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# A survey of young women's perceptions of the influence of the Levonorgestrel-Intrauterine System or copper-intrauterine device on sexual desire

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ABSTRACT

*Objectives:* Few studies, with contradictory results, evaluate intrauterine contraceptives (IUC) and sexual function specifically. This study compares perception of sexual desire related to IUC use and aspects of sexual function in women who use the Lng-IUS with those using the Cu-IUD.

*Study design:* A secondary analysis regarding IUC use based on a larger cross-sectional survey of contraceptive use in Sweden, conducted in 2013. In total, 153 IUC users (103 Cu-IUD and 50 Lng-IUS users) answered the questionnaire. The only inclusion criterion was intrauterine contraceptive use.

*Main outcome measures:* Were self-reported sexual desire changes related to contraceptive method. We also analysed aspects of sexual functioning; sexual desire level, sexual activity, orgasm frequency, satisfaction with sex life and satisfaction of desire level.

*Results:* A negative effect on sexual desire due to contraceptive method was reported by 28% of the Lng-IUS users and by 10.1% of the Cu-IUD users ($p < 0.05$). Results were more marked after adjusting for age, body mass index, depression, parity, switching behaviour, and partnership (OR 5.0; CI: 1.8–13.8).

The adjusted odds of reporting low sexual desire level (never or almost never feeling sexual desire) (OR 3.5; CI: 1.1–11.2) as well as low satisfaction with sex life (OR 2.7; CI: 1.2–6.3) was higher in the Lng-IUS group (adjusted for same confounders as above).

*Conclusions:* The women in this study using the Lng-IUS more often report negative sexual desire effects of their contraception as well as lower sexual desire level compared with women using the Cu-IUD.

## Introduction

Low adherence and high discontinuation rates of combined oral contraceptive (COC) use are well known [1], and are partially due to reported side effects, including mood changes and decreased sexual desire [2,3]. Hormonal contraceptives, especially Long Acting Reversible Contraceptives (LARCs) ensure safe and effective contraception, which is essential for preventing unintended pregnancies [4]. The levonorgestrel - intrauterine system, (Lng-IUS) offers excellent contraceptive efficacy and a range of non-contraceptive benefits such as a significant reduction in mean menstrual blood loss, reduced endometriosis-associated pain, and reduced fibroid-associated blood loss [5,6]. The most commonly used, and most studied Lng-IUS contains 52 mg levonorgestrel (Mirena®, Bayer AG). It involves a low systemic release of levonorgestrel and is therefore, on a theoretical basis, believed to be a good option for women with previously reported systemic progestogen associated side effects [7]. Still, discontinuation of use of the Lng-IUS method is comparable with the discontinuation of other hormone-containing LARCs [8]. It has previously been reported that Lng-IUS users have higher discontinuation rates than women using a copper intrauterine device (Cu-IUD) [9], mainly due to unscheduled bleeding but also possibly due to other progestogenic side effects [10]. In contrast, another study showed that sexual functioning did not differ between women using an Lng-IUS and those using a Cu-IUD, with similar levels of sexual satisfaction, sexual activity, sexual desire, and ease of attaining orgasm [11]. A recent study showed no difference between one year continuation rates of Lng-IUS and Cu-IUD users [12].

The possible negative side effects of Lng-IUS on female sexuality is still a matter of debate, with conflicting results, and, like the progestogen-related mental side effects, is still a rather unexplored scientific

*Abbreviations:* BMI, body mass index; COC, combined oral contraceptives; Cu-IUD, copper intrauterine device; FSFI, female sexual function index; IUC, intrauterine contraceptives; LARCs, long active reversible contraceptives; Lng-IUS, Levonorgestrel-Intrauterine System; MFSQ, McCoy Female Sexuality Questionnaire

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field [13]. Nonetheless, these negative side effects are daily issues to be dealt with within clinical contraceptive counselling.

We previously reported that 27% of 1851 young Swedish women using any kind of hormonal contraceptive method reported that the method had negative effects on their sexual desire, compared with 9–11% of women using hormone-free contraceptive methods [3]. Regardless of the lack of scientific evidence or proven causality between the use of hormonal contraception and sexual function, women's personal perceptions of the disadvantages and advantages of their contraception affect their decision to continue, change or even to discontinue the method [14,15]. Therefore, a study investigating the combination of both the perceptions of side effects and the actual sexual functioning level is needed.

An objective of this study was to compare Lng-IUS users (Mirena®) with Cu-IUD users regarding their reported perception of sexual desire related to contraceptive method. Another objective was to compare specific aspects of sexual functioning, such as sexual desire, sexual activity, orgasm frequency, satisfaction with sex life, and satisfaction of desire level between Lng-IUS users and Cu-IUD users.

## Materials and methods

This is a secondary analysis from a larger study. Sampling and survey methods are described in detail elsewhere [3]. Briefly, 1851 women aged 22, 25 and 28 years, residing in a mid-sized university city in Sweden answered questions (response rate 49.5%) about contraceptive use and related positive and negative effects. In total, 153 women, 8.3% of the participants, reported current use of an intrauterine contraceptive method (IUC) and were included in the present study as shown in the flow chart (Fig. 1) Ongoing intrauterine contraceptive use was the only inclusion criterion. No exclusion criteria were used, and the analyses were performed including all the women returning the questionnaire and reporting current use of an IUC.

All respondents answered a three-part validated questionnaire. All questions except for height and weight were multiple choice with boxes to tick and extra space for comments on the questions about side effects.

"Part One" contained questions about demographic background, such as age, weight, history of depression, type of current relationship, and parity. "Part Two" contained questions about current contraceptive method and satisfaction with that method. Here, the positive and negative side effects could be listed and details about contraceptive counselling sought by the participant as well as their considerations about ending use of the method or changing to a new method. It also included a question about experiences with previously used hormonal contraceptives and reasons for discontinuation. Questions about side effects were neutral, with equally adverse as well as positive effects choices. "Part Three" was concerned with different aspects of sexuality. Questions were based upon the validated female sexual function index (FSFI), which is a short multidimensional scale for assessing sexual function in women [16], and the McCoy Female Sexuality Questionnaire (MFSQ) [17]. Both questionnaires have been validated in several languages and used in many different studies such as the recent studies by Vitale [18] and Guida [19]. The question "Do you find that your current contraceptive method affects your sexual desire?" which was our primary outcome for this secondary analysis, was added at the end of Part Three. It was placed here to avoid, as far as possible, the bias risk of having the question associated with Part Two, dealing with side effects. Answer alternatives were "No", "Yes, for the better", "Yes, for the worse", and "I'm not using any contraceptive method". The other five questions in Part Three aimed to more objectively describe sexual functioning and were analysed as secondary outcomes for comparison with the first more subjective question. The six questions focused upon in the analyses are shown in Table 1. Prior to regression analyses we operationalised the answers to dichotomised alternatives, also shown in Table 1.

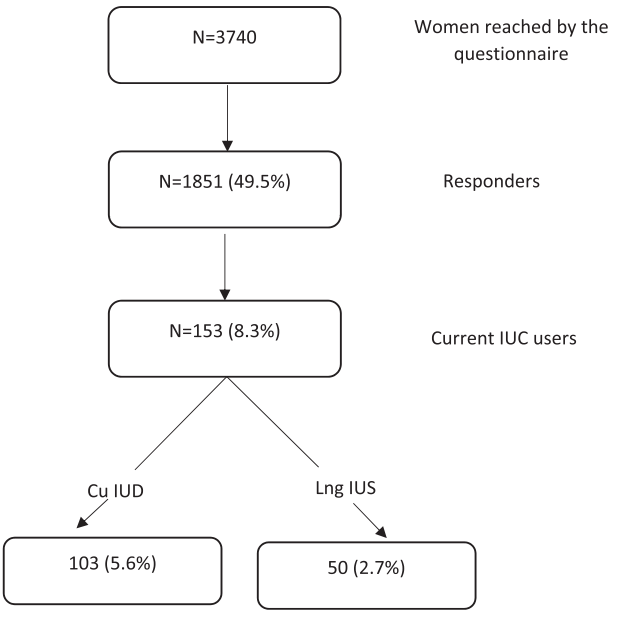


**Fig. 1.** Flow chart showing the participants in a questionnaire study of contraception sent to all 22,25, and 27 years old women living in the city of Linköping, Sweden, IUC = Intrauterine contraceptive, Cu-IUD = copper-intrauterine device, Lng-IUS = Levonorgestrel intrauterine system.

Age, BMI, depression, parity, having a steady partner, and switching (due to discontent) from a previously used hormonal method were variables identified as possible confounders to the outcomes on sexual function.

### *Statistical analyses*

The results are presented as frequencies and proportions in tables and text. Comparisons of differences between groups were performed using the $\chi^2$ test and, when the expected count was less than five, Fischer's exact test. In order to adjust for identified possible confounders also affecting sexual function and asked for in the questionnaire, we used binary multiple logistic regression analyses. The data were analysed using IBM SPSS statistics version 21.

The questionnaire was accompanied by a study information letter. The act of returning the questionnaire was regarded as giving consent to participate. The study was also approved by the Regional Ethical Committee in Linköping (Dnr 2013/257–31). No financial compensation or other incentives were given to the participants.

## Results

Demographic data/background information are summarised in Table 2. Relationship characteristics ($p = 0.05$) as well as switching behaviour ($p < 0.05$) differed between the two groups of IUC users. A larger proportion of women in the Lng-IUS group were in a short-term relationship or had no relationship. A larger proportion of women in the Cu-IUD group had switched from a previous hormonal contraceptive to their current method. Contraceptive counselling and information about alternatives to hormonal contraception were sought by 76% of the IUC users (NS). A larger proportion of the Lng-IUS users were satisfied with the guidance provided at the visit compared with the Cu-IUD users (94% versus 84% $p < 0.05$).

All women using an IUC answered the question (Q1) about experiences regarding sexual desire related to their contraceptive method. A negative effect on sexual desire related to the contraceptive method was reported by 13 (28%) of the Lng-IUS users and by 11 (10.7%) of the Cu-IUD users ($p < 0.05$). After adjusting for age, BMI, depression, parity, switching behaviour and type of relationship, the difference between

**Table 1**
Showing the key questions (Q1-Q6) as in the questionnaire and the operationalized versions used in the multiple regression analyses. Analyses of Q1 seen in Table 3, Q2-6seen in Table 5.

| | *Original question* | Original answering alternatives in the questionnaire | Regrouped answers | Numeric value in the regression analysis |
|---|---|---|---|---|
| Q1 | Do you find that your current contraceptive method affects your sexual desire? | No<br>Yes for the better<br>Yes for the worse | No<br>Yes for the better<br>Yes for the worse | 0<br><br>1 |
| Q2 | How often during the last 4 weeks have you felt sexual desire or sexual interest | Daily<br>once or a couple of times/week<br>never or almost never | Daily<br>Once or a couple of times/ week<br>Never or almost never | 0<br><br>1 |
| Q3 | How often have you been engaged in any sexual activity during the last 4 weeks | Daily<br>Some or a couple of times/week<br>OccasionallyNever | Daily<br>Some or a couple of times/ week<br>Occasionally<br>Never | 0<br><br>1 |
| Q4 | The last 4 weeks, how often did you attain orgasm during any kind of sexual activity | Every time or almost every time<br>More than half of the times<br>Occasionally<br>Never | Every time or almost every time<br>More than half of the times<br>Occasionally<br>Never | 0<br><br>1 |
| Q5 | During the last 4 weeks, how satisfied are you with your sex life | Very satisfied<br>Rather satisfied<br>Rather unsatisfied<br>Very unsatisfied | Very satisfied<br>Rather satisfied<br>Rather unsatisfied<br>Very unsatisfied | 0<br><br>1 |
| Q6 | Are you satisfied with your sexual desire level | Yes<br>No, I wish it was less<br>No, I wish it was higher | Yes<br>No, I wish it was less<br>No, I wish it was higher | 0<br><br>1 |

**Table 2**
Demographic data in 153 women using an intrauterine device. Figures are absolute numbers and percentage out of the respective group within brackets. P-values according to $\chi^2$ test or Fischer's exact test. There are no missing data for the variables presented.

| Variable | Intrauterine device users (%) | | Total (no) (%) | $\chi^2$ (p-value) |
|---|---|---|---|---|
| | Lng-IUS N = 50 | Cu- IUD N = 103 | 153 | |
| Age:22/25/28 | | | | |
| *22* | 15 (30) | 20 (19) | 35 (23) | 0.14 |
| *25* | 17 (34) | 45 (44) | 62 (41) | 0.25 |
| *28* | 18 (36) | 38 (37) | 56 (37) | 0.91 |
| BMI < 25 kg/m$^2$[1] | 36 (72) | 80 (78) | 116 (76) | 0.44 |
| Non-smoker | 46 (92) | 92 (89) | 138 (90) | 0.84[7] |
| Exercises regularly[2] | 26 (52) | 54 (52) | 80 (52) | 0.96 |
| Postgraduate studies[3] | 39 (78) | 83 (81) | 122 (80) | 0.71 |
| Considers herself healthy | 44 (88) | 94 (91) | 138 (90) | 0.71[7] |
| Depression treatment[4] | 4 (8,0) | 11 (11) | 15 (10) | 0.84[7] |
| Steady partner[5] | 40 (80) | 94 (91) | 134 (86) | **0.05** |
| Nulliparous | 40 (80) | 74 (72) | 114 **(75)** | 0.28 |
| Previously use of a hormonal contraceptive[6] | 39 (75) | 93 (90) | 132 (86) | 0.04 |

[1] Body mass index.
[2] Exercising two or more times per week.
[3] Ongoing or finished postgraduate studies.
[4] Both medical and psychological treatments included.
[5] Married, cohabitant or long-term boyfriend/girlfriend.
[6] Women switching from a previous hormonal contraceptive method to current IUS method.
[7] Fishers exact test used.

**Table 3**
Multiple regression analysis Q1– women's perception of reduced sexual desire due to use of intrauterine contraceptives adjusted for identified confounders possibly affecting sexual function.

| Independent Variables | Dependent variable; women reporting reduced sexual desire due to their contraceptive method | |
|---|---|---|
| | OR | CI 95% |
| Age: | | |
| *22 (ref)* | | |
| *25* | 0.87 | 0.25–2.98 |
| *28* | 0.46 | 0.10–2.03 |
| BMI[1]: | | |
| < 25 kg/m$^2$(ref) | | |
| 25–30 kg/m$^2$ | 1.58 | 0.43–5.86 |
| > 30 kg/m$^2$ | 1.27 | 0.21–7.75 |
| Steady partner[2] | 5.29 | 0.58–48.2 |
| Depression[3] | 1.03 | 0.18–5.89 |
| 1 or more children | 1.30 | 0.35–4.86 |
| previously hormonal contraceptive method[4] | 0.94 | 0.10–9.36 |
| Lng-IUS as contraceptive method[5] | 4.99 | 1.81–13.8 |

[1] Body mass index.
[2] Married, cohabitant or long-term boyfriend/girlfriend.
[3] Both medical and psychological treatments included.
[4] Compared with women that previously to current contraceptive method had not tried hormonal contraception.
[5] Compared with Cu–IUD as contraceptive method.

the two groups was more marked (OR 5.0; CI: 1.8–13.8) (Table 3).

The results concerning all aspects of sexual function (Q2-Q6) pointed towards a tendency for a poorer overall sexual function level in women using an Lng-IUS than in those using a Cu-IUD. There were significant differences between the two groups regarding frequency of sexual activity, orgasm frequency, and the level of satisfaction with sex life but not regarding sexual desire level or satisfaction with sexual desire level (Table 4). However, adjusted for age, BMI, depression, parity, switching behaviour and type of relationship, and after dichotomisation, only sexual desire (OR 3.5; CI: 1.1–11.2) and overall

**Table 4**
Aspects of sexual function, a comparison between absolute numbers (percentages not including the few missing answers within brackets) out of the 50 users of Lng-IUS and 103 users of Cu-IUD.

| Variable | Intrauterine device users (%) | | Total no | No of missing answers | $\chi^2$ (p-value) |
|---|---|---|---|---|---|
| | Lng-IUS N = 50 | Cu- IUD N = 103 | 153 | | |
| Sexual desire | | | 150 | 3 | 0.247 |
| Daily | 8 (16) | 19 (18) | | | |
| Once or a couple of times/week | 32 (64) | 73 (71) | | | |
| Never or almost never | 9 (18) | 9 (8.7) | | | |
| Sexual activity | | | 149 | 4 | 0.045 |
| Daily | 2 (4.0) | 6 (5.8) | | | |
| Some or a couple of times/week | 15 (30) | 44 (43) | | | |
| Occasionally | 22 (44) | 46 (45) | | | |
| Never | 9 (18) | 5 (4.9) | | | |
| Orgasm | | | 150 | 3 | 0.048 |
| Every time or almost every time | 24 (48) | 63 (61) | | | |
| More than half of the times | 6 (12) | 16 (16) | | | |
| Occasionally | 4 (8.0) | 9 (8.7) | | | |
| Never | 6 (12) | 9 (8.7) | | | |
| No sexual activity | 9 (18) | 4 (3.9) | | | |
| Satisfaction with sexlife | | | 148 | 5 | 0.005 |
| Very satisfied | 13 (26) | 32 (31) | | | |
| Rather satisfied | 15 (30) | 47 (46) | | | |
| Rather unsatisfied | 11 (22) | 20 (19) | | | |
| Very unsatisfied | 8 (16) | 2 (1.9) | | | |
| Satisfaction with sexual desire | | | 150 | 3 | 0.664 |
| Yes | 25 (50) | 56 (54) | | | |
| No, wish it was less | 0 (0.0) | 1 (1.0) | | | |
| No, wish it was higher | 24 (48) | 44 (43) | | | |

satisfaction with sex life (OR 2.7; CI: 1.2–6.3) differed significantly between the two groups (Table 5).

## Discussion

The women who used the Lng-IUS as a contraceptive method had fivefold higher odds of subjectively reporting a negative effect on sexual desire compared with Cu-IUD users. The results of the more specific questions regarding desire and sexual function showed similar results (threefold higher odds), which strengthens our findings.

Interestingly however, the degree of satisfaction with their sexual desire did not differ between the two study groups, as only approximately half of the women in both groups reported that they were satisfied with their level of desire. This might indicate that the majority of women, no matter which IUC they use, wish for more desire.

A number of factors identified as differing between the two groups (Table 4) disappeared after adjustment for confounding factors (Table 5), illustrating the complexity of female sexuality and the difficulty of evaluating influencing factors. Apparently, other factors such as age, depression, and having a partner may also influence aspects of sexual function (Table 5).

Unfortunately, there are no randomised controlled trials evaluating and comparing the Lng-IUS and Cu-IUD contraceptive methods with sexual function as the primary outcome. Studies evaluating the Lng-IUS have yielded contradictory findings. Some studies indicate negative changes of certain aspects of sexual function [20–23], whereas others

**Table 5**
Multiple regression analysis of variables of sexual function (Q2-Q6) adjusted for identified confounding factors possibly affecting sexual function.

| Independent Variables | OR for impairment of the following dependent variables: (95% CI) | | | | |
|---|---|---|---|---|---|
| | Sexual desire | Sexual activity | Orgasm frequency | Sex life satisfaction | Sexual desire satisfaction |
| Age: | | | | | |
| *22 (ref)* | | | | | |
| *25* | 0.7(0.1–4.2) | 2.6(0.9–7.2) | 0.6(0.2–1.6) | 1.2(0.4–3.6) | 0.7(0.3–1.7) |
| *28* | 3.2(0.6–19.0) | **6.5(2.1–20.0)** | 0.6(0.2–1.8) | 2.2(0.7–7.0) | 1.5(0.6–4.1) |
| BMI[1]: | | | | | |
| < 25 kg/m$^2$(ref) | | | | | |
| 25–30 kg/m$^2$ | 0.8(0.2–4.0) | 0.8(0.3–2.3) | 0.8(0.2–2.7) | 0.6(0.8–1.9) | 1.3(0.5–3.4) |
| > 30 kg/m$^2$ | 1.7(0.2–12.4) | 2.9(0.5–17.0) | 2.4(0.6–10.1) | 1.0(0.2–4.6) | 1.6(0.4–6.1) |
| Steady partner[2] | 1.3(0.2–9.3) | **0.1(0.0–0.6)** | 2.1(0.2–20.2) | 0.5(0.1–1.6) | **5.1(1.2–22.3)** |
| Depression[3] | **16.7(3.4–81.1)** | 2.0(0.5–7.5) | 1.3(0.2–7.9) | **6.3(1.8–22.7)** | 2.8(0.8–9.9) |
| 1 or more children | 2.6(0.7–9.5) | 0.8(0.3–1.9) | 1.3(0.5–3.4) | 0.6(0.2–1.8) | 0.9(0.4–2.1) |
| previously hormonal contraceptive method[4] | 0.3(0.0–2.7) | 3.7(0.6–23.2) | 1.6(0.2–16.4) | 0.7(0.1–3.9) | 0.3(0.1–1.6) |
| Lng-IUS as contraceptive method[5] | 3.5(1.1–11.6) | 1.6(0.7–3.7) | 1.0(0.4–2.6) | 2.7(1.2–6.3) | 1.4(0.7–2.9) |

[1] Body mass index.
[2] Married, cohabitant or long-term boyfriend/girlfriend.
[3] Both medical and psychological treatments included.
[4] Compared with women that previously to current contraceptive method had not tried hormonal contraception.
[5] Compared with Cu–IUD as contraceptive method.

report no changes [24] or even increased sexual health quality [11,25–27]. In a qualitative study [28], use of hormone-free contraceptive alternatives was pointed out as one of six important themes for women using the Cu-IUD. It should also be mentioned that after our study was completed new Lng-IUSs have been introduced with lower doses of levonorgestrel and with observed increased sexual function scores at evaluation up to one year after baseline [29].

Our study differs in methodology from other cited studies, as it addressed an unselected population of young contraceptive users and considered both how study participants perceived their IUC and aspects of their actual sexual function level independent of the contraceptive method currently used. Thus, the possibilities for further comparisons with other studies are limited.

The overall lack in the literature of a clear and joint definition of "sexual function", especially regarding healthy young women with an expected "normal" function, makes study designing and comparisons even more difficult.

The cross-sectional design used can only show associations and no causality, and the results must therefore be interpreted with caution. Moreover, the small size of the study population and the overall 50% response rate make our statistical calculations uncertain. The limited size of our study also jeopardises analyses of subgroups and the influence of confounders; thus, these results must be carefully interpreted. Self-reported depression treatment is considered in both background demographics and used in the regression analyses but no other kinds of psychiatric diseases, for example anxiety, were asked about in our questionnaire. On the other hand, the prevalence of IUC use in our study (8%) is of the same magnitude as in other surveys of contraceptive use in Sweden. A nationwide survey [30] of sexual habits in Sweden reported that three percent of women aged 18–24 years and 13% aged 25–34 years used IUCs. This is also in line with the findings of a German study [31]. A more recent survey found that 17% of 21–29 year-old Swedish women were IUC users [4]. The increase of IUC use in Sweden can partly be explained by new national recommendations from the Swedish Medical Products Agency. Since spring 2014, the implant and the IUCs are recommended as the second choice of contraception method after COCs. We can therefore assume that although we only had a 50% response rate, we gained a fairly good overview of the prevalence and associations in this group of women.

Another limitation is the questionnaire itself, which was validated prior to the study but had not been used previously. The questionnaire did not include questions about the exact duration or the quality of the current relationship. Women's interpretations of "sex life" are probably very diverse and we have probably not included all the possible confounding factors in our questionnaire. On the other hand, including even more possible confounding factors in the analyses might cause statistical uncertainty, with increased risk of including more covariates, making the results less clear.

It might also be that women who are generally unsatisfied with their sex life, for example due to poor relationship quality, have a low level of sexual desire which they might think is explained by their hormonal contraceptive method. Despite our efforts to design a good questionnaire with no leading or explicitly conditional questions, there is still a risk of bias in answering questions about sexuality and sexual function in a questionnaire also that also asks about contraceptive use and perceived side effects.

A larger proportion of current Cu-IUD users than Lng-IUS users had previously discontinued a hormonal contraceptive method, which might indicate that the current Cu-IUD users more often had a history of negative experiences of hormone-based contraceptive methods and thus were a selected group. It may be speculated that some of the current Cu-IUD users had a non-hormonal dependent sexual dysfunction, which they misinterpreted as caused by earlier hormonal contraceptive use. This subgroup was not possible to identify in our study but by including switchers in our model we controlled for this possibility to some degree.

The fact that women currently using a Cu-IUD were more often unsatisfied with the information they had received earlier about hormonal contraceptive methods could suggest that some women are more vulnerable to hormonal exposure. These women might find negative psychological and sexual side effects, irrespective of the hormonal method used. The group of women having difficulty finding an effective well-functioning and well tolerated contraceptive method is a group at risk of unintended pregnancies [4,32]. More studies on this specific category of women are needed, preferably with a prospective randomised design. Despite the lack of causality our study adds knowledge about the clinical contraceptive counselling situation by suggesting clinicians ask about the woman's perception of her sexual function and whether she thinks it is affected by the contraceptive method itself or by other factors.

In conclusion, women using the Lng-IUS, compared with Cu-IUD users, had significantly higher odds of reporting negative effects of their contraceptive method on sexual desire as well as lower satisfaction with sex life and lower sexual desire. However, the degree of satisfaction with their sexual desire did not differ between the two study groups. It is also important to emphasise that a majority of the women using either of the two contraceptive methods reported that they were satisfied with their sex life overall.

Our findings emphasise that in the clinical contraceptive counselling setting it is important to raise the question of sexual function and perceived sexual function adverse effects.

## Declarations

### *Ethics approval and consent to participate*

The study was approved by the Regional Ethical Committee in Linköping (Dnr 2013/257-31). No financial compensation or other incentives were given to the participants.

### *Availability of data and material*

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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## Declaration of Competing Interest

The authors declare that they have no competing interests.

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