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Women's sexual experiences as a side effect of contraception in low- and middle-income countries: evidence from a systematic scoping review

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Abstract: *Contraception is essential to preventing unintended pregnancy. While contraceptive use has increased significantly over the past decade, discontinuation and gaps in use remain common. Although women cite side effects as the reason for discontinuing or stopping methods, little is known about the specific ways in which contraception affects women's sexual experiences. This systematic scoping review aimed to understand how contraceptive-induced side effects relating to women's sexual experiences have been measured, classified, and explored in the literature, specifically in low- and middle-income countries (LMICs). Studies were eligible for inclusion if they were peer-reviewed, English-language articles published between 2003 and 2018 that examined women's sexual experiences related to their use of modern contraception, including sexual satisfaction, arousal, sexual dysfunction, discomfort, vaginal dryness, sexual frequency, and relationship or partner dynamics. Study populations were restricted to women of reproductive age in LMICs. Twenty-two studies were deemed eligible for inclusion, comprising a range of methods and geographies. Emergent sexual experience themes included: menstrual issues impacting sexual experience; libido; lubrication; sexual pleasure; dyspareunia; and female sexual function. Results highlight the variability in measures used, lack of a women-centred perspective, and void in research outside of high-income countries to study the influence of contraception on women's sexual experiences. Very few studies focused on women's sexual experiences as the primary outcome or predictor. Providers should adopt woman-centred contraceptive counselling that considers women's relationships. Further research is needed to disentangle the nuanced effects of contraception on women's sex lives, contraceptive decision-making, and method continuation.* DOI: 10.1080/26410397.2020.1763652

Keywords: contraception, side effects, sex, sexual pleasure, discontinuation

Introduction

Nearly half of all pregnancies worldwide are mistimed or unwanted.[1] Unintended pregnancy rates differ substantially between developing and developed regions, varying from 127 to 28 unintended pregnancies per 1000 women in East Africa vs. Western Europe, respectively.[1] While contraception is an effective means to prevent unintended pregnancy, many women living in developing countries who want to prevent or delay a pregnancy are not using contraception.[2] Among women who are using contraception, discontinuing use while still in need of pregnancy prevention methods remains common.[3,4] Family Planning 2020 (FP2020) estimates that one-third of women who start using contraception will stop use within one year and more than half of women will stop within two years.[5] The majority of women who discontinue contraception while still in need of family planning do so for method-related concerns, such as side effects.[2,5] Concerns about side effects, both those that are clinically recognized and those that are

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myths or misconceptions, are well-documented as one of the primary deterrents to contraceptive use.[6–11]

Despite evidence linking side effects to contraceptive use and discontinuation, the majority of research on this relationship is non-specific. Numerous studies have identified general side effects as reasons that women stop or switch methods,[4,12] yet very little is known about the distinct types of side effects that increase rates of discontinuation and switching. Due to the ambiguous measurement of contraceptive side effects in most studies, the role of specific emotional, mental, and physical changes on women's use of contraception remains largely unknown. This is particularly relevant in low- and middle-income countries (LMICs), which bear the burden of unintended pregnancies worldwide; further, many LMICs have made commitments toward achieving the FP2020 goal of enabling 120 million additional women and girls to become users of contraception by 2020.[13]

The Demographic and Health Surveys (DHS) and Performance Monitoring for Action (PMA), previously Performance Monitoring for Accountability 2020 (PMA2020), are the two nationally representative surveys that constitute the majority of publicly available data on contraceptive use in LMICs. Neither collect information on the specific side effects women are concerned about and/or have experienced.[14,15] Studies that have explored the role of specific side effects, such as changes to menstrual bleeding, headaches, or nausea, have generally been conducted in high-income settings[16–18] or have relied on data collected within health facility systems or with special populations, thereby limiting their generalisability.[19–21] A recent review from Polis and colleagues, however, highlighted the significant and variable impact that changes to women's menstrual cycles have on their use of contraception.[22] This research underscores the importance of moving beyond the monolithic category of "side effects" to developing a more nuanced understanding of this issue.

The ways that contraception influences women's experiences with sex, and vice versa, remain understudied. Although some research has reported on women's contraceptive-induced side effects related to sex, including changes in libido or lubrication, many studies focus only on the experiences of women who have discontinued their use of contraception.[23,24] Additionally, while there is evidence that contraception can improve women's sex lives, most notably by separating sex from pregnancy and childbearing, as Higgins and Smith state, "women do not have sex in order to use contraception".[25] Rather, women use contraception for a variety of reasons, one of the most common being the desire to have sex without worrying about an unintended pregnancy.[26,27] Understanding the role that contraception-induced changes to women's sexual experiences play in the calculus that women make about using contraception is critical.

Substantial evidence exists that changes to sexual enjoyment and pleasure affect the use of barrier methods, particularly the male condom. Specifically, decreased sexual satisfaction among men while using male condoms is a widely acknowledged barrier to men's use of the method.[28–32] Other studies have noted men's decreased sexual pleasure when their partners are using intrauterine devices (IUDs).[33,34] While this research is valuable and contributes meaningfully to understanding a couple's experience with sex, the influence that contraceptive methods have on women's sexual experiences is far less understood. As the primary users of contraception, women's sex-related side effects of methods should be at the fore of family planning research. However, particularly in LMICs, cultural expectations, coupled with gender and power dynamics, often necessitate sex as an activity for procreation and rarely take into account women's sexual desires.[35,36]

A limited, but growing, body of research from studies in the biological and social sciences has demonstrated that hormonal contraception can affect sexual function.[37,38] A study in the United Kingdom found that approximately 10% of women using a tailored combination of the pill had lower interest in sex after initiation,[18] while 10% and 20% of Australian women using IUDs and implants, respectively, reported lowered libido within six months of initiation.[17] Similarly, a US study found that among women who discontinued the pill over the course of one year, decreased sexual thoughts and decreased psychosexual arousal were the strongest predictors of discontinuation.[39] These and other studies demonstrate that changes in sexual experience do occur in tandem with the use of contraceptive methods and that these changes can have a significant impact on contraceptive use. However, studies examining these relationships have largely been limited to high-income settings.[40–44]

Complicating the understanding of this issue is the fact that side effects are generally defined using medical terminology and interpreted through a biomedical framework.[23] The issues that women describe, which may fall outside of the clinically expected side effects, including impact on sexual pleasure and desire, are often categorised as "other" or not included in analyses.[23] The current study aimed to understand how changes in women's sexual experiences associated with their use of female-controlled modern contraceptive methods have been measured, classified, and explored in the literature, among women living in LMICs.

Methods

A scoping review was conducted to identify, collate, and summarise studies from LMICs on this topic. Scoping reviews are a useful approach for examining how research on a specific topic is conducted across contexts, clarifying concepts of interest, and identifying gaps in the knowledge base that invoke specific questions for further research.[45] Given this paper's focus on describing the breadth and depth of research examining the influence of modern contraception on women's sexual experiences, a scoping review was deemed more appropriate than a systematic review, which aims to synthesise the results of a specific research question.

Search and review strategy

Following the systematic process first described by Arskey and O'Malley,[46] and later expanded on by Levac, Colquhoun and O'Brien,[47] a search strategy was developed to guide queries of the literature (see supplementary material). Parallel searches were implemented in PubMed and Scopus in October 2018. Identified references were reviewed for manual removal of duplicate records and remaining references were then imported into Covidence, an online software program for managing systematic literature reviews. Two researchers screened titles and abstracts of each reference to determine eligibility. Articles preliminarily identified as eligible progressed to full-text screening; any disagreements were resolved by a third researcher. Full-text articles were retrieved from PubMed and Scopus and reviewed by two researchers to determine final eligibility; any disputes were resolved through discussion among team members.

Inclusion criteria

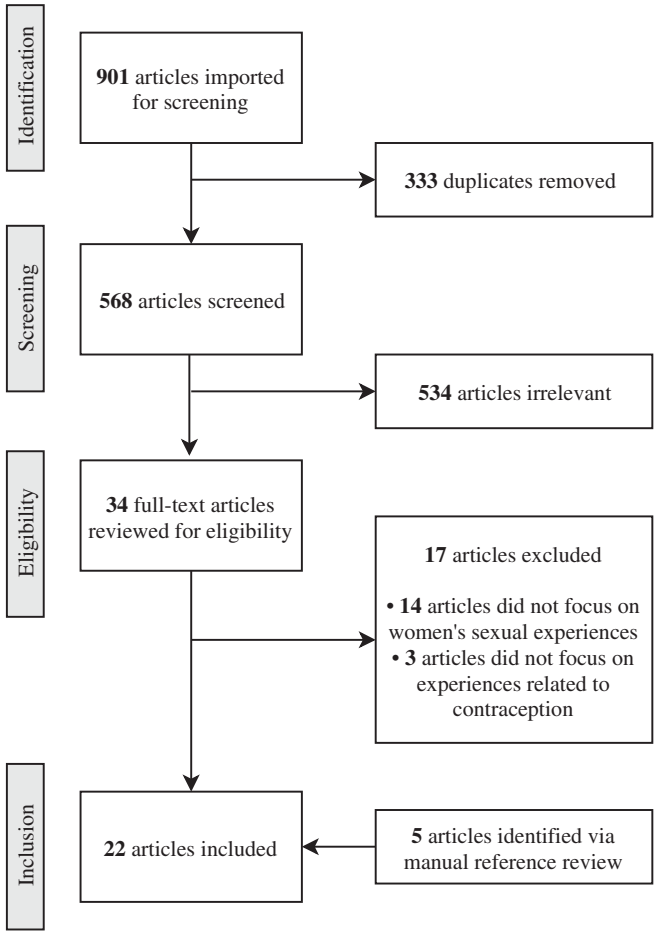
Studies were eligible for inclusion if they were peer-reviewed, English-language articles published between 2003 and 2018, that examined women's sexual experiences related to their use of modern contraception, including sexual satisfaction, arousal, sexual dysfunction, discomfort, vaginal dryness, sexual frequency, and relationship or partner dynamics. The search was limited to articles published between 2003 and 2018 to focus on recent research that had been published within the past 15 years. Study populations were restricted to women of reproductive age (15–49 years) to capture the breadth and depth of experiences affecting women at greatest risk of pregnancy. To ensure the search captured articles that were comprehensive in terms of modern contraceptive methods and diverse changes in women's sexual experiences, yet were reflective of the broad-ranging experiences of women of reproductive age at a population-level, exclusion criteria comprised:

- Studies that assessed the effect of male-controlled contraception (e.g. condom, vasectomy) and traditional methods (withdrawal, abstinence, rhythm) on sexual experiences
- Studies that examined changes in men's sexual experiences resulting from modern contraception
- Studies that explored postpartum dyspareunia
- Studies focusing exclusively on highly specific sub-populations (e.g. HIV-positive women, women with autoimmune/chronic diseases, women who underwent gynaecological procedures/surgeries or experienced genital mutilation or cutting)
- Studies that were conducted in upper-middle-income or high-income economies as specified by the World Bank[48]

Data extraction

A multi-stage process of study identification and data extraction was conducted to establish the final set of included articles (Figure 1). The searches in PubMed and Scopus identified 416 and 485 studies, respectively, yielding a total of 901 articles for review. Three hundred and twenty-two articles were manually removed as duplicates; another 11 duplicate records were identified by Covidence and removed ($n = 333$). A total of 568 articles were screened for title and abstract review, and only 34 advanced to full-text review. Initially, 17 articles were eligible for inclusion. The reference

Figure 1. Flowchart of included studies



lists of these articles were reviewed in full to identify additional articles for inclusion; five articles were identified and included based on secondary review (total *n* included = 22). Key characteristics of each article (e.g. objective, population, study design, contraceptive method, sexual experience, results) were described in a table and analysed for similarities and variations by these variables. Study results were synthesised according to contraceptive method.

Results

Overview of studies

Twenty-two studies were deemed eligible for inclusion; study objectives, design, and sexual experience results by contraceptive method are outlined in Table 1. Study designs comprised qualitative (focus group discussions (FGDs) and in-depth interviews (IDIs); $n = 8$), cross-sectional ($n = 5$), longitudinal ($n = 4$), case control ($n = 1$), case cross-over ($n = 1$), and mixed-methods ($n = 3$). Included studies were geographically dispersed, including sub-Saharan Africa ($n = 11$), Asia ($n = 7$), Latin America ($n = 3$), and North Africa ($n = 1$).

Several studies reported on modern methods of contraception generally (i.e. hormonal methods, barrier methods, sterilisation, lactational amenorrhea, and standard days method) or multiple types of modern contraceptive methods ($n = 6$). However, the majority of studies focused specifically on one method of contraception, including:

Table 1. Overview of included studies

Author (Year)	Country	Objective	Population and sample size	Study design	Contraceptive method(s)	Sexual experience reported	Sexual experience results
Injectable							
Burke et al. (2011)[49]	Kenya	To understand why women discontinue using contraception, specifically injectables	Current injectable users and groups that influence use (husbands, mother-in-laws, community leaders, service providers, and longer-term injectable users; $n = 14$ FGDs)	Qualitative (FGDs)	Injectable	Libido	• Lowered libido was mentioned in all 14 FGDs as a common theme associated with injectable use • Two FGD participants discussed decreased libido as a positive side effect, particularly for widows • Husband and mother-in-law FGDs specifically focused on negative familial repercussions of decreased libido
Djami et al. (2018)[50]	Indonesia	To determine the difference in sexual function of depot medroxyprogesteron acetat (DMPA) and non-hormonal contraceptive users.	47 DMPA users and 47 matched non-hormonal contraceptive users ($n = 94$)	Historical cohort	Injectable (DMPA)	Libido lubrication, sexual pleasure dyspareunia	• No significant differences in desire, arousal, lubrication, orgasm, satisfaction, dyspareunia for DMPA users vs. non-hormonal contraceptive users
Hyttel et al. (2012)[51]	Uganda	To understand women's and men's experiences of injectable side effects and the impact on their relationships, as well as how providers and policymakers addressed their experiences	Women aged 18–45 ($n = 28$) and men aged 18–60 ($n = 18$); family planning providers ($n = 17$), and family planning policymakers ($n = 15$)	Qualitative (FGDs and IDIs)	Injectable	Menstrual issues; lubrication; libido	• Loss of lubrication and libido were problematic for sexual relationships, as wetness during intercourse was viewed as desirable • Even if partners were involved in decision-making, sexual side effects threatened relationship stability, with male partners describing unavailability as reason for infidelity • Strained relationships and opinions of male partners caused women to discontinue injectable use • Women discussed that upon reporting side effects to service providers they were told to "wait" for effects to subside • Few providers and policymakers felt that women's concerns with sexual side effects were justified, with several stating that they were exaggerated

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Wanyonyi et al. (2011)[52]	Kenya	This study aims to assess the health-related quality of life changes among Kenyan women using DMPA (injectable)	Women aged 15–49 who used DMPA seeking service from Aga Khan clinic in Nairobi	Prospective cohort	Injectable	Menstrual issues; libido	• 15 participants (15.3%) discontinued DMPA within the study period (4 participants at 3-month and 11 at 6-month follow-up • Primary reasons for discontinuation were menstrual irregularity (26.6%), reduced libido (13.3%), need for longer acting method (20%) and weight gain (20%).
Implant							
Aisien et al. (2010)[55]	Benin	To evaluate the safety, efficacy, and acceptability of Implanon subdermal implant contraceptive amongst its acceptors	Sexually active women ages 24–45 at family planning clinics ($n = 32$)	Prospective longitudinal	Implant	Libido	• Three participants reported reduced libido (7.3%)
Intrauterine device (IUD)							
Bradley et al. (2009)[34]	Bangladesh	To identify factors associated with IUD discontinuation	IUD acceptors sampled from clinic registers in March 2006 and traced after one year (n = 330; IDIs n = 20)	Retrospective cohort using closed-ended questions and IDIs	IUD	Dyspareunia	• 90% of women who discontinued contraception at one-year reported their cited side effects as their reasons for discontinued use • 19.4% reported pain with intercourse and non-menstrual side effects were associated with discontinuation (OR = 2.4) • Husbands' dislike of IUD strings was also associated with discontinuation (OR = 2.8) • Excessive bleeding contributed to partner disputes but was not discussed in relation to sexual activity
Sharma et al. (2014)[56]	India	To determine intrauterine contraceptive device (IUD) discontinuation rate and its causes	Women who had an IUD inserted during the last 1–5 years who were interviewed during their visits to the outpatient/ family planning clinic ($n = 387$)	Cross-sectional survey	IUD	Menstrual issues; dyspareunia	• 17% of IUD users discontinued in the first year following insertion • 56% discontinued IUD use because of a desire to conceive, 28% because of side effects, 15% due to familial opposition, and 2% due to sexual inactivity • Discontinuation in the first 12 months was mostly due to side effects (irregular bleeding and menorrhagia, followed by infection and pain)

(*Continued*)

Female barrier methods							
Bowling et al. (2018)[62]	India	To examine the acceptability of female condoms in urban India with a focus on sexual pleasure	Sexually active men and women aged 18 and older, living in New Delhi and Chennai, and willing to use a female condom (n = 53 women; 19 men)	Qualitative (FGDs)	Female condom	Sexual pleasure	• Increased pleasure by decreasing stress associated with unintended preganancy, STI acquisition, and potential for reproductive coercion • Some participants reported that sex "felt better" when using the female condom. Authors indicate that this could be due to lubricant • Thickness of condom reduced sensation – this was seen as a benefit to some due to prolonged sex, and a limitation to others
Buck et al. (2005)[65]	Zimbabwe	To explore the acceptability of the diaphragm compared to female and male condoms among Zimbabwean women and their partners	Reproductive age women participating in an RCT selected from public sector reproductive and family planning clinics in Harare, Zimbabwe between 2000–2001 and their male partners (n = 81 women; n = 34 men)	Qualitative (IDIs and FGDs)	Diaphragm	Sexual pleasure; lubrication	• Many women preferred diaphragm and male condoms equally, whereas men expressed clear preference for diaphragm • Women felt that female condom disrupted sexual experience • Mixed feelings on lubrication provided by diaphragm – some reported that it was too wet whereas others felt it enhanced experience by reduction of friction • Both men and women preferred a female-controlled method
Coffey et al. (2008)[64]	Dominican Republic	To assess the fit and acceptability of the SILCS diaphragm compared to the Ortho ALL-FLEX® diaphragm to validate the product design among parous women in a low-resource setting	Sexually active couples (18 years and older) not at risk of pregnancy and at low risk of sexually transmitted infections (n = 20 couples)	Comparative crossover evaluation	Diaphragm	Sexual pleasure, dyspareunia	• 8% of SILCS and 10% of Ortho female participants reported being aware of the device during sex – two women reported that the SILCs device was "bothersome" or "painful" during sex • Bad sensation was reported for 13% of women during or after Ortho use; no women reported bad sensation after SILCS use • Sexual satisfaction was only measured for men • Qualitative debriefing interviews with women describe increased enjoyment for themselves and their partners due to increased time to ejaculation

(*Continued*)

Francis-Chizororo et al. (2003)[60]	Zimbabwe	To present the acceptability, attitudes, and perception of the female condom among rural women in Zimbabwe	Women seeking outpatient health services at 30 health centers in eight districts who were provided the female condom ($n = 700$ quantitative; $n = 11$ FGDs with men and women)	Evaluation study and qualitative (FGD)	Female condom	Dyspareunia; sexual pleasure; lubrication	• Women felt that the inner ring was uncomfortable during intercourse, but for men it was sexually satisfying • Outer ring prevented fondling • Women had mixed thoughts on lubrication of female condom, however, most men disliked it • Men discussed liking the female condom as it was looser than the male condom and felt arousal with rings
Kestelyn et al. (2018)[63]	Rwanda	To explore the acceptability of contraceptive vaginal ring (NuvaRing) use in Kigali, Rwanda using a mixed methods approach	Women aged 18-35, willing to provide informed consent, HIV negative, sexually active, and in good physical and mental health. Not currently using a modern contraception, but were interested in and eligible for NuvaRing ($n = 104$)	Mixed methods (quantitative surveys throughout a RCT, IDIs and FGDs)	Nuvaring	Lubrication; sexual pleasure	• Most women (80.6%) reported at least once during ring use that the ring made sex feel better and at the last ring removal visit, this increased to 87.5% • Women reported an overall increase in vaginal lubrication, but felt that it decreased with increased duration of use (52.9% of the women at least once during ring use and 74.8% at the last ring removal visit) • 82.5% of the women reported to never have felt the ring during vaginal sex
Mathenjwa et al. (2012)[59]	Swaziland	To explore female sex workers' experiences with the female condom in Swaziland	Female sex workers (FSWs; $n = 25$)	Qualitative (FGDs and IDIs)	Female condom	Lubrication; sexual pleasure	• Reported increased lubrication with use of the female condom • Improved sexual experience from "relaxing and enjoying" instead of worrying about male condom breakage or coercion • Enhanced stimulation for both women and men from the rings of the device
McLellan-Lemal et al. (2017)[66]	Kenya	To examine user experiences with a contraceptive ring	Women enrolled in a contraceptive ring trial ($n = 24$) and their male sexual partners ($n = 20$)	Qualitative (IDIs)	Contraceptive ring	Libido	• One woman did not like having sex with the ring due to reduced libido
Okunlola et al. (2006)[61]	Nigeria	To determine female condom awareness, usage, and concerns among the female undergraduates of the University of Ibadan, Nigeria	Female undergraduates of the University of Ibadan, Nigeria ($n = 850$)	Cross-sectional	Female condom	Sexual pleasure; Dyspareunia	• Only 11.3% of the respondents had experience of having used the female condom • Among users, the most common difficulty identified was lack of sexual satisfaction (30.2%); other issues included pain during sexual intercourse (5.2%)

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Female sterilisation							
Kunkeri et al. (2017)[67]	India	To assess women's experiences with sexual functioning before and after tubal ligation (TL) in India	Married women aged 20–40 who receiving TL ($n = 60$)	Cohort	TL	Female sexual function	• Sexual dysfunction was found in around 36.7% of the study population before undergoing TL • Most common pre-tubal sterilisation sexual disorders related to orgasm, lubrication, desire, arousal and satisfaction • After TL, around 71.1% of women had sexual dysfunction; the most common disorders related to orgasm, arousal and desire • Mean of all dimensions of the Female Sexual Function Index (FSFI) significantly decreased after TL ($p < 0.001$) • Among unemployed women, 68.75% experienced sexual dysfunction following sterilisation compared to 35.4% before sterilisation
Multiple contraceptive methods							
Echeverry et al. (2010)[57]	Colombia	To find the prevalence of female sexual complaints in a sample of sexually active women aged 18–40 in a city of Colombia	Population-based sample of sexually active women aged 18–40 years ($n = 410$)	Cross-sectional	Any contraceptive use[a]	Female sexual function	• No significant difference in female sexual function between contraceptive users and non-contraceptive users
Escajadillo-Vargas et al. (2011)[58]	Peru	To assess female sexual dysfunction (FSD) risk and associated factors in young Peruvian university women	Healthy women aged 18+, with a partner at least 1 month prior, registered for the first academic semester of 2009 ($n =$ 163 women at increased risk of FSD; $n = 246$ controls)	Nested case-control study	Oral contraceptive use, emergency contraceptive use, IUD use	Female sexual function	• No significant difference in female sexual function by contraceptive use or IUD use • Increased risk for FSD among emergency contraceptive users ($p = 0.001$)

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Hassanin et al. (2018)[53]	Egypt	To identify the type(s) of the commonly used birth control method(s) in Egypt that can negatively impact Female Sexual Function	Healthy married women aged 21–45 with an established sexual relationship ($n = 107$ contraceptive users; $n = 100$ non-users)	Cross-sectional	IUD, injectable, oral contraceptive pills (OCP), combined oral contraceptive pills (COP), progestin-only pills (POP)	Female sexual function	• FSFI scores in desire ($p < 0.001$), arousal ($p = 0.001$), lubrication ($p = 0.02$), and total score ($p = 0.002$) were significantly lower in women who were using current modern method vs. those who were not • IUD ($n = 45$) associated with increased satisfaction ($p = 0.02$) compared to non-users • Injectable ($n = 22$) associated with decreased desire, arousal, lubrication, orgasm, satisfaction, and total score ($p < 0.001$ for all) compared to non-users • OCP ($n = 40$) associated with decreased desire ($p < 0.001$), arousal ($p = 0.001$), lubrication ($p = 0.03$), and total score ($p = 0.006$) compared to non-users • POP ($n = 19$) associated with decreased desire ($p < 0.001$), arousal ($p < 0.001$), lubrication ($p = 0.05$), orgasm ($p = 0.05$), and total score ($p = 0.003$) compared to non-users
Jain et al. (2017)[54]	Bangladesh	To understand the ways that side effects affect Bangladeshi women's participation in different social settings	Married women, age 15–39, who were recent contraceptive discontinuers or method switchers ($n = 35$)	Qualitative (IDIs)	Modern methods (pill, injectable, implant, IUD)	Dyspareunia; libido; menstrual issues	• One-third of women reported pain in abdomen or vagina during sex – attributed to contraception • Reported loss of libido and inability to refuse sex with their husbands when experiencing menstrual side effects
John et al. (2015)[69]	Malawi	To explore the link between sexual pleasure seeking, partner dynamics and contraceptive decision-making and use	Married women ($n = 132$), married men ($n = 50$), and service providers ($n = 10$)	Qualitative (FGDs and IDIs)	Modern methods[a]	Menstrual issues; sexual pleasure; libido	• Ability to have impromptu sex was important for both men and women, leading them to favour longer-acting methods • Bloating, weight gain, prolonged bleeding, aches and pains seen as disruptive to sex life • Perception that use of modern methods makes women less "sweet" towards their partners and that male sterilization leads to "loss of manhood" • Potential loss of libido associated with method use caused women to fear partner abandonment and infidelity

(*Continued*)

Padmadas et al. (2006)[70]	India	To estimate the prevalence of dyspareunia and identify associated symptoms and individual demographic and sociocultural factors	National sample of currently married women from 1998–1999 (n = 84,644)	Population-based national survey	All methods[a]	Dyspareunia	• 12.6% of the total study population reported dyspareunia • 13.2% of contraceptive non-users, 13.9% of traditional method users, 12.9% of modern temporary method users, and 11.3% of modern permanent method users reported dyspareunia • Among those reporting dyspareunia, 34% sought advice or treatment

[a]Method type not specified.

female condom (n = 4), injectable (n = 4), vaginal ring (n = 2), diaphragm (n = 2), implant (n = 1), IUD (n = 2), and tubal ligation (n = 1). Most study objectives did not aim to examine sexual experiences or side effects specific to sexual pleasure, and some offered very little insight into women's sexual experiences. Methodological quality was not assessed as part of inclusion criteria; as such, diversity in methodological quality across studies persists and is addressed within the Discussion.

Results are structured by contraceptive method, namely: injectable, implant, IUD, female barrier methods, and female sterilisation, with nonspecific results for all modern contraceptive methods reported at the end. Of note, some studies report on multiple contraceptive methods and may be included within different categories.

Injectable

Four studies focused on sexual side effects specific to injectable contraceptives,[49–52] with two additional studies examining the injectable as part of a broader list of contraceptive methods.[53,54] Sexual side effects discussed in relation to injectable use included reduced libido, loss of lubrication, prolonged menses, and mixed results for Female Sexual Function Index (FSFI) dimensions. These studies occurred across countries: Kenya (n = 2), Uganda (n = 1), Indonesia (n = 1), Egypt (n = 1), and Bangladesh (n = 1).

Reduced libido and lubrication were the most common side effects reported among studies on injectables. Specifically, a prospective cohort study in Kenya found that of women discontinuing the injectable within six months of initiation, 13.3% discontinued due to reduced libido.[52] Further, FGDs and IDIs with women in Uganda identified reduced libido as a reason for women to discontinue injectable use due to relationship strain and threats to relationship stability.[51] Interestingly, women in Kenya noted that decreased libido associated with injectable use could be positive, particularly for widows.[49] The Ugandan study further discussed contributors to discontinuation of the injectable, specifically vaginal dryness associated with injectable use as a strain to relationships and prolonged or excessive menses and menstrual spotting that began after injectable use.[51]

Two studies examined the impact of the injectable on female sexual function.[50,53] A cross-sectional study in Egypt reported that injectable use was significantly associated with decreased desire, arousal, lubrication, orgasm, satisfaction, and FSFI

total score compared to non-users.[53] Conversely, a historical cohort study in Indonesia found no significant differences for desire, arousal, lubrication, orgasm, satisfaction, or dyspareunia between injectable users and non-hormonal contraceptive users.[50]

Implant

One study, in Benin, evaluated the safety, efficacy, and acceptability of the implant. This study reported reduced libido with the use of the implant (7.3% of study participants).[55] Qualitative interviews in Bangladesh further explored side effects related to contraceptive use, including the implant, however, sexual side effect results were non-specific to the implant.[54]

Intrauterine device (IUD)

Two studies specifically focused on side effects related to IUD discontinuation;[34,56] two additional studies examined female sexual function as the result of modern contraceptive methods, including the IUD.[53,57] One study, in India, reported that IUD discontinuation was generally due to side effects, including pain, though ambiguity remained as to whether this pain was general or exclusive to sex.[56] A Bangladeshi study similarly described that 19.4% of recent IUD acceptors reported dyspareunia and this was significantly associated with discontinuation.[34] In the two studies examining female sexual function, the Egyptian study found that the IUD was associated with decreased sexual satisfaction,[53] whereas the study in Peru did not find significant differences in female sexual function by IUD use.[58]

Female barrier methods

Female barrier methods discussed in relation to sexual side effects comprised the female condom ($n = 5$), diaphragm ($n = 2$), vaginal ring ($n = 2$). These studies were primarily in sub-Saharan Africa (Zimbabwe ($n = 2$), Dominican Republic, Rwanda, Swaziland, Kenya, and Nigeria), with an additional study conducted in India.

Sex-related side effects reported in relation to female condom use included lubrication, sexual pleasure, and dyspareunia. In Swaziland, female sex workers discussed increased lubrication with the use of the female condom, attributing this increase in vaginal lubrication to a decrease in their concerns about male condom breakage or condom manipulation by clients.[59] Conversely, female condom users in Zimbabwe reported mixed feelings on increased lubrication provided by this method.[60] Four female condom studies discussed sexual pleasure, with varying results.[59–62] While female sex workers in Swaziland reported increased stimulation from the ring of the device,[59] women in Nigeria and India discussed decreased sensation,[61,62] and women in Zimbabwe indicated decreased ability for "fondling" or physical stimulation of women's genitals by male clients or partners.[60] Authors in both the Swaziland and India studies indicated that increases in pleasure may be attributed to decreased stress associated with protection from pregnancy and sexually transmitted infection acquisition; further, these studies indicated less potential for reproductive coercion or contraceptive interference by male partners or clients in contraceptive use, through use of the female condom.[59,62] Lastly, two studies examined the female condom and dyspareunia.[60,61] One study in Nigeria found that 5.2% of women using the female condom reported pain during sexual intercourse;[61] similarly, a study in Zimbabwe found the inner ring of the female condom to be "uncomfortable".[60]

Studies examining the vaginal ring and diaphragm further reported increased pleasure with usage.[63–65] In the Dominican Republic study, sexual satisfaction was only quantitively measured for men, although qualitative interviews with women described increased enjoyment and associated this increase with longer ejaculation time for male partners; the authors also indicated that a few women described the diaphragm as "bothersome" or "painful" during sex.[64] One study in Kenya reported reduced libido with use of the contraceptive ring (discussed by one woman in IDIs).[66] Lastly, within a randomised controlled trial in Rwanda, women reported an overall increase in lubrication with vaginal ring use, however, felt that lubrication decreased with prolonged use.[63]

Female sterilisation

One study in India examined the impact of tubal ligation on sexual function and found that after undergoing tubal ligation, 71.1% of women had female sexual dysfunction, compared to 36.7% before tubal ligation.[67] Further, the mean of all FSFI dimensions significantly decreased after tubal ligation ($p < 0.001$).

Unspecified modern methods

Six studies reported results for multiple contraceptive methods.[53,57,58,68–70] Three studies' results were presented non-specific to contraceptive

method;[57,69,70] these studies reported diverse results, covering dyspareunia, menstrual issues, libido, and sexual pleasure. Three studies specifically reported on the FSFI and related dimensions.[53,57,58]

Two studies examined dyspareunia associated with contraceptive methods.[54,70] The first study, conducted in India, specifically aimed to examine the national prevalence of dyspareunia and related factors; authors found that dyspareunia was higher among users of traditional contraceptive methods and contraceptive non-users, compared to users of modern contraception.[70] Another study, in Bangladesh, found that one-third of women experienced pain in the abdomen or vagina during sex; women associated this pain with contraceptive use (pill, injectable, implant, or IUD).[54]

John et al. in Malawi and Jain et al. in Bangladesh further discussed the impact of contraceptive methods on sexual activity, given irregular menstruation and decreased libido.[54,69] John et al. conducted IDIs and FGDs with women, men, and service providers on the links between sexual pleasure and all modern methods of contraception. While not explicitly discussed as an experienced side effect, both men and women perceived that modern methods made women less "sweet" towards men and that decreased libido could lead to partnership dissolution.[69] Female participants further discussed that prolonged bleeding due to some contraceptives was seen as disruptive to sex life, given that impromptu sex was favourable for both intimate partners.[69] Similarly, in Bangladesh, qualitative data described husbands' intolerance and women's difficulty in refusing sex given extended menstruation associated with some modern methods.[54]

Three studies explicitly examined FSFI dimensions, including arousal, satisfaction, orgasm and pain.[53,57,58] Two studies examining any contraceptive use and female sexual function in Colombia and Peru, respectively, found no difference between contraceptive users and non-users.[57,58] The Peruvian study further examined emergency contraception and female sexual function, finding a significant increased risk for sexual dysfunction among emergency contraceptive users.[58] Similarly, in Egypt, Hassanin et al. examined specific methods and found that neither IUDs or combined oral contraceptive pills impacted female sexual function; however, progestin-only pills and injectables were associated with decreased female sexual function.[53] Further, desire, arousal, lubrication dimensions and FSFI total score were lower in women who were using any modern methods vs. non-users.[53]

Discussion

These results highlight the dearth of literature specific to understanding the influence of contraception on women's sexual experiences as a side effect of use in LMICs. Nearly 600 unique articles were identified based on the specified PubMed and Scopus search terms, however, 534 were deemed irrelevant. The vast majority of studies were excluded from both full-text review and final inclusion due to a lack of focus on women's sexual experiences; instead, many articles described side effects unrelated to sexual experiences or the impact of contraception on men's sexual experiences. Restricting studies of contraceptive-related changes to sexual experience to focus solely on the male partner's perspective not only limits findings, but largely discounts the importance of women's sexual experiences. Further, of the included articles, only seven had study objectives specific to female sexual experience,[50,53,57,58,62,67,69] with four studies focusing on the wide-ranging outcome of female sexual function.[50,53,58,67] As the majority of the included articles focused on alternative study aims, their discussions surrounding side effects specific to sexual experiences were often minimal. The limited reporting of female-focused, sex-specific results relating to contraceptive side effects underscores the need for further work to understand women's sexual preferences, and perceptions and experiences of sex-related side effects in LMICs.

Articles encompassed a wide range of modern contraceptive methods, including studies specific to the injectable, implant, IUD, female barrier methods (female condom, diaphragm, vaginal ring), and female sterilisation. Of note, six studies reported broadly on contraceptive methods or modern contraceptive methods,[53,54,57,58,69,70] with only two disaggregating results by type of method.[53,58] Across contraceptive methods, studies overwhelmingly reported the negative impact of contraceptive methods on women's sexual experience, including reduced libido, lubrication, and sexual pleasure, as well as heightened dyspareunia. Only studies specific to female barrier methods discussed the potentially positive impact of contraception on women's sexual experience, particularly through increased lubrication and satisfaction; however, these studies reported inconsistent results. Moreover, included studies highlighted that some increases in sexual pleasure may be attributable to reduced stress surrounding

pregnancy and sexually transmitted infections that coincides with contraceptive use, rather than side effects attributable to the method itself.[59,62] A further understanding of sexual side effects attributed to specific types of contraceptive methods, including side effects that may be positive, is necessary to ensure that contraceptive use maximises women's sexual health.

Results also highlight the cross-cultural variation in sexual norms and practices that factor into what is perceived as a side effect, as well as the degree of distress or inconvenience that women attribute to contraceptive side effects. For example, all but two studies reporting on lubrication discussed decreased lubrication as a negative effect.[51,59,63] However, the Zimbabwean studies described cultural preferences surrounding dryer sex, where increased lubrication was viewed negatively.[60,65] Surprisingly, there were few studies that focused on the effect of menstrual changes on sexual experience, though all indicated that menstrual changes were disruptive to sex.[51,52,54,56,69] Recent literature highlights that while menstrual changes may be disruptive to sexual activity, increased or decreased menstruation is viewed differently across contexts and is largely based on women's preferences.[22] These seemingly conflicting findings underscore the important role of cultural norms in shaping women's contraceptive preferences, highlighting the fact that no one method or its side effects will be universally tolerated. Thus, assuring that a range of contraceptive methods are available, including through the development of new methods, as Darroch and colleagues argue, is critical to meeting women's sexual and reproductive health needs.[7] These findings also support the central argument of Higgins and Smith, that the ways in which contraceptive methods influence women's sexual experiences also independently inform women's contraceptive practices.[25] Though these studies found contradictory evidence related to the tolerability of specific side effects on women's sexual experience, they collectively confirmed that side effects related to sex played a key role in women's contraceptive preferences and future use. The understanding that culture influences how acceptable and tolerated sex-related side effects are, is critical for future research and programmes to consider. Recognising women's sexual preferences in contraceptive decision-making can aid in the design of new contraceptive methods and clinical services that better meet their needs.

This review was not without limitations. Foremost, heterogeneity in measurement of female sexual experience limited comparability of studies across settings, populations, and study designs. Four studies used the FSFI, which measured a broad range of symptoms relating to female sexual experience.[50,53,58,67] Its dimensions, however, were difficult to disentangle and classify specifically to one side effect. Differences in study designs and populations further limited comparability; one study was specific to female sex workers,[59] whereas other studies included men and policy makers.[51,62,64,69] Several studies did not define the study sample, measures, comparison groups, and terminology, including contraceptive methods included within the study. Specifically for the qualitative studies, participant demographics were often unindicated, leading to ambiguity surrounding whether men or women were the ones concerned with sex-related side effects. Lastly, given the dearth of studies specific to female sexual experience, quality of studies was not assessed as part of inclusion criteria nor were studies excluded for poor quality methods.

This review highlighted a number of critical gaps in reproductive and sexual health research. Despite recent calls for a broader understanding of how side effects inform contraceptive use, and the recognition that women's sexual experiences matter in this equation,[7,25,71] this search did not yield any population-based studies that assessed the prevalence of contraceptive-induced side effects related to sexual experience or contraceptive dynamics. Information about how frequently women report changes in their sexual experience in relation to their use of contraception would greatly expand the evidence base for reproductive health research. Secondly, while these findings from LMICs indicate results that align with findings from high-income settings,[37,38] significant variation in quality and measurement hindered our ability to draw conclusive results. Only two studies included a prospective evaluation of the impact of changes in sexual experience on continuation.[52,55] More research, with higher quality study designs, including prospective cohorts, clearly defined comparison groups, and primary study aims specific to women's sexual experiences, are necessary to strengthen our understanding of the complex relationships between sex-related side effects and contraceptive use. We encourage researchers to fill this "pleasure deficit".[25,71]

Practice implications should focus on the role of providers in counselling on sex-related

contraceptive side effects. Without attributing bodily changes to contraception and understanding the degree to which these side effects impact women's lives, some women may be less likely to seek provider counselling or services. While all included studies examined side effects from the woman's perspective, the two studies that also interviewed service providers indicated that few providers felt that women's concerns with sexual side effects were justified.[51,69] Providers must adopt woman-centred, rights-based contraceptive counselling approaches that consider women's relationships and changes to intimacy in order to increase women's method satisfaction and well-being, and ultimately, decrease contraceptive discontinuation and unintended pregnancy.

Conclusion

In an effort to prevent unintended pregnancy by increasing access to and use of contraception, researchers, practitioners and clinicians must recognise and respond to women's sexual health needs. The current study underscores a neglected research focus on the ways that contraception affects women's sexual experiences in LMICs. This limited understanding of sex-related side effects and their influence on contraceptive dynamics hinders progress toward improving satisfaction and continued use of methods. Woman-centred contraceptive counselling that accounts for the myriad effects of contraception on women's sexual well-being, including menstrual irregularities, changes in libido and sexual pleasure, and dyspareunia, may better equip women to make informed decisions about contraception and address any sex-related contraceptive side effects they experience. Future research should adopt concerted focus on the impact of side effects, particularly those that influence women's sexual experiences and relationships.

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Supplementary material

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Résumé

La contraception est essentielle pour prévenir les grossesses non désirées. Si l'emploi de contraceptifs a sensiblement augmenté ces dix dernières années, l'interruption de la contraception reste fréquente. Même si les femmes citent les effets secondaires comme raison pour arrêter ou abandonner les méthodes, on sait peu de choses des effets spécifiques de la contraception sur les expériences sexuelles des femmes. Cette étude systématique de portée visait à comprendre comment les effets secondaires induits par la contraception relatifs aux expériences sexuelles des femmes ont été mesurés, classés et étudiés dans les publications, précisément dans les pays à revenu faible ou intermédiaire. Les études susceptibles d'être incluses, des articles en anglais évalués par des pairs et publiés entre 2003 et 2018, examinaient les expériences sexuelles des femmes dans l'optique de leur emploi d'une contraception moderne, notamment la satisfaction sexuelle, l'excitation, les troubles sexuels, la gêne, la sécheresse vaginale, la fréquence des rapports sexuels et les dynamiques avec les relations ou le partenaire. Les populations étudiées ont été limitées aux femmes en âge de procréer dans les pays à revenu faible ou intermédiaire. Vingt-deux études ont été jugées éligibles, englobant un éventail de méthodes et de géographies. Les thèmes émergents sur les expériences sexuelles comprenaient: les problèmes menstruels ayant un impact sur l'expérience sexuelle; la libido; la lubrification; le plaisir sexuel; la dyspareunie; et la fonction sexuelle féminine. Les

Resumen

La anticoncepción es esencial para evitar el embarazo no intencional. Pese a que el uso de anticonceptivos ha aumentado de manera significativa en la última década, el abandono de uso y las brechas en el uso continúan siendo comunes. Aunque las mujeres citan los efectos secundarios como la razón para abandonar o suspender el uso de anticonceptivos, no se sabe mucho sobre las maneras específicas en que la anticoncepción afecta las experiencias sexuales de las mujeres. Esta revisión sistemática buscó entender cómo se han medido, clasificado y explorado en la literatura los efectos secundarios inducidos por anticonceptivos con relación a las experiencias sexuales de las mujeres, en particular en países de bajos y medianos ingresos (PBMI). Los estudios elegibles para su inclusión eran artículos redactados en inglés, revisados por pares y publicados entre 2003 y 2018, que examinaban las experiencias sexuales de las mujeres relacionadas con su uso de anticonceptivos modernos, incluida su satisfacción sexual, excitación, disfunción sexual, molestia, sequedad vaginal, frecuencia sexual y dinámicas de relación o pareja. Las poblaciones del estudio fueron restringidas a mujeres en edad reproductiva en PBMI. Se determinó que 22 estudios eran elegibles para su inclusión; estos abarcaban una variedad de métodos y geografías. Entre los temas emergentes de experiencias sexuales figuraban: problemas menstruales que afectan la experiencia sexual; libido; lubricación; placer sexual; dispareunia; y función sexual femenina. Los resultados destacan la

résultats mettent en évidence la variabilité des mesures utilisées, le manque de perspective axée sur les femmes et un vide au plan des recherches en dehors des pays à revenu élevé pour étudier l'influence de la contraception sur les expériences sexuelles des femmes. Très peu d'études se centraient sur les expériences sexuelles féminines comme principal résultat ou indicateur. Les prestataires devraient prodiguer des conseils contraceptifs axés sur les femmes qui tiennent compte des relations des femmes. De nouvelles recherches sont nécessaires pour démêler les effets nuancés de la contraception sur la vie sexuelle féminine, la prise de décision en matière de contraception et la poursuite de la méthode.

variabilidad de las medidas utilizadas, la falta de una perspectiva centrada en las mujeres y la escasez de investigaciones realizadas fuera de países de altos ingresos para estudiar la influencia de la anticoncepción en las experiencias sexuales de las mujeres. Muy pocos estudios se enfocaron en las experiencias sexuales de las mujeres como el principal resultado o predictor. Los prestadores de servicios deben adoptar consejería anticonceptiva centrada en la mujer que considere las relaciones de las mujeres. Se necesitan más investigaciones para desenredar los efectos matizados de la anticoncepción en la vida sexual de las mujeres, en su toma de decisiones anticonceptivas y en la continuación del uso de anticonceptivos.