Stressful life events around the time of unplanned pregnancy and women's health: Exploratory findings from a national sample

Kelli Stidham Hall, PhD, MS[a,b], **Vanessa K. Dalton, MD, MPH**[b], **Melissa Zochowski, MBA**[b], **Timothy R.B. Johnson, MD**[b], and **Lisa H. Harris, MD, PHD**[b]

[a]Department of Behavioral Sciences and Health Education, Rollins School of Public Health, Emory University, 1518 Clifton Road, NE, GCR 560, Atlanta, GA 30322, (t) 404-727-8741 (f) 404-727-1369

[b]Department of Obstetrics and Gynecology, University of Michigan, L4000 Women's Hospital, 1500 East Medical Center Dr., Ann Arbor MI 48109

Abstract

Objective—Little is known about how women's social context of unintended pregnancy, particularly adverse social circumstances, relates to their general health and wellbeing. We explored associations between stressful life events around the time of unintended pregnancy and physical and mental health.

Methods—Data are drawn from a national probability study of 1,078 U.S. women aged 18–55. Our internet-based survey measured 14 different stressful life events occurring at the time of unintended pregnancy (operationalized as an additive index score), chronic disease and mental health conditions, and current health and wellbeing symptoms (standardized perceived health, depression, stress, and discrimination scales). Multivariable regression modeled relationships between stressful life events and health conditions/symptoms while controlling for sociodemographic and reproductive covariates.

Results—Among ever-pregnant women (N=695), stressful life events were associated with all adverse health outcomes/symptoms in unadjusted analyses. In multivariable models, higher stressful life event scores were positively associated with chronic disease (aOR 1.21, CI 1.03–1.41) and mental health (aOR 1.42, CI 1.23–1.64) conditions, higher depression (B .37, CI .19–.55), stress (B .32, CI .22–.42), and discrimination (B .74, CI .45–1.04) scores, and negatively associated with very good perceived health (aOR .84, CI .73–.97). Stressful life event effects were strongest for emotional and partner-related sub-scores.

Conclusion—Women with adverse social circumstances surrounding their unintended pregnancy experienced poorer health. Findings suggest that reproductive health should be considered in the

broader context of women's health and wellbeing and have implications for integrated models of care that address women's family planning needs, mental and physical health, and social environments.

Keywords

Stress; stressful life events; chronic disease; mental health; unintended pregnancy; reproductive health

INTRODUCTION

Research has documented the social consequences that women may experience following a pregnancy that is unplanned (Brown & Eisenberg, 1995; Gipson, Koenig, and Hindin, 2008; Sonfield, Kost, Gold, & Finer, 2011). Lack of education, low socioeconomic status, reduced employment, limited access to health care, disrupted family dynamics, and intimate partner issues like violence, are a few outcomes noted among women who experience unplanned pregnancies (Brown & Eisenberg; Gipson et al; Sonfield et al). Health-related research has largely focused on physical and mental conditions that can *precede* unplanned pregnancy, for instance the influence of depression, stress, and chronic disease (CD) on sexual and contraceptive behaviors, rather than the health outcomes that follow it (Denobles et al, 2014; Chor, Rankin, Harwood, & Handler, 2011; Holing, Beyer, Brown, & Connell, 1998; Davis, Pack, Kritzer, Yoon, & Camus, 2008; Hall, Kusunoki, Gatny, & Barber, 2014; Hall, Moreau, Trussell & Barber, 2013; Hall, Reame, O'Connell, Rickert, & Westhoff, 2012; Chen, Stiffman, Cheng, & Dore, 1997; Steinberg et al, 2013). Some literature exists to describe unplanned pregnancy-related perinatal and postpartum depression (Cheng, Schwarz, Douglas, & Horon, 2009; CDC, 2007) and on whether induced abortion causes mental health (MH) morbidity (APA, 2008; Charles, Polis, Sridhara, & Blum, 2008; Steinberg & Finer, 2012; Steinberg & Finer, 2011; Foster, Steinberg, Roberts, Neuhaus, & Biggs, 2015). Overall, however, reproductive health issues have been largely marginalized from women's general health, healthcare needs, and lives. Notably, the social context of unplanned pregnancy, particularly the role of adverse life events or social stressors as they may be interrelated to women's reproductive, physical and mental health experiences, has rarely been considered in family planning research.

"Toxic" stress associated with prolonged exposure to adverse life circumstances, such as discrimination, economic hardship, violence, and other stressful life events (SLE), can cause inflammatory, immune, and neuroendocrine dysfunction, accelerated cellular aging, mental distress, and cumulative biological and psychological "wear and tear" or "weathering" (McEwen & Seeman, 1999; Gouin, Glaser, Malarkey, Beversdorf, &Kiecolt-Glaser, 2012; Boardman & Alexander, 2011; Williams, 2002; Geronimous, 2001; Geronimous et al, 2010; Hogue & Bremner, 2005; Hogue et al, 2013; Rondo et al, 2003; Williams et al, 1997). Cutting-edge aging and chronic disease research has provided insight into how "weathering" contributes to rates of and disparities in cardiovascular disease, cancer, depression, and even mortality among U.S. women, especially socially disadvantaged groups, including racial/ethnic minority and poor women (McEwen & Seeman; Gouin et al; Boardman & Alexander; Williams; Geronimous; Geronimous et al; Williams et al). However, health outcomes

potentially *attributable to* the stressful social environments in which women may experience unplanned pregnancy - itself a common and potentially unique stressful life event that often occurs within a greater context of social adversity - are not well understood. Overall, little is known about relationships between stress-related health processes specifically occurring with unplanned pregnancy and women's physical and mental health.

Objective

We explored 14 different SLEs experienced by women around the time of unplanned pregnancy and their association with a broad range of CD and MH conditions and symptoms among a population-based sample in the U.S. We hypothesized that women who experienced SLEs at the time of unplanned pregnancy would have higher rates of adverse health conditions and symptoms reported at the time of data collection compared to women without those SLE experiences.

METHODS

Design and Sample

Data were drawn from the population-based survey study of a random national probability sample of U.S. women aged 18–55 years, *The Women's Health Care Experiences and Preferences Study* (Hall, Fendrick, Zochowski, & Dalton, 2014). This cross-sectional internet-based survey was conducted in September 2013 and fielded by GfK KnowledgePanel using their national household random probability panel comprised of 50,000 U.S. residents aged 13 and older (Menlo Park, CA, USA). GfK uses random digit dialing telephone and probability-based address mailing methods to select their panel. All GfK panelists are provided computer and Internet access if needed and given unique login information. To allow for complex, stratified sampling designs, panel demographic information is collected and updated. Modest incentives are used to encourage participation in the panel (e.g. $4 monthly gift card).

Among English-speaking female GfK panelists aged 18–55 eligible for inclusion in our survey, 2,520 were randomly selected by GfK and emailed an invitation to participate. A total of 1,078 women consented and completed the survey (response rate of 43%). For this analysis, we focused on a sub-sample of 695 women who reported that they had ever been pregnant. Data were de-identified by GfK and national probability sampling weights were applied to adjust for the complex, stratified sampling design and bring the sample in line with national demographic benchmarks. The University of Michigan's Institutional Review Board approved the study.

The survey, which has been described elsewhere (Hall et al, 2014), included 29 items assessing different dimensions of women's health and wellbeing across the reproductive life course. We collected information on sociodemographics, reproductive, physical, and mental health histories, social wellbeing, relationship characteristics, health service experiences and intentions, and reproductive health knowledge and attitudes. The survey took an average of 15 minutes to complete and was pilot tested among 25 GfK participants to ensure readability, comprehension, and feasibility of administration.

Measures

Stressful Life Events Around the Time of Unplanned Pregnancy—Among women who reported ever having been pregnant, we first asked, "Please indicate the most recent time, if ever, you became pregnant when you were not trying to become pregnant," on a scale of never, more than 5 years ago, within the last 5 years, or within the last 12 months. Women who reported having experienced a pregnancy when not trying to (referred to hereafter as "unplanned") were then asked about any SLEs occurring within the 12 months before their unplanned pregnancy. These items, which were adapted from the Pregnancy Risk Assessment Monitoring System, specifically assessed 14 different SLEs, including financial, emotional, traumatic and partner-related adverse life experiences, occurring around the time of unplanned pregnancy (Hogue et al, 2013; CDC, 2004). We examined SLEs in several ways consistent with the broader literature (Hogue et al): 1) total SLE score (continuous additive index scale of sum total number of SLEs reported, ranging from 1–14); 2) sub-scores based upon SLE type (financial, emotional, trauma-related, partner-related); 3) any SLE (yes/no), and 4) categorical indicator of SLEs (0, 1, 2, or ≥ 3). Cronbach's alpha (α) for the scale was .78 (sub-scale range .43–.63).

Health Conditions and Symptoms—All women were asked a series of items regarding health conditions diagnosed by a health care provider and current physical, mental, and social health status. Here we focus on six different health experiences: 1) chronic disease (CD) diagnoses, 2) mental health (MH) diagnoses, and the following symptoms at the time of the survey 3) self-reported perceived general health, 4) depression symptoms, 5) stress symptoms, and 6) everyday discrimination symptoms, as an indicator of social wellbeing. For health diagnoses, we administered a comprehensive list of 21 CD and MH medical conditions most relevant to our stress-related hypothesis (listed in Table 2). We examined CD and MH as individual conditions and as summary indicators: any CD and any MH conditions (yes/no) and total number of conditions (continuous).

For current health and social wellbeing measures, we first used the standard self-reported perceived health 5-point Likert item (excellent, very good, good, fair, or poor) and present results using a binary indicator of excellent/very good (i.e. ≥ very good) versus good/fair/poor (i.e. < very good) health. We used abbreviated standardized scales for current depression, stress, and discrimination symptoms. Via the Patient Health Questionnaire (PHQ) (Kroenke, Spitzer, & Williams, 2003), women were asked how often over the last 2 weeks, on a 5-pt scale (1=never, 2=almost never, 3=sometimes, 4=fairly often, or 5=very often) they had been bothered by the following four depression symptoms: 1) feeling down, depressed or hopeless; 2) little interest or pleasure in doing things; 3) feeling nervous, anxious or on edge; and 4) not being able to stop or control worrying. With the same response options, they were asked about two stress symptoms occurring over the last month, from the Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1993): 1) felt that you were unable to control the important things in your life; and 2) felt that difficulties were piling up so high that you could not overcome them. Via Everyday Discrimination Scale items (Williams, Yu, Jackson, & Anderson, 1997), women were asked how often in their day-today lives (6-point likert scale, 1=never, 2=less than once a year, 3=a few times a year, 4=a few times a month, 5=at least once a week, or 6=almost every day) they had the

following five discrimination experiences: 1) you are treated with less courtesy or respect than other people; 2) you receive poorer service than other people at restaurants or stores; 3) people act as if they think you are not smart; 4) people act as if they're afraid of you; and 5) you are threatened or harassed. For all three scales, responses were summed for total scores, with higher scores indicating greater depression (range 4–20, α .90), stress (range 2–10, α .92), and discrimination (range 5–30, α .83) symptoms.

Demographic, social, and reproductive variables available in the dataset included age, race/ethnicity, educational attainment, marital status, income level, religious affiliation and service attendance, type of health insurance, and histories of childbirth, miscarriage, and abortion.

Analysis—Our primary analysis focused on the women reporting an unplanned pregnancy and compared health conditions/symptoms among those who had experienced SLEs at the time of unplanned pregnancy versus those who had not experienced SLEs. We used weighted proportions (%) and means (M) with standard deviations (SD) and Pearson's Chi-square, student's t-tests and ANOVA to describe and compare proportions of CD and MH conditions, very good perceived health, and mean scores for depression, stress, and discrimination symptoms, among women with versus without SLEs (by score, sub-scores, any/none, and categorical number). We also conducted the same tests to compare health conditions/symptoms across sociodemographic groups. We used multivariable linear and logistic regression modeling to assess associations between SLEs and health conditions/symptoms while controlling for sociodemographic and reproductive history covariates. We also explored univariate, age-specific, and reduced (controlling for only significant covariates) models, and models with and without reproductive controls (childbirth, miscarriage and abortion). Point estimates for SLEs remained stable across all models, so the latter models are not presented. Results are adjusted beta (B) coefficients with 95% CIs for linear models and adjusted odds ratios (aOR) with 95% confidence intervals (CI) for logistic models. We applied sampling weights and employed weighted statistical commands in STATA 13.0 (College Station, Texas).

RESULTS

Sample Characteristics

Characteristics of the sample are presented in Tables 1 and 2. Among ever-pregnant women (N=695), 62% had ever experienced an unplanned pregnancy; 46% had an unplanned pregnancy 5 years ago and 15% had experienced an unplanned pregnancy <5 years ago. Among the women reporting an unplanned pregnancy (N=415), the mean number of SLEs around the time of unplanned pregnancy was 1.4 (SD 2.1, range 0–14), with 56% reporting at least one SLE and 25% reporting 3 SLEs. Two-thirds of women reported having received a medical diagnosis of any CD (66%); 26% reported any MH diagnosis. For current health and wellbeing, 51% reported very good health. Current depression (PHQ: M 8.9, SD 3.9, range 4–20), stress (PSS: M 4.2, SD 2.2, range 2–10), and discrimination (EDS: M 9.5, SD 4.3, range 5–30) symptoms were reported as occurring, on average, "almost never."

SLEs Around the Time of Unplanned Pregnancy and Health

In unadjusted analyses (Table 3), SLEs were associated with all adverse health conditions and symptoms (p-values<0.01), with the exception of any CD (p=0.08). Additionally, all health conditions and symptoms, except discrimination, were associated with the timing of event exposure (p-values<0.02, Table 3). Women reporting unplanned pregnancies and related SLEs ≥5 years ago had higher rates of health conditions and symptoms than those who reported more recent events. In multivariable models (Table 4), SLE scores were associated with increased odds of having any CD (aOR 1.21, CI 1.03, 1.41, p=0.02) and/or MH (aOR 1.42, CI 1.23,1.64, p<0.001) condition, higher depression (B 0.37, CI 0.19, 0.55, p<0.001), stress (B 0.32, CI 0.22, 0.42, p<0.001), and discrimination (B 0.74, CI 0.45, 1.04, p<0.001) symptom scores, and lower odds of having very good health (aOR 0.84, CI 0.73, 0.98, p=0.02). Results were consistent across all other SLE indicators.

By type of SLE, results for emotional and partner-related SLE scores were consistently present across outcomes, while trauma-related SLEs had the strongest effects for several specific outcomes (Table 4). For individual health conditions (Table 5), SLE scores were associated with increased odds of migraines (aOR 1.28, CI 1.10, 1.49, p=0.002), chronic pain disorder (aOR 1.25, CI 1.10, 1.48, p=0.01), anxiety (aOR 1.42, CI 1.23, 1.65, p<0.001), depression (aOR 1.32, CI 1.15, 1.52, p<0.001) and substance use disorder (p=0.01, full point estimates not produced in models due to small sub-sample sizes).

DISCUSSION

Family planning studies have described the influence of stress and distress on women's risk of unplanned pregnancy, including risky sexual and contraceptive behaviors, and on subsequent MH morbidity (Chen et al, 1997; Steinberg et al, 2013; APA, 2008; Charles et al, 2008; Steinberg & Finer, 2011; Foster et al, 2015; Hall et al, 2014; Hall et al, 2013; Hall et al, 2012). In fact, the majority of family planning research has focused on this association – stress as a determinant of unplanned pregnancy, rather than as an indicator of the social context of unplanned pregnancy, with implications for women's broader health and wellbeing (Denobles et al, 2014; Chor et al, 2011; Holing et al, 1998; Davis et al, 2008; Hall et al, 2014; Hall et al, 2013; Hall et al, 2012; Chen et al; Steinberg et al, 2013). Here, we attempted to explore the effects of social stress specifically occurring with unplanned pregnancy by examining adverse social circumstances surrounding events of pregnancies that women were not trying to conceive. We found strong, consistent associations between SLEs and a wide range of physical and mental health conditions and symptoms. Our focus specifically on the social context of unplanned pregnancy offers new insights into our understanding of women's experiences with social stress and reproductive health. A strength of this study is our assessment of a robust set of CD and MH diagnoses, use of standard MH scales, and a validated social stress measure that captures the complex social environments some women may confront at the time of unplanned pregnancy. This comprehensive approach was particularly useful in allowing us to identify specific types of stress, including emotional, partner, and trauma-related SLEs, and their relationship to women's health, especially mood disorders, chronic pain, and migraines, which are known to be highly

comorbid with stress, social adversity, and with each other (Boardman & Alexander, 2011; Williams, Jackson, & Anderson, 1997).

From a stress and health perspective, ongoing exposure to adverse social circumstances can facilitate inflammatory, immune, and neuroendocrine dysfunction, contributing to biological and psychological "weathering" over time and subsequent disease (McEwen & Seeman, 1999; Gouin et al, 2012; Boardman & Alexander, 2011; Williams, 2002; Geronimous, 2001; Geronimous et al, 2010; Hogue & Bremner, 2005; Hogue et al, 2013; Rondo et al, 2003; Williams et al, 1997). Our findings are consistent with the broader stress and morbidity literature that documents higher rates of cardiovascular disease, cancer, depression and anxiety, and mortality among women who have experienced social adversity (Boardman & Alexander; Williams; Geronimous; Geronimous et al, Williams et al). In reproductive health, studies to date have focused on perinatal outcomes and the impact of stress on disparities in miscarriage, stillbirth, and preterm birth rates (Hogue & Bremner; Hogue et al; Rondo et al). "Weathering" has not been well considered in family planning. Our study provides new information on stress and the social context of unplanned pregnancy and has implications for continued research to understand and address interrelationships between women's family planning needs, social environments, and broader health and wellbeing.

Importantly, our survey did not assess ongoing experiences with SLEs or the specific dates of unplanned pregnancy events or CD and MH diagnoses, so the conflation of exposure and age may have confounded results. While the highest rates of health conditions and current symptoms were noted among women with unplanned pregnancies and associated SLEs occurring 5years ago, the cross-sectional design ultimately precluded our ability to establish temporal ordering of SLEs and health outcomes. Certainly, reverse causality may be possible. Stress, adverse social experiences, and unplanned pregnancy could *follow* poor health, potentially due to limited access to and use of effective contraception among women with health conditions (Denobles et al, 2014; Chor et al, 2011; Holing et al, 1998; Davis et al, 2008). Prior work using medical claims data documented lower rates of prescription hormonal contraceptive use among reproductive aged women with CD; this might suggest an influence of provider prescribing practices for women with health diagnoses (Denobles et al; Chor et al; Holing et al; Davis et al). As noted, research (ours and others') has also documented the impact of stress and stressful life events, like discrimination, on the risk of unplanned pregnancy (Hall et al, 2014; Hall et al, 2013; Hall et al, 2012; Chen et al; Steinberg et al, 2013).

Additionally, these data do not allow us to disentangle the potential effects of stress *associated* specifically with unplanned pregnancy from stress more generally (i.e. at any time, irrespective of pregnancy). Because our survey items were purposefully administered to women with reproductive histories, consistent with other reproductive health studies (e.g. PRAMS), we are unable to comment on how physical and mental health outcomes associated with stressful life events occurring at the time of unplanned pregnancy may or may not differ from the outcomes of women who did not experience unplanned pregnancies. Nor do our findings reflect any experiences of stress that may occur *after* an unplanned pregnancy or pregnancy resolution (i.e. childbirth, abortion, etc). Further research is needed to provide a more nuanced understanding of stress that may precede, follow, and occur

simultaneously with various reproductive events and its impact on women's health outcomes.

Moreover, although our sample was drawn from a national probability panel and we applied sampling weights to adjust for our response rate, women in our study are older, more educated, privately insured, and of higher income than the general U.S. population. Thus, our results have limited generalizability to socially disadvantaged women, which is important since women of racial/ethnic minority and lower SES who are disproportionately exposed to "toxic" stress are known to experience the greatest share and poorest health consequences of "weathering" (Boardman & Alexander, 2011; Williams, 2002; Geronimous, 2001; Geronimous et al, 2010; Hogue & Bremner, 2005; Hogue et al, 2013; Williams et al, 1997). They are also the very groups of women who experience inequities in unplanned pregnancy rates and adverse outcomes (Finer & Henshaw, 2006). While our findings here likely *underestimate* the effects for a more diverse population of U.S. women, further research is needed to provide adequate insight into social stress, unplanned pregnancy, and women's health inequities.

Several other limitations are noteworthy. Self-report and recall bias likely impacted our estimates of SLEs, CD and MH diagnoses, as well as the timing of events. Our sample was young in regards to CD prevalence and we had insufficient sub-sample sizes of important CDs (e.g. diabetes, heart disease, cancer, and autoimmune disorders), so that our statistical power to detect significant but potentially small effects was limited. We also had numerous outcomes of interest and so from a statistical standpoint, multiple comparisons may have been an issue, although we conducted sensitivity analyses using various adjustment techniques (i.e. Bonferonni) and results were consistent with those reported. We did not collect objective measures of biological processes (e.g. inflammatory/immune biomarkers, anthropometric measurements), which could have provided important information on the biological mechanisms of stress. Finally, although unplanned pregnancy itself was not our focus, our measurement of it as we defined the specific context of SLE's, was limited to a single composite item that did not adequately capture other dimensions of pregnancy intentions, such as mistiming, unwantedness, or ambivalence. This is notable since it is unclear how the construct of pregnancy unintendedness, which is not stable over time, may be *uniquely* related to women's experiences with stress and long-term health trajectories (Santelli et al, 2003). Given all of these issues, our findings should be considered exploratory in nature.

Conclusion

Nonetheless, this preliminary work points to the significance of social stressors occurring with unplanned pregnancy for women's broader health and wellbeing. Findings reinforce the need for future research using representative samples, longitudinal designs, life course approaches that take into account critical bio-psycho-social developmental periods across the reproductive lifespan, and interdisciplinary perspectives drawing from relevant theories and methodological approaches from public health, medicine, psychology, sociology, nursing, social work, etc), all of which which are required to study the social context of family planning and women's long-term physical and mental health. This work can inform

more holistic public health interventions and integrated models of health care that simultaneously address women's reproductive health *and* their CD, MH and social wellbeing needs. The challenge, though, will assuredly be for practitioners, administrators policy makers, and researchers to carefully consider how the complexities of women's interrelated health needs may (or may not) be adequately or feasibly addressed in any given clinical encounter, health program or policy, or statistical model. Nonetheless, a broader, intersectional paradigm is ultimately needed–one that situates reproduction (whether intended or not) within the greater context of women's overall health and lives.

Acknowledgments

References

American Psychological Association (APA). Report of the Task Force on Mental Health and Abortion. Washington, DC: Author; 2008.

Boardman JD, Alexander KB. Stress trajectories, health behaviors and the mental health of black and white young adults. Social Science and Medicine. 2011; 72(10):1659–1666. [PubMed: 21514025]

Brown, SS., Eisenberg, L., editors. The best intentions: unplanned pregnancy and the wellbeing of children and families. Washington, D.C: National Academy Press; 1995.

Centers for Disease Control and Prevention (CDC). Preconception and interconception health status of women who recently gave birth to a live-born infant—pregnancy risk assessment monitoring system (PRAMS), United States, 26 Reporting Areas, 2004. Morbidity and Mortality Weekly Report. 2007; 56(SS-10):1–40. [PubMed: 17218934]

Centers for Disease Control and Prevention (CDC), Division of Reproductive Health. Topic Reference. Atlanta, GA: Centers for Disease Control and Prevention; 2004. Pregnancy Risk Assessment Monitoring System (PRAMS). Phase 5 Core Questionnaire. http://www.cdc.gov/prams/PDF/Phase5_TopicsReference.pdf [Accessed January, 2015]

Charles VE, Polis CB, Sridhara SK, Blum RW. Abortion and long-term mental health outcomes: a systematic review of the evidence. Contraception. 2008; 78(6):436–450. [PubMed: 19014789]

Chen YW, Stiffman AR, Cheng LC, Dore P. Mental health, social environment and sexual risk behaviors of adolescent service users: a gender comparison. Journal of Child and Family Studies. 1997; 6:9–25.

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

Chor J, Rankin K, Harwood B, Handler A. Unplanned pregnancy and postpartum contraceptive use in women with and without chronic medical disease who experienced a live birth. Contraception. 2011; 84:57–63. [PubMed: 21664511]

Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. Journal of Health and Social Behavior. 1993; 24:385–96.

Davis AR, Pack AM, Kritzer J, Yoon A, Camus A. Reproductive history, sexual behavior and use of contraception in women with epilepsy. Contraception. 2008; 77:405–9. [PubMed: 18477488]

Denobles A, Hall KS, Xu X, Zochowski MK, Piehl K, Dalton VK. Receipt of prescription contraception by commercially insured women with chronic medical conditions. Obstetrics and Gynecology. 2014; 123:1213–1220. [PubMed: 24807345]

Finer LB, Henshaw SK. Disparities in rates of unplanned pregnancy in the United States, 1994 and 2001. Perspectives on Sexual and Reproductive Health. 2006; 38:90–96. [PubMed: 16772190]

Foster DG, Steinberg J, Roberts SCM, Neuhaus J, Biggs MA. A comparison of depression and anxiety symptom trajectories between women who had an abortion and women denied one. Psychological Medicine. 2015; 45(10):1–10. [PubMed: 25065902]

Geronimus AT. Understanding and Eliminating Racial Inequalities in Women's Health in the United States: The Role of the Weathering Conceptual Framework. Journal of the American Medical Women's Association. 2001; 56:133–136.

Geronimus AT, Hicken M, Pearson J, Seashols S, Brown K, Cruz T. Do US Black Women Experience Stress-Related Accelerated Biological Aging? Human Nature. 2010; 21:19–38. [PubMed: 20436780]

Gipson JD, Koenig MA, Hindin MJ. The effects of unplanned pregnancy on infant, child and parental health: A review of the literature. Studies in Family Planning. 2008; 39:18–38. [PubMed: 18540521]

Gouin JP, Glaser R, Malarkey WB, Beversdorf D, Kiecolt-Glaser J. Chronic stress, daily stressors and circulating inflammatory markers. Health Psychology. 2012; 31(2):264–268. [PubMed: 21928900]

Hall KS, Fendrick AM, Zochowski M, Dalton VK. Women's health and the Affordable Care Act: High hopes versus harsh realities? American Journal of Public Health. 2014; 104(8):e10–13.

Hall KS, Kusunoki Y, Gatny H, Barber J. Unplanned pregnancy risk among young women with psychological stress and depression symptoms. Social Science and Medicine. 2014; 100:62–71. [PubMed: 24444840]

Hall K, Moreau C, Trussell J, Barber J. Young women's consistency of contraceptive use–do depression and stress matter? Contraception. 2013; 88:641–9. [PubMed: 23850075]

Hall K, Reame N, O'Connell K, Rickert V, Weshoff C. Influence of depressed mood and psychological stress symptoms on perceived oral contraceptive side effects and discontinuation in young minority women. Contraception. 2012; 86:518–25. [PubMed: 22673038]

Hogue CJR, Bremner D. Stress model for research into preterm delivery among black women. American Journal of Obstetrics and Gynecology. 2005; 192:S47–55. [PubMed: 15891712]

Hogue CJR, Parker CB, Willinger M, Temple JR, Bann CM, Silver RM, et al. A Population-based Case-Control Study of Stillbirth: The Relationship of Significant Life Events to the Racial Disparity for African Americans. American Journal of Epidemiology. 2013; 177(8):755–67. [PubMed: 23531847]

Holing EV, Beyer CS, Brown ZA, Connell FA. Why don't women with diabetes plan their pregnancies? Diabetes Care. 1998; 21:889–95. [PubMed: 9614603]

Kroenke K, Spitzer RL, Williams JB. The patient health questionnaire-2: validity of a two-item depression screener. Medical Care. 2003; 41:1284–92. [PubMed: 14583691]

McEwen BS, Seeman TE. Protective and damaging effects of mediators of stress: Elaborating and testing concepts of Allostasis and Allostatic Load. Annual of the New York Academy of Sciences. 1999; 89:30–47.

Rondo PHC, Ferreira RF, Nogueira F, Riberio MC, Lobert H, Artes R. Maternal psychological stress and distress as predictors of low birthweight, prematurity and intrauterine growth retardation. European Journal of Clinical Nutrition. 2003; 57(2):266–272. [PubMed: 12571658]

Santelli J, Rochat R, Hatfield-Timajchy K, Gilbert BC, Curtis K, Cabral R, Hirsch JS, Shieve L. the Unplanned Pregnancy Working Group. The measurement and meaning of unplanned pregnancy. Perspectives on Sexual and Reproductive Health. 2003; 35(2):94–101. [PubMed: 12729139]

Steinberg JR, Finer LB. Coleman, Coyle, Shuping, and Rue make false statements and draw erroneous conclusions in analyses of abortion and mental health using the National Comorbidity Survey. Journal of Psychiatric Research. 2012; 46(3):407–409. [PubMed: 22348853]

Steinberg JR, Finer LB. Examining the association of abortion history and current mental health: A reanalysis of the National Comorbidity Survey using a common-risk-factors model. Social Science and Medicine. 2011; 72(1):72–82. [PubMed: 21122964]

Steinberg JR, Tschann JM, Henderson JT, Drey EA, Steinauer JE, Harper CC. Psychological distress and post-abortion contraceptive choice at an urban clinic. Contraception. 2013; 88(6):717–24. [PubMed: 24094755]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Sonfield A, Kost K, Gold RB, Finer LB. The public costs of births resulting from unplanned pregnancies: National and state-level estimates. Perspectives in Sexual and Reproductive Health. 2011; 43(2):94–102.

Williams DR. Racial/Ethnic Variations in Women's Health: The Social Embeddness of Health. American Journal of Public Health. 2002; 92:588–597. [PubMed: 11919058]

Williams DR, Yu Y, Jackson JS, Anderson NB. Racial differences in physical and mental health: Socioeconomic status, stress, and discrimination. Journal of Health Psychology. 1997; 2:335–351. [PubMed: 22013026]

SIGNIFICANCE

Findings on associations between women's stressful life events around the time of unintended pregnancy and a range of physical and mental health experiences has implications for more holistic public health interventions and integrated health services that simultaneously address women's reproductive needs *and* their broader health and wellbeing.

Table 1

Characteristics of the Sample (N=695)

Sociodemographic and Reproductive Characteristics	N	Weighted %
Age (range, mean, SD)	Range 18–55	Mean 42.0, SD 9.2
Age group		
18–24 years	24	4
25–34 years	139	25
35–44 years	227	33
45–55 years	305	38
Educational attainment		
<High School	50	9
High School	226	29
Some college	205	33
Bachelor's	214	29
Race/ethnicity		
White, non-Hisp	494	60
Black, non-Hisp	64	13
Other, non-Hisp	47	9
Hispanic	90	18
Income		
<$25,000	131	18
$25–49,999	149	22
$50–74,999	116	18
$75,000	299	42
Marital status		
Married	485	68
Previously married	83	12
Never married	64	10
Cohabitating	63	10
Residence		
Metro	575	83
Non-Metro	120	17
Employment status		
Employed	430	61
Not employed	265	39
Religiously affiliated	582	83
Not affiliated	113	17
Religious service attendance		
Weekly	222	31
< Weekly	335	49
Never	138	20
Type of insurance		

Sociodemographic and Reproductive Characteristics	N	Weighted %
Private	458	65
Medicaid/care	84	14
Other	36	5
None	104	17
Unplanned pregnancy (Ever)	415	62
Timing of event		
Never	274	39
<5 years ago	89	15
5 years ago	326	46
Childbirth (Ever)	640	91
Miscarriage (Ever)	253	35
Abortion (Ever)	149	23

Sub-sample here is the 695 women who reported a history of pregnancy. Results are presented as unweighted frequencies (N) and weighted proportions (%) for binary and categorical variables and as sample ranges, means, and standard deviations (SD) for continuous variables.

Table 2

Descriptions of Women's Stressful Life Events and Health Conditions and Symptoms

(N=415)	N or Range	Weighted % or Mean (M) with Standard Deviation (SD)
Stressful Life Events Around the Time of Unplanned Pregnancy		
Stressful Life Events Score	Range 0–14	M 1.4, SD 2.1
Any Stressful Life Event	217	56
Number Stressful Life Events		
0	198	44
1	88	21
2	46	10
3	83	25
Stressful Life Events, By Type of Event and Individual Events		
Financial Stressful Life Events Score	Range 0–3	M .33, SD .67
My spouse or partner lost his or her job	34	11
I lost my job even though I wanted to go on working	28	9
I had a lot of bills I could not pay	77	18
Emotional Stressful Life Events Score	Range 0–4	M .36, SD .70
I had a problem with drinking or drugs	22	7
I moved to a new address	97	26
I was homeless	16	5
My spouse or partner or I went to jail	13	5
Trauma-related Stressful Life Events Score	Range 0–2	M .24, SD .52
A close family member was very sick and had to go to the hospital	49	14
Someone close to me died	51	16
Partner-related Stressful Life Events Score	Range 0–5	M .47, SD .92
I was in a physical fight	14	5
I got separated or divorced from my spouse or partner	31	9
Someone close to me had a problem with drinking or drugs	53	13
My spouse or partner did not want me to be pregnant	48	13
I argued with my spouse or partner more than usual	48	15
Chronic and Mental Health Conditions		
Any chronic disease diagnosis	462	66
Any mental health condition diagnosis	180	26
Number of chronic or mental health conditions	Range 0–12	M 2.0, SD 2.3
Individual health conditions		
Heart disease	8	1
Hypertension	125	19
Diabetes	44	8
High cholesterol	90	12
Obesity	84	12
Anemia	77	12
Thyroid disease	57	8

(N=415)	N or Range	Weighted % or Mean (M) with Standard Deviation (SD)
Asthma	89	14
Allergies	188	25
Gastrointestinal reflux disease	69	10
Inflammatory bowel disease	11	1
Cancer	37	5
Rheumatoid arthritis	78	10
Seizure disorder	3	<1
Chronic pain disorder	59	8
Migraines	93	14
Anxiety	108	17
Depression	132	18
Substance use disorder	6	1
Eating disorder	10	1
Other	24	3
Current Health Status/Symptom Measures		
Perceived general health		
Excellent	83	14
Very good	273	37
Good	262	38
Fair	58	8
Poor	19	3
Very good or excellent health	356	51
Poor, fair or good health	339	49
Patient Health Questionnaire (PHQ) depression score	Range 4–20	M 8.9, SD 3.9
Any depression symptom	411	64
Perceived Stress Scale (PSS) score	Range 2–10	M 4.2, SD 2.2
Any stress symptom	278	42
Everyday Discrimination Scale (EDS) score	Range 5–30	M 9.5, SD 4.3
Any discrimination symptom	383	58

Analytic sample is the 415 women who reported a history of one or more unplanned pregnancies. Results are presented as unweighted frequencies (N) and weighted proportions (%) for binary and categorical variables and as sample ranges, means, and standard deviations (SD) for continuous variables.

Table 3

Women's Health Conditions and Symptoms, By Unplanned Pregnancy and Stressful Life Events

(N=695)	Chronic Disease (CD) and Mental Health (MH) Conditions						Current Health Status/Symptom Measures (Perceived Health and Depression, Stress and Discrimination Scale Scores)[c]							
	Any CD		Any MH		Number CD/MH		Very Good Health		PHQ Score		PSS Score		EDS Score	
	(%)	P	(%)	P	(m)	P	(%)	P	(m)	P	(m)	P	(m)	P
[a]Timing of Unplanned Pregnancy, Among Women With Each Outcome														
Timing of event		<.001		.12		<.001		.02		<.001		<.001		<.001
Never	63		20		1.63		57		8.05		3.78		8.40	
<5 years ago	49		25		1.32		57		9.12		4.32		10.99	
5 years ago	75		30		2.52		43		9.61		4.61		10.05	
[b]Stressful Life Events Among Women With and Without Each Outcome (continuous indicators)	(m)	P	(m)	P	(B)	P	(m)		(B)	P	(B)	P	(B)	P
Stressful Life Events Score		.08		<.001	B .22	.01		<.001	B .46	<.001	B .37	<.001	B .74	<.001
SLE Mean (outcome group)	1.52		2.29				.94							
SLE Mean (ref. group)	1.12		1.02				1.79							
Financial SLE Score		.16		<.001	B .41	.08		<.001	B .92	.03	B .89	.001	B 1.66	.002
Mean (outcome group)	.36		.56				.20							
Mean (ref. group)	.26		.24				.45							
Emotional SLE Score		.48		<.001	B .33	.14		.01	B .98	<.001	B .80	<.001	B 1.74	<.001
Mean (outcome group)	.37		.55				.27							
Mean (ref. group)	.32		.27				.43							
Trauma-related SLE Score		.39		<.001	B .94	.009		.06	B 1.80	<.001	B 1.08	.001	B 1.38	.05
Mean (outcome group)	.25		.39				.19							
Mean (ref. group)	.21		.17				.28							
Partner-related SLE Score		.06		<.001	B .52	.01		<.001	B .94	<.001	B .79	<.001	B 1.73	<.001

(N=695)	Chronic Disease (CD) and Mental Health (MH) Conditions			Current Health Status/Symptom Measures (Perceived Health and Depression, Stress and Discrimination Scale Scores)[c]			
	Any CD	Any MH	Number CD/MH	Very Good Health	PHQ Score	PSS Score	EDS Score
Mean (outcome group)	.52	.80		.28			
Mean (ref. group)	.34	.32		.62			

[d]Stressful Life Events (binary/categorical indicators)	Any CD		Any MH		Number CD/MH		Very Good Health		PHQ Score		PSS Score		EDS Score	
	(%)	P	(%)	P	(m)	P	(%)	P	(m)	P	(m)	P	(m)	P
Any SLE		.74		.02		.04		.01		<.001		<.001		<.001
Yes	67		34		2.49		40		10.29		4.97		11.21	
No	69		22		2.01		55		8.64		4.01		9.20	
Number SLEs		.67		<.001		.009		.04		<.001		<.001		<.001
0	69		22		2.01		55		8.64		4.09		9.20	
1	62		24		2.01		47		9.40		4.17		10.71	
2	66		20		2.52		36		9.93		4.98		10.37	
3	73		49		2.99		35		11.44		5.81		12.20	

[a]Results are presented as weighted proportions (%) of women with diagnoses of chronic disease (CD) and mental health (MH) conditions and very good/excellent perceived health (VG health), and current health status measure mean scores (m) for depression (Patient Health Questionnaire PHQ), stress (Perceived Stress Scale PSS), and discrimination (Everyday Discrimination Scale EDS) symptoms. Unadjusted chi-square and student's t-tests compared proportions and means across unplanned pregnancy experiences.

[b]For continuous SLE indicators, results are presented as mean SLE scores (m) for women with and without chronic disease (CD) and mental health (MH) conditions and very good/excellent versus <very good perceived health (VG health), and as B coefficients from univariate linear regression models for depression (Patient Health Questionnaire PHQ), stress (Perceived Stress Scale PSS), and discrimination (Everyday Discrimination Scale EDS) scale symptom scores.[c]

[d]Results for binary/categorical SLE indicators are presented as proportions (%) of women with CD/MH diagnoses and mean scores (m) on depression, stress and discrimination scales for each SLE group.

Boldface indicates statistical significance at p<0.05 comparing proportions and means across groups using weighted unadjusted chi-square, student's t-tests, ANOVA and univariate linear regression, where appropriate.

Table 4

Stressful Life Events Around the Time of Unplanned Pregnancy and the Odds of Health Conditions and Symptoms

	Chronic Disease aOR (95%CI)	Mental Health Conditions aOR (95%CI)	Perceived Health Very Good[a] aOR (95%CI)	PHQ Depression Score[a] B (95%CI)	PSS Stress B (95%CI)	EDS Discrimination Score[a] B (95%CI)
Stressful Life Events (SLE)[b]						
Stressful Life Events Score	1.21 (1.03, 1.41) *	1.42 (1.23, 1.64) ***	.84 (.73, .98) *	.37 (.19, .55) ***	.32 (.22, .42) ***	.74 (.45, 1.04) ***
Financial SLE Score	1.25 (.82, 1.91)	2.57 (1.55, 4.28) ***	.74 (.44, 1.24)	.53 (−.14, 1.20)	.70 (.27, 1.12) **	1.79 (.77, 2.82) **
Emotional SLE Score	1.42 (.95, 2.15) ^	2.33 (1.56, 3.48) ***	.54 (.34, .89) *	.79 (.27, 1.30) **	.66 (.35, .96) ***	1.52 (.69, 2.34) ***
Trauma-related SLE Score	1.66 (.86, 3.23)	2.60 (1.49, 4.54) **	.70 (.41, 1.20)	1.55 (.76, 2.35) ***	.94 (.45, 1.42) ***	1.06 (−.15, 2.25) ^
Partner-related SLE Score	1.50 (1.04, 2.15) *	1.69 (1.24, 2.29) **	.66 (.48, .91) *	.74 (.32, 1.16) **	.67 (.41, .92) ***	1.75 (1.14, 2.36) ***
Any SLE	1.32 (.74, 2.33)	2.74 (1.53, 4.88) **	.59 (.34, 1.03) ^	.94 (.17, 1.71) *	.84 (.39, 1.29) ***	2.24 (1.24, 3.24) ***
None	1	1	1	1	1	1
Number SLEs						
0	1	1	1	1	1	1
1	.98 (.47, 2.04)	1.50 (.68, 3.28)	.75 (.37, 1.52)	.76 (−.29, 1.75)	.17 (−.40, .76)	1.47 (.49, 2.81) *
2	1.41 (.61, 3.27)	1.41 (.56, 3.60)	.44 (.17, 1.15)	.89 (−.79, 2.57)	.64 (−.21, 1.50)	.97 (−.49, 2.63)
3	1.80 (.84, 3.90)	6.10 (2.75, 13.54) ***	.50 (.24, 1.05) ^	2.37 (1.25, 3.49) ***	1.63 (1.00, 2.25) ***	3.40 (1.80, 5.00) ***
Sociodemographics						
Age	1.05 (1.02, 1.08) ***	1.03 (1.00, 1.07) *	.97 (.94, 1.00) *	.01 (−.03, .05)	.007 (−.02, .03)	−.03 (−.08, .01)
Educational attainment						
<High School	1	1	1	1	1	1
High School	1.24 (.54, 2.85)	.69 (.27, 1.79)	.94 (.41, 2.15)	−.54 (−2.06, .99)	−.28 (−1.15, .58)	−2.39 (−4.30, −.47) *
Some college	1.47 (.62, 3.46)	.71 (.27, 1.86)	2.00 (.87, 4.58)	−1.27 (−2.81, .27)	−.81 (−1.69, .07)	−2.37 (−4.28, −.46) *
Bachelor's	1.27 (.51, 3.20)	.84 (.28, 2.47)	2.76 (1.10, 6.91) *	−1.44 (−3.07, .18)	−.98 (−1.88, −.07) *	−2.73 (−4.75, −.72) **
Race/ethnicity						
White, non-Hisp	1	1	1	1	1	1
Black, non-Hisp	1.02 (.53, 1.97)	.10 (.04, .32) ***	.75 (.38, 1.48)	−.69 (−1.96, .87)	−.14 (−.88, .61)	.16 (−1.11, 1.43)
Other, non-Hisp	1.05 (.44, 2.52)	.90 (.26, 3.20)	.91 (.30, 2.72)	1.04 (−.53, 2.62)	.61 (−.28, 1.50)	.99 (−1.17, 3.16)

	Chronic Disease aOR (95%CI)	Mental Health Conditions aOR (95%CI)	Perceived Health Very Good[a] aOR (95%CI)	PHQ Depression Score[a] B (95%CI)	PSS Stress B (95%CI)	EDS Discrimination Score[a] B (95%CI)
Hispanic	1.24 (.63, 2.44)	.45 (.20, 1.02)	.65 (.33, 1.29)	.33 (−.63, 1.29)	.12 (−.47, .70)	−.13 (−1.48, 1.22)
Income						
<$25,000	1	1	1	1	1	1
$25–49,999	.64 (.40, 1.46)	1.69 (.88, 3.30)	1.09 (.58, 2.05)	−.73 (−1.84, .39)	−.46 (−1.16, .25)	.69 (−.72, 2.11)
$50–74,999	.84 (.38, 1.83)	1.23 (.57, 2.67)	**3.31 (1.61, 6.80)****	**−1.10 (−2.27, −.05)***	**−.90 (−1.65, −.15)***	−.77 (−2.38, .83)
$75,000	.96 (.46, 2.00)	.84 (.38, 1.82)	**2.74 (1.32, 5.65)****	**−1.45 (−2.70, −.21)***	**−1.09 (−1.79, −.39)****	−.71 (−2.11, .68)
Marital status						
Married	1	1	1	1	1	1
Previously married	**2.34 (1.11, 4.90)***	**2.60 (1.34, 5.07)****	.82 (.42, 1.60)	.49 (−.55, 1.52)	.31 (−.30, .92)	.54 (−.70, 1.78)
Never married	1.21 (.59, 2.45)	**3.78 (1.53, 9.35)****	1.41 (.64, 3.11)	.85 (−.48, 2.17)	.51 (−.35, 1.36)	1.14 (−.48, 2.76)
Cohabitating	.93 (.42, 2.01)	1.58 (.61, 4.13)	.91 (.41, 2.04)	−.89 (−2.37, .59)	−.34 (−1.08, .39)	−.92 (−2.40, .56)
Residence						
Non-Metro	1	1	1	1	1	1
Metro	1.22 (.69, 2.16)	1.31 (.77, 2.22)	.81 (.43, 1.50)	−.17 (−1.03, .69)	−.009 (−.52, .50)	−.20 (−1.11, .70)
Employment status						
Not employed	1	1	1	1	1	1
Employed	1.27 (.77, 2.09)	.69 (.39, 1.22)	**1.91 (1.11, 3.29)***	−.49 (−1.33, .36)	−.13 (−.58, .32)	.57 (−.39, 1.54)
Religious service attendance						
Weekly	1	1	1	1	1	1
< Weekly	1.09 (.68, 1.74)	1.69 (1.00, 2.65)	**.52 (.32, .82)****	**.86 (.13, 1.59)***	**.45 (.02, .88)***	.21 (−.60, 1.02)
Never	.59 (.32, 1.09)	1.59 (.80, 3.19)	**.44 (.24, .83)***	**1.19 (.27, 2.09)***	.45 (−.07, .97)	.96 (−.15, 2.06)
Type of insurance						
Private	1	1	1	1	1	1
Medicaid/care	1.64 (.74, 3.62)	1.48 (.69, 3.15)	1.25 (.61, 2.56)	.30 (−.97, 1.56)	−.37 (−1.11, .36)	−.88 (−2.32, .55)
Other	2.02 (.70, 5.84)	.91 (.34, 2.43)	.76 (.30, 1.89)	.38 (−1.14, 1.89)	.86 (−.16, 1.87)	.57 (−1.35, 2.51)
None	.65 (.34, 1.23)	1.02 (.52, 2.02)	1.20 (.60, 2.39)	0 (−1.04, 1.04)	−.03 (−.67, .61)	.17 (−1.31, 1.66)
No childbirth experience	1	1	1	1	1	1
Ever childbirth	1.72 (.76, 3.87)	1.03 (.42, 2.49)	1.36 (.50, 3.65)	.03 (−1.19, 1.24)	−.07 (−.70, .56)	.75 (−.53, 2.03)

	Chronic Disease aOR (95%CI)	Mental Health Conditions aOR (95%CI)	Perceived Health Very Good[a] aOR (95%CI)	PHQ Depression Score[a] B (95%CI)	PSS Stress B (95%CI)	EDS Discrimination Score[a] B (95%CI)
No miscarriage experience	1	1	1	1	1	1
Ever miscarriage	1.08 (.69, 1.71)	1.40 (.90, 2.18)	.84 (.54, 1.31)	.08 (−.57, .72)	.08 (31, .46)	**.98 (.22, 1.75)** *
No health conditions			1	1	1	1
Chronic/mental health conditions			**.32 (.19, .54)** ***	**1.92 (1.22, 2.60)** ***	**.90 (.51, 1.29)** ***	**1.23 (.42, 2.05)** **

Results are presented as adjusted odds ratios and 95% confidence intervals from multivariable logistic regression models estimating the effects of unplanned pregnancy and sociodemographic covariates on the odds of binary chronic disease (CD) and mental health (MH) condition outcomes. Results from multivariable linear regression are presented as beta coefficients (B) and 95% confidence intervals (CI) from models of number of chronic/mental health conditions and current health status/symptom measures for depression (Patient Health Questionnaire PHQ), stress (Perceived Stress Scale PSS), and discrimination (Everyday Discrimination Scale EDS) scores.

[a] Current health status/symptom outcome models controlled for chronic disease/mental health conditions.

[b] **Each SLE sub-scale indicator was treated as a separate independent variable in separate regression models;** point estimates of sociodemographic and reproductive covariates shown are from SLE score model and were consistent in all other models.

Boldface indicates statistical significance; p-values considered significant at

*
<0.05,

**
<0.01 and

***
<0.001;

^
marginal at p<0.10.

Table 5

Associations Between Stressful Life Events Around the Time of Unplanned Pregnancy and Individual Chronic Disease and Mental Health Conditions

Chronic Disease (CD) and Mental Health (MH) Conditions	Mean Stressful Life Events Score Among Women with Each CD/MH Condition[a]			Effect of Stressful Life Events Score on the Odds of Each CD/MH Condition[b]
	Mean SLE score for + CD/MH	Mean SLE score for − CD/MH	*P*	aOR (95%CI)
Heart disease	2.60	1.39	.20	4.12 (.50, 34.31)
Hypertension	1.45	1.39	.77	.97 (.85, 1.11)
Diabetes	2.03	1.35	.09	1.17 (.99, 1.39)^
High cholesterol	1.49	1.38	.72	1.11 (.94, 1.31)
Obesity	1.67	1.36	.30	1.03 (.88, 1.20)
Anemia	1.85	1.34	.11	1.02 (0.87, 1.21)
Thyroid disease	1.78	1.36	.29	1.13 (.94, 1.36)
Asthma	1.62	1.36	.35	0.99 (.86, 1.14)
Allergies	1.52	1.35	.44	1.03 (.91, 1.16)
Gastrointestinal reflux disease	1.87	1.34	.11	1.03 (.88, 1.21)
Inflammatory bowel disease	2.00	1.39	.48	.93 (.46, 1.86)
Cancer	1.11	1.41	.55	1.16 (.88, 1.52)
Rheumatoid arthritis	1.81	1.33	.11	1.05 (.89, 1.25)
Seizure disorder[c]	1.00	.10	.79	
Chronic pain disorder	2.00	1.33	**.049**	**1.25 (1.10, 1.48)**
Migraines	2.05	1.29	**.009**	**1.28 (1.10, 1.49)**
Anxiety	2.78	1.09	**<.001**	**1.42 (1.23, 1.65)**
Depression	2.31	1.14	**<.001**	**1.32 (1.15, 1.52)**
Substance use disorder[c]	3.50	1.37	**.01**	
Eating disorder	2.71	1.38	.09	3.23 (.22, 47.33)

[a]Bivariate results comparing mean stressful life events scores (SLE) among women with and without each CD/MH condition.

[b]Multivariable results are adjusted odds ratios and 95% confidence intervals from weighted multivariable logistic regression models estimating the effects of SLE scores on the odds of having each specific chronic and mental health condition (ref is no history of each condition). All models controlling for full set of covariates listed in Tables 3–4 plus all reproductive history variables. Significant results were consistent in models with all other stressful life events indicators (any SLEs, type of SLE scores, and categorical SLE variable). Boldface indicates statistical significance at p<0.05.

[c]Models for seizure disorder, substance use disorders and "other" conditions had insufficient cell sizes for multivariable modeling.