Men's sexual response to female partner's intranasal oxytocin administration for hypoactive sexual desire disorder: an open prospective cohort study

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Objective: To study sexual function, quality of life, and depression in men, whose female partners are undergoing double-blind placebo-controlled randomized treatment for hypoactive sexual desire disorder (HSDD).
Design: Open prospective cohort study of 22 weeks.
Setting: Academic medical center.
Patient(s): Male partners of 30 premenopausal and postmenopausal women with HSDD.
Intervention(s): Baseline, 3-month, and 5-month assessment (for 8 weeks each) of male response to female partner's use of oxytocin nasal spray (32 IE) and placebo within 50 minutes before sexual intercourse.
Main Outcome Measure(s): Primary outcome parameters were Sexual Life Quality Questionnaire-Male, Sexual Activity Record, Partner Performance Questionnaire, and Hamilton Depression Scale.
Result(s): Male Sexual Life Quality questionnaire improved significantly from -7.4 ± 9.9 at baseline to 8.2 ± 12 with female partners' treatment with oxytocin nasal spray and to 10.8 ± 13.8 with placebo. Frequency of intercourse improved slightly but not significantly from 6.3 ± 3.9 at baseline to 7.3 ± 4 with female oxytocin therapy, but not with placebo. Male desire and arousal remained stable throughout the study period. Evaluation of female partners' performance by men improved significantly from 8.9 ± 2.8 at baseline to 10.6 ± 2.2 with oxytocin and to 11.2 ± 2.6 with placebo.
Conclusion(s): Female treatment with either oxytocin or placebo for HSDD significantly improves male sexual quality of life and evaluation of female partner's sexual performance with no difference between oxytocin and placebo on any outcome parameters. A nonsignificant improvement was seen in the frequency of intercourse, male arousal, desire, satisfaction, and Hamilton depression scale.
Clinical Trial Registration Number: NCT02229721. (Fertil Steril® 2017;107:781–7. ©2016 by American Society for Reproductive Medicine.)
Key Words: Male sexual function, hypoactive sexual desire disorder, oxytocin, quality of life

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Stable sexual well-being of intimate partners contributes to a fulfilled dyadic relationship. There is a substantial body of evidence that women whose male partners suffer from erectile dysfunction, also have reduced sexual quality of life and sexual function, all of which improve or resolve once their male partner receive adequate treatment (1–3). Reduced sexual quality of life and function may

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also be present in men, whose partners have female sexual dysfunction. Female sexual dysfunction has three categories: genitopelvic pain/penetration disorder, female orgasmic disorder, and sexual interest/arousal disorder. The most prevalent form of female sexual dysfunction is hypoactive sexual desire disorder (HSDD) and it affects 21%–36% of European women (4). It is defined as persistently or recurrently deficient sexual fantasies and desire for sexual activity causing significant distress for at least 6 months in 75%–100% of the time (5). Hypoactive sexual desire disorder has been shown to be associated with a more negative pattern in sexual and nonsexual partner interactions (6). The availability of flibanserin as a treatment option for female sexual arousal disorder may add valuable insights into couples' dynamics from future analysis of male sexual function in correlation with improved female HSDD.

For further evidence related to pharmacotherapy of HSDD, we have recently assessed the effect of intranasal oxytocin administration in women with HSDD in a prospective randomized, placebo-controlled phase II clinical trial (7). We found that oxytocin, as well as placebo, improved sexual function and symptoms of depression in women. Driving a complex physiological circuit, oxytocin is a brain nanopeptide with important influences on intimate bonding and social interactions. In men, intranasal oxytocin has been shown to increase the sympathetic outflow during sexual events with increased arousal (8) and intensity of orgasm, more contentment and sexual satiety (9), as well as overall improvement of male sexual function (10, 11).

Evaluation of the effect of female intranasal oxytocin administration on male partner's sexuality is a novel research concept that has not been studied at present elsewhere. We have therefore designed this subanalysis on male partners of female patients with HSDD being treated with intranasal oxytocin and placebo for 22 weeks and surveyed male outcome on sexual activity and function, depression, and partner performance.

MATERIALS AND METHODS

Study Design

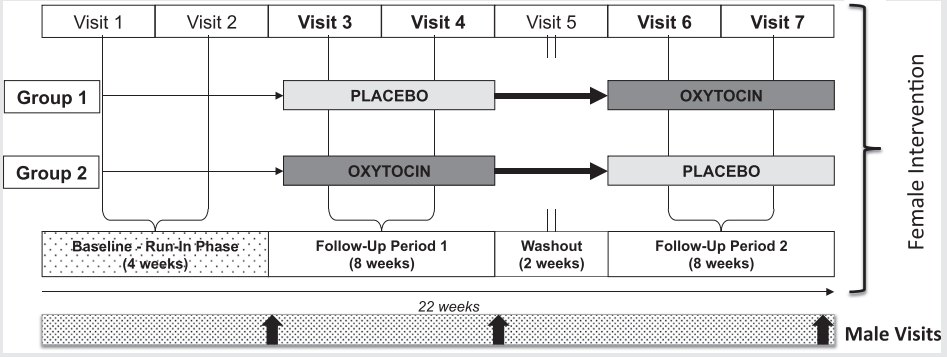
The study was designed as an open prospective cohort study at the Department of Clinical Pharmacology at the Medical University of Vienna. Female partners in this study agreed to participate in a prospective double-blind crossover trial to assess the effect of oxytocin and placebo on their hypoactive sexual desire disorder.

Upon enrolment, the couple entered a 4-week run-in phase in which women were asked to record their sexual encounters using a sexual diary and practice documentation of their sexual function and activity by questionnaires. During a second visit at our clinic, participants received instructions on study drug application and had to demonstrate that they were able to administer the intranasal spray. The published data from this phase describe the net effect of the use of sexual diaries on female sexual function and depression (12). After a randomized study design one group of women (n = 15) received placebo for 8 weeks and were then switched to oxytocin nasal spray for another 8 weeks after a 1-week wash-out period (Fig. 1). The other group (n = 15) received oxytocin nasal spray followed by placebo for 8 weeks each. Results of this study have been discussed elsewhere (7).

Couples were seen at baseline and every 4–8 weeks for a total study period of 22 weeks. During the first visit, we collected demographic data of male partners, recorded the current intake of medications, and performed a detailed history to exclude any severe urologic, medical, or sexual comorbidity. Furthermore we measured men's height and weight to calculate their body mass index (BMI) and performed a physical examination including blood pressure measurement and tracing of an electrocardiogram. At each visit, male participants were asked to fill in questionnaires for assessment of Sexual Life Quality Questionnaire-Male, Sexual Activity Record, Partner Performance Questionnaire, Hamilton Depression Scale, and International Index of Erectile Function.

The investigation conformed with the principles outlined in the Declaration of Helsinki and was carried out according

FIGURE 1



Study design and timeline.

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to the Good Clinical Practice (GCP) guidelines of the European Union. The study protocol was approved by the Ethics Committee of the Medical University of Vienna (EK-Number 230/2011; EudraCT Number 2011-001310-34; AGES Number PHMS-717505/0002; Clinical Trial Registration Number NCT02229721). The nature of this study was explained to all participants and written consent was obtained prior to enrollment.

Patient Population

Thirty-two men whose female partners were diagnosed with HSDD were enrolled in this study. Couples were recruited upon medical referrals from sexual therapists, general practitioners, and by public campaigns. Exclusion criteria for men and women included erectile and primary sexual dysfunction, untreated male or severe female sexual dysfunction, history of sexual abuse, untreated or severe psychiatric diseases, malignant diseases, severe medical problems (e.g., renal insufficiency), overweight or obese states, as well as comedication with known adverse effects on sexual function.

At Visit 1, a clinical psychological evaluation was performed to check the relationship context and exclude participants with sexual problems attributable to underlying conflicts in the partnership. In male partners, we ensured absence of any severe andrological dysfunction or related medical problem by detailed history taking, urologic and physical examination. Furthermore the couples were asked to attempt sexual intercourse and/or masturbation at least twice per week.

Oxytocin Nasal Spray

Syntocinon nasal spray (Sigma-Tau Pharmaceuticals Inc.) was self-administered as needed by women up to 50 minutes before sexual activity. The recommended dose was four puffs per nostril, containing 32 IU of synthetic oxytocin. The maximum dose was four puffs per nostril per day; minimum dose was twice weekly. Timing and frequency of drug administration were documented into a logbook after each use. Compliance was monitored at each follow-up visit by weighing the sprays to ensure adherence to the study medication throughout the study period.

Questionnaires

Sexual quality of life questionnaire. The Sexual Quality of Life Questionnaire-Male has been validated by Woodward et al. (13) in 2002 to assess sexual quality of life and satisfaction before and after treatment for erectile dysfunction among patients and their sexual partners. It consists of 10 questions with each item being rated on an 8-point response scale (−4 to +4; 0 "no change"). Score ranges from −40 to +40. The higher the scores, the better the subjective evaluation of sexual quality of life.

Sexual activity record. The Sexual Activity Record is a 12-item questionnaire. It was developed to evaluate the frequency of "successful and satisfactory sexual events" as measured by the number of sexual encounters with experienced orgasms and overall satisfaction, either by sexual activity with a partner or by masturbation (14).

Partner performance questionnaire. The Partner Performance Questionnaire is an institution-based modified version of the validated Partner's Treatment Satisfaction Scale Questionnaire (15) to evaluate sexual performance in intimate relationships during the course of a pharmacologic treatment study. The Partner's Treatment Satisfaction Scale questionnaire has been originally used for female partners of male patients under treatment with phosphodiesterase-5 inhibitors for erectile dysfunction. The Partner Performance Questionnaire consists of nine items, which elaborate the domains desire, arousal, lubrication, orgasm, pain and, sexual/personal/relationship satisfaction from the male partner's perspective in the past 4 weeks (Supplemental Appendix, available online).

Hamilton depression scale. The Hamilton Depression Scale (or Hamilton Rating Score for Depression) has been developed by Max Hamilton (16) in 1960 to assess the severity of depression in patients. It consists of 21 questions covering somatic, emotional, and psychological aspects of depression. Response choices range from absent/never/none (0) to severe/always/present (4), resulting in estimation of mild depression (scores 0–10), moderate depression (scores 20–29), or severe depression (scores 30–66).

International index of erectile function. The International Index of Erectile Function has been developed by Rosen et al. (17) in 1997 to assess erectile function with or without treatment. It consists of 15 questions addressing erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction. The lower the total scores in the grouped items, the more likely that the dysfunction will be present in the relevant domain.

Statistical Analysis

Response rate to questionnaires was 88% as completion occurred on site during the study visits. All data were entered manually into a database in a "double data entry" process and results transferred into SPSS version 20.0.0 (SPSS, Inc.). The observers were blinded to partner's treatment allocation. The measurements were carried out continuously during the active study phase at the end of each month. Baseline data obtained without pharmaceutical intervention was calculated as means of Visits 1 and 2. The values of Sexual Quality of Life-Male, Partner Performance Questionnaire, Hamilton Depression Scale, and Sexual Activity Record were calculated for placebo and oxytocin as mean value of Visits 3 and 4, and Visits 6 and 7, respectively.

Changes in sexual function were expressed as percentage change from baseline. Descriptive statistics of all outcome parameters was performed and parameters were tested for normal distribution. All results were expressed as mean ± SD. Parameters were analyzed by repeated measures analysis of variance (ANOVA) using treatment (oxytocin vs. placebo) as within subject factor, sequence, and grouping variables. Where appropriate, simple effect tests were conducted for significant main effects or interaction effects. Correlation was calculated by

Pearson's correlation coefficient. Acts of intercourse were analyzed using Poisson regression models. All reported *P* values are two-sided, and a Greenhouse-Geisser corrected *P* value was considered as level of significance ($P<.05$).

RESULTS

Baseline Patients' Characteristics

Baseline characteristics are presented in Table 1. In total, we assessed 45 couples of which 32 were eligible to participate. There was a dropout rate of two couples due to female comorbidities and noncompliance. Men were of European white ethnicity and between 46 to 64 years of age (55 ± 5 years). Although 13 men had no comorbidities, 12 men were on chronic medications at the beginning of the study, including antihypertensives, beta-blocker, psychopharmaceuticals, antiasthmatics, analgesia, antigout agents, antiarrhythmic, antithrombotic agent, B vitamin, hormonal agents (testosterone), proton pump inhibitor, and statins. All patients reported that the medication intake had not caused any reduction in sexual function or activity.

Body mass index ranged between 18.8 and 31.0 kg/m^2. The duration of relationship at time of recruitment was between 5 and 40 years (17.5 ± 12.2 years).

Effects on Sexual Quality of Life

At baseline, sexual life quality in men was −7.4 ± 9.9 and improved significantly to 8.2 ± 12 ($P<.001$) during the period when their female partners received oxytocin and to 10.8 ± 13.8 with placebo nasal spray ($P<.001$) (Fig. 2). There was no significant difference between placebo and oxytocin.

Effects on Partner Performance Questionnaire

At baseline, subjective evaluation of female partner performance by men was 8.9 ± 2.8 and improved significantly to 10.6 ± 2.2 ($P<.006$) during the period when female partners took oxytocin nasal spray and to 11.2 ± 2.6 ($P<.008$) with placebo (Supplemental Fig. 1, available online).

Effects on Sexual Activity Record

At baseline, the frequency of intercourse during 4 weeks was 6.3 ± 3.9 and improved slightly to 7.3 ± 4.0 (P = not significant [NS] vs. baseline) with female intranasal oxytocin administration but remained stable at 6.3 ± 2.8 with placebo (P = NS vs. baseline). Poisson regression analysis showed no significant effect on the frequency of intercourse when women received oxytocin: the incident rate ratio of sexual intercourse with oxytocin versus placebo administration was 1.27 (95% confidence interval [CI] 0.89–1.8, $P=.19$) and 1.1 (95% CI 0.63–1.9, $P=.73$), respectively.

Male desire was 8.1 ± 1.3 at baseline and increased to 9.3 ± 1.2 with female oxytocin and remained stable at 8.5 ± 1.0 during placebo (P = NS between groups). Male arousal was 8.3 ± 1.1 at baseline. While female partners administered intranasal oxytocin and placebo nasal spray it remained stable at 8.3 ± 2.0 and 8.4 ± 0.8, respectively. Male satisfaction and their subjective evaluation of the female partner's satisfaction showed only a weak correlation ($P=.31$).

Effects on Hamilton Depression Scale

Hamilton Depression Scale in men was 1.5 ± 1.7 at baseline and improved slightly but not significantly to 1.3 ± 2.6 ($P=.91$) in the female oxytocin treatment arm and to 1.1 ± 1.4 ($P=.76$) with placebo (Supplemental Fig. 2, available online).

DISCUSSION

In this study, men's sexual response to female partner's treatment for HSDD was examined. In a previous analysis of the effect of oxytocin on HSDD in women, we found that sexual quality of life in female participants increased compared with baseline results, which was also seen during placebo treatment (7). Women kept a sexual diary before the start of

TABLE 1

Patients' baseline characteristics.

Variable	Mean (±SD)	Range
Age (y)	55 (±5)	46–64
Relationship duration (y)	17.5 (±12.2)	5–40
Body mass index	23.8 (±3.6)	18.8–31.0
International Erectile Function Index	23.2 (±2)	

	Baseline[a]	Oxytocin	Placebo	Oxytocin versus Placebo
Sexual Quality of Life	−7.4 (±9.9)	8.2 (±1) ($P<.001$)	10.8 (±13.8) ($P<.001$)	NS
Sexual Frequency	6.3 (±3.9)	7.3 (±4.0) (P = NS)	6.3 (±2.8) (P = NS)	NS
Male Desire	8.1 (±1.3)	9.3 (±1.2) (P = NS)	8.5 (±1.0) (P = NS)	NS
Male Arousal	8.3 (±1.1)	8.3 (±2.0) (P = NS)	8.4 (±0.8) (P = NS)	NS
Partner Performance Questionnaire	8.9 (±2.8)	10.6 (±2.2) ($P<.006$)	11.2 (±2.6) ($P<.008$)	NS
Hamilton Depression Scale	1.5 (±1.7)	1.3 (±2.6) (P = NS)	1.1 (±1.4) (P = NS)	NS

Note: Data presented as mean (±SD), unless stated otherwise. FDS = female sexual dysfunction; NS = not significant.
[a] Cutoff values for established FSD.

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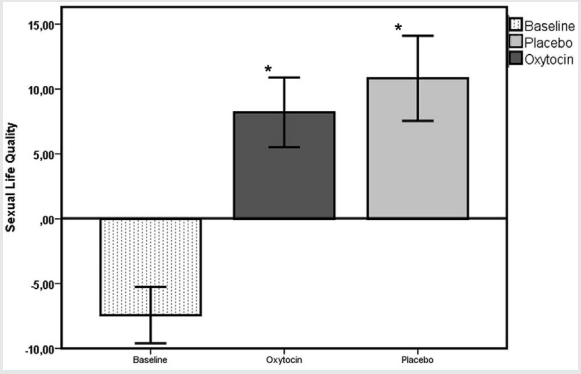
FIGURE 2



Sexual Life Quality Questionnaire (SLQQ) total scores at baseline (mean values of Visits 1 and 2; *dotted bar*), during female partners' oxytocin (n = 30, *dark gray bar*) and placebo (n = 30, *light gray bar*) treatment. Mean ± SD are indicated. Each *bar* is marked with the standard error of 2. The *stars* represent the level of significance compared with baseline (*$P<.01$ vs. baseline).

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treatment during the "run-in phase" and throughout the active study phases. In a subanalysis, we found that women reported a significant enhancement of their sexual life and improvement in depression scores (12). In the present study, sexual life quality in their male partners was likewise significantly increased from baseline in both study phases, with no significant differences between placebo and oxytocin.

It is likely that couple's learning experience through reflective practice and self-observation during the total study period of 22 weeks might have fostered a positive attitude to improve the relationship on a mutual basis. Furthermore, greater awareness of sexual needs might have resulted in a more open and empathic communication style in the couple. This is in accordance with other studies that describe an improvement of sexual functioning and reduction of distress in a relationship where better dyadic sexual communication was consciously cultivated, in addition to treatment for sexual dysfunction (18, 19).

Our data demonstrate that men evaluated their female partner's sexual performance significantly better with oxytocin and placebo use. This is especially interesting in the light of females' response to oxytocin and placebo, which revealed that women experienced a significant increase in their Female Sexual Function Index (FSFI) scores from baseline onward ($P<.001$), with no statistically significant difference between treatment agent or sequence of application (7). This is in accordance with the findings of Behnia et al. (9), who reported that intranasal oxytocin administration increased the intensity of orgasm, contentment after sexual intercourse, and effect of study participation.

Furthermore, we found that male desire was only subjectively, but not objectively, increased in the study phase during which their partner administered oxytocin nasal spray, yet remained stable under placebo. Important, there was no significant difference between the two treatment arms. This is in accordance with the findings by Burri et al. (8), who postulated that oxytocin administration does not alter appetitive, consummative. and refractory sexual behavior as assessed by the "acute sexual experience scale" in subjects. However, when participants were interviewed about their subjective perception, they pointed out to have an altered perception of arousal after oxytocin administration, but not after placebo. Likewise in the present study, we found an increase in subjective male desire after female partner's oxytocin administration as assessed by a "sexual diary." This effect may be either due to a random variation or because of an altered subjective perception of the female patient herself, which reflected onto her male partner. Sexual desire in men and women results from a positive orchestration of cognitive processes, such as fantasy, thoughts, neurophysiological central arousal, and affective components (20). In long-term relationships, it has been described that men's endorsement for intimacy was the desire to please their partners, whereas women reported greater desire for intimacy and emotional closeness (21).

The frequency of intercourse during female oxytocin and placebo administration showed a slight, but not significant, increase with oxytocin; however, this was not compared with placebo. It therefore has to be hypothesized that many other factors are involved in increasing sexual

TABLE 2

Outcome parameters.

Parameters	Baseline values, mean (±SD)	With oxytocin, mean	Difference of oxytocin versus baseline, mean	With placebo, mean	Difference of placebo versus baseline, mean	Difference (and 95% CI) between oxytocin and placebo, mean (95% CI)
Sexual Quality of Life	−7.4 (±9.9)	8.2	15.6	10.8	18.25	−2.6 (−11.2–5.9)
Partner Performance Questionnaire	8.9 (±2.8)	10.6	1.7	10.6	2.3	−0.63 (−2.1–0.8)
Sexual Frequency	6.3 (±3.9)	7.3	1.02	6.3	0.07	0.99 (−2.8–2.96)
Male Desire	8.1 (±1.3)	9.3	1.2	9.3	0.4	0.8 (−2.5–3.56)
Male Arousal	8.3 (±1.1)	8.3	0.04	8.3	0.1	−0.06 (−3.1–2.78)
Hamilton Depression Scale	1.5 (±1.7)	1.3	0.59	1.3	0.2	0.68 (−1.7–0.99)

Note: CI = confidence interval.

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behavior among couples, such as psychological bonding and mutual support, within the frame of targeting a common goal. Studies have shown that in fulfilled relationships in which women and men share the same moral and ethical standards, more emphasis is put onto an empathic tender love and care togetherness with cuddling, kissing, and fondling, all of which reflect women's prevalent sexual behavioral traits, than solely the penetrative act (22–24). A large survey in men across all age groups and different cultures concluded that men seeking treatment for erectile dysfunction were rather prompted by their effort to support their valued sexual partnership than by the fulfillment of their sexual needs (25).

Similar to the finding that overall scores in Female Sexual Distress Scale (FSDS) were improved throughout the study period with no statistically significant treatment or sequence effects (7), we found that Hamilton Depression Scale in men improved slightly but not significantly throughout the study period in both treatment arms. A substantial body of literature has examined the correlation between sexual dysfunction, personal distress, and depression. With a prevalence of 12% of women between 45 and 64 years, sexual dysfunction and depression are a frequent comorbidity and are correlated with poor self-assessed health, low education level, anxiety, thyroid conditions, and urinary incontinence (26). The improvement of those parameters in our female study population and its positive effect on their male partners indicate a positive attitude and optimistic mindset because the effect was independent of the treatment agent.

Our previous reports in a female patient population with HSDD (7) have shown that oxytocin proved not to be superior to placebo for any of the outcome parameters in women. In conclusion of this present study, we found a significant improvement of male sexual quality of life and evaluation of female partner's sexual performance by men, yet again, no differences between oxytocin and placebo (Table 2).

We postulate that the placebo effect follows behavioral changes in couples. The latter itself is an integral component of the present sexual therapy (27, 28) and anchored to complement success and compliance to treatment (29). As sexuality is the result of positive and negative feedback mechanisms, it is of uppermost importance to incite both individuals to engage in improving their dynamics as a couple together, as "it takes two to tango." The same dyadic effect has been shown in men with sexual dysfunction (30–32). Where couple disturbances had caused erectile disorders, especially in young men (33), treatment of the psychological domain subsequently led to resolution of the erectile dysfunction and a significant improvement in both partners' sexual life quality.

We acknowledge several limitations to our study. Its small number of couples with the heterogeneity of male partners might have contributed to some variation in statistical analysis and underpowered data analysis. Comorbidities of female participants might have influenced the decision to take part in this study and contributed to a selection bias of patients. As couples were instructed to attempt sexual intercourse and/or masturbation at least twice weekly, sexual motivation might have been externally triggered by competition feeling, leading to an increased sexual frequency throughout the study period. Last but not least, evaluation questionnaires were self-reported and might have contributed to a recall bias.

Despite these limitations, this study is the first that evaluates all domains of male sexual function when their intimate long-term partners underwent treatment for HSDD during 22 weeks. To validate the impact of intranasal oxytocin administration on sexual relationships and its effect on the physical and emotional state of the individuals, further data from prospective trials are needed to shed more light on this issue.

In conclusion, our data demonstrate that female treatment with oxytocin or placebo significantly improves male sexual quality of life and subjective evaluation of their partner's sexual performance during 22 weeks. Oxytocin and placebo exert similar benefit on the outcome parameters.

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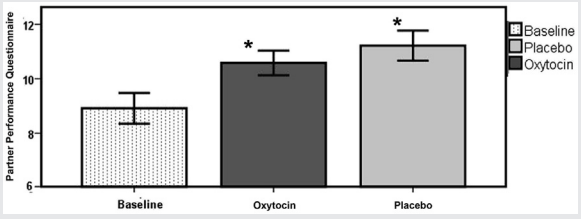
SUPPLEMENTAL APPENDIX

PARTNER PERFORMANCE QUESTIONNAIRE

1. From your point of view, has your female partner felt any sexual desire in the past 4 weeks?
   - ○ Very often
   - ○ Often
   - ○ Sometimes
   - ○ Rarely
   - ○ Never
2. From your point of view, has your female partner felt any sexual arousal in the past 4 weeks?
   - ○ Very often
   - ○ Often
   - ○ Sometimes
   - ○ Rarely
   - ○ Never
3. Has your female partner been lubricated in the past 4 weeks?
   - ○ No sexual activity
   - ○ Very often
   - ○ Often
   - ○ Sometimes
   - ○ Rarely
   - ○ Never
4. Has your female partner experience any orgasm in the past 4 weeks?
   - ○ No sexual activity
   - ○ Very often
   - ○ Often
   - ○ Sometimes
   - ○ Rarely
   - ○ Never
5. Has your female partner had any pain or discomfort during intercourse in the past 4 weeks?
   - ○ No sexual activity
   - ○ Very often
   - ○ Often
   - ○ Sometimes
   - ○ Rarely
   - ○ Never
6. How satisfied have *you* been in the past 4 weeks with your intimacy toward your female partner during sexual activity or intercourse?
   - ○ No sexual activity
   - ○ Very satisfied
   - ○ Somewhat satisfied
   - ○ Neutral
   - ○ Not very satisfied
   - ○ Not at all satisfied
7. How satisfied have *you* been in the past 4 weeks with your sexual relationship with your female partner?
   - ○ No sexual activity
   - ○ Very satisfied
   - ○ Somewhat satisfied
   - ○ Neutral
   - ○ Not very satisfied
   - ○ Not at all satisfied
8. How satisfied have *you* been in the past 4 weeks with your sexual life?
   - ○ No sexual activity
   - ○ Very satisfied
   - ○ Somewhat satisfied
   - ○ Neutral
   - ○ Not very satisfied
   - ○ Not at all satisfied
9. Have you found your female partner sexually attractive in the past 4 weeks?
   - ○ Very much
   - ○ Undecided
   - ○ Not really
   - ○ Not at all

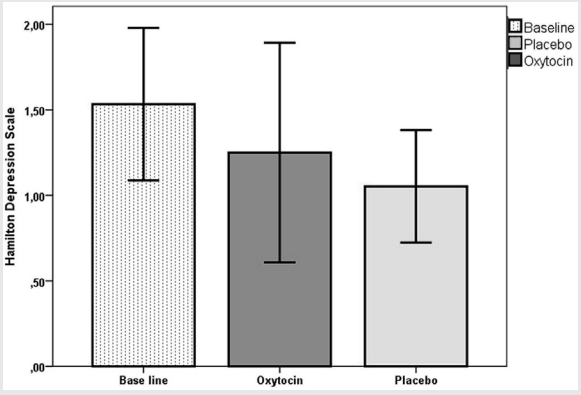
SUPPLEMENTAL FIGURE 1



Partner Performance Questionnaire (PPQ) total scores at baseline (mean values of Visits 1 and 2; *dotted bar*), during female partners' oxytocin (n = 30, *dark gray bar*) and placebo (n = 30, *light gray bar*) treatment. Mean ± SD are indicated. Each *bar* is marked with the standard error of 2. The stars represent the level of significance compared with baseline (*P<.01 vs. baseline).

Muin. Male sexuality under partner treatment. Fertil Steril 2016.

SUPPLEMENTAL FIGURE 2



Hamilton Depression Scale (HDS) total scores at baseline (mean values of Visits 1 and 2; *dotted bar*), during female partners' oxytocin (n = 30, *dark gray bar*) and placebo (n = 30, *light gray bar*) treatment. Mean ± SD are indicated. Each *bar* is marked with the standard error of 2.

Muin. Male sexuality under partner treatment. Fertil Steril 2016.