



Maternal and Partner Pregnancy Impact Expectations Scales (PIES-M/P): Development, Evaluation, and Implications

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Abstract

Introduction A number of studies have examined women's and couples' sexual experiences during pregnancy; few studies, however, have explored how pregnant couples expect their sex lives to change despite the possible relationship between sexual expectations and sexual function and satisfaction. The purpose of this study was to assess the utility of two scales: the Maternal Pregnancy Impact Expectations Scale (PIES-M) and the Partner Pregnancy Impact Expectations Scale (PIES-P), which measure newly pregnant couples' sexual expectations later in the pregnancy.

Methods The current project was split into three distinct phases across two data collection points: 1. language elicitation, 2. item development and revision, and 3. empirical validation. A total of 242 participants were included in Phase 1, and a total of 241 data points in 124 dyads for Phase 3 were obtained via a cross-sectional, web-based survey administered in 2011 and 2012. Exploratory factor analysis was used to assess the factor structure of the PIES-M and PIES-P. Multilevel modeling was used to understand the variability of PIES-M and PIES-P scores. Measures on sexual motivation, sexual interest, sexual anxiety, attitudes to sex, and somatic pregnancy symptoms were used to further assess the test scales.

Results Findings demonstrated a two-factor structure for the PIES-M with sexual expectations and pain expectations loading on separate factors. For PIES-P, all items loaded onto one factor as no pain expectation items were included for partners.

Conclusions Both the maternal and partner versions of the scales demonstrated acceptable construct validity and internal consistency, providing evidence for the validity of these measures of sexual expectations during pregnancy.

Policy Implications A greater understanding of sexual expectations during pregnancy has social, clinical, and research implications. Policy makers and practitioners should assess and incorporate sexual expectations into their practice, especially with marginalized and minoritized populations.

Keywords Pregnancy · Couples · Sexual expectations · Sexual satisfaction · Sexual function

Introduction

There is an inherent expectation of sex in many romantic relationships, particularly marriages (Blumstein & Schwartz, 1983; McNulty & Fisher, 2008; Schwartz & Young, 2009). Sexual expectations can be defined as an “individual's

beliefs about their future self, including behaviors, relationships, feelings, and quality of these sexual experiences” (McClelland, 2010; Savin-Williams & Diamond, 2004) and recent biopsychosocial models of perinatal sexuality include expectations as important factors to consider (Fitspatrick et al., 2021). Sexual expectations may be directly linked to constructs established as important elements of romantic relationship well-being such as sexual and relationship satisfaction by providing a point of comparison that individuals may judge their actual experiences against (Rosen et al., 2022). McClelland (2010) recommends that research questions about sexual satisfaction be contextualized by questions about sexual expectations (e.g., entitlement, importance, and aspiration) in order to develop “necessary insights into the otherwise flat sexual satisfaction scores” (pg. 674). Unfortunately, no measures of sexual expectation

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in the context of pregnancy exist to date. In this study, we sought to develop a measure that would allow for a better understanding of expectations related to sexual behaviors and sexual well-being during pregnancy.

Sexuality During Pregnancy

During pregnancy, the dynamics of couples' sexual relationships often undergo changes, representing a significant period of psychosocial adjustment for both the expectant mother and her partner. Research suggests that throughout pregnancy, a substantial proportion of individuals experience changes in their sexual behaviors (Jawed-Wessel & Sevic, 2017). Studies indicate that frequency of vaginal intercourse drops mid-to-late pregnancy for as many as 90% of people (Hyde et al., 1996; Jawed-Wessel et al., 2017; Sagiv-Reiss, et al., 2012; von Sydow, 1999). However, there are little to no changes in non-coital sexual behaviors, although studies including non-coital sexual behaviors are limited in quantity (Jawed-Wessel et al., 2017). Additionally, findings reveal that up to 63% of women and 76% of men report a decline in sexual satisfaction during this period (Erol et al., 2007; von Sydow, 1999), while approximately 42% of women experience clinically significant sexual distress, characterized by negative emotions such as frustration, worry, or guilt regarding their sex life (Vannier & Rosen, 2017).

Key factors implicated in the observed shifts in sexual behavior during pregnancy are misconceptions, anxiety, and general negative attitude regarding sexual activity during this period. Both women and men often express concerns about engaging in sexual intercourse while pregnant, which frequently serve as reasons for abstaining (Bartellas et al., 2000; Beveridge et al., 2017; de Pierrepont et al., 2022; Jawed-Wessel et al., 2016; Jawed-Wessel et al., 2017; Nakić Radoš et al., 2015). The significant sexual changes during pregnancy coupled with susceptibility to negative attitudes toward sex during pregnancy that impact sexual satisfaction further emphasize the importance of examining sexual expectations during pregnancy and after childbirth.

Sexual Expectations

Sexual expectations and expectations in general (i.e., perceived likelihood of an outcome occurring) are often learned via personal and vicarious experiences and social messages (Bandura, 1986) and, therefore, are likely to reflect between group differences. McClelland's Intimate Justice Framework (2010) emphasizes how this can occur, i.e., because of systematic discrepancies in sexual experience, sexual expectations are also subject to between group differences (e.g., trans women of color are significantly more likely to experience sexual violence than other genders (James et al., 2016; Stotzer, 2009; Tillery et al., 2018)). This phenomenon has

become well documented in relation to gender differences in orgasm expectations (Armstrong et al., 2012; Chadwick & van Anders, 2017; Klein & Conley, 2021; Matsick et al., 2016). For example, one study provided correlational evidence that both men and women base their expectation and desire for orgasm at least partially on how often they experience orgasm in a relationship (Wetzel et al., 2022). And one experimental study (Blumenstock, 2022) confirmed young men and women's sexual desire increased when they read a vignette suggesting an orgasm was more likely to occur than when it was less likely to occur. As predicted, however, expectations of non-orgasmic sexual pleasure and emotional closeness had a stronger impact on women's sexual desire than it did for men. This finding reflects at least somewhat gendered aspects of sexuality in terms of orgasm expectations, with women typically valuing non-orgasmic or emotional closeness during sexual activity more so than men, therefore expectations of emotional closeness would likely have a stronger impact on desire for women than men.

Sexual Expectations During Pregnancy

It is important to note that two studies closely examine sexual expectations about sexuality post-childbirth (Pauleta et al., 2010; Rosen et al., 2022). Pauleta et al. (2010) focused solely on expectations of sexual frequency, and Rosen et al. (2022) took a multi-faceted approach and assessed "how much will the following things affect your sex life once you are a parent?" with "things" including constructs such as fatigue, time for sex, and body image. The current study is focused on sexual expectations for sexuality during pregnancy and asserts that while pregnancy is a temporary condition, it is a unique and impactful period worthy of understanding more deeply. Pregnancy is a status substantially regulated by culture, law, and familial expectations that infringe on autonomy of individual expectations and will likely influence assessments of sexual experiences during pregnancy (Brotto & Heiman, 2007; Ma & Teasdale, 2004; Williams et al., 2006). The Intimate Justice Framework (McClelland, 2010) emphasizes how high satisfaction can result from low expectations, especially for those without social, economic, or sexual autonomy to exercise full control over these expectations. Within the context of pregnancy, the heavy legal, religious, and cultural regulations on women's reproductive choices are likely to affect the expectations a person holds about their sex life during pregnancy.

The cultural anxiety of pregnant people as desiring sex and *being* sexually desirable also reflects the limitations placed on pregnant women and the experiences they are allowed to have. This includes within feminist activism. For example, second-wave feminist writers drafted the Minneapolis Ordinance (Dworkin & MacKinnon, 1988) in condemnation of pornographic images of pregnant or lactating

women in sexual situations. While fetishization of pregnant people augments their objectification, the assumption that sexual presentations of them are inherently fetishizing is itself dehumanizing. How can pregnant people expect to be sexual with their partners if they are not allowed to be considered sexual by another adult?

Women are also presented with portrayals of pregnant women as sexual through media images of prominent, normatively attractive celebrities posing nude during pregnancy and pregnancy-related blogs as well as websites offering advice and tips on how to maintain sex during pregnancy. And they are inundated with views of pregnant women as de-sexualized mothers, “Madonnas” without the impurities of sexual urges and positioned as “safe from sex” (Huntley, 2000; Kaplan, 1992). These cultural and societal portrayals of pregnant women convey contradictory messages of what is acceptable and also shape sexual expectations during pregnancy, further complicating the chances for satisfying sexual experiences during pregnancy.

Perhaps in response to the challenges with cultural portrayals of sexuality during pregnancy or lack thereof, researchers, educators, and clinicians have stressed to couples the importance of setting positive and realistic expectations for themselves and their partners; emphasizing that they need to contextualize their bodies in age-appropriate ways and that adapting their expectations to each new phase of life is crucial (Metz & McCarthy, 2007; Metz & Miner, 1998.) Healthy sexuality during the transition to parenthood is a key component in maintaining the relationship and overall quality of life (Pastore et al., 2007; Rosen et al., 2021, 2022; von Sydow, 1999) and pregnancy appears to be a period in which psychosexual concerns increase (Beveridge et al., 2017; Gałazka et al., 2015; Jawed-Wessel et al., 2017).

Several aspects of sexual function decline during pregnancy, especially in the third trimester (Adinma, 1995; Aslan et al., 2005; Bartellas et al., 2000; Erol et al., 2007; Eryilmaz et al., 2004; Fok et al., 2005; Gökyildiz & Beji, 2005; Jawed-Wessel & Sevick, 2017; Naim & Bhutto, 2000; Pauleta et al., 2010; Pauls et al., 2008; Robson et al., 1981). Studies have found genito-pelvic pain to be one of the areas of sexual function most affected during pregnancy (Erol et al., 2007; Pauls et al., 2008; Robson et al., 1981; Rossi et al., 2019; von Sydow, 1999) with between 22 and 58% of women reporting at least some degree of genito-pelvic pain (Bartellas et al., 2000; Erol et al., 2007; Glowacka et al., 2014). Much less is known about the sexual lives of partners of pregnant people, but changes in satisfaction are documented for partners as well (Bogren, 1991; Hyde et al., 1996; van Anders et al., 2013).

Of the studies related to sexual expectations during pregnancy specifically, almost all focus on the prevalence of beliefs that sex during pregnancy will result in preterm labor, harm to the fetus, a miscarriage or other adverse obstetric event (Adinma, 1995; Bartellas et al., 2000; Eryilmaz et al.,

2004; Fok et al., 2005; Gökyildiz & Beji, 2005; Morris, 1975; Naim & Bhutto, 2000; Uwapusitanon & Choobun, 2004), even though these beliefs are likely unfounded (Bartellas et al., 2000; Ekwo et al., 1993; Kurki & Ylikorkala, 1993; McClelland, 2010; Sayle et al., 2001; Solberg et al., 1978). Further, at least one study has documented a connection between a negative expectation and behavior avoidance with over half of this sample reporting at least one fear as a reason to avoid sexual activity while pregnant (Beveridge et al., 2018). Though studies have examined expectations of the negative outcomes of sex during pregnancy, what is missing is an understanding of what couples expect their sex lives will be like broadly and with regard to specific aspects of sexual functioning, such as sexual arousal, sexual interest, pain during sex, and experiences of orgasm during pregnancy. Further, physicians and other prenatal health care professionals are urged to discuss possible sexual changes during pregnancy to avoid relational and sexual distress and frustration during pregnancy (Foux, 2008; Lewis & Black, 2006), however, we do not know what the couples are expecting to begin with. Assessing couples' sexual expectations, and whether these expectations play a role in sexual satisfaction, experiences, and overall sexual and relational well-being is important to understand sexuality during pregnancy. But, to do so, there first needs to be a measure with evidence of validity and reliability.

Measuring Sexual Expectations During Pregnancy

In addition to the limited information related to the sexual expectations of pregnant people and their partners regarding their sexual experiences later in the pregnancy, there is also a lack of measures that assess these expectations. The Medical Impact Scale (MIS) is an assessment of the impact of medical treatments, specific diseases, or conditions on aspects of sexual function that has evidence of reliability and validity with adult survivors of blood or marrow transplants (BMT), adult survivors of childhood BMT for cancer, adult survivors of childhood leukemia without BMT, and young survivors of breast cancer (Herbenick & Reece, 2010; Syrjala et al., 2000). Items in this measure are framed to ask participants to indicate what impact a specific medical treatment or condition has had on their sex life, sexual interest or desire for sex, sexual arousal during sexual activity, and orgasms during sex (see Table 1). The scale was intended to be adapted to various specific medical treatments or conditions. Although pregnancy is not a disease or medical treatment, pregnancy certainly does impact the physical body and may involve a number of medical interventions and treatment for complications. And, of course, pregnancy is intensely medicalized in Western contexts. As such, the SFQ-MIS might be useful for pregnancy.

Table 1 Phase I themes and item decisions

Phase I theme	Theme example	Matched original SFQ-MIS item	Decision	New PIES-M item
Decreased sexual interest and desire	"I don't think I will want to have sex"	What impact has your (illness or treatment) had on your interest or desire for sex?	SFQ-MIS item retained with support from elicitation survey	What impact do you expect your pregnancy to have on your interest or desire for sex?
Changes in sexual arousal	"I think I'll have a really hard time getting turned on"	What impact has your (illness or treatment) had on your sexual arousal during sexual activity?	SFQ-MIS item retained with support from elicitation survey	What impact do you expect your pregnancy to have on your sexual arousal during sexual activity?
Change in sex life	"Our sex life will be great"	What impact has your (illness or treatment) had on your sex life?	SFQ-MIS item retained with support from elicitation survey	What impact do you expect your pregnancy to have on your sex life?
N/A	N/A	Please rate how well you think you have adjusted to changes in your sex life since your (illness and treatment) by circling a number from 0 to 10	Item removed as it does not reflect anticipated changes to broad sex life or sexual function, nor was their empirical or elicitation survey support	N/A
Awkwardness due to belly and body changes	"How would we navigate sex with a big belly? It will be so uncomfortable."	N/A	New item added with support from elicitation survey	During the next month, sex will be significantly more difficult because of the size of my belly
Reduced vigor of sexual activity	"Sex won't be as rough"	N/A	New item added with support from elicitation survey	What impact do you expect your pregnancy to have on the vigor of your sexual activity?

The SFQ-MIS was adapted and tested as a tool to assess sexual changes post childbirth among primiparous women (Jawed-Wessel et al., 2013). This measure might be useful for understanding how sexual expectations impact sexuality during pregnancy with some adaptation. This would be useful because, currently, no other measure of sexual function exists that measures the impacts of expectations on sexual function. The SFQ-MIS may allow impact to be studied when prospective, longitudinal data collection is not feasible.

The Current Study

In this study, we sought to develop a measure that would allow for a better understanding of expectations related to sexual behaviors and sexual well-being during pregnancy. To do so, we defined expectation as a strong belief that something will happen or be the case in the future. This includes beliefs about future sexual behaviors, future selves in sexual circumstances, and future quality of sexual experiences. Several, well-studied theoretical frameworks utilize various forms of expectation to explain and predict human behavior. For example, the *Theory of Reasoned Action* (Ajzen & Fishbein, 1980) and *Social Cognitive Theory* (Bandura, 1986) both follow the principles of an expectancy-value model in which the expectations/expectancies and the value placed on those expectations/expectancies precede the formation of attitudes which in turn help understand and predict behavior. These theories view expectations generally as the beliefs of what might happen when a behavior is performed. While the context of this study requires a broader definition of expectation, one that is not rooted solely in outcome expectations, the directionality and predictive capacity of these theories is still important and relevant in situating our findings.

According to these theories, if outcome expectations are evaluated as negative, they are more likely to hold more globally negative attitudes toward the behavior and, therefore, less likely to engage in the behavior. According to principles of expectancy-value theories, expectancies influence our behavior motivations (Bandura, 1986). For example, if a person expects to experience a lot more pelvic pain during sex when they are pregnant, they are likely to exhibit lesser sexual motivation because of this expectation (if more pelvic pain is evaluated as a negative experience). It can be reasoned that sexual interest would perform similarly (as seen in the studies on sexual expectation and sexual desire cited earlier) and sexual anxiety inversely. Accordingly, we predicted sexual motivation and sexual interest would be lower and sexual anxiety would be higher for those with more conventionally negative sexual expectations.

In order to develop a measure of sexual expectations during pregnancy, the current project was split into three distinct phases across two data collection points: 1. language

elicitation, 2. item development and revision, and 3. empirical validation.

Phase 1: Elicitation

The primary purpose of Phase 1 was to assess the language individuals use when discussing expectations about sexual experiences during pregnancy in order to determine if any constructs emerge beyond those assessed by the SFQ-MIS.

Phase 1 Methods

Participants

A total of 242 individual participants completed the survey. Age of the participants ranged from 18 to 60 with a mean of 26.1 years ($SD = 8.9$, $Mdn = 25$). Less than 1% of participants were transgender ($n = 2$, 0.8%), 44.6% were men ($n = 108$), and 54.5% were women ($n = 132$). Slightly more than half of the respondents were married or partnered ($n = 140$, 57.8%). The largest racial demographic was White ($n = 147$, 60.7%), followed by Black ($n = 72$, 29.7) and Asian ($n = 19$, 7.9%). A third of the sample (33.0%, $n = 80$) were either lesbian, gay, bisexual, pansexual, or queer, and the remaining as “heterosexual/straight” ($n = 159$; 65.7%), and three individuals responded “other” or “prefer not to say.” All participants were current United States (U.S.) residents.

Measures

The Phase 1 survey consisted of closed-ended items related to participant demographics (i.e., age, gender, race, relationship status, and sexual identity); previous history of sexual activity during pregnancy and one open-ended item: “What do you think your sex life would be like if you or your sexual partner were pregnant?”

Procedures

The Institutional Review Board at the first author’s institution reviewed and approved all protocols. Participants were recruited via a range of internet-based methods such as posting of the recruitment message on research, pregnancy, and sexuality related listservs, blogs, and message boards as well as through health and sexuality related undergraduate classrooms after obtaining permission from class instructors. Online and paper elicitation surveys were administered to people aged 18 and over during November 2011. Because participants in Phase 3 would all be individuals who were very early in their (or their partner’s) pregnancy, and because experiences influence expectations (Ajzen & Fishbein, 1980; Bandura, 1986), only those who had never been pregnant or

never been in a sexual relationship with a pregnant person were included. It is very likely that individuals who have had experience being pregnant and being sexual or being sexual with a pregnant partner will have expectations that are influenced by their experience with sexuality during pregnancy. Our goal with this project was to better understand the sexual expectations of first-time pregnant/expecting people and their partners and, therefore, Phase 1 included only those who lacked this experience.

Analysis

The first author and a research assistant independently engaged in an inductive coding process to identify themes. In this process, we used the methods of constructivist grounded theory (Charmaz, 2014) including initial coding, focused coding, and theme development. The analysis did not progress to the theory development stage, as that was beyond the scope of this study. An iterative process (three iterations were needed) was used until researcher consensus was established on the final list of salient themes (Middlestadt, 1996).

Phase 1 Results

Analysis of the open-ended item produced five salient themes: Decreased Sexual Interest and Desire (e.g., “I don’t think I will want to have sex”), Reduced Vigor of Sexual Activity (e.g., “sex won’t be as rough”; “we will just have to be very gentle and not fuck hard”), Changes to Arousal (e.g., “I think I’ll have a really hard time getting turned on”; “I think all the pressure and blood flow will make me sensitive kind of in this constant state of arousal”), Change in Sex Life (e.g., “Our sex life will be great”; “Our sex life will be much worse”), and Awkwardness due to Belly and Body Changes (e.g., “I think sex would be so uncomfortable”; “it just seems like sex would be so difficult, how do we even have sex?”; “sex will be so awkward and uncomfortable”; “how would we navigate sex with a big belly? It will be so uncomfortable”).

Phase 2: Item Development and Revision

All of the themes that emerged from the elicitation survey closely resembled constructs assessed in the SFQ-MIS (Syrjala et al., 2000), aside from the themes reflecting concerns that the size of the pregnant woman’s abdomen would make sex more difficult later in pregnancy and the expected change in the vigor of sexual activity (see Table 1). The first author (along with her dissertation committee; see Acknowledgements) concluded that a significant modification of the SFQ-MIS effectively represented the emergent themes from Phase 1, therefore, expectations about the impact of the pregnancy on aspects of their

sexual function, and broadly their sex life, were operationalized by revising the SFQ-MIS items by adding “do you expect.” For example, “what impact has your pregnancy had on your interest or desire for sex?” was changed to “what impact do you expect your pregnancy to have on your interest or desire for sex?”. Items assessing impact of the pregnancy on the vigor of sexual activity and the degree to which the size of the pregnant woman’s abdomen would make sex more difficult were added based on the analysis of the elicitation survey. These items were written to mimic the SFQ-MIS item style with the exception of the item assessing difficulty due to belly size: “during the next month, sex will be significantly more difficult because of the size of my belly (my partner’s belly).” In addition, the SFQ-MIS does not include items assessing pain during sexual activity. Although very few women from Phase 1 expected to experience genital or pelvic pain during sexual activity, several discussed expectations of discomfort during intercourse, especially in the third trimester. Because pain is an established aspect of sexual function (Quirk et al., 2002; Rosen et al., 2000) and experiences of pain have been shown to increase during pregnancy (Erol et al., 2007; Pauls et al., 2008; Robson et al., 1981; Rossi et al., 2019; von Sydow, 1999) for pregnant participants, two items reflecting impact of the pregnancy on the amount of genital and pelvic pain experienced during sexual activity were added. Ultimately, only one item, the SFQ-MIS adjustment item, was removed, as it did not reflect anticipated changes to broad sex life or sexual function during the next month. All item decisions and revisions are presented in Table 1. The resulting PIES-M and PIES-P items are presented in Appendix 1. The chosen numerical codes assigned to response anchors were selected for ease of interpretability. An impact expectation of no change was assigned the value of “0” and subsequent response options listed one degree at a time as positive or negative numerical values. Conventionally positive expectations (e.g., less pain, easier orgasm, and improved sex life) were assigned positive numerical codes, and conventionally negative expectations were assigned negative numerical codes.

Phase 3: Psychometric Assessment

The purpose of Phase 3 was to assess the factor structure and evidence of internal consistency and construct validity of the initial PIES-M and PIES-P when administered to a sample of newly pregnant women and their partners.

Phase 3 Methods

Participants

The majority of participants were White, married, highly educated, and employed for paid work. All participants were

current U.S. residents. The mean age of the women was 28.4 ($SD = 3.2$, range = 18 to 39) and 30.2 ($SD = 4.1$, range = 20 to 56) for the men. All men and 94.5% of women ($n = 117$) reported their sexual identity as “heterosexual/straight;” four women identified as “bisexual”. No gender expansive individuals participated in this study; all pregnant participants were women. A minority of the women ($n = 17$, 1.7%) reported having at least one previous miscarriage and close to 80% ($n = 88$) of the men and women reported this current pregnancy as planned. Approximately half of the women had begun receiving prenatal care from a doctor or midwife ($n = 57$, 54.3%) and 36.3% had been told by a care provider to refrain from sexual intercourse during pregnancy ($n = 35$). See Table 2 for demographic details.

Of the women who completed the screening survey ($n = 206$), 153 (74.3%) were eligible for enrollment. Two couples asked to withdraw after enrollment, and three couples failed to complete the survey after enrollment for unknown reasons which resulted in 124 couples (241 individuals) participating in the study; a response rate of 81.0%

of those who were eligible. It was 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. The multilevel modeling framework uses all the available data to estimate the associations for missing data, therefore, couples with missing data ($n = 7$) were not deleted.

Procedures

The Institutional Review Board at the first author’s institution reviewed and approved all protocols. Couples who were between 8 and 12-week gestation, in a mixed-sex, monogamous relationship, had not previously given birth or had any other biological children and were living together at time of enrollment, were recruited during March, April, and May of 2012 primarily through a range of internet-based methods, largely community boards within pregnancy-related internet sites. Participants were also recruited with the help of local obstetric, gynecologic, and midwifery practices. Flyers and study information sheets were posted inside participating practices. Advertisements for the study were also posted throughout the local community. Participants consented to participation online by reading the informed consent and continuing with the screening survey. Eligible women provided an email address for their partners who were then sent the link to the informed consent online page and study questionnaire.

Measures

The study questionnaire included closed-ended items related to socio-demographic characteristics (e.g., age, relationship status, education, sexual orientation, and race/ethnicity) and measures related to recent and lifetime sexual behaviors and pregnancy health and characteristics (e.g., have you been told to refrain from sexual intercourse by a prenatal care provider; previous miscarriages). The following scales were also included:

Maternal Adjustment and Maternal Attitudes During Pregnancy and After Delivery (MAMA) This questionnaire includes 60-items assessing an expectant mother’s perceptions of her body, somatic symptoms, marital relationship, attitudes to sex, and attitudes toward the pregnancy and baby (Kumar et al., 1984). Only the MAMA Somatic subscale was used for the purposes of this study. The MAMA Somatic subscale (10 items) measures the extent to which pregnant women have been experiencing pregnancy-related symptoms (e.g., lack of energy, nausea, vomiting, perspiring, swelling, and tingling breasts) on the same four-point scale. This scale demonstrated weak reliability in this sample, but this is expected as there will be considerable variation on which and how many somatic symptoms are experienced (Kumar et al., 1984). Higher scores indicate fewer experiences of negative symptoms. Only the pregnant participants were asked to complete this subscale.

Table 2 Participant sociodemographic characteristics

	Women <i>n</i> (%)	Men <i>n</i> (%)
Age (<i>mean, SD</i>)	28.4 (3.2)	30.2 (4.1)
Weeks pregnant (<i>mean, SD</i>)	10.1 (1.2)	10 (1.5)
Ethnicity		
White	102 (88.7)	98 (94.2)
African American/Black	4 (3.5)	2 (1.9)
Asian/Asian American	4 (3.5)	2 (1.9)
American Indian or Alaska Native	1 (0.9)	1 (1.0)
Multi-racial	4 (3.5)	1 (1.0)
Relationship status		
Married	107 (93.0)	105 (92.9)
Living together, not married	7 (6.1)	8 (7.1)
Divorced or separated	1 (0.9)	0 0.0
Education		
Less than high school	1 (0.9)	1 (1.0)
High school or GED	1 (0.9)	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	62 (54.4)	45 (43.7)
Catholic	14 (12.3)	11 (10.7)
No specific religion	22 (19.3)	29 (28.2)
Atheist	5 (4.4)	6 (5.8)
Other	7 (6.3)	12 (11.6)

Multidimensional Sexuality Questionnaire-Sexual Motivation (MSQ-SM) and Sexual Anxiety (MSQ-SA) Subscales These subscales use 5 items each to measure the strength of one's desire to be involved in a sexual relationship (MSQ-SM) and the degree to which sexual aspects of one's life produces feelings of tension, discomfort, and anxiety (MSQ-SA) by asking respondents to indicate to what degree they think the scale statements are characteristic of them (not at all, slightly, somewhat, moderately, and very) (Snell et al., 1993). Scores are summed, and higher scores indicate higher levels of each construct. Both subscales demonstrated strong reliability for pregnant participants (MSQ-SM, $\alpha = .91$; MSQ-SA $\alpha = .90$) and partners (MSQ-SM, $\alpha = .93$; MSQ-SA $\alpha = .93$).

Sexual Interest One item from the *Sexual Function Questionnaire* (Syrjala et al., 2000) was used to assess participant's level of sexual interest. Participants were asked "please rate how interested you have been in sexual thoughts, feelings or actions in the past month by selecting from 0 to 10 (0 = not at all interested; 10 = extremely interested).

Analysis

Descriptive and bivariate analyses were conducted using IBM SPSS Statistical Software (Version 26.0). Descriptive statistics were used for variables related to demographics. Exploratory factor analysis (EFA) is an analytic approach aimed at simplifying complex survey data (Gorsuch, 1988). Specifically, it aims to identify the smallest number of hypothetical constructs that can explain the shared associations between observed variables. An EFA was performed to assess the factor structure of the PIES-M/P scales among this sample of newly pregnant women and their partners. It was hypothesized that the PIES scales will support a single factor structure. In other words, differences in the scores on the PIES-M/P scale were expected to fall along a single dimension.

The scales were not written with intended subscales in mind, but it is possible that the two pain items (genital pain and pelvic pain) will load together and separately from the other items. In addition, to help with the aims of test construction, we were interested in addressing validity through convergent measures. To do so, we included measures of sexual motivation, sexual anxiety, and sexual interest to assess convergent validity. We predicted that PIES scores would be negatively associated with MSQ-SA (more sexual anxiety associated with more conventionally negative expectations) and positively associated with MSQ-SM (more sexual motivation associated with more conventionally positive sexual expectations), MAMA-Somatic (fewer negative pregnancy symptoms associated with fewer conventionally negative sexual expectations), and the single sexual interest item (more sexual interest associated with

more conventionally positive sexual expectations). These analyses were conducted using multilevel structural equation modeling in M-Plus (ver. 7.20; Muthen & Muthen, 2012) to account for the non-independent nature of the dyadic data with individuals nested within couples. This approach allows for the explanation of differences in the variable of interest based on individual level and dyadic level factors.

Phase 2 Results

Construct Validity and Internal Consistency

In order to assess the factor structure of the PIES, an exploratory factor analysis was performed using principal extraction with initial communalities of 1.0 after mean centering all the variables. A varimax rotation was applied to the resulting factor structure. Eigenvalues over 1.0 and an examination of the scree plot were used to determine the number of factors. For the women, both the scree plot and factor loadings suggested a two-factor solution. Two factors accounted for 66.34% of the variance and loaded with eigenvalues over 1.0 (3.96 and 1.34). A large decrease was seen between the second and third eigenvalues, with small decreases thereafter (0.95, 0.51, 0.39, 0.33, 0.31, and 0.18). Items 1 through 6 loaded onto factor 1 above 0.50 and ranged from 0.57 to 0.85. Items 7 and 8 (pain expectations) loaded onto factor two by themselves (0.88 and 0.89). Internal consistency was assessed using Cronbach alpha coefficients. The Cronbach alpha was strong for the sexual impact expectation items (0.88), adequate for the complete scale (0.81) and within the acceptable range for the pain expectation items (0.79) (DeVellis & Thorpe, 2021; Nunnally, 1978; Streiner, 2003).

No pain expectation items were included for the sexual partners and therefore, the scree plot and one eigenvalue over 1.0 (3.27) suggested a one-factor solution accounting for 54.4% of the variance. Eigenvalues beyond the first (0.83, 0.59, 0.50, 0.48, and 0.34) accounted for a minimal amount of variance. All items loaded above 0.50 and ranged from 0.64 to 0.83. The Cronbach alpha was 0.80.

Multilevel modeling was used to assess the variability in PIES scores and account for that variability using individual and dyadic level variables. At the individual level, there were 241 data points in 124 dyads. The unconditional model revealed that 68.93% of the variability in PIES scores was at the individual level and 31.07% at the dyadic level. This reflected a significant proportion of dyadic level variability (estimate = .23, *S.E.* = .06, $z = 4.08$, $p = .04$), justifying a multilevel modeling approach of the PIES data.

The factor structure results informed scoring decisions for the PIES scales. PIES-M scores for pregnant participants were calculated by averaging the six (items 1–6) sexual impact subscale items with the average of the pain expectation items for a mean score of -0.20 ($Mdn = -0.43$,

$SD = 1.01$, range = -2.33 to 2.36). PIES-P scores of partners on each of the six items were averaged for a mean score of -0.43 ($Mdn = -0.50$, $SD = 0.78$, range = -2 to 2). Item and total means are presented in Table 3. Sexual anxiety (MSQ-SA) and sexual motivation (MSQ-SM) were added as individual level predictors. Not surprisingly, anxiety and motivation were negatively related to each other ($r = -.18$, $p < .04$). More relevant is that both anxiety ($b = -.24$, $S.E. = .06$, $z = -3.74$, $p = .01$) and motivation ($b = .27$, $S.E. = .07$, $z = 4.11$, $p = .01$) were associated with PIES scores, reducing individual level prediction error by 4.03%. In other words, when anxiety and motivation are included in the model, individual level PIES prediction is more accurate than without anxiety and motivation. These results support the hypothesis that PIES scores should reflect more conventionally positive expectations (e.g., easier orgasms, less expectation of pain, more easily aroused, and stronger interest or desire) associated with less sexual anxiety and greater sexual motivation.

At the dyadic level, somatic symptoms and sexual interest were added predictors (see Fig. 1). Whereas somatic symptoms was significantly positively associated with PIES scores ($b = .48$, $S.E. = .23$, $z = 2.13$, $p = .03$), meaning that those with fewer negative symptom also had fewer conventionally negative expectations, supporting the authors' hypothesis. There was no significant effect of interest ($b = -.10$, $S.E. = .07$, $z = -1.48$, $p = .14$). Moreover, somatic symptoms and interest were also negatively related to each other ($r = -.05$, $p = .02$). All told, the predictors accounted for 41.03% of the dyadic level predictor error in PIES scores. Figure 1 illustrates the standardized associations in the final model.

Discussion

Findings from Phase 2 show some evidence for validity and internal consistency of the initial PIES-M/P. The scales converged with the constructs, sexual motivation, and sexual anxiety in expected ways, and there was also a relationship between the test construct and presence of negative pregnancy-related symptoms. The one-item measure of sexual interest did not contribute to the model significantly. Previous research has found sexual expectations about valued sexual experiences such as orgasmic or non-orgasmic pleasure to be associated with sexual interest or desire (Blumenstock, 2022), but the test scales did not perform as hypothesized in this sample.

The current study has presented data on men and women's expectations about their sexual functioning and overall sex life during the next month of pregnancy. Men and women generally expected negative change due to the pregnancy. Close to 60% of both men ($n = 66$) and women ($n = 67$) expected their sex lives to become worse during the next month because of the pregnancy, but 30% of men ($n = 34$) and 23% of women ($n = 26$) expected no change in their sex lives. The majority of both men and women expected the size of the pregnant person's abdomen to make sex significantly more difficult during the next month. These generally negative expectations align with the findings related to attitudes toward sex during pregnancy from the same sample (Jawed-Wessel et al., 2016) in that couples from this sample begin their pregnancy journey with a negative mindset on how their sexual well-being will be impacted through the next several months. Previous research also shows that attitudes toward sex during pregnancy potentially

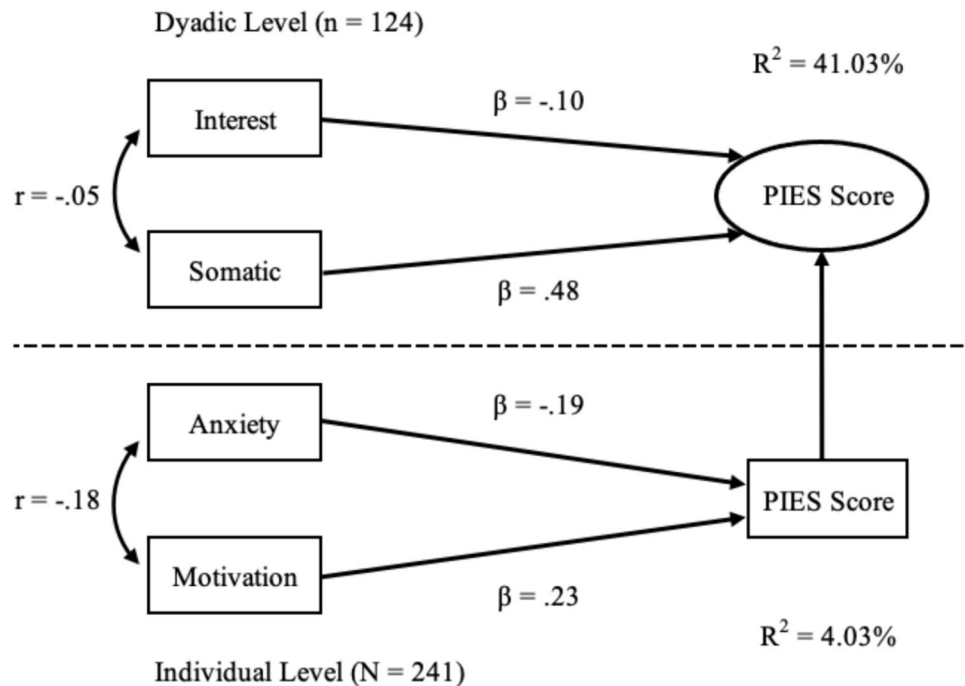
Table 3 Pregnancy impact expectation means by item

	Women		Men	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sexual expectations				
Expected impact on sex life	-0.65	1.01	-0.59	0.87
Expected impact on desire or interest for sex	-0.49	1.17	0.03	0.86
Expected impact on sexual arousal during sexual activity	-0.31	1.23	-0.27	0.88
Expected impact on ease of orgasms	-1.00	1.68	-0.22	0.86
Expected impact on vigor of sexual activity	-1.00	0.87	-0.80	0.77
Size of belly will make sex significantly more difficult	-1.21	1.69	-0.70	2.02
Sexual expectations subscale ($\alpha = .88$)	-0.52	0.83	-0.43	0.78
Pain expectations				
Expected impact on amount of genital pain during sexual activity	1.19	1.87	-	-
Expected impact on amount of pelvic pain during sexual activity	1.26	1.78	-	-
Pain expectation subscale ($\alpha = .86$)	1.25	1.65	-	-

Negative scores indicate negative expectations; positive scores indicate positive expectations and scores equal to zero indicate no change is expected

* $p < .001$; ** $p < .01$

Fig. 1 Standardized associations in the final model



influence sexual satisfaction (or vice versa) (Jawed-Wessel et al., 2019). One previous study found new parents who experienced postpartum sexual experiences that were worse than expected pre-childbirth reported poorer sexual and relationship well-being at 3-month postpartum, though this group of parents were in the minority (16% of mothers and 19% of partners reported unmet sexual expectations) (Rosen et al., 2022). This finding suggests that having realistic post-childbirth sexual expectations can be protective; these results may also apply to early expectant couples and their sex lives later in the pregnancy.

At this stage, however, it is still largely unknown if these conventionally negative expectations have any impact on the sex lives of couples who are expecting a new child: do couples who expect a pregnant abdomen to be a significant barrier to pleasurable sexual experiences become more creative with sexual positions or do they not even bother to try? Are people who expect no changes taken by surprise when they experience any change? Several questions such as these are left unanswered at this point but could greatly shape the course of education and therapy for people who are newly pregnant and their partners or those trying to conceive.

In contrast to general sexual expectations during pregnancy, when examining expectations of pelvic or genital pain specifically, less than a quarter of the women expected to experience greater pelvic or genital pain in the next month during sexual activity and close to half expected to experience no pelvic or genital pain. Interestingly, when examining the pain expectations items specifically, women who reported no sexual activity during the last month had more

positive pain expectations for the following month. It is possible that women who have had sexual activity during the past month have experienced some degree of pain and, therefore, have higher expectations of experiencing pain during sexual activity over the following month, whereas the women who have abstained have never experienced pain with sexual activity. This line of reasoning aligns with principles of expectancy-value theories in that past experiences influence expectations and future behavior (Bandura, 1986) as well as a past study that has linked negative expectations of sex during pregnancy with sex avoidance (Beveridge et al., 2017).

Caution is necessary when applying positive and negative value labels to participants' expectations. While some items explicitly elicit a value-based response (e.g., better/worse), other items only elicit expectations of change and the anticipated direction of the change (e.g., more sexual interest). While some individuals may interpret easier or stronger orgasms, for example, as a positive expected change, others may view the change as either neutral or even negative (e.g., Chadwick et al., 2019). Those who employ this scale should also always make certain to collect gestational age, as expectations for each individual item are likely to be different at different stages of the pregnancy; failing to do so could invalidate findings or confound comparisons between participants.

Limitations of this study include a sample of respondents that were socio-demographically similar and not representative of all newly pregnant couples in the U.S.. Phase 1 participants were somewhat younger (though at age where

pregnancy is not uncommon) as both online and university student sampling was used and both Phase 1 and Phase 3 samples were majority White. While a third of the phase 1 sample identified as lesbian, gay, bisexual, pansexual, or queer, the phase 3 sample is made entirely of mixed gender couples with only four participants identifying as “bisexual,” therefore, the scales still need to be tested in more gender and sexually diverse samples. The authors of this study are committed to more robust recruitment in the future that will attract more racially and sexually diverse participants. Further, phase 1 sample was limited to those who had never been pregnant or never engaged sexually with someone who was pregnant but not limited to those who hoped to have children in the future. It is possible those who were included that do not want to ever be pregnant have greater negative associations with sex during pregnancy. A majority of the Phase 3 respondents were recruited via community message boards from a major baby and pregnancy-related website. It is possible that these individuals are more likely to be seeking pregnancy-related information and have formed different expectations based on this information. This study also relied on online survey data which are limited by self-selection and other types of bias. Finally, the data within this study are over 10 years old, and it is possible attitudes and expectations regarding sexual behaviors during pregnancy have shifted in the past decade to be more or less accepting. Recent studies continue to find concerns about sex during pregnancy as common, suggesting at least some old mores remain (Beveridge et al., 2017; Gałazka et al., 2015; Jawed-Wessel et al., 2017).

With regard to specific pregnancy characteristics, nearly 80% of couples in this study reported having planned their pregnancy, whereas the national estimate of intended pregnancies is 45% (Guttmacher Institute, 2019). It is possible couples that have planned their pregnancies and are aware of the pregnancy earlier have spent more time thinking and communicating with their partner about how their pregnancy and sex lives might change during the next month, resulting in different expectations than those who did not plan their conception. Close to 40% of the couples had been told by a prenatal care provider to refrain from having sexual intercourse at some point during their current pregnancy; this is particularly high considering only slightly over half had begun receiving prenatal care from a doctor or midwife. Couples who were told to refrain from sexual intercourse are likely to have their expectations impacted more than those who were not told to refrain; they may be less clear on what to expect or expect the pregnancy to have greater impact on their sex lives than those who were not. Another consideration for future research and application is how these scales can be used for non-monogamous couples, particularly those who do not consider any one partner to be their “primary partner.”

Related to the specific analyses and scale decisions, the pain items emerged on their own factor, likely because they were the only two items that measured the same construct “pain,” and these items should not necessarily be used as a subscale. Demonstrating convergent validity was also difficult at this stage, as a scale for sexual expectations that has previously shown evidence of validity and reliability did not exist at time of data collection for the PIES to be tested against. There were also a number of potential items that could have been included and tested in this study that are relevant to sexual function expectations (e.g., expectations of the impact pregnancy would have on frequency of sexual activity or specific sexual behaviors, expectations of the impact pregnancy would have on non-orgasmic sexual pleasure, etc.) and supported by the scientific literature, but were not included. This decision was made primarily because it was difficult to estimate how many people would choose to participate in the study given this understudied and hard to reach population (newly pregnant people and their partners). Exploratory Factor Analysis and Principal Components Analysis are both subject to participant-to-item ratio guidelines, and the authors chose to begin with fewer items to maintain smaller ratios for this preliminary study. Further, the current study would be strengthened by performing confirmatory factor analysis, but ultimately a larger sample would be needed to adopt a confirmatory approach. A sample of 300 dyads or more would be needed to assess the factor structure overall and also account for differences between members of the dyad.

Conclusions

The primary purpose of this study was to develop and assess a scale to measure the sexual expectations of pregnant people and their partners. After significant modification of the Sexual Functioning Questionnaire’s Medical Impact Scale, the resulting maternal and partner PIES scales have shown potential to serve this purpose. Knowledge gained from further testing of the scale and a close examination of its relationship to sexual satisfaction and sexual function would be valuable to clinicians, researchers, and childbirth educators who are interested in understanding the role of sexual expectations on sexual and relational satisfaction as well as sexual function. Examining differences in expectations in various groups, particularly those who have been historically marginalized, might provide valuable insights into the social and cultural factors that influence sexual expectations and feelings of deservingness and entitlement. It is important to note that the current study presents an initial version of the scale and significant further testing, and revisions (as described in scale decisions above) are likely. The authors see strong potential for future researchers to adapt and test additional items that might be relevant to their populations of interest.

Policy Implications

Understanding the sexual expectations of pregnant people and their partners has significant social, clinical, and research implications. Within the social context of the U.S., political and legal attacks on sexual and reproductive rights of pregnant people — which limit their self-determination, bodily autonomy, and access to healthcare — are increasingly common and restrictive. A broad understanding of the expectations of pregnant people, including their sexual expectations, is essential to understanding pregnancy-related decision making. It is also possible that pregnancy expectations are, at least in part, shaped by the sociopolitical context of pregnancy. Clinicians and other professionals working with pregnant people and their partners should explore and account for sexual expectations when providing services, support, and advice to those trying to conceive and newly pregnant people and partners. Researchers studying sexuality need to include pregnant people in their samples, account for sexual expectations when measuring sexual satisfaction, and recognize that the expectations of marginalized social groups may be significantly different than those of majority groups.

Appendix 1. Pregnancy Impact Expectations Scale

In the NEXT MONTH...

1. What impact do you expect your pregnancy (your partner's pregnancy) to have on your sex life?

2 = My sex life will be a lot better than before
 1 = My sex life will be a little better than before
 0 = My sex life will be no different than before
 -1 = My sex life will be a little worse than before
 -2 = My sex life will be a lot worse than before

2. What impact do you expect your pregnancy (your partner's pregnancy) to have on your **interest** or **desire** for sex? (This question is about your thoughts, fantasies or wishes, not about how you feel during sexual activity.)

2 = My interest or desire will be a lot stronger
 1 = My interest or desire will be a little more
 0 = My interest or desire will be about the same
 -1 = My interest or desire will be a little less
 -2 = My interest or desire will be a lot less

3. What impact do you expect your pregnancy (your partner's pregnancy) to have on your **sexual arousal** during sexual activity? (By arousal, we mean the physical and

emotional responses in your body and mind that tell you that you are feeling sexual.)

2 = It will be quite a bit easier for me to get aroused
 1 = It will be a little easier for me to get aroused
 0 = Arousal will be about the same
 -1 = It will be a little more difficult for me to get aroused
 -2 = It will be quite a bit more difficult for me to get aroused

4. What impact do you expect your pregnancy (your partner's pregnancy) to have on your **orgasms** during sex?

2 = It will be quite a bit easier for me to orgasm
 1 = It will be a little easier for me to orgasm
 0 = Ease of orgasms will be about the same
 -1 = It will be a little more difficult for me to orgasm
 -2 = It will be quite a bit more difficult for me to orgasm
 -3 = I do not expect to experience orgasm

5. What impact do you expect your pregnancy (your partner's pregnancy) to have on the vigor of your sexual activity? (By vigor we mean, how rough or energetic your sexual activity will be)

2 = Sexual activity will be a lot more vigorous
 1 = Sexual activity will be a little more vigorous
 0 = The vigor of our sexual activity will be about the same
 -1 = Sexual activity will be a little less vigorous
 -2 = Sexual activity will be a lot less vigorous

Please respond to what extent you agree or disagree with the following statement.

6. During the next month, sex will be significantly more difficult because of the size of my belly (my partner's belly).

-3 = Strongly agree
 -2 = Agree
 -1 = Somewhat agree
 1 = Somewhat disagree
 2 = Disagree
 3 = Strongly disagree

[Items 7 and 8 for Pregnant Participants Only]

7. What impact do you expect your pregnancy to have on the amount of **GENITAL** pain you experience during sexual activity? (By pain we mean, pain in the vulva, labial or vaginal areas during or after sexual activity)

3 = I do not expect to experience genital pain
 2 = The amount of pelvic pain will be a lot less
 1 = The amount of pelvic pain will be a little less

- 0 = The amount of pelvic pain will be about the same
 -1 = The amount of pelvic pain will be a little more
 -2 = The amount of pelvic pain will be a lot more

8. What impact do you expect your pregnancy to have on the amount of PELVIC pain you experience during sexual activity? (By pelvic pain we mean, pain in the lower abdominal area)

- 3 = I do not expect to experience pelvic pain
 2 = The amount of pelvic pain will be a lot less
 1 = The amount of pelvic pain will be a little less
 0 = The amount of pelvic pain will be about the same
 -1 = The amount of pelvic pain will be a little more
 -2 = The amount of pelvic pain will be a lot more

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Declarations

Ethics Approval Approval was obtained from the Institutional Review Boards of [University names included in the title page separate from the manuscript].

Consent to Participate Informed consent was obtained from all individual participants included in the study

Consent for Publication No identifying details of participants are included in this manuscript.

Competing Interests The authors declare no competing interests.

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