Title

Pregnancy context and women's health-related quality of life

Permalink

https://escholarship.org/uc/item/7rz2w7ss

Journal

Contraception, 95(5)

ISSN

0010-7824

Authors

Gariepy, Aileen
Lundsberg, Lisbet S
Vilardo, Nicole
et al.

Publication Date

2017-05-01

DOI

10.1016/j.contraception.2017.02.001

Peer reviewed

Pregnancy context and women's health-related quality of life

Aileen GARIEPY, MD, MPH[1], **Lisbet S. LUNDSBERG, PhD**[1], **Nicole VILARDO, MD**[1], **Nancy STANWOOD, MD**[1], **Kimberly YONKERS, MD**[1,2], and **Eleanor B. SCHWARZ, MD**[3]

[1]Department of Obstetrics, Gynecology and Reproductive Sciences, Yale School of Medicine, New Haven, CT

[2]Department of Psychiatry, Yale School of Medicine, New Haven, CT

[3]Department of Internal Medicine, University of California, Davis, CA

Abstract

OBJECTIVE—To quantify the association of pregnancy context and health-related quality of life (HRQoL).

STUDY DESIGN—English- or Spanish-speaking women, aged 16–44, with pregnancies <24 weeks gestation were enrolled in this cross-sectional study between June 2014 and June 2015. Participants completed self-assessments of pregnancy "context," including: timing, intention, wantedness, desirability, happiness, and planning (measured with the London Measure of Unplanned Pregnancy). HRQoL was measured using the Patient Reported Outcomes Measurement Information System Global Short Form (PROMIS-GSF). Associations between measures of pregnancy context and HRQoL scores in the lowest tertile were examined using multivariable logistic regression to adjust for potential confounding variables.

RESULTS—We enrolled 161 participants (mean age=27.2±6.6 years). Only 14% self-identified as White, non-Hispanic; 42% Hispanic, 37% Black, non-Hispanic, and 7% multiracial. Most (79%) participants were unmarried, and 75% were parenting. Mean gestational age was 9±4.6 weeks. In unadjusted models, women reporting mixed feelings about wanting to have a baby, an undesired pregnancy, or feeling unhappy about learning of their pregnancy more frequently had low mental and physical HRQoL compared to women reporting wanted, desired, happy pregnancies. Women with an unplanned pregnancy or pregnancy occurring at the wrong time also had lower physical HRQoL than women reporting pregnancies that were planned or happened at the right time. However, after multivariate adjustment, including history of depression, pregnancy contexts were not associated with low mental or physical HRQoL.

Corresponding author: Aileen M. Gariepy, MD, MPH, Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale School of Medicine, 310 Cedar Street, New Haven, CT 06510, Work Phone: 203-737-4665, Private phone: 203-737-6476, Fax: 203-737-6195, aileen.gariepy@yale.edu.

CONCLUSIONS—After adjusting for multiple confounders, pregnancy context is not significantly associated with HRQoL.

IMPLICATIONS—The focus on pregnancy intention in public health programs may not sufficiently assess multidimensional aspects of pregnancy context and may not align with patient-centered outcomes such as HRQoL.

Keywords

London Measure of Unplanned Pregnancy; PROMIS; Pregnancy intention; Quality of life; Unplanned pregnancy

INTRODUCTION

Public health systems have focused on reducing rates of unintended pregnancy [1–4], which has been associated with lower rates of prenatal care and increased risk of preterm birth [2–9]. However, there is a paucity of data evaluating the impact of unintended pregnancy on women's health and lives [8]. Previous comparative and cost effectiveness assessments of strategies to prevent unintended pregnancy have predominantly been conducted from the perspective of society, the health care system, insurance companies, or various government programs (e.g., Medicaid) [9–13], rather than being patient-centered. However, to incorporate women's perspectives into comparative effectiveness research aimed at improving pregnancy outcomes, we need robust patient-centered measurements, such as health-related quality of life (HRQoL) to more comprehensively understand the association between unintended pregnancy and psychosocial health and well-being.

HRQoL is a standard, quantifiable, multi-dimensional measure of the physical, functional, social and psychological impact that a disease or health state has on an individual's quality of life [14–17]. Assessments of HRQoL can improve patient care by aiding decision-making, and informing resource allocation and healthcare policy [14–17]. Improvement in HRQoL is a central public health goal highlighted in Healthy People 2000, 2010, and 2020 [16]. However, we lack essential data evaluating the association of unintended pregnancy and women's HRQoL.

To understand whether unintended pregnancy is associated with HRQoL and incorporate recent calls for improved measurements of unintended pregnancy [8,18–21], we evaluated multiple pregnancy "contexts" including assessments of pre-pregnancy perceptions (pregnancy intention, wantedness, planning), in addition to including assessments of post-conception (after pregnancy diagnosis) perspectives (pregnancy timing, desirability, happiness). By evaluating pregnancy contexts that include both assessments of pre-pregnancy perceptions and women's assessments after pregnancy diagnosis, we aimed to address multidimensional aspects of unintended pregnancy [18] and incorporate ideas about the ways in which "women's preconception desires and emotional orientations toward pregnancy may evolve after conception has occurred [19]." This approach also addresses criticisms of previously overly simplistic and dichotomous characterization of pregnancies as intended or unintended [20], which may not be relevant to some women [21].

We hypothesized that suboptimal pregnancy context, specifically pregnancies that were unintended, unplanned, unwanted, undesired, that occurred at the wrong time, or that women described as feeling unhappy about, would be associated with low HRQoL among a diverse group of pregnant women.

MATERIALS AND METHODS

Study setting and design

We recruited women presenting for pregnancy testing or abortion services at clinical sites in New Haven, CT, from June 2014 to June 2015. Research staff screened interested women for eligibility, and offered study participation to all eligible women. Women were eligible if they were English or Spanish speaking, pregnant at <24 completed weeks gestational age, 15–44 years of age, and completed study enrollment within 1 week of their pregnancy test or pre-operative clinic visit. A total of 361 women were screened and 269 women were determined to be eligible; 196 were interested in participating and 164 enrolled. One individual provided consent but did not complete the enrollment questionnaire and another two individuals initially tested positive for pregnancy were subsequently found not to be pregnant. We collected data in person using self-administered paper questionnaires, primarily at clinical sites of enrollment. A small percentage (<5%) of questionnaires were completed in a public, community setting (e.g. restaurant) to accommodate participants' schedules. Overall, 161 participants contributed data to this analysis.

Measures of Pregnancy Context

At enrollment, contextual questions regarding specific circumstances and conditions related to the pregnancy were asked, referencing the time period either just prior to pregnancy or around conception. These context measures included assessments of pre-pregnancy perceptions: pregnancy *intention* ("Just before I became pregnant: a) I intended to get pregnant, b) My intentions kept changing, c) I did not intend to get pregnant"); whether pregnancy was *wanted* ("Just before I became pregnant: a) I wanted to have a baby, b) I had mixed feelings about having a baby, c) I did not want to have a baby"); and pregnancy *planning* which was assessed using the 6-item London Measures of Unplanned Pregnancy (LMUP) [22]. The LMUP is scored from 0–12, with scores of 0–3 categorized as unplanned, 4–9 as ambivalent, and 10–12 as planned. Context measures also included assessments of post-conception (after pregnancy diagnosis) perspectives: pregnancy *timing* ("In terms of becoming a mother (first time or again), I feel that my pregnancy happened at the: a) right time, b) ok but not quite right time, c) wrong time"); whether pregnancy was *desired*, ("Is this pregnancy desired? a) Yes, b) No, c) Not sure"); and *happiness* with pregnancy news ("Rate how happy or unhappy you felt when you found out you were pregnant: a) very happy, b) somewhat happy, c) neither happy nor unhappy, d) somewhat unhappy, e) very unhappy, f) don't know"). This measure was categorized for analysis as: (a) very or somewhat happy; (b) neither happy nor unhappy, don't know; and (c) somewhat or very unhappy. Questions on pregnancy timing, intention, and wantedness come from the LMUP. All measures of pregnancy context were evaluated as 3-level categorical variables, including a category to assess ambivalence.

While consistent with the previous literature [22], some of these measurements of pregnancy context differ from those produced by the National Survey of Family Growth (NSFG). NSFG data provide large sample sizes, however retrospective pregnancy assessments (questions about pregnancy are asked after a woman has given birth) are subject to recall and social desirability bias [18,20]. NSFG focuses on "timing-based" measures of unintended pregnancy including whether women wanted a baby/another baby, and if they did, whether they wanted that baby sooner or later than the referenced pregnancy actually occurred, and assumes that contraceptive use reflects pregnancy intentions. Answers are used in a complex algorithm to characterize unintended pregnancies as unwanted or mistimed. Similarly, "desire" has been measured in NSFG data [18] by combining responses to various questions about happiness about pregnancy, wanting to be pregnant, trying to become pregnant, and whether pregnancy happened on time. Unlike the current study, it is essential to note that women participating in the NSFG were never directly asked whether the pregnancy was unintended, unwanted or mistimed.

Measures of HRQoL

At enrollment, we assessed HRQoL using the Patient Reported Outcomes Measurement Information System (PROMIS) Global Short Form (GSF) (Appendix A), a multi-dimensional instrument developed by the National Institutes of Health to reliably assess patients' self-reported health and measure HRQoL [23–26]. The PROMIS GSF includes a validated questionnaire that identifies physical and mental health domains affected by a certain disease or health state [25]. Ten questions comprise the PROMIS-GSF, with nine questions utilizing a 5-point response scale and pain intensity assessed using an 11-point scale [25]. We included assessments of physical health because for many conditions individuals' understanding and perceptions about their pregnancy could be associated with perceptions about their physical health and thus HRQoL. Separate domain scores for GSF Mental and Physical Health components are calculated based on responses to select PROMIS-GSF questions. Converting several response values and summing domain question scores based on preset algorithms yields PROMIS domain raw scores, from which T-score metrics are calculated [23]. The primary outcome measures in this study are T-scores for PROMIS-GSF Mental and Physical domains. T-score distributions are standardized and 50 represents the U.S. population mean [24]. Low PROMIS T-scores represent lower quality of life. For this analysis, low HRQoL was defined as the lowest tertile of GSF mental and physical health domains, a clinically meaningful differentiation.

Potential confounding variables

We collected sociodemographic information at enrollment, including age, race and ethnicity, level of educational attainment, employment status, and relationship status. We asked participants whether they had ever been diagnosed with a chronic medical condition (e.g. asthma, diabetes, thyroid problem) including depression and anxiety. Substance use during the 3 months prior to the home interview was ascertained, including smoking and tobacco use, marijuana use and alcohol consumption. We assessed reproductive history, including parity, previous miscarriage, previous abortion, and age of first pregnancy. Gestational age was based on reported last menstrual period or clinician's estimate of gestational age at time of enrollment.

Statistical analysis

We performed descriptive and bivariate analyses using the chi-square and Fisher's exact tests as appropriate. Logistic regression modeling was used to evaluate the association between pregnancy context measures and dichotomized measures of HRQoL, producing unadjusted and adjusted odds ratio (OR) estimates and 95% confidence intervals (CI). Multivariable logistic regression was performed to adjust for potential confounding variables using backwards selection at α=0.10. For each model, the measure of pregnancy context and an indicator variable for recruitment site were included. All statistical analysis was performed using SAS 9.4 (SAS Institute, Cary, NC).

The study protocol was reviewed and approved by the Yale University Human Research Protection Program. Written consent was obtained from study participants prior to enrollment.

RESULTS

Sample characteristics

Participants ranged in age from 16–44 years with an average age of 27($\pm$6.6) years; mean estimated gestational age at enrollment was 9($\pm$4.6) weeks (Table 1). Twenty-six percent completed the study in Spanish and the remainder in English (74%). Forty-two percent self-identified as Hispanic, 37% Black, non-Hispanic, 14% White, non-Hispanic and 7% multiracial. Most participants had a high school degree or less (61%), and had a previous birth (75%). Approximately half (48%) were employed either part-time or full-time, 52% identified as homemaker or unemployed. Previous abortion was reported by 44%. Some participants reported a previous diagnosis of depression (21%) or anxiety (21%). In the 3 months prior to enrollment, 32% reported tobacco use and 23% reported smoking marijuana, while 52% reported alcohol consumption. Most (61%) participants were planning to parent, 26% planned abortion, 1% planned adoption, and 13% were unsure of their plans for this pregnancy. Participant's reports of the context of their pregnancy varied considerably (Table 1), as did measures of HRQoL.

Mean PROMIS GSF Mental T-score among the study sample was 50.1($\pm$9.8), ranging from 28.4 to 67.6, and the mean PROMIS-GSF Physical T-score was 48.4($\pm$8.5), ranging from 29.6 to 67.7. In bivariate analyses, the following participant characteristics were significantly associated with scoring in the lowest tertile for mental HRQoL: age older than 25 years (p=0.01), history of depression (p<0.001) or anxiety (p=0.0002), no previous abortion (p=0.02), and being recruited from an abortion clinic (p=0.04). History of depression (p<0.0001) or anxiety (p=0.0006), were also significantly associated with scoring in the lowest tertile for physical HRQoL.

Association of pregnancy context with mental health domain scores

Chi-square analyses demonstrated that one measure of pregnancy context, happiness (p=0.03), demonstrated significant association with PROMIS-GSF mental health HRQoL scores (Table 1). In unadjusted models (Table 2), women reporting mixed feelings about wanting to have a "baby" (OR=2.47, 95%CI 1.06–5.74), undesired pregnancy (OR=2.31,

95%CI 1.07–5.01), or feeling unhappy or very unhappy about pregnancy news (OR=2.91, 95%CI 1.17–7.27), had increased odds of low mental HRQoL compared to women reporting that the pregnancy was wanted, desired, and that they felt happy about the pregnancy. After multivariate adjustment, measures of pregnancy context were not significantly associated with lower PROMIS-GSF mental health scores.

Association of pregnancy context with physical health domain scores

In bivariate analyses, pregnancy timing (p=0.02) and happiness (p=0.04) were associated with physical HRQoL scores (Table 1). In unadjusted models (Table 3), women reporting mixed feelings about wanting to have a "baby" (OR=2.56, 95%CI 1.02–6.48), an unplanned pregnancy (OR=2.75, 95%CI 1.02–7.42), that the pregnancy occurred at the wrong time (OR=3.34, 95%CI 1.35–8.30), an undesired pregnancy (OR=2.61, 95%CI 1.15–5.93), or reported feeling unhappy or very happy about pregnancy news (OR=3.06, 95%CI 1.20–7.82) had increased odds of low physical HRQoL, compared to women reporting that the pregnancy was wanted, planned, occurred at the right time, was desired, and that they felt happy about the pregnancy. Following multivariate adjustment, measures of pregnancy context were not significantly associated with lower PROMIS-GSF physical health scores.

DISCUSSION

In this diverse cohort of pregnant women, we found that in unadjusted analyses pregnancy wantedness, desirability and happiness were associated with low mental HRQoL, and wantedness, planning, timing, desirability, and happiness were associated with low physical HRQoL. Of note, despite the public discourse and health care policy focused predominantly on unintended pregnancy, there was no association between *unintended* pregnancy and low HRQoL which supports and expands on recent research that challenges current constructs and highlights limitations of traditional measures of pregnancy intention and planning [18–21,27,28].

For example, the concepts of pregnancy intention and planning are not relevant for many women [18,21,27,28]. Among low income African-American and white women [21], "decisions about the acceptability of a pregnancy are often determined after the pregnancy has already occurred." For these women, pregnancy *intention* may be aspirational and may not adequately represent women's *current* life circumstances once pregnancy occurs. As time elapses between planning a pregnancy, becoming pregnant, and continuing or terminating a pregnancy, circumstances change and partner relationships, financial instability, or deteriorating health, can all influence how women contextualize their pregnancy. Focusing solely on pregnancy intention, especially in a dichotomous fashion (intended or unintended), is overly simplistic and lacks sufficient depth to meaningfully understand the realities of pregnancy. These examples are emblematic of our insufficient characterization of a complex problem and the need for new measures [20].

After adjustment for confounding variables, we found no association between pregnancy contexts and mental or physical HRQoL. These results add to the growing criticism that previously identified associations between unintended pregnancy and negative maternal and neonatal outcomes are weak and inconsistent [8,29], which may be due to methodological

flaws such as retrospective assessments of pregnancy intention which are subject to recall and social desirability bias [18], and emphasize the importance of appropriate adjustment for potential confounders [30]. Given that history of depression was retained as a covariate in all multivariable models, these findings also point to the need to further understand the complex relationship between women with a history of depression and reproductive health, and for future research on pregnancy contexts to include information of women's history of depression as essential covariates.

Strengths of this study include that pregnancy contexts and HRQoL measurements were assessed shortly after pregnancy diagnosis, the diversity of the participants and expected pregnancy outcomes, and the fact that questionnaires were administered in both English and Spanish. An additional strength is the use of the well-validated PROMIS-GSF [21] to measure HRQoL. Further, assessment of multiple potential confounding variables allowed multivariable adjustment, strengthening the conclusions that can be drawn from this analysis.

Our analysis may be limited by data collection from a single urban area. However, a recent analysis [31] found that New Haven, CT, where this study was conducted, is the metropolitan area most similar in demographic characteristics to the U.S. overall. It is also worth noting that some assessments of pre-pregnancy perspectives (e.g. pregnancy intention and wantednesss) were measured in women who were already pregnant. Furthermore, the pregnancy context measures for intention and wantedness did not include answer options for women that may have a more passive viewpoint on these context (e.g. "not really thinking about pregnancy"), which is relevant for some women [23]. However, these questions on intention and wantedness are taken verbatim from the validated London Measure of Unplanned Pregnancy [18]. Additionally, it is important to acknowledge that questions from the PROMIS-GSF assess overall general health, and questions on emotional problems, fatigue, and pain (Appendix A) refer to the "past 7 days." Women were not directed to answer questions with respect to the recent pregnancy diagnosis specifically, which could mean that women answered without incorporating how this pregnancy diagnosis may be affecting their overall mental and physical health. Finally, our sample size may have limited our ability to demonstrate statistically significant associations between measures of pregnancy context and HRQoL, with some estimates exhibiting wide confidence intervals. Further research with larger sample sizes would be informative.

While the concept of HRQoL is applicable to all patient populations and health states, the transient nature of pregnancy may require a different conceptual model [32,33] than that used for chronic diseases like cancer and diabetes that have extensive research literature regarding assessment of HRQoL. Further testing with domain specific PROMIS measures (e.g. companionship, social isolation), could lead to further understanding of the association between pregnancy contexts and HRQoL [19,20]. Taking into consideration its retention in all multivariable models, it is important to assess a history of depression when evaluating the relationship between pregnancy context and HRQoL.
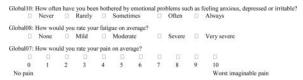
Acknowledgments

None

Appendix A. Patient-Reported Outcomes Measurement Information System (PROMIS) Global Short Form21

Please respond to each item by marking one box per row.	**Excellent**	**Very good**	**Good**	**Fair**	**Poor**
Global01: In general, would you say your health is:					
Global02: In general, would you say your quality of life is:					
Global03: In general, how would you rate your physical health?					
Global04: In general, how would you rate your mental health, including your mood and your ability to think?					
Global05: In general, how would you rate your satisfaction with social activities and relationships?					
Global09: In general, please rate how well you carry out your usual social activities and roles. (This includes activities at home, at work and in your community, and responsibilities as a parent, child, spouse, employee, friend, etc.)					
Global06: To what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair?					

In the past 7 days…

Global10: How often have you been bothered by emotional problems such as feeling anxious, depressed or irritable?
☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always

Global08: How would you rate your fatigue on average?
☐ None ☐ Mild ☐ Moderate ☐ Severe ☐ Very severe

Global07: How would you rate your pain on average?
☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10
No pain   Worst imaginable pain

Global Physical Health raw score[21] = sum of Global03, Global06, Global07 (rescored), Global08 (rescored)

Global Mental Health raw score[21] = sum of Global02, Global04, Global05, Global10 (rescored)

References

1. Finer LB, Zolna MR. Declines in unintended pregnancy in the United States, 2008–2001. N Engl J Med. 2016 Mar 3; 374(9):843–52. [PubMed: 26962904]

2. Cheng D, Schwarz E, Douglas E, et al. Unintended pregnancy and associated maternal preconception, prenatal and postpartum behaviors. Contraception. 2009 Mar; 79(3):194–8. [PubMed: 19185672]

3. Cleland K, Peipert JF, Westhoff C, Spear S, Trussell J. Family planning as a cost-saving preventive health service. N Engl J Med. 2011 May 5.364(18):e37. [PubMed: 21506736]

4. Logan, C., Holcombe, E., Manlove, J., et al. The consequences of unintended childbearing: A white paper [Internet]. Washington: Child Trends, Inc; 2007 May. Available from: http://www.childtrends.org/Files//Child_Trends-2007_05_01_FR_Consequences.pdf

5. Brown, SS., Eisenberg, L. The best intentions: unintended pregnancy and the well-being of children and families/Committee on Unintended Pregnancy. Institute of Medicine, National Academy of Sciences; 1995.

6. Cheng D, Schwarz EB, Douglas E, Horon I. Unintended pregnancy and associated maternal preconception, prenatal and postpartum behaviors. Contraception. 2009 Mar; 79(3):194–8. [PubMed: 19185672]

7. Tsui AO, McDonald-Mosley R, Burke AE. Family planning and the burden of unintended pregnancies. Epidemiol Rev. 2010 Apr; 32(1):152–74. [PubMed: 20570955]

8. Gipson J, Koenig M, Hindin M. The effects of unintended pregnancy on infant, child, and parental health: A review of the literature. Studies in Family Planning. 2008; 39(1):18–38. [PubMed: 18540521]

9. Logan, C., Holcombe, E., Manlove, J., Ryan, S. The consequences of unintended childbearing: A white paper. Washington, DC: Child Trends, and the National Campaign to Prevent Teen and Unplanned Pregnancy; 2007. See more at: http://www.childtrends.org/?indicators=unintended-births#sthash.jiZvqgiC.dpuf

10. Schwarz EB, Smith R, Steinauer J, Reeves MF, Caughey AB. Measuring the effects of unintended pregnancy on women's quality of life. Contraception. 2008 Sep; 78(3):204–10. [PubMed: 18692610]

11. Sonnenberg FA, Burkman RT, Hagerty CG, Speroff L, Speroff T. Costs and net health effects of contraceptive methods. Contraception. 2004; 69:447–459. [PubMed: 15157789]

12. Washington CI, Jamshidi R, Thung SF, Nayeri UA, Caughey AB, Werner EF. Timing of postpartum intrauterine device placement: a cost-effectiveness analysis. Fertil Steril. 2015 Jan; 103(1):131–7. [PubMed: 25439838]

13. Krashin JW, Edelman AB, Nichols MD, Allen AJ, Caughey AB, Rodriguez MI. Prohibiting consent: what are the costs of denying permanent contraception concurrent with abortion care? Am J Obstet Gynecol. 2014 Jul; 211(1):76.e1–76.e10. [PubMed: 24799310]

14. Centers for Disease Control and Prevention. Health-Related Quality of Life (HRQoL): HRQoL Concepts. http://www.cdc.gov/hrqol/concept.htm (last accessed May 9, 2016)

15. Tolley, K. What are health utilities? Health Economics. 3rd2014. http://www.whatisseries.co.uk/what-are-health-utilities/ (last accessed May 9, 2016)

16. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2020. Washington DC: Available at: https://www.healthypeople.gov/2020/topics-objectives/topic/health-related-quality-of-life-well-being. Accessed May 11, 2016

17. Ubel PA, Loewenstein G, Jepson C. Whose quality of life? A commentary exploring discrepancies between health state evaluations of patients and the general public. Qual Life Res. 2003 Sep; 12(6):599–607. [PubMed: 14516169]

18. Santelli JS, Lindberg LD, Orr MG, Finer LB, Speizer I. Toward a multidimensional measure of pregnancy intentions: evidence from the United States. Stud Fam Plann. 2009 Jun; 40(2):87–100. [PubMed: 19662801]

19. Aiken AR, Borrero S, Callegari LS, Dehlendorf C. Rethinking the Pregnancy Planning Paradigm: Unintended Conceptions or Unrepresentative Concepts? Perspect Sex Reprod Health. 2016 Aug 11.

20. Mumford SL, Sapra KJ, King RB, Louis JF, Buck Louis GM. Pregnancy intentions-a complex construct and call for new measures. Fertil Steril. 2016 Aug 1.

21. Borrero S, Nikolajski C, Steinberg JR, Freedman L, Akers AY, Ibrahim S, Schwarz EB. "It just happens": a qualitative study exploring low-income women's perspectives on pregnancy intention and planning. Contraception. 2015 Feb; 91(2):150–6. [PubMed: 25477272]

22. Barrett G, Smith SC, Wellings K. Conceptualisation, development, and evaluation of a measure of unplanned pregnancy. J Epidemiol Community Health. 2004 May; 58(5):426–33. [PubMed: 15082745]

23. Ader DN. Developing the patient-reported outcomes measurement information system (PROMIS). Med Care. 2007; 45(5 suppl 1):S1–S2. [PubMed: 18027399]

24. Cella D, et al. The patient reported outcomes measurement information system (PROMIS) developed and tested its first wave of adult self-reported health outcome item banks. J Clin Epidemiol. 2010; 63:1179–1194. [PubMed: 20685078]

25. Hays RD, Bjorner JB, Revicki DA, Spritzer KL, Cella D. Development of physical and mental health summary scores from the patient-reported outcomes measurement information system (PROMIS) global items. Qual Life Res. 2009 Sep; 18(7):873–80. [PubMed: 19543809]

26. Crosby RD, Kolotkin RL, Williams GR. Defining clinically meaningful change in health-related quality of life. J Clin Epidemiol. 2003; 56:395–407. [PubMed: 12812812]

27. Aiken AR, Potter JE. Are Latina women ambivalent about pregnancies they are trying to prevent? Evidence from the Border Contraceptive Access Study. Perspect Sex Reprod Health. 2013 Dec; 45(4):196–203. [PubMed: 24192284]

28. Jones RK, Frohwirth LF, Blades NM. "If I know I am on the pill and I get pregnant, it's an act of God": women's views on fatalism, agency and pregnancy. Contraception. 2016 Jun; 93(6):551–5. [PubMed: 26872719]

29. Kost K, Lindberg L. Pregnancy intentions, maternal behaviors, and infant health: investigating relationships with new measures and propensity score analysis. Demography. 2015 Feb; 52(1):83–111. [PubMed: 25573169]

30. Gariepy AM, Lundsberg LS, Stolar M, Stanwood NL, Yonkers KA. Are pregnancy planning and timing associated with preterm or small for gestational age births? Fertil Steril. 2015 Dec; 104(6):1484–92. [PubMed: 26364840]

31. Kolko, J. Normal America is not a small town of white people. Available at: http://fivethirtyeight.com/features/normal-america-is-not-a-small-town-of-white-people/ Accessed June 8, 2016

32. Goldhaber-Fibert JD, Brandeau ML. Evaluating cost-effectiveness of interventions that affect fertility and childbearing: how health effects are measured matters. Med Decis Making. 2015 Apr 29.

33. Myers ER. How should we estimate the cost-effectiveness of interventions that affect reproduction. Med Decis Making. 2015 Aug 21.

Table 1

Participant demographics, pregnancy context and Mental and Physical Health Related Quality of Life scores at enrollment (N=161)[a]

Characteristic	n (%)[b]	GSF Mental Health T-scores Lowest Tertile – n (%)			GSF Physical Health T-scores Lowest Tertile – n (%)		
		No	Yes	p-value[c]	No	Yes	p-value[c]
Total	161 (100)	99 (63.9)	56 (36.1)		110 (71.9)	43 (28.1)	
Age in years				**0.01**			0.14
25	74 (46.3)	52 (74.3)	18 (25.7)		55 (77.5)	16 (22.5)	
>25	86 (53.7)	46 (54.8)	38 (45.2)		54 (66.7)	27 (33.3)	
Gestational age at enrollment				0.08			0.75
Up to 12 completed weeks	132 (83.0)	85 (66.4)	43 (33.6)		88 (71.0)	36 (29.0)	
>12 completed weeks	27 (17.0)	12 (48.0)	13 (52.0)		20 (74.1)	7 (25.9)	
Language study conducted in				0.94			0.18
English	119 (73.9)	73 (64.0)	41 (36.0)		78 (69.0)	35 (31.0)	
Spanish	42 (26.1)	26 (63.4)	15 (36.6)		32 (80.0)	8 (20.0)	
Race/ethnicity				0.31			0.23
Hispanic	67 (42.4)	40 (62.5)	24 (37.5)		49 (79.0)	13 (21.0)	
Black, non-Hispanic	58 (36.7)	40 (70.2)	17 (29.8)		39 (68.4)	18 (31.6)	
White, non-Hispanic	22 (13.9)	10 (47.6)	11 (52.4)		12 (57.1)	9 (42.9)	
Multiracial, other	11 (7.0)	7 (70.0)	3 (30.0)		8 (80.0)	2 (20.0)	
Education (years)				0.60			0.71
12 yrs/GED or less	97 (60.6)	57 (62.0)	35 (38.0)		67 (72.8)	25 (27.2)	
Some college/college degree	63 (39.4)	41 (66.1)	21 (33.9)		42 (70.0)	18 (30.0)	
Employment				0.06			0.08
Unemployed/homemaker	83 (51.9)	45 (57.7)	33 (42.3)		53 (66.3)	27 (33.7)	
Full-time/part-time	77 (48.1)	54 (72.0)	21 (28.0)		57 (79.2)	15 (20.8)	
Relationship status				0.74			0.84
Single	69 (43.1)	45 (68.2)	21 (31.8)		47 (72.3)	18 (27.7)	
Married	24 (15.0)	14 (60.9)	9 (39.1)		18 (78.3)	5 (21.7)	
Living with partner, not married	48 (30.0)	29 (61.7)	18 (38.3)		32 (69.6)	14 (30.4)	
Separated, divorced, widowed, other	19 (11.9)	10 (55.6)	8 (44.4)		12 (66.7)	6 (33.3)	

Characteristic	n (%)[b]	GSF Mental Health T-scores Lowest Tertile – n (%)			GSF Physical Health T-scores Lowest Tertile – n (%)		
		No	Yes	p-value[c]	No	Yes	p-value[c]
Current chronic medical problems[d]				0.82			0.18
Yes	354 (21.1)	78 (63.4)	45 (36.6)		90 (74.4)	31 (25.6)	
No	127 (78.9)	21 (65.6)	11 (34.4)		20 (62.5)	12 (37.5)	
Ever diagnosed with depression				**<0.0001**			**<0.0001**
No	127 (78.9)	91 (74.0)	32 (26.0)		98 (80.3)	24 (19.7)	
Yes	34 (21.1)	8 (25.0)	24 (75.0)		12 (38.7)	19 (61.3)	
Ever diagnosed with anxiety				**0.0002**			**0.0006**
No	128 (79.5)	88 (71.0)	36 (29.0)		96 (78.1)	27 (21.9)	
Yes	33 (20.5)	11 (35.5)	20 (64.5)		14 (46.7)	16 (53.3)	
Smoking/use of tobacco past 3 months				0.08			0.05
None	109 (67.7)	73 (69.5)	32 (30.5)		81 (77.9)	23 (22.1)	
Once/twice or monthly	15 (9.3)	9 (60.0)	6 (40.0)		8 (61.5)	5 (38.5)	
Weekly or daily	37 (23.0)	17 (48.6)	18 (51.4)		21 (58.3)	15 (41.7)	
Drinking alcohol past 3 months				0.33			0.14
None	77 (47.8)	49 (64.5)	27 (35.5)		57 (76.0)	18 (24.0)	
Once/twice or monthly	67 (41.6)	43 (67.2)	21 (32.8)		46 (71.9)	18 (28.1)	
Weekly or daily	17 (10.6)	7 (46.7)	8 (53.3)		7 (50.0)	7 (50.0)	
Marijuana use in past 3 months				0.09			0.80
None	123 (76.4)	82 (67.8)	39 (32.2)		85 (72.7)	33 (27.3)	
Once/twice or monthly	24 (14.9)	9 (42.9)	12 (57.1)		16 (72.7)	6 (27.3)	
Weekly or daily	14 (8.7)	8 (61.5)	5 (38.5)		9 (64.3)	5 (35.7)	
Parity				0.56			0.68
0	40 (25.2)	26 (70.3)	11 (29.7)		30 (76.9)	9 (23.1)	
1	56 (35.2)	32 (59.3)	22 (40.7)		38 (70.4)	16 (29.6)	
2+	63 (39.6)	39 (62.9)	23 (37.1)		40 (69.0)	18 (31.0)	
Previous miscarriage				0.99			0.67
Yes	54 (36.0)	59 (63.4)	34 (36.6)		67 (72.0)	26 (28.0)	
No	96 (64.0)	33 (63.5)	19 (36.5)		35 (68.6)	16 (31.4)	
Previous abortion				**0.02**			0.37

Characteristic	n (%)[b]	GSF Mental Health T-scores Lowest Tertile – n (%)			GSF Physical Health T-scores Lowest Tertile – n (%)		
		No	Yes	p-value[c]	No	Yes	p-value[c]
Yes	67 (43.8)	58 (70.7)	24 (29.3)		61 (73.5)	22 (26.5)	
No	86 (56.2)	34 (52.3)	31 (47.7)		42 (66.7)	21 (33.3)	
Recruitment Site				<0.05			0.58
Pregnancy testing	123 (76.4)	81 (68.1)	38 (31.9)		84 (73.0)	31 (27.0)	
Abortion Services	38 (23.6)	18 (50.0)	18 (50.0)		26 (68.4)	12 (31.6)	
Plans for current pregnancy				0.25			0.17
Planning to parent	97 (60.6)	65 (69.1)	29 (30.9)		71 (78.0)	20 (22.0)	
Planning for adoption	2 (1.3)	1 (50.0)	1 (50.0)		1 (50.0)	1 (50.0)	
Planning for abortion	41 (25.6)	24 (61.5)	15 (38.5)		27 (67.5)	13 (32.5)	
Don't know	20 (12.5)	9 (47.4)	10 (52.6)		11 (57.9)	8 (42.1)	
Measures of Pregnancy Context							
Assessment of pre-pregnancy perspectives							
Intention				0.15			0.34
Intended to get pregnant	44 (27.3)	30 (75.0)	10 (25.0)		34 (79.1)	9 (20.9)	
Intentions kept changing	25 (15.5)	13 (52.0)	12 (48.0)		16 (76.2)	5 (23.8)	
Did not intend to get pregnant	92 (57.1)	56 (62.2)	34 (37.8)		60 (67.4)	29 (32.6)	
Wanted				0.10			0.12
Wanted to have a baby	51 (31.7)	37 (75.5)	12 (24.5)		41 (82.0)	9 (18.0)	
Mixed feeling about having a baby	56 (34.8)	30 (55.6)	24 (44.4)		32 (64.0)	18 (36.0)	
Did not want to have a baby	54 (33.5)	32 (61.5)	20 (38.5)		37 (69.8)	16 (30.2)	
London Measure of Unplanned Pregnancy				0.62			0.08
Planned	40 (24.8)	24 (66.7)	12 (33.3)		31 (79.5)	8 (20.5)	
Ambivalent	79 (49.1)	52 (65.8)	27 (34.2)		55 (75.3)	18 (24.7)	
Unplanned	42 (26.1)	23 (57.5)	17 (42.5)		24 (58.5)	17 (41.5)	
Assessment of post-conception perspectives							
Timing				0.16			**0.02**
Right time	55 (34.2)	39 (73.6)	14 (26.4)		44 (81.5)	10 (18.5)	
Ok but not quite right time	59 (36.6)	35 (61.4)	22 (38.6)		41 (74.6)	14 (25.4)	
Wrong time	47 (29.2)	25 (55.6)	20 (44.4)		25 (56.8)	19 (43.2)	
Desired				0.05			0.06

Characteristic	n (%)[b]	GSF Mental Health T-scores Lowest Tertile – n (%)			GSF Physical Health T-scores Lowest Tertile – n (%)		
		No	Yes	p-value[c]	No	Yes	p-value[c]
Yes	79 (49.4)	55 (73.3)	20 (26.7)		61 (80.3)	15 (19.7)	
Not sure	33 (20.6)	18 (54.6)	15 (45.4)		20 (66.7)	10 (33.3)	
No	48 (30.0)	25 (54.4)	21 (45.6)	**0.03**	28 (60.9)	18 (39.1)	
Happy							**0.04**
Happy/very happy	101 (63.1)	69 (71.1)	28 (28.9)		76 (78.4)	21 (21.6)	
Neither happy/unhappy/not sure	34 (21.3)	18 (54.6)	15 (45.5)		20 (64.5)	11 (35.5)	
Unhappy/very unhappy	25 (15.6)	11 (45.8)	13 (54.2)		13 (54.2)	11 (45.8)	

[a] Totals may not add to 161 due to missing information

[b] Column percentages presented for first column; other table data presented as row percentages

[c] p-value based on chi-square or Fisher's exact test

[d] Current chronic medical problems (e.g. including asthma, hypertension, diabetes, multiple sclerosis)

Bold text indicates a statistical significance with a p-value of less than 0.05

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 2

Associations of measures of pregnancy context with lowest tertile of PROMIS-GSF Mental Health HRQoL T-scores

Measures of Pregnancy Context	Lowest tertile	Unadjusted		Adjusted	
	n (%)	OR	95% CI	aOR	95% CI
Assessment of pre-pregnancy perspectives					
Intention					
Intended to get pregnant	10 (25.0)	Ref		Ref[a]	
Intentions kept changing	12 (48.0)	2.77	0.96–8.01	2.97	0.75–11.72
Did not intend to get pregnant	34 (37.8)	1.82	0.79–4.19	1.82	0.60–5.54
Wanted					
Wanted to have a baby	12 (24.5)	Ref		Ref[b]	
Mixed feeling about having a baby	24 (44.4)	**2.47**	**1.06–5.74**	2.43	0.88–6.71
Did not want to have a baby	20 (38.5)	1.93	0.82–4.55	0.82	0.24–2.77
London Measure of Unplanned Pregnancy					
Planned	12 (33.3)	Ref		Ref[c]	
Ambivalent	27 (34.2)	1.04	0.45–2.39	0.67	0.24–1.83
Unplanned	17 (42.5)	1.48	0.58–3.76	0.87	0.22–3.51
Assessment of post-conception perspectives					
Timing					
Right time	14 (26.4)	Ref		Ref[d]	
Ok but not quite right time	22 (38.6)	1.75	0.78–3.93	0.89	0.33–2.41
Wrong time	20 (44.4)	2.23	0.95–5.20	1.54	0.34–7.04
Desired					
Yes	20 (26.7)	Ref		Ref[b]	
Not sure	15 (45.4)	2.29	0.97–5.39	2.04	0.63–6.66
No	21 (45.6)	**2.31**	**1.07–5.01**	1.36	0.38–4.92
Happy					
Happy/very happy	28 (28.9)	Ref		Ref[c]	
Neither happy/unhappy/not sure	15 (45.5)	2.05	0.91–4.63	0.80	0.26–2.44
Unhappy/very unhappy	13 (54.2)	**2.91**	**1.17–7.27**	1.90	0.51–7.02

Author Manuscript

Author Manuscript

[a] Adjusted for age, language, history of depression, history of anxiety, marijuana use, recruitment site;

[b] adjusted for language, history of depression, tobacco use, recruitment site;

[c] adjusted for age, history of depression, marijuana use, and recruitment site;

[d] adjusted for age, history of depression, tobacco use, recruitment site. Bold text indicates statistical significance

Author Manuscript

Author Manuscript

Table 3

Associations of measures of pregnancy context with lowest tertile of PROMIS-GSF Physical HRQoL T-scores

Measures of Pregnancy Context	Lowest tertile n (%)	Unadjusted OR	95% CI	Adjusted[a] aOR	95% CI
Assessment of pre-pregnancy perspectives					
Intention					
Intended to get pregnant	9 (20.9)	Ref		Ref	
Intentions kept changing	5 (23.8)	1.03	0.23–4.59	0.86	0.21–3.45
Did not intend to get pregnant	29 (32.6)	1.79	0.66–4.84	0.99	0.34–2.91
Wanted					
Wanted to have a baby	9 (18.0)	Ref		Ref	
Mixed feeling about having a baby	18 (36.0)	2.56	1.02–6.48	1.97	0. 68–5.73
Did not want to have a baby	16 (30.2)	1.97	0.77–4.99	0.60	0.17–2.08
London Measure of Unplanned Pregnancy					
Planned	8 (20.5)	Ref		Ref	
Ambivalent	18 (24.7)	1.27	0.49–3.25	1.00	0.34–2.94
Unplanned	17 (42.5)	2.75	1.02–7.42	1.41	0.35–5.64
Assessments of post-conception perspectives					
Timing					
Right time	10 (18.5)	Ref		Ref	
Ok but not quite right time	14 (25.4)	1.50	0.60–3.76	0.69	0.23–2.10
Wrong time	19 (43.2)	3.34	1.35–8.30	1.85	0.41–8.30
Desired					
Yes	15 (19.7)	Ref		Ref	
Not sure	10 (33.3)	2.03	0.79–5.24	0.82	0.25–2.70
No	18 (39.1)	2.61	1.15–5.93	1.39	0.42–4.58
Happy					
Happy/very happy	21 (21.7)	Ref		Ref	
Neither happy/unhappy/not sure	11 (35.5)	1.99	0.83–4.80	0.91	0.31–2.67
Unhappy/very unhappy	11 (45.8)	3.06	1.20–7.82	1.30	0.37–4.51

[a] Adjusted for tobacco use, history of depression, and recruitment site.

Author Manuscript

Bold text indicates statistical significance

Author Manuscript

Author Manuscript

Author Manuscript