on sexual function [17]. Women may express concerns about the quality of sexual function associated with their method of contraception, particularly in the case of hormonal contraception. Review of a temporal relationship between the onset of female sexual dysfunction and initiation of contraception is warranted, as is an assessment of the biopsychosocial model of other potential contributing factors. Healthcare providers should openly query women about sexuality and sexual satisfaction with their current contraceptive use and should consider alternative options when needed. A multidisciplinary approach is suggested, particularly when multiple contributing or complicating factors are identified, such as sexual pain, relationship discord, multiple comorbid medical conditions, and a history of sexual abuse.

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