

The Effects of Female Sexual Response in Coitus on Early Reproductive Processes

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Research has shown that infertility and its medical investigation are stressful for couples and have adverse effects on sexual functioning. The purpose of this study was to examine how female sexual functioning could influence aspects of the reproductive process. This question was examined within the context of the postcoital test (PCT) routinely performed during the infertility investigation. The sample consisted of 85 women with a mean age of 30 years ($SD = 3.8$ years) and a mean infertile period of 2.5 years ($SD = 1.1$ years). Prior to the physiological examination, women completed a battery of questionnaires about their sexual functioning during the scheduled encounter engaged in for purposes of the PCT and during other nonscheduled encounters. The results indicated that the PCT contributed to deterioration in female sexual functioning, and in turn, a poor sexual response was associated with poorer physiological results. The implications of sexual behavior influencing physiohormonal reproductive factors are discussed.

KEY WORDS: infertility; sexual response; reproductive factors; postcoital test; stress.

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INTRODUCTION

Infertility is a serious life dilemma to more than one in five couples of childbearing age (Aral and Cates, 1983). It is defined as the inability to conceive after 1 year of regular, unprotected intercourse. Several studies have found that infertility and the medical investigation undertaken to determine its cause can be stressful for many couples (Daniluk, 1988; McGrade and Tolor, 1981; Takefman *et al.*, 1990). Sexual functioning is one aspect of the infertile couple's relationship that is particularly vulnerable to the stresses associated with infertility (McGrade and Tolor, 1981; Lalos *et al.*, 1985; Takefman *et al.*, 1990). Because of the focus on sex for procreation rather than for pleasure, many infertile couples come to perceive sexual activity as a purely mechanical act to be performed in a specific way, at a specific time, and at a predetermined frequency. Viewing sex in this goal-oriented manner can lead to various sexual inhibitions (Masters and Johnson, 1970).

Of the various infertility diagnostic tests that have been shown to affect couples' sexual functioning, the Sims-Huhner or postcoital test (PCT) has been particularly implicated (De Vries *et al.*, 1984; Drake and Grunert, 1979). The purpose of the PCT is to evaluate the interaction between sperm and cervical mucus during the midcycle (ovulatory) phase of the menstrual cycle. The PCT consists of counting the number of motile sperm found in the mucus sample and evaluating the quality of the cervical mucus. The rationale behind this test is that for conception to occur naturally, sperm must be able to reach and survive in the mucus produced by the cervix. For this test, the physician will typically ask couples to engage in coitus on the approximate day of ovulation and then perform the PCT within several hours of this sexual encounter.

The reason why the PCT is associated with sexual difficulties is that couples are obliged to engage in sex regardless of their level of sexual desire and they must do so with the knowledge that their physician will grade (indirectly) the outcome of their sexual performance. It seems likely that the performance anxiety inherent in this goal-oriented task, as well as the chronic distress already experienced by the infertile couple, could provide an ideal backdrop for the development of sexual difficulties. Indeed, several studies have found that sexual difficulties do develop in a proportion of individuals undergoing the PCT. For example, Drake and Grunert (1979) found that approximately 10% of their male sample was repeatedly unable to perform for the PCT. Moreover, half of these subjects were unable to perform during their wives fertile period, despite normal functioning during nonfertile periods. Similarly,

De Vries *et al.* (1984) found that women rated the quality of their foreplay and orgasmic response in the sexual encounter for the PCT less favorably than in other sexual encounters.

The reports that couples perceive the quality of their sexual functioning during the PCT encounter as more negative raises the question of whether such strained sexual interaction could influence the physiological results of the PCT. PCT results could theoretically be influenced by the quality of sexual interaction via both behavioral and physiohormonal pathways. The former include sexual difficulties that interfere with intravaginal ejaculation, for example, erectile difficulties and/or vaginismus. The latter include sexual factors that interfere with parameters of reproduction such as cervical and/or sperm quality (Wagner and Levine, 1984; Ansari *et al.*, 1980). In support of this possibility, one study found a relationship between women's reports of feeling distant from their partners during the PCT sexual encounter and poor PCT results (i.e., poor semen and/or cervical quality) (DeVries *et al.*, 1984).

The PCT provides an ideal context in which to study the relationship between sexual factors and the reproductive process. Specifically, couples must engage in intercourse under stressful conditions and thereafter undergo a medical evaluation which requires the collection of physiological data. The purpose of this study was to evaluate women's sexual functioning during the PCT encounter and to determine whether the sexual parameters of this encounter were associated with physiological results.

METHOD

Subjects

The sample consisted of 85 women with a mean age of 30 years ($SD = 3.8$) and an average infertile period of 2.5 years ($SD = 1.1$). Subjects were included in the study if they had been infertile for at least 1 year and if their spouse's prior semen analysis had been rated as normal. This requirement controlled for the possibility that poor PCT results would be due to semen abnormalities. Only women whose spouses were able to achieve intravaginal ejaculation were included. The majority of couples, 82.4% (70), was primary infertile (i.e., no known prior conception). Because the PCT sexual experience of the primary and secondary infertile

women was not found to be significantly different, the two groups were collapsed.

Measures

The battery of questionnaires included two standardized measures: the Marital Adjustment Scale (Kimmel and van der Veen, 1974) to assess marital satisfaction and the Sexual History Form (Nowinski and LoPiccolo, 1979) to evaluate general (non-PCT) sexual functioning. Both these measures have been shown to have adequate reliability and validity (Schiavi *et al.*, 1979; LoPiccolo *et al.*, 1985). The PCT Sexual Functioning Questionnaire, developed for this study, evaluated aspects of sexual functioning during the PCT sexual encounter (e.g., sexual and emotional feelings during the encounter, arousal, sexual satisfaction, degree of erectile difficulties, etc.).

Procedure

Female subjects attending a hospital Fertility Service (Jewish General Hospital, Montréal, Québec) were scheduled for the PCT 1 month in advance based on average length of their menstrual cycle and basal body temperature monitoring. They were instructed by the infertility physician to abstain from intercourse for 2 days prior to their appointment and to engage in sexual intercourse on that day. The PCT was carried out within several hours ($M = 4.31$, $SD = 3.24$)⁴ of this encounter. At the time of their appointment, women completed the questionnaires (approximately 15 min) in a private office and then underwent the PCT.

The specialist who evaluated the PCTs (T.T.) was not aware of the hypotheses of this study, nor did he have access to questionnaire responses. The PCT was graded by obtaining a sample of endocervical mucus using a nasal polyp forceps. The PCT score consisted of the number of sperm in the cervical mucus sample which was rated according to the standard method of Marcus and Marcus (1968): 0, no sperm or no motile sperm; 1, 1–5 sperm per high-powered field (HPF); 2, 6–20 sperm/HPF; and 3 > 20 sperm/HPF.

⁴The standard deviation is inflated because a proportion of women, 22.3% (19), had intercourse the night before the PCT. There were no significant differences between this group of women and the remaining sample on any of the demographic, sexual, or physiological variables. Consequently these two groups were collapsed.

RESULTS

General (Non-PCT) and PCT Sexual Functioning

Mean scores on the Marital Adjustment Scale ($M = 117.8$, $SD = 12.4$) fell within the established norms of well-functioning couples, as did mean scores on general sexual functioning. The reported mean frequency of intercourse was at least twice a week for 78.8% (67) of women, which is consistent with previous reports of coital frequency among infertile couples of this age group (Freidman, 1979). The majority of women was orgasmic, with 78.6% (66) reporting the occurrence of orgasm through intercourse in at least 50% of sexual encounters. Almost all women, 95.3% (81), reported that their sexual encounters were at least moderately satisfying. With respect to male sexual functioning, 74.1% (63) of women reported that their spouses never experienced erectile difficulties during their regular sexual encounters.

Overall, 38.8% (33) of women reported that they were extremely uncomfortable about engaging in sex for purposes of the PCT, and 30.6% (26) reported that they experienced a great deal of nervousness or tenseness during this sexual encounter. To determine whether the PCT sexual encounter was rated differently from other sexual encounters, scores on two indices of sexual adequacy were examined: frequency of reported erectile difficulties and female sexual satisfaction. Of the 74.1% (63) of women who reported that their spouses never experienced erectile difficulties during regular sexual encounters, 11.1% (7) reported that their mates had experienced such difficulties during the PCT sexual encounter. The increase in erectile difficulties was significant using McNemar's test for the significance of change ($p < .01$). Similarly, a repeated-measures t test on female sexual satisfaction was found to be significant [$t(84) = 8.67$, $p < .001$], indicating that women were less satisfied during the PCT sexual encounter ($M = 4.18$, $SD = 1.38$) than during other sexual encounters ($M = 5.42$, $SD = .76$). Of the 95.3% (81) of women who reported moderate or extreme sexual satisfaction during regular sexual encounters, only 47.1% (40) reported a similar satisfaction level during the PCT sexual encounter. There was no significant correlation between erectile difficulties (as perceived by the female) and female sexual satisfaction [$r(83) = -.05$], arousal [$r(83) = -.08$], or orgasm [$r(83) = .02$] during the PCT sexual encounter.

In combination, these results indicate that performing for the PCT diminished the quality of female sexual response.

Impact of Sexual Difficulties on PCT Outcome

To determine whether quality of sexual response would influence postcoital test results, women were classified into three sexual response groups on the basis of their ratings on three sexual response variables: satisfaction, arousal, and orgasm. Scores on these measures ranged from 1 to 6, with higher scores indicating a more favorable response during the PCT sexual encounter. Women were classified into the "High" sexual response group ($n = 19$) if they reported a score of 5 or 6 on all three measures, into the "Medium" response group ($n = 18$) if they reported a score of 4 on all three measures, and finally, into the "Low" sexual response group ($n = 17$) if they reported a score of 3 or less on the three measures.⁵

To confirm that the categorization of these three groups did indeed represent different levels of sexual response during the PCT sexual encounter, a multivariate analysis of variance (MANOVA) was computed on other sexual variables. The overall multivariate F test for the main effect of sexual response was found to be significant [multivariate $F(12,92) = 7.21$, $p < .001$], and all variables included in the MANOVA contributed significantly to this effect. Table I shows the means and standard deviations for the three sexual response groups on these variables. Tukey post hoc tests revealed that the Low sexual response group scored significantly more poorly on all variables compared to the High response group. As expected, the scores for the Medium sexual response group fell between those of the two other groups.

An ANOVA was then computed to evaluate the major question of interest. Do PCT results differ among the three sexual response groups? The main effect of group proved to be significant [$F(2,53) = 4.79$, $p = .01$]. Tukey post hoc tests showed that the Low sexual response group obtained significantly poorer PCT scores than the High sexual response group (see Table II). Another method of examining these data showed similar results. That is, 47.1% (8) of women in the Low sexual response group obtained a PCT score of zero (the poorest classification), whereas 10.5% (2) of women in the High sexual response group received this score.

⁵Women who did not meet any of these criteria ($n = 20$) (e.g., a score of 3 on one measure and a score of 6 on another) were not included in subsequent analyses. In addition, women who reported that their spouses had experienced erectile difficulties during the PCT encounter ($n = 11$) were also excluded to ensure that any effects on the PCT were due to female rather than male sexual difficulties. The three groups were then compared on all demographic, medical, cervical mucus quality, and general sexual functioning variables and on time interval between the PCT and sexual intercourse. No significant differences between groups were found on any of these measures, indicating that any differences found on PCT results could be attributed to sexual response differences during the PCT sexual encounter.

Table I. Means and Standard Deviations for Sexual Variables Included in the MANOVA

Variable	Sexual Response Group		
	Low (<i>n</i> = 17)	Medium (<i>n</i> = 18)	High (<i>n</i> = 19)
Nervousness ^a	4.2 (1.8)	3.6 (1.4)	2.3 (1.4)
Emotional closeness	4.5 (1.8)	5.8 (1.2)	6.2 (1.8)
Comfort	2.8 (1.8)	4.2 (1.6)	5.1 (1.1)
Duration	4.4 (1.4)	5.4 (1.1)	7.3 (1.8)
Number of sexual activities	4.4 (2.2)	5.8 (2.2)	7.3 (1.8)
Intensity of physical sensations	23.9 (9.6)	42.8 (9.2)	59.7 (11.5)

^a Lower scores indicate a more favorable response.

A chi-square for these proportions was found to be significant [$\chi^2(2) = 5.96, p < .05$].

DISCUSSION

Although studies have confirmed the vulnerability of male sexual performance to the demands of postcoital testing (Drake and Grunert, 1979; Harrison, 1981), only one study has assessed the impact on women (De Vries *et al.*, 1984). In the present study, about a third of women experienced feelings of discomfort and nervousness during the PCT sexual encounter, and 20% of women with normal sexual functioning reported an unfavorable sexual response. Furthermore, the majority of women reported lower levels of sexual satisfaction in this encounter as compared to sexual relations at other times. These findings suggest that factors inherent in the postcoital situation may be stressful for women and may contribute to decreases in sexual enjoyment.

Because women in this study were not asked to specify what influenced their evaluation of the PCT sexual encounter, the nature of these factors must be inferred. One such factor may be the partner's sexual response during the PCT encounter. Male spouses did not participate in this study and therefore their evaluation of the PCT encounter cannot be determined. However, women were asked to specify the degree of erectile difficulties experienced by their mates during this sexual encounter. Preliminary analyses indicated that there was no significant relation between

Table II. Means and Standard Deviations for the Three Sexual Response Groups on PCT Physiological Results*

Sexual response group	PCT results ^a	
Low	.53 ^b	(.51)
Medium	.94	(.73)
High	1.21 ^c	(.71)

^a Scores range from 0 to 3; higher scores indicate a more favorable result.

*Means with different subscripts are significantly different at $p < .05$ (Tukey post hoc tests).

erectile difficulties and female sexual satisfaction, arousal, and orgasm. It seems, therefore, that for this group of infertile women, the evaluation of a sexual encounter was not based on this aspect of male sexual participation. Other factors that could contribute to female PCT sexual enjoyment include performance anxiety, anticipated discomfort, and concerns about test results. It is interesting to note that some of these factors may also be present in other sexual contexts faced by the infertile couple. For instance, many couples report experiencing performance anxiety when they engage in sexual activity during the women's fertile period (McGrade and Tolor, 1981), indicating that these encounters may also be less enjoyable. Despite these strains, however, couples continue to engage in sexual activity because of their desire for pregnancy. The major goal of this study was to determine how such strained sexual interactions would affect the reproductive processes measured by the PCT.

The findings indicate that quality of the PCT sexual encounter has an impact on PCT results. In other words, women who were negatively affected by the demands of the postcoital sexual situation subsequently obtained poorer PCT results. Several findings support the hypothesis that it is female sexual functioning rather than other factors that influenced PCT results. First, it is unlikely that the poor PCTs in this study were due to chronic sperm abnormalities because women whose spouses had obtained poor semen analyses prior to the PCT were not included in the analysis. Second, it is unlikely that the poor PCTs were due to the influence of male sexual performance because women who perceived their partners as experiencing such difficulties were not included in the analysis. Finally, as with any correlational analysis, it is possible that an unknown variable that covaries with sexual functioning could account for this result. However, the fact that the three sexual response groups did not differ on any medical,

demographic, or regular sexual functioning variables suggests that female postcoital sexual response most likely explains the difference in PCT results among these three groups.

The actual physiological mechanisms by which quality of sexual activity acts on the process of insemination cannot be inferred from this study. Although the findings of this study are consistent with the hypothesis that sexual factors may play a role in early reproductive events, it is premature to conclude that quality of female sexual functioning has direct and causative effects on conception. It may be of value, however, to examine the effects of female sexual arousal on physiological parameters known to affect sperm migration to the cervix, such as vaginal pH (Zavos and Cohen, 1980). The results of such studies could prove to be important in elucidating why 30% of infertile couples repeatedly obtain poor PCT results despite profiles that would predict favorable outcomes (Harrison, 1981). However, because of recent controversy over the reliability of the PCT in predicting fertility potential (Overstreet, 1986), it is difficult to understand the long-range significance of this finding without further research on this test.

A practical implication of this study is that physicians should inquire about a couple's sexual functioning for the PCT when poor PCT results are obtained. If sexual interaction problems are reported, then physicians could attempt to alleviate the pressures associated with this test by recommending other, less intrusive diagnostic procedures. For instance, PCT results have been found to correlate significantly with the results of sperm penetration tests which do not require coitus (Moghissi and Syner, 1970). However, if the postcoital test is deemed necessary, then physicians should try to alleviate the stress associated with sexual performance by accommodating individual patient needs. For instance, some couples may prefer to have the PCT sexual encounter the night prior to their appointment rather than the same morning or on days when they do not work. Couples who experience persistent sexual difficulties which are detected in postcoital testing might be encouraged to seek appropriate counseling.

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