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Sexual Activity and Attitudes as Predictors of Sexual Satisfaction During Pregnancy: A Multi-Level Model Describing the Sexuality of Couples in the First 12 Weeks

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Abstract

The sexual satisfaction of couples during pregnancy is an under-researched area of study. Several limitations exist within the current literature, including a lack of inquiry into attitudes about sex during pregnancy, analysis of the relationship between sexual satisfaction and sexual behaviors, and analysis of dyadic interactions within the couple. The purpose of the current study was to examine the relationships between attitudes toward having sex during pregnancy, various sexual behaviors, and sexual satisfaction among expectant couples via multilevel structural equation modeling. Recruitment focused on mixed-gender monogamous couples where the pregnant individual was between 8 and 12 weeks of gestation, and both partners were soon-to-be first time parents. Touching, hugging, or holding, kissing, vaginal and oral sex, and rubbing each other's genitals were all common behaviors among the 116 couples in the current investigation. Anal sex and sex toy use were less common, but far from absent. According to our model, attitudes toward having sex during pregnancy significantly predicted sexual satisfaction by operating through specific sexual behaviors: kissing, vaginal fingering, and vaginal intercourse, while use of a toy alone and use of a toy with partner were independent predictors of sexual satisfaction. Gender had a direct relationship with satisfaction (men were more satisfied), as well as indirect relationship with satisfaction through an interaction with vaginal fingering and use of a sex toy alone. While multiple past month sexual behaviors were likely to increase satisfaction among pregnant and non-expectant couples alike, this improvement might depend on which behaviors are included and the gender of the individual.

Keywords Pregnancy · Sexual behaviors · Sexual satisfaction · Attitudes toward having sex

Introduction

Considering sexual health is a cornerstone of overall well-being (World Health Organization, 2017), maintaining healthy sexuality during pregnancy and after childbirth is beneficial for expectant parents. It is unsurprising, however, that the sexual lives of pregnant people and couples will be altered during the course of a pregnancy given the many physiological and psychological effects of pregnancy (Jawed-Wessel & Sevick, 2017; Johnson, 2011). Despite this knowledge, the literature does not sufficiently describe the sexual lives of pregnant individuals or their partners. Frequency of sexual activity is often assessed, but rarely across behaviors beyond vaginal intercourse and oral sex (Jawed-Wessel & Sevick, 2017; Johnson, 2011). While sexual function has been more thoroughly examined, sexual satisfaction specifically is nearly absent from the literature when discussing pregnant people and their partners (Serati et al., 2010), even though satisfaction has routinely been included as a sub-domain of sexual function (Rosen et al., 2000; Syrjala et al., 2000).

Potential Influence of Sexual Activity on Relationship and Sexual Satisfaction

By neglecting to explore a more descriptive and detailed view of sexual behaviors and sexual satisfaction during pregnancy, the scientific literature has mirrored Western culture's traditional portrayal of pregnant women and mothers as asexual and undesirable via mainstream media and social norms (Daniluk, 1998; Dempsey & Reichert, 2000; Friedman, Weinberg, & Pines, 1998; Tardy, 2000; Weisskopf, 1980). While a decrease in sexual activity during pregnancy is common (Jawed-Wessel & Sevick, 2017; Johnson, 2011,) pregnancy does not suddenly leave a couple void of sexual needs. Sex is important to individuals and their relationships and pregnant people and their partners are no exception. Relationship satisfaction has been frequently linked to sexual satisfaction among the general population (e.g., Byers, 2005; Fallis, Rehman, Woody, & Purdon, 2016; Yeh, Lorenz, Wickrama, Conger, & Elder, 2006), and pregnant individuals follow a similar pattern (de Judicibus & McCabe, 2002; van Brummen, Bruinse, van de Pol, Heintz, & van der Vaart, 2006). Pregnant women with higher relationship satisfaction have also been found to be more positive about their upcoming role as a mother (de Judicibus & McCabe, 2002) and experience less maternal emotional distress (Røsand, Slinning, Eberhard-Gran, Røysamb, & Tambs, 2011). Long pauses in sexual activity between couples can potentially be harmful to intimate relationships and frequency of sexual activity is one predictor of sexual satisfaction in both men and women (Haavio-Mannila & Kontula, 1997; Smith et al., 2011; Waite & Joyner, 2001; Young, Denny, Luquis, & Young, 1998). Less frequent vaginal intercourse during pregnancy has

been associated with lesser relationship satisfaction during pregnancy (Vannier & Rosen, 2017). Further, reduced vaginal intercourse during pregnancy was associated with relationship dissatisfaction at 1 year postpartum (van Brummen et al., 2006), and relationship instability at 4 months and 3 years postpartum (von Sydow, 1999).

Attitudes Toward Sex During Pregnancy and Sexual Activity

All relationships experience ebbs and flows in frequency of sexual activity, but pregnant people and their partners have been especially vulnerable to prolonged decreases in sexual activity due to pregnancy-related symptoms and/or negative beliefs and feelings surrounding sexuality during pregnancy (Adinma, 1995; Fok, Chan, & Yuen, 2005; Gokyildiz & Beji, 2005; Jawed-Wessel et al., 2016; Nakić Radoš, Soljačić Vraneš, & Šunjić, 2015; Uwapusitanon & Choobun, 2004). Attitudes held by either partner about having sex during pregnancy has changed the way some couples engage in sexual activity (e.g., avoiding certain sexual positions in first trimester and/or preferring to masturbate than have vaginal sex; Jawed-Wessel et al., 2016). In fact, the cross-cultural (although far from universal, see: Vannier & Rosen, 2017) belief that vaginal intercourse can induce preterm labor, cause miscarriage, or otherwise harm the fetus has been identified as a common reason why couples forgo sexual activity during pregnancy (e.g., Adinma, 1995; Bartellas, Crane, Daley, Bennett, & Hutchens, 2000; Fok et al., 2005; Gokyildiz & Beji, 2005; Jawed-Wessel et al., 2016; Nakić Radoš et al., 2015; Pauls, Occhino, & Dryfhout, 2008; Uwapusitanon & Choobun, 2004) even though these fears are unsubstantiated (Bartellas et al., 2000; Ekwo, Gosselink, Woolson, Moawad, & Long, 1993; Fok et al., 2005; Goodlin, Keller, & Raffin, 1971; Klebanoff, Nugent, & Rhoads, 1984; Kurki & Ylikorkala, 1993; Sayle, Savitz, Thorp, Hertz- Picciotto, & Wilcox, 2001). In other words, pregnant people or their partners who may otherwise be engaging in sexual activity refrained from doing so during pregnancy because they think that they should not have sex or have been told not to have sex by health care professionals (Jawed-Wessel et al., 2016). Several sociological and psychological behavior theories also support the influence of attitudes on relevant behaviors. For example, according to the theory of cognitive dissonance people are motivated to behave in a way that is consistent with their beliefs to avoid psychological distress. The theory of reasoned action explains how intention to perform a behavior precedes the behavior itself, and this behavioral intention is determined in part by expectations and attitudes regarding the action and, in this way, attitudes can predict behavior. Therefore, participants who hold more negative attitudes toward

having sex during pregnancy might avoid sexual behaviors during pregnancy because of these negative attitudes. There is also evidence that suggests pregnant individuals are commonly distressed by changes in their sexuality (such as reduced frequency) during this period and greater sexual distress was correlated with decreased relationship satisfaction (Vannier & Rosen, 2017).

Partner Experiences

Very little is known about the experiences of partners. There is not enough research to conclude whether partners of pregnant individuals hold more or less concerns about sex during pregnancy than pregnant individuals or whether there are gender differences in attitudes as the findings are contradictory with one study finding no gender or partner differences (Jawed-Wessel et al., 2016) and one finding male partners holding more negative attitudes than pregnant women (Nakić Radoš et al., 2015). The latter did not collect partner data and, therefore, could not examine partner differences. Three studies (Barclay, McDonald, & O'Loughlin, 1994; Hyde, DeLamater, Plant, & Byrd, 1996; Jawed-Wessel et al., 2016) provided information on the sexual lives of both pregnant women and their partners. The first study to include both partners was conducted by Barclay et al. (1994) and examined sexual interest, orgasm, and sexual behavior during each trimester. Male partners in this study were aware of discordance in sexual interest between themselves and their partner and worked to adjust their own levels to match their partner; the pregnant women reported attempts to do the same or find alternative methods to satisfy the sexual desires of their partners. The second study, Hyde et al. (1996), provided information on prevalence of sexual behaviors (masturbation, vaginal intercourse, oral sex, petting), satisfaction with the sexual relationship in the second trimester, and found pregnant women reported statistically higher sexual satisfaction than men suggesting potential gender differences. The relationship between frequency of sexual behaviors and sexual satisfaction, however, was not analyzed.

With the exception of Jawed-Wessel et al. (2016), prior studies in which both pregnant women and partner data were collected did not conduct dyadic analyses, rather the women and partners were treated as individuals. While information on the sexual health of partners of pregnant women is valuable in and of itself, collecting data from both partners simultaneously takes into account the interdependence of sexual and relational data (Kenny, Kaniskan, & McCoach, 2014). Dyadic study designs control for shared variance, but in order to do so individual data need to be paired and analyzed accordingly. The actor-partner

interdependence model (Kenny et al., 2014) highlights the importance of taking into consideration both the effect that a person has on themselves (actor effect) and the effect that a person has on their partner (partner effect). This interdependence was reflected in the third study to include pregnant women and their partners (Jawed-Wessel et al., 2016). Pregnant women in this study correctly perceived their male partner's sexual difficulties during the pregnancy and, therefore, stood to be impacted by these difficulties psychologically. Gathering information from only one partner does not fully reflect the complexity of partnered sexuality and may potentially bias the results (Kenny, Kashy, & Cook, 2006). Dyadic data are also beneficial for assessing potential gender differences among mixed-gender partners and the influence these potential differences might have on sexual satisfaction. McClelland (2010) described sexual satisfaction as a deeply contextual construct, highly dependent on individual variables and interpretations. McClelland's intimate justice framework suggests high sexual satisfaction can result from low expectations regarding sexual activity (e.g., expecting very low frequency of sexual activity when desiring greater frequency might lead to high sexual satisfaction when frequency of sex is greater than anticipated), especially for those with less social, economic, or sexual autonomy due to institutionalized and culturally rooted social injustices. In this manner, the sexual satisfaction score of individuals may reflect their identities and social locations and not purely qualities of their sexual relationship. In mixed-gender relationships between cis-men and women, gender might play a moderating role in the relationship between attitudes and sexual satisfaction or sexual activity and sexual satisfaction.

Connecting Sexual Activity, Attitudes, and Sexual Satisfaction

It is difficult to surmise the complex relationship between attitudes toward having sex during pregnancy, sexual behaviors, and sexual satisfaction for pregnant individuals from the available literature because of the previously noted gaps in scientific knowledge in these areas and lack of dyadic data describing experiences of both pregnant individuals and their current partners. In sum, we can derive from the literature a link between reduced or less frequent vaginal intercourse and relationship dissatisfaction/distress (Beveridge, Vannier, & Rosen, 2017; van Brummen et al., 2006; von Sydow, 1999) and between negative attitudes and decreased vaginal intercourse among pregnant women (e.g., Adinma, 1995; Bartellas et al., 2000; Fok et al., 2005; Gokyildiz & Beji, 2005; Jawed-Wessel et al., 2016; Nakić Radoš et al., 2015; Pauls et al., 2008; Uwapusitanon & Choobun, 2004). Although sexual activity has been found to be a predictor of sexual satisfaction

among the general population (e.g., Byers, 2005; Yeh et al., 2006), this has not been established specifically among pregnant people. One study found a significant positive relationship between frequency of sexual intercourse and sexual satisfaction in a sample of primi- and nulli- parous pregnant women suggesting the possibility of sexual activity predicting sexual satisfaction (Beveridge et al., 2017). The literature also has yet to fully determine whether attitudes toward having sex during pregnancy predict sexual satisfaction or whether sexual activity predicts sexual satisfaction. One study (Beveridge et al., 2017) found rates of fear-based reasons to avoid having sex were not significantly associated with sexual satisfaction. No other study has evaluated the relationship between these two variables. It is possible attitudes toward having sex during pregnancy are related to sexual satisfaction, but only through increased sexual behaviors. Considering the existing evidence and supporting social psychological theories discussed earlier, holding more positive attitudes about sex in pregnancy may lead people to engage in more sexual behaviors in pregnancy, resulting in greater sexual satisfaction.

Current Study

To this end, the purpose of the current study was to examine the relationships between attitudes toward having sex during pregnancy, various sexual behaviors, and sexual satisfaction among mixed-gender expectant couples via multilevel structural equation modeling. We hypothesized, based on the literature summarized above, positive attitudes toward having sex during pregnancy would predict more frequent sexual activity which in turn would predict greater sexual satisfaction. In other words, different forms of sexual activity will at least partially explain the relationship between attitudes and sexual satisfaction. We did not make any predictions as to which specific sexual behaviors would contribute significantly as there is not enough evidence in the literature to support any hypotheses on this. We also explored potential gender differences in sexual satisfaction and hypothesized a moderating influence of gender based on principles of the intimate justice framework. We did not make specific predictions on how gender might strengthen or weaken this relationship, due to lack of data on common sexual expectation patterns between cis-men and pregnant women that might impact sexual satisfaction.

Method

Participants and Procedure

Newly expectant couples were invited to participate in this cross-sectional study during March, April, and May of 2012. Recruitment occurred primarily through a range of Internet- based methods, with the bulk of recruitment occurring from community boards within pregnancy-related Internet sites. Participants were also recruited with the help of local obstetric, gynecologic, and midwifery practices through the use of fliers detailing the study information. Study fliers were also placed in public places in the local community. Prior to enrollment in the study, participants were screened via online survey of inclusion/exclusion items to ensure both partners had read the study information sheet and were eligible to participate. To be eligible for the study, one person in the couple had to be pregnant between 8 and 12 weeks of gestation, had not given birth before, in a mixed-gender, monogamous relationship, and were living together at the time of the study. The study was limited to first-time parents in the first trimester to focus the findings and limit confounding variables. The larger longitudinal study sought to examine whether attitudes toward having sex during pregnancy evolved as the pregnancy progressed as this is not yet scientifically known; therefore, individuals indicating previous experience with sex during pregnancy were excluded. Both partners were also required to speak fluent English and be living in Canada or the U.S. at the time of study completion as the study questionnaire was only available in English. Mixed- gender couples were selected to examine the potential role of gender in the model. Once eligibility was determined, participants were sent an internet link to the online questionnaire informing them of the study procedures, estimated duration of the questionnaire, the private nature of the questions, and our request for partners to complete the questionnaire individually. Participants were asked to respond to all items individually as partners may have different perceptions of the nature of the pregnancy and frequency of partnered sexual activity. Participants were given gift cards to an online store after completing the first three surveys and \$25 after completing the final survey. The institutional review board at the authors' institution reviewed and approved all study protocols and measures.

Measures

All items included for this study were collected in the base- line questionnaire for a larger longitudinal project. The items included in this study were items related to socio-demographic characteristics (e.g., age, relationship status, education, sexual orientation, race/ethnicity, geographic location). Participants were also asked questions regarding their previous pregnancy history, sexual history, (lifetime and past year

sexual behaviors; same as past month behavior options given below with responses of never, past year, more than a year ago) the health of the current pregnancy (So far, have you experienced any health complications during this most recent pregnancy?), prenatal care (Are you currently receiving prenatal care from a midwife, nurse practitioner, or Ob/Gyn? If no, do you plan to seek prenatal care?), if the pregnancy was planned (yes/no) and, if so, how long the couple had been trying to conceive, and information and advice regarding sexual behaviors during pregnancy from prenatal care providers (Have you received any information regarding sexual health during pregnancy?; During this pregnancy, have you been told to refrain from having sexual intercourse? If yes, please explain). Participants were asked how often (“Not at all,” “Once,” “2 to 3 times,” “Once a week,” “2 to 3 times per week,” “Once a day”) they engaged in various sexual behaviors during the past month (“Masturbation,” “Touching, hugging, holding,” “Anal intercourse,” “Vaginal Intercourse,” “Kissing,” “Rubbing your partner’s genitals,” “Vaginal fingering,” “Receive oral sex,” “Perform oral sex,” “Use personal lubricant,” “Use a sex toy alone,” and “Use a sex toy with a partner”). These items were written by the authors of this study. Cronbach’s alpha score for internal consistency of sexual behavior items was .82.

This study also included previously validated/written measures. To measure sexual satisfaction, a single item from the Sexual Function Questionnaire (SFQ; Syrjala et al., 2000) was used: “Rate the extent to which sexual activity has been satisfying for you in the past month by selecting a number from 0 to 10 (0 = not at all satisfied, 10 = extremely satisfied).” The SFQ item was used in lieu of a validated multi-item measure to avoid redundancy as the full SFQ was included for the purpose of the larger longitudinal project and to limit length of the questionnaire. One previously tested single-item measure of sexual satisfaction was found, but this item centers sexual satisfaction on partnered activity, and this study included both partnered and solo sexual activity; therefore, this item was not appropriate. The previously validated 6-item Maternal Sex during Pregnancy (MSP) and 8-item Partner Sex during Pregnancy (PSP) scales (Jawed-Wessel et al., 2016) assessed the attitudes of pregnant people and their sexual partners toward having sex during pregnancy on a 6-point agree–disagree Likert scale. For these scales, attitude is operationalized as a function of feelings, beliefs, experiences and preferences related to sexual activity during pregnancy (e.g., “I feel anxious about having sex because of the pregnancy,” “Having sex can cause a mis- carriage,” “The pregnancy has made sex awkward,” “During pregnancy, I would rather masturbate than have sex”) and sex refers to vaginal, anal, or oral sex. Items on each scale are averaged to create an attitude score; scores range from 1 to

6 with higher scores indicating more positive sexual attitude toward having sex during pregnancy. Cronbach's alpha scores for internal consistency were .87 for MSP and .90 for PSP.

Plan of Analyses

Descriptive and bivariate analyses were conducted in SPSS version 23. All other analyses were conducted using multilevel structural equation modeling in M-Plus (ver. 7.20; Muthén & Muthén, 2012) to account for the non-independent nature of the dyadic data. Individuals (lower level) were nested within dyads (higher level). First, we examined inter- class correlations (ICC) to assess between and within-dyad variability in attitudes and sexual activity variables in order to establish interdependence of data. The ICC for attitudes placed most of the variability between dyads (80.7%) meaning couples within a dyad were more equally similar in attitude toward having sex during pregnancy than not. For the sexual activity variables, the between-couple variability ranged from 65.5% to as high as 81.3% suggesting members within a couple tend to be much more similar than between- couples. The only outlier was for the variable "used a sex toy alone" which had an ICC of 28.3% meaning that 71.7% of the variability is within couples. These analyses confirm the interdependence of the study variables and support the use of dyadic analyses.

Dyadic analysis began with an unconditional model using only satisfaction with sexual activity in the past month. The variable of positive attitudes was added as a predictor. We then tested for gender differences in satisfaction and a moderating influence of gender on the effect of attitudes. The variables of past sexual activity were added to the model as predictors of satisfaction. Then, the potential moderating influence of gender on the significant associations was explored. Finally, we examined whether the effect of attitudes on sexual satisfaction was mediated by the past sexual activity variables.

Results

Participant Characteristics

Of those who completed the screening survey ($n = 206$), 153 couples (74.2%) were eligible for enrollment and 116 couples agreed to participate, a response rate of 75.8%. It is not possible to calculate a true response rate because it is unknown how many individuals viewed advertisements for the survey, but chose not to participate. Comparisons between participants and eligible non-participants are not possible as the

screening survey only included items related to the inclusion criteria. Participant demographic characteristics are presented in Table 1. The majority of the men and women who participated in this phase were White, heterosexual and married. The majority of the men and women were also college graduates and employed full time for paid work. The mean age of the women was 28.4 years (SD = 3.2, range = 18–39) and 30.2 years (SD = 4.1, range = 20–56) for the men. A minority of the women ($n = 17$, 15.2%) reported having at least one previous miscarriage, and close to 80% ($n = 88$) of the men and women reported this current pregnancy as planned. About half of the women were receiving prenatal care ($n = 57$, 54.3%) and although only 12 women reported experiencing health complication during the pregnancy and 5 categorized their pregnancy as “high risk”, 36.3% ($n = 35$) had been told by a care provider to refrain from vaginal intercourse during pregnancy.

Sexual Behaviors

Tables 2 and 3 detail the distribution in the various sexual activities and satisfaction variables and compare the out-comes for women and men participants. The majority of the respondents had engaged in sexual activity in both the past year and the past month. Over 30% of the couples engaged in touching, hugging, or holding and kissing at least once a day in the past month. Over 50% of couples engaged in vaginal intercourse and received or performed oral sex at least once in the past month. Anal intercourse was less common, but not absent from past month sexual repertoire for over 20% of couples. Rubbing partner’s genitals was more common than vaginal fingering with less than a half engaging in fingering in the past month. Approximately a quarter of respondents reported sex toy use in the past month, both alone or with a partner.

Utilizing chi-square and difference of means *t*-tests, significant differences by gender are noted for rubbing partner’s genitals, performing oral sex, masturbation, frequency of sexual dreams and fantasies, frequency of orgasm in the past month, and pleasure from sex in the past month. Men are more likely to have engaged in little to no rubbing of their partner’s genitals, were less likely to have performed oral sex on their partner, more likely to masturbate, more likely to have received sexual pleasure in the past month, and more likely to have had an orgasm in the past month.

Table 1 Participant socio-demographic characteristics, *n* = 228

	Women <i>n</i> (%)	Men <i>n</i> (%)
Age (M, SD)	28.4 (3.2)	30.2 (4.1)
Weeks pregnant (M, SD)	10.1 (1.2)	10 (1.5)
Ethnicity		
White	102 (91.1)	98 (94.2)
African American/Black	4 (3.6)	2 (1.9)
Asian/Asian American	2 (1.8)	2 (1.9)
American Indian or Alaska native	0 (.0)	1 (1.0)
Multi-racial	4 (3.6)	1 (1.0)
Sexual orientation		
Heterosexual/straight	107 (96.4)	104 (100.0)
Bisexual	2 (1.8)	0 (.0)
Other	1 (.9)	0 (.0)
Relationship Status		
Married	104 (92.9)	105 (92.9)
Living together, not married	7 (6.3)	8 (7.1)
Divorced or separated	1 (.9)	
Education		
Less than high school	1 (.9)	1 (1.0)
High school or GED	1 (.9)	5 (4.9)
Some college	26 (23.4)	18 (17.5)
College graduate	57 (51.4)	37 (35.9)
Graduate school	26 (23.4)	42 (40.8)
Employment		
Part-time paid work	16 (14.5)	9 (8.7)
Full-time paid work	81 (73.6)	91 (87.5)
Not employed for paid work	13 (11.8)	4 (3.8)
Religious affiliation		
Christian	60 (54.1)	45 (43.7)
Catholic	13 (11.7)	11 (10.7)
No specific religion	22 (19.8)	29 (28.2)
Atheist	5 (4.5)	6 (5.8)
Other	12 (10.8)	12 (11.6)
Was this pregnancy planned?		
Yes	88 (79.3)	89 (78.8)
No	17 (15.3)	19 (16.8)
Unsure	6 (5.4)	5 (4.4)
Time to conception		
Less than 1 month	18 (18.8)	11 (11.2)
1–3 months	31 (32.2)	36 (36.7)
4–6 months	27 (28.1)	31 (31.6)
7–12 months	13 (13.5)	12 (12.2)
More than 1 year	6 (6.3)	6 (6.1)
Unsure	1 (1.0)	2 (2.0)

Modeling Attitudes, Sexual Behaviors, and Satisfaction

The unconditional model revealed that 56.14% of the variability in satisfaction with sexual activity in the last month was within the dyad level. Hypothesis testing began by adding positive attitudes as a

predictor of satisfaction. As expected, attitudes were positively associated with satisfaction ($b = .70$, $SE = .12$, $z = 6.10$, $p < .05$). The addition of attitudes as a predictor significantly improved the model ($\Delta\chi^2 = 31.46$, $p < .05$) and led to a .96% decrease in prediction error. We then tested for gender differences in satisfaction and for a potential moderating influence of gender on the effect of attitudes. Men reported higher satisfaction scores ($b = .82$, $SE = .23$, $z = 3.63$, $p < .05$) though there was no significant gender by attitudes interaction ($b = .003$, $SE = .01$, $z = .42$, $p > .05$). The addition of these two variables further improved the model ($\Delta\chi^2 = 8.35$, $p < .05$) and led to a decrease in prediction error of 11.84%.

Next, the variables of past sexual activity were added to the model as predictors of satisfaction. Only "Kissing" ($b = .24$, $SE = .10$, $z = 2.42$, $p < .05$), "Vaginal fingering" ($b = .60$, $SE = .10$, $z = 6.17$, $p < .05$), "Vaginal Intercourse" ($b = .16$, $SE = .08$, $z = 2.06$, $p < .05$), "Use a sex toy alone" ($b = -.34$, $SE = .10$, $z = 3.33$, $p < .05$) and "Use a sex toy with a partner" ($b = .33$, $SE = .13$, $z = 2.55$, $p < .05$) were significantly associated with satisfaction. A revised model was tested using only these significant variables. The addition of these five variables significantly improved the model ($\Delta\chi^2 = 43.66$, $p < .05$) and led to an additional 4.81% decrease in prediction error. To explain, all of the variables above were significantly associated with satisfaction though the use of a sex toy alone was a negative predictor, whereas the others were positive. We then tested for gender differences in the associations by including gender as a moderator. Only two effects were significant and retained in the final model. Specifically, the effect of vaginal fingering was more strongly negatively associated with satisfaction among men (Fig. 1). Meanwhile, use of a sex toy alone was positively associated with satisfaction among men and negatively associated among women (Fig. 2). The addition of these two interactions significantly improved the model ($\Delta\chi^2 = 5.41$, $p < .05$) and led to an additional 11.49% decrease in prediction error.

We then examined whether there were indirect effects of the past sexual activity variables on the association between attitudes and sexual satisfaction. To do so, we added positive attitudes as a predictor of satisfaction and of the sexual activity variables. As hypothesized, attitude was positively associated with increased "Kissing" ($b = .24$, $SE = .08$, $z = 3.04$, $p < .05$), "Vaginal fingering" ($b = .56$, $SE = .07$, $z = 8.40$, $p < .05$), and "Vaginal Intercourse" ($b = .74$, $SE = .09$, $z = 8.47$, $p < .05$). There was no significant effect of attitudes on either "Use a sex toy alone" or "Use a sex toy with a partner", however. Attitudes reduced prediction error in the estimation of "Kissing," "Vaginal fingering," and "Vaginal Intercourse" by 39.83, 4.24 and 30.74%, respectively.

Table 2 Percentages of engagement in various sexual activity in past month and breakdown by sex, n= 228

	Total n (%)	Women n (%)	Men n (%)	χ^2	r test
Touching, hugging, holding				1.54	
None at all	10 (4.4)	5 (4.3)	5 (4.5)		
Once	7 (3.1)	4 (3.4)	3 (2.7)		
2-3 times	11 (4.8)	5 (4.3)	6 (5.4)		
Once a week	14 (6.1)	9 (7.8)	5 (4.5)		
2-3 times per week	67 (29.4)	32 (26.6)	35 (31.3)		
Once a day	73 (32.0)	37 (31.9)	36 (32.1)		
More than once a day	46 (20.0)	24 (20.7)	22 (19.6)		
Anal intercourse (<i>woman recipient</i>)				6.18	
None at all	179 (78.5)	91 (78.4)	88 (78.6)		
Once	30 (12.8)	12 (10.3)	18 (16.1)		
2-3 times	9 (3.8)	6 (5.2)	3 (2.7)		
Once a week	8 (3.4)	6 (0)	2 (9)		
2-3 times per week	1 (4)	0 (0)	1 (9)		
Once a day	1 (4)	1 (9)	0 (0)		
More than once a day	0 (0)	0 (0)	0 (0)		
Vaginal Intercourse				2.89	
None at all	103 (45.2)	52 (44.8)	51 (45.5)		
Once	33 (14.5)	19 (16.4)	14 (12.5)		
2-3 times	28 (12.3)	11 (9.5)	17 (15.2)		
Once a week	27 (11.8)	15 (12.9)	12 (10.7)		
2-3 times per week	29 (12.7)	15 (12.9)	14 (12.5)		
Once a day	5 (2.2)	2 (1.7)	3 (2.7)		
More than once a day	3 (1.3)	2 (1.7)	1 (9)		
Kissing				2.12	
None at all	12 (5.3)	7 (6.0)	5 (4.5)		
Once	4 (1.7)	2 (1.7)	2 (1.8)		
2-3 times	12 (5.3)	5 (4.3)	7 (6.3)		
Once a week	17 (7.5)	9 (7.8)	8 (7.1)		
2-3 times per week	36 (15.8)	17 (14.7)	19 (17.0)		
Once a day	76 (33.3)	36 (31.0)	40 (35.7)		
More than once a day	71 (31.1)	40 (34.5)	31 (27.7)		
Rubbing partner's genitals				15.61*	
None at all	65 (28.5)	25 (21.6)	40 (35.7)		
Once	31 (13.6)	13 (11.2)	18 (16.1)		
2-3 times	46 (20.2)	27 (23.3)	19 (17.0)		
Once a week	37 (16.2)	24 (20.7)	13 (11.6)		
2-3 times per week	34 (14.9)	22 (19.0)	12 (10.7)		
Once a day	10 (4.4)	2 (1.7)	8 (7.1)		
More than once a day	5 (2.2)	3 (2.6)	2 (1.8)		
Vaginal fingering				6.61	
None at all	116 (50.9)	61 (52.6)	55 (49.1)		
Once	29 (12.7)	15 (12.9)	14 (12.5)		
2-3 times	27 (11.8)	12 (10.3)	15 (13.4)		
Once a week	24 (10.5)	12 (10.3)	12 (10.7)		
2-3 times per week	25 (11.0)	15 (12.9)	10 (8.9)		
Once a day	5 (2.2)	0 (0)	5 (4.5)		
More than once a day	2 (9)	1 (9)	1 (9)		
Receive oral sex				9.97	
None at all	99 (43.4)	59 (50.9)	40 (35.7)		

Table 2 (continued)

	Total n (%)	Women n (%)	Men n (%)	χ^2	t test
Once	30 (13.2)	15 (12.9)	15 (13.4)		
2–3 times	42 (18.4)	22 (19.0)	20 (17.9)		
Once a week	34 (14.9)	10 (8.6)	24 (21.4)		
2–3 times per week	17 (7.5)	7 (6.0)	10 (8.9)		
Once a day	2 (.9)	1 (.9)	1 (.9)		
More than once a day	4 (1.8)	2 (1.7)	2 (1.8)		
Perform oral sex				12.53*	
None at all	96 (42.1)	42 (36.2)	54 (48.2)		
Once	39 (17.1)	22 (19.0)	17 (15.2)		
2–3 times	32 (14.0)	13 (11.2)	19 (17.0)		
Once a week	41 (18.0)	29 (25.0)	12 (10.7)		
2–3 times per week	14 (6.1)	6 (5.2)	8 (7.1)		
Once a day	2 (.9)	2 (1.7)	0 (.0)		
More than once a day	4 (1.8)	2 (1.7)	2 (1.8)		
Masturbation				75.22***	
None at all	73 (32.0)	62 (53.4)	11 (9.8)		
Once	28 (12.3)	18 (15.5)	10 (8.9)		
2–3 times	48 (21.1)	21 (18.1)	27 (24.1)		
Once a week	39 (17.1)	5 (4.3)	34 (30.4)		
2–3 times per week	30 (13.2)	7 (6.0)	23 (20.5)		
Once a day	8 (3.5)	1 (.9)	7 (6.3)		
More than once a day	2 (.9)	2 (1.7)	0 (.0)		
Used personal lubricant				2.98	
None at all	141 (61.8)	71 (61.2)	70 (62.5)		
Once	34 (14.9)	20 (17.2)	14 (12.5)		
2–3 times	25 (11.0)	12 (10.3)	13 (11.6)		
Once a week	20 (8.8)	8 (6.9)	12 (10.7)		
2–3 times per week	7 (3.1)	4 (3.4)	3 (2.7)		
Once a day	0 (.0)	0 (.0)	0 (.0)		
More than once a day	1 (.4)	1 (.9)	0 (.0)		
Used sex toy alone				3.63	
None at all	174 (76.3)	87 (75.0)	87 (77.7)		
Once	21 (9.2)	12 (10.3)	9 (8.0)		
2–3 times	15 (6.6)	6 (5.2)	9 (8.0)		
Once a week	10 (4.4)	5 (4.3)	5 (4.5)		
2–3 times per week	6 (2.6)	4 (3.4)	2 (1.8)		
Once a day	1 (.4)	1 (.9)	0 (.0)		
More than once a day	1 (.4)	1 (.9)	0 (.0)		
Used sex toy with partner				3.31	
None at all	177 (78.0)	88 (75.9)	89 (80.2)		
Once	13 (5.7)	8 (6.9)	5 (4.5)		
2–3 times	19 (8.4)	10 (8.6)	9 (8.1)		
Once a week	10 (4.4)	5 (4.3)	5 (4.5)		
2–3 times per week	6 (2.6)	4 (3.4)	2 (1.8)		
Once a day	1 (.4)	0 (.0)	1 (.9)		
More than once a day	1 (.4)	1 (.9)	0 (.0)		
Sexually active in past year					.04
No	25 (11.2)	12 (48.0)	13 (52.0)		
Yes	198 (88.8)	99 (50.0)	99 (50.0)		
(Means)	(.89)	(.89)	(.88)		

Table 2 (continued)

	Total n (%)	Women n (%)	Men n (%)	χ^2	r test
Sexually active in past month					.51
No (0)	86 (37.4)	46 (53.5)	40 (46.5)		
Yes (1)	144 (62.6)	70 (48.6)	74 (51.4)		
(Means)	(.60)	(.60)	(.65)		

Interestingly, the association between attitudes and satisfaction was no longer significant in the new model ($b = .13$, $SE = .14$, $z = .90$, $p > .05$) providing support for the indirect effects. Indirect effects tests of the three variables were each statistically significant. To explain, part of the association between positive attitudes and satisfaction with sexual activity was a result of increased “Kissing” ($b_{[indirect]} = .41$, $SE = .10$, $z = 4.26$, $p < .05$), “Vaginal fingering” ($b_{[indirect]} = .05$, $SE = .03$, $z = 2.04$, $p < .05$) and “Vaginal Inter- course” ($b_{[indirect]} = .11$, $SE = .06$, $z = 1.94$, $p = .05$). The resulting model (Fig. 3) was a modest fit to the data ($\Delta\chi^2 = 64.49$, $p < .05$, $CFI = .92$, $RMSEA = .10$); however, this was to be expected with a sample of 116 dyads (Kenny et al., 2014).

Table 3 Sexual satisfaction and attitude scores total and by gender

	Total \bar{x} (SD)	Women \bar{x} (SD)	Men \bar{x} (SD)	r test
Sexual activity in past month satisfying	6.39 (2.35)	5.95 (2.62)	6.81 (1.98)	-2.76*
Attitude scale score	3.61 (1.29)	3.57 (1.25)	3.64 (1.34)	-.40

* $p < .01$

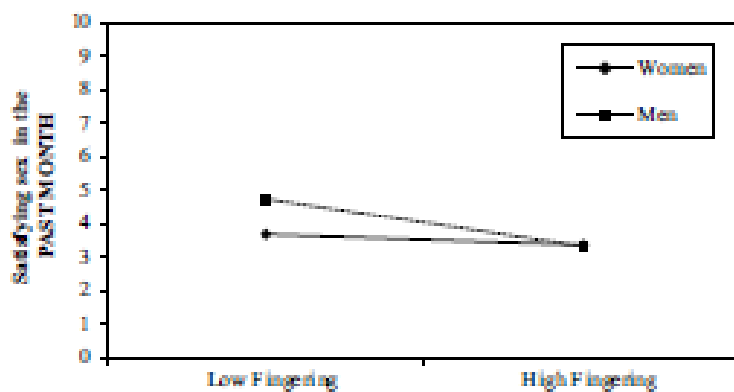


Fig. 1 The moderating influence of gender on the association between vaginal fingering and satisfaction

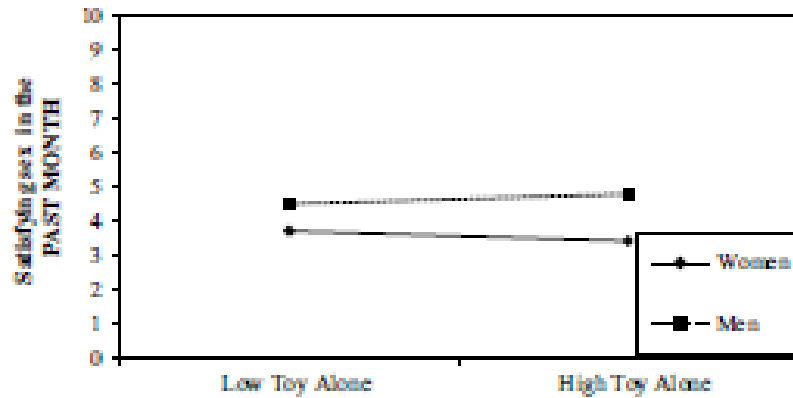


Fig. 2 The moderating influence of gender on the association between the use of a sex toy alone and satisfaction

Discussion

According to our model, more positive attitudes toward having sex during pregnancy are significantly associated with higher sexual satisfaction by operating through specific sexual behaviors: kissing, vaginal fingering, and vaginal intercourse, while use of a toy alone and use of a toy with partner are independent predictors of sexual satisfaction. Gender is also important to this relationship as it has a direct link to satisfaction (men are more satisfied), as well as an indirect relationship with satisfaction through an interaction with vaginal fingering and use of a sex toy alone. This is unlike previous findings on gender differences in satisfaction among expectant couples however, with one study reporting women in their second trimester more sexually satisfied than men (Hyde et al., 1996). This discrepancy could be due to differences in time of data collection (first trimester versus second) or measurement tools used to assess sexual satisfaction (“how satisfied with past month sexual activity” versus “how satisfied with the sexual relationship”). Unfortunately, no further data are available to provide comparisons in a context more similar to the parameters of the current study.

Men engaging in frequent fingering of their partners experienced lower levels of satisfaction, perhaps due to a desire for a different form of sexual expression, like vaginal penetration as this behavior was relatively low in the sample. Men engaging in frequent sex toy use alone, assumedly in masturbation, had higher levels of satisfaction, but women’s satisfaction decreased slightly with higher levels of solo sex toy usage. It is possible since men in this sample are masturbating more than women, using a masturbatory aid is more satisfying while women may see using a sex toy during masturbation as a last

choice when their sexual needs aren't being met via partnered activity. The literature on sex toy use (alone or with a partner) is extremely limited in general, but especially during pregnancy, making conclusions difficult to draw.

Interestingly, oral sex did not load onto the model significantly for either partner. Although oral sex (receiving and giving) has become a normative sexual behavior (Herbenick et al., 2010) and has been linked to greater incidence of orgasm (Armstrong, England, & Fogarty, 2012; Richters, de Visser, Rissel, & Smith, 2006), this does not mean it is universally enjoyed in terms of giving and receiving (Backstrom, Armstrong, Puentes, 2012; Lewis & Marston, 2016; Saliaras, Wilkerson, Sieving, & Brady, 2017; Vannier & O'Sullivan, 2012). It is possible, in this sample, there is too much variation between individuals so that a clear pattern did not emerge. A larger sample size might lead to oral sex loading onto the model significantly. Regardless, data on the extent individuals find specific sexual behaviors generally enjoyable would contribute to our understanding of the current model and the impact of pregnancy, but unfortunately, it was not measured in the current study. Further, it is also important to note some studies looking to understand sexual activity beyond vaginal intercourse do so by adding oral sex behaviors, rarely have behaviors such as genital rubbing or vaginal fingering included (Jawed-Wessel & Sevcik, 2017). Researchers should carefully consider why certain sexual behaviors are included in scientific inquiry and others ignored (e.g., kissing, vaginal fingering, sex toy use) and the impact this has on our scientific understanding. It is possible specific sexual behaviors are in fact more influential to sexual satisfaction than vaginal or oral sex or, at the very least, part of a complex pattern of behaviors that should be examined together. Few studies of the general population concretely linking specific sexual behaviors or combination of specific behaviors to sexual satisfaction (as opposed to orgasm) were found to compare with the current sample; therefore, speculations or conclusions are difficult to make at this time on how pregnancy might impact the relationship between sexual behaviors and sexual satisfaction. Of the existing studies, it appears the presence of more behaviors within a given sexual act increases sexual satisfaction for non-pregnant people (e.g., Armstrong et al., 2012; Herbenick et al., 2010). The current investigation builds on this possibility by suggesting that while multiple behaviors within an event are likely to increase satisfaction among expectant and non-expectant couples alike, this improvement might depend on which behaviors are included and the gender of the individual.

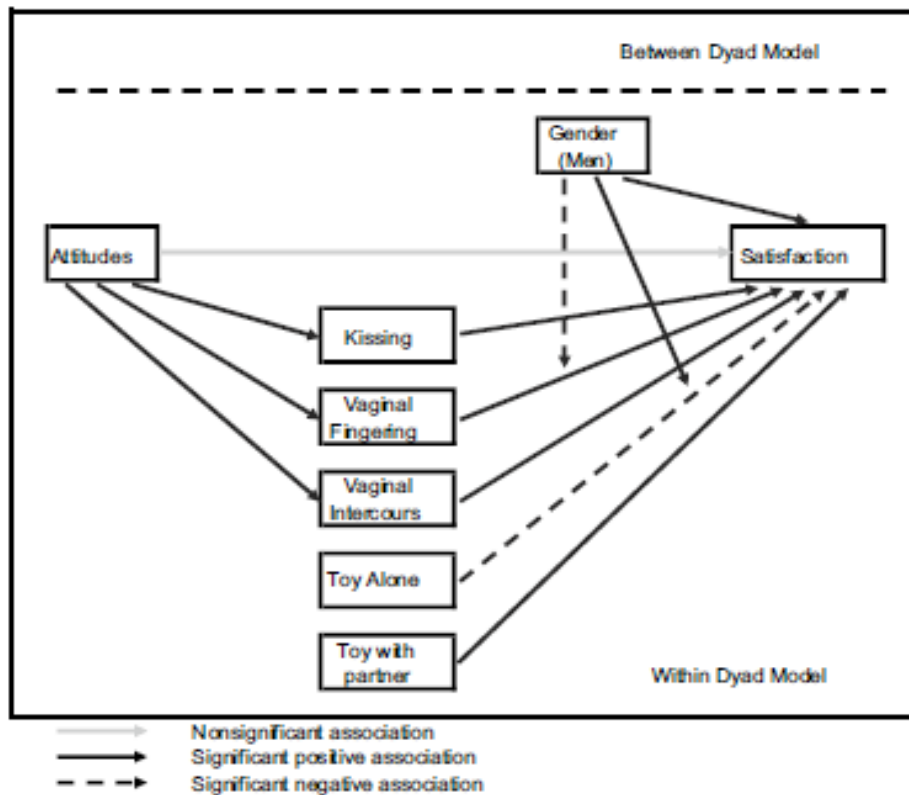


Fig. 3 Final model illustrating the mediating effect of types of sexual activity on the association between attitudes and satisfaction in addition to the moderating influence of gender

Finally, it is important to emphasize not all behaviors act positively on sexual satisfaction or in the same direction for both partners. As previously described, in the Intimate Justice Framework, McClelland (2010) discussed sexual satisfaction as a deeply contextual construct, highly dependent on individual variables and interpretations. Findings from the present study suggest interpretation of the relationship of specific behaviors on sexual satisfaction is also contextual. Based on previous literature, we hypothesized positive attitudes toward having sex during pregnancy would predict more frequent sexual activity and greater sexual satisfaction. We learned, not only was this hypothesis overly simplistic, it assumed more is always better for everyone. Long-term intimate relationships require give and take and perhaps the behaviors that feel less personally satisfying would be more enjoyable, or at least less negative, if the context of the desired/undesired behavior was better understood. Radoš, Vraneš, and Šunjić (2014) demonstrated that decreased sexual frequency is not always associated with decreased sexual satisfaction for men partnered

with pregnant women, that, in fact, “closeness” was a stronger predictor than sexual frequency. This finding, alongside our study, suggests communication about sexual preferences can build the intimacy and mutual understanding needed to withstand potentially negative effects of changes in other aspects of a sexual relationship.

Limitations and Strengths

The current study adds to the understanding of sexual satisfaction during pregnancy by utilizing dyadic analysis to account for both members of the relationship, filling in gaps where previous research of couples treated each person as an individual. This paper also explores a wider range of sexual behaviors during pregnancy. This study is not without limitations, however. We present findings from a very specific cross section of pregnancy—all participants were 8–12 weeks pregnant. It is highly likely this model would look different at different stages of pregnancy or for those with previous births. It is important to note that temporal order of mediation or indirect effects within cross-sectional data cannot be established and these data cannot state causation. This sample is also limited to pregnant women who are currently living with their other-gender partner. There are pregnant women who engage in solo and partnered sexual activity, but with multiple partners, non-cohabiting partners, same gender partners, and/or no partners at all and this study did not capture their experiences and, therefore, should not be generalized to all pregnant women or all partners of pregnant women. The single-item measure of sexual satisfaction used in this study was part of a previously validated measure of sexual function, but not tested for its utility as a single-item measure of sexual satisfaction. While this single-item was economic, there are multi-item scales that are more psychometrically rigorous. There are slight issues with significance testing of difference by gender in the descriptive analysis as some cell sizes within Chi-square tests were below 5, but for the ease of consistent interpretation, and as this analysis is preliminary and not the focus of the paper, this analytic approach was maintained. Finally, we present this paper on satisfaction without the contextual piece of how people prioritize and interpret satisfaction through an intersectional lens; therefore, care should be taken with how these satisfaction findings are interpreted and compared.

From a bigger picture perspective, findings from this study highlight the significant gaps in knowledge regarding sexuality during pregnancy. By no means are the speculations and findings in this study conclusive. Considerably more research is needed with more diverse populations to understand these initial

patterns of relationships between attitudes toward have sex during pregnancy, sexual behaviors, gender, and sexual satisfaction found in this study. Future studies are encouraged to explore these constructs among same gender and/or transgender partners to not only better serve these populations, but to also further detangle partner versus gender versus pregnancy effects. Findings from this study also elucidate the need for closer examinations of the relationship between specific sexual behaviors and sexual satisfaction among any couple, not just those including a pregnant partner.

According to data and analysis presented in this study, multiple past month sexual behaviors are likely to increase sexual satisfaction for many couples, regardless of pregnancy, this improvement might depend on which behaviors are included and the gender of the individual.

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