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Pregnancy Intentionality in Relation to Nonplanning Impulsivity

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Abstract

Background—Half of US pregnancies are unintended. Understanding risk factors is important for reducing unintended pregnancy rates.

Aim—We examined a novel risk factor for unintended pregnancies, impulsivity. We hypothesized that nonplanning impulsivity, but not motor or attentional impulsivity, would be related to pregnancy intention.

Methods—Pregnant women (N=116) completed self-report measures during their second or third trimester. Impulsivity was measured using the Barratt Impulsiveness Scale (BIS-15); subscales measured motor, attentional and nonplanning impulsivity (subscale range: 5–20). On each subscale, high impulsivity was indicated by a score of ≥ 11 . Pregnancy intention was assessed by asking women whether they were trying to become pregnant at the time of conception (yes or no). Crude and multivariable-adjusted logistic regression models estimated the cross-sectional association between impulsivity and unplanned pregnancy.

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Declarations of Interest

The authors report no conflicts of interest to disclose.

Results—Thirty-four percent of women reported that their current pregnancy was unplanned, and 32% had high nonplanning impulsivity. Fifty-one percent of women with high nonplanning impulsivity reported an unplanned pregnancy versus 25% of women with low impulsivity. Women with high nonplanning impulsivity had 3.53 times the odds of unplanned pregnancy compared to women with low nonplanning impulsivity (adjusted OR=3.53, 95% CI: 1.23–10.14). Neither motor (adjusted OR=0.55, 95% CI: 0.10–2.90) nor attentional (adjusted OR=0.84, 95% CI: 0.25–2.84) impulsivity were related to pregnancy intentionality.

Conclusions—High nonplanning impulsivity may be a risk factor for unplanned pregnancy. Further research should explore whether increasing the use of long-acting reversible contraceptives or integrating if-then planning into contraceptive counseling among women with higher nonplanning impulsivity can lower unplanned pregnancy rates.

Keywords

pregnancy intention; impulsivity; long-active reversible contraceptives

Introduction

Half of pregnancies in the United States are unintended.¹ Unintended pregnancies are associated with high financial costs,^{2,3} maternal depression and stress, and poorer infant health.^{4,5} Unintended pregnancies typically result from failure to use contraception in women who are not purposefully trying to achieve pregnancy, inconsistent or incorrect use of effective contraceptives, or lack of contraceptive availability.⁶ Understanding risk factors for unintended pregnancies is an important step towards reducing the proportion of unintended pregnancies, their associated costs² and consequences for maternal and child health.^{4,5}

A major theme emerging from the literature exploring why women engage in unprotected sexual intercourse is a lack of thought or preparation.⁷ In one study, adolescents with repeated unintended pregnancies reported that decisions to participate in sexual activity were impulsive and spontaneous.⁸ It has been previously suggested that adolescents, rather than making risky decisions to engage in intercourse without contraception, actually fail to foresee relevant consequences of sexual intercourse and do not engage in a decision making process at all.⁸ Not anticipating participation in sexual activity, the likelihood of conception, or the need for contraception, precludes opportunities to plan ahead for pregnancy prevention. A recent meta-analysis found a small but significant association between impulsivity and risky sexual behaviors among adolescents, especially among females,⁹ and impulsivity has been linked with sexual risk behaviors among young adults.^{10–12} Most articles to date examining associations of impulsive actions, lack of contraceptive planning, and unplanned pregnancy have utilized qualitative methods.^{7,8,13} There have been no previous quantitative studies examining trait impulsivity and pregnancy intention among adult women.

The three dimensions of impulsivity including nonplanning, motor, and attention. Nonplanning impulsivity can be described as hasty decision-making, or a lack of decision-making, related to planning for the future. Motor impulsivity is comparable to physical

hyperactivity. Attention impulsivity corresponds to a cognitive difficulty focusing or concentrating. The aim of this study was to examine pregnancy intentionality in relation to the three impulsivity dimensions among pregnant women. We hypothesized that women with higher nonplanning impulsivity will be more likely to report an unplanned pregnancy, but that neither motor nor attention impulsivity would be associated with pregnancy intention.

Methods

Data were derived from a prospective cohort study of pregnant women. The overarching aim of the parent study was to examine associations between impulsivity, eating, and weight gain during pregnancy. We recruited 125 pregnant women from August 2013 through December 2014 from faculty and resident obstetric practices at the University of Massachusetts Memorial Health Care (UMMHC), Worcester, MA, USA, a private obstetric practice in Worcester, MA, and from the greater Worcester, MA community. At UMMHC, research assistants actively approached patients <36 weeks gestation at routine prenatal visits after obtaining permission from their prenatal care provider. Recruitment from the private obstetric practice was passive; research assistants sat in the practice waiting room with a sign advertising the study and interested women initiated contact. We also posted flyers advertising the study in both the practices at UMMHC and the private obstetric practice, online in the Worcester Craigslist, and in community venues such as the local YMCA. Inclusion criteria were age ≥ 18 years, singleton gestation between 14–36 weeks at enrollment, 18.5 kg/m² ≤ pre-pregnancy BMI < 40 kg/m², plans to deliver at UMMHC, feeling comfortable reading and writing in English, and being able and willing to provide informed consent. Exclusion criteria included chronic medical conditions that could influence body weight (e.g., pre-gestational diabetes, HIV/AIDS, chronic hepatitis, autoimmune disease), current use of medication associated with significant weight change or medications to treat opioid dependence, previous weight loss surgery, or current participation in a weight loss program. All participants provided written informed consent. The Institutional Review Board at the University of Massachusetts Medical School approved this study (initial approval date: 5/17/2013, approval number: H00001672).

At an in-person study visit, women completed self-report measures via a secure web form.¹⁴ We measured impulsivity with the 15-item Barratt Impulsiveness Scale (BIS), a validated measure that assesses three subscales of impulsivity: nonplanning, motor, and attention impulsivity.^{15,16} The BIS is one of the most widely-used self-report measures of impulsivity.¹⁷ The 15-item version of the BIS was developed using a large community sample (n=700; 60% female, mean 29.3 [SD: 12.9] years old, mean 14.2 [SD: 1.9] years education); factor analysis confirmed the latent structure of the original 30-item version with good internal reliability and validity.¹⁶ The BIS measures impulsivity using subjective statements about the respondent's behaviors with response options of rarely/never (1), occasionally (2), often (3), and almost always/always (4), and higher scores indicate greater impulsivity (subscale range: 5–20).^{15,16} Sample questions for the subscales include “I do things without thinking” (motor), “I am restless at lectures or talks” (attention), and “I plan tasks carefully” (nonplanning, reverse-coded). The 15-item BIS in its entirety is available in Spinella et al. (2007).¹⁶ In our sample, Cronbach's alphas were 0.70 for motor impulsivity,

0.70 for attentional impulsivity, and 0.83 for nonplanning impulsivity. We categorized women as being less impulsive (subscale score of 5–10) versus more impulsive (11–20). We chose a subscale score of 10 to categorize women with less impulsive behavior within each subscale, as this score indicates responding on average “never/rarely” or “occasionally” on subscale items. This cutoff of 11 indicates more impulsive behavior within each subscale and corresponds to the recommended cutoff of 72 out of 120 on the 30-item BIS which classifies individuals as highly impulsive.¹⁷ We secondarily examined the three subscales continuously. Pregnancy intention was measured by asking women “When you got pregnant, were you trying to get pregnant?” (yes or no).

We evaluated several self-reported characteristics for potential confounding. Known risk factors for unintended pregnancy include younger age, African-American race or Hispanic/Latina ethnicity, lower education, lower income, higher parity, and single marital status.^{18,19} Women were asked “Is it hard for you to pay for basics, like food, housing, medical care and heating?” and responses of “somewhat hard” or “very hard” were considered to indicate financial strain; responses of “not at all hard” were considered to indicate no financial strain. Gravidity was assessed by asking whether this was the patient’s first pregnancy (yes or no). In addition to these potential confounders, we also examined the proportion of women who self-reported previous and current diagnoses of Attention-Deficit/Hyperactivity Disorder (ADD/ADHD) and previous or current medication usage for ADD/ADHD.

Statistical analyses

We used crude and multivariable-adjusted logistic regression models to estimate the association between impulsivity and pregnancy intention. We evaluated for potential confounding with previously-observed risk factors for unplanned pregnancy. We compared the proportion of women reporting an unplanned pregnancy by sample characteristics using Fisher’s Exact Tests and Cochran-Armitage trend tests; except for gravidity ($p=0.5400$) and BMI ($p=0.0681$), all characteristics examined were associated with pregnancy intention with $p<0.001$. Given the modest sample size, we considered for inclusion in the multivariable-adjusted regression model potential confounders associated with at least one component of impulsivity (high impulsivity or continuous impulsivity). We used a 10% change-in-estimate approach for model-building, and for consistency, final multivariable-adjusted models included covariates meeting this criterion for at least one dimension of impulsivity (nonplanning, motor, or attention impulsivity). We also presented a second multivariable-adjusted model that additionally included the other two subscales of impulsivity (categorically; high versus low impulsivity), to estimate the association between each subscale of impulsivity and pregnancy intention independent of the other two subscales. Secondarily, we examined the three dimensions of impulsivity as continuous measures. We used logistic regression models to estimate the association between one-point higher impulsivity score with unplanned pregnancy using the model-building approach above. In these models, when adjusting for other dimensions of impulsivity, we included them as continuous measures. Analyses were conducted in SAS (version 9.3, SAS Institute, Inc., Cary, NC).

Results

We excluded women missing information on one or more questions on the BIS-15 ($n=9$) or information on pregnancy intention ($n=1$), resulting in an analytic sample of 116 pregnant women. At enrollment, women were on average 29.1 years old (SD: 4.7 years) and 24.9 weeks gestation (SD: 6.6 weeks). Additional characteristics of the sample are presented in Table 1. Thirty-five percent were primigravid, and 47% were overweight or obese prior to conception. Fifty-nine percent were non-Hispanic white, 18% were Hispanic/Latina, and 11% were non-Hispanic Black or African-American. Six women reported ever being diagnosed with ADD/ADHD, four of whom reported a current diagnosis of ADD/ADHD. Only one reported taking medication for ADD/ADHD prior to pregnancy, and none reported current use of medications for ADD/ADHD.

Ten percent of women had high motor impulsivity, 21% high attentional impulsivity, and 32% high nonplanning impulsivity. The proportions of women with high impulsivity for each subscale within each sociodemographic subgroup are shown in Table 1.

Thirty-four percent of women reported that the current pregnancy was unplanned. Nonplanning impulsivity was associated with pregnancy intention. Fifty-one percent of women with high nonplanning impulsivity reported unplanned pregnancy compared to 25% of women with low nonplanning impulsivity (Table 2). After adjusting for education, financial strain, marital status, and the other two subscales of impulsivity (motor and attentional), women with high nonplanning impulsivity had 3.5 times the odds of unplanned pregnancy compared to women with low nonplanning impulsivity (OR=3.53; 95% CI: 1.23–10.14; Table 2). Neither motor nor attentional impulsivity were associated with pregnancy intention (Table 2).

Secondarily we examined the three dimensions of impulsivity as continuous measures. Average scores were 7.9 (SD: 2.1) for motor impulsivity, 8.8 (SD: 2.5) for attentional impulsivity, and 9.2 (SD: 3.2) for nonplanning impulsivity. Nonplanning impulsivity was associated with 15% higher odds of unplanned pregnancy in the crude model (OR=1.15; 95% CI: 1.02–1.30 for each one point higher score) but the association was not statistically significant after adjusting for education, marital status, financial strain, and the other two impulsivity subscales as continuous variables (OR=1.13, 95% CI: 0.97–1.31 for each one point higher score). Neither motor nor attentional impulsivity was associated with pregnancy intention (crude OR=0.89; 95% CI: 0.73–1.08 and adjusted OR=0.89, 95% CI: 0.70–1.15 for motor impulsivity, and crude OR=1.03; 95% CI: 0.89–1.20 and adjusted OR=1.04, 95% CI: 0.83–1.31 for attention impulsivity, respectively, for each one point higher score).

Discussion

We found that pregnant women with high nonplanning impulsivity were significantly more likely to report unplanned pregnancy. Neither motor nor attentional impulsivity was associated with pregnancy intentionality. This research suggests that nonplanning impulsivity may be a potential novel risk factor for unplanned pregnancy, an important

finding given the adverse effects on maternal and infant health^{4,5} and on health care costs^{2,3} associated with unplanned pregnancies.

Contraception is vital to decreasing risk of unplanned pregnancy, and is a relevant sexual health issue that providers can directly address and affect in their clinical practice. While all women should be provided with sufficient information to make an informed decision about which contraceptive method is right for them, providers may wish to encourage women to consider their personal characteristics including impulsivity as part of contraceptive decision-making. Long-acting reversible contraceptives (LARCs), including intrauterine devices and contraceptive implants, may be ideal methods for women with high nonplanning impulsivity because they do not require any purposeful effort at the time of sexual activity or any daily adherence regimen yet remain highly effective (failure rates of 0.1–0.3% annually²⁰) for 3–10 years following their initial placement. Indeed, at enrollment into the Contraceptive CHOICE study, adolescent and adult women at high risk for unplanned pregnancy rated the importance of a contraceptive method being “forgettable” (i.e., do not have to remember to take/use method regularly) as 2.54 on a scale of “not at all important” (1) to “very important” (3).²¹ A recent series of studies found that provider counseling using if-then planning reduced subsequent use of emergency contraception and pregnancy testing among adolescent women attending family planning clinics.^{22–24} For women who elect a more user-dependent method of contraception, especially those with higher nonplanning impulsivity, behavioral counseling including such implementation intentions may be an effective strategy for promoting consistent use. The 5-item nonplanning impulsivity subscale of the BIS-15 may be helpful for identifying women at risk for unplanned pregnancies due to high nonplanning impulsivity during routine gynecological care, in the primary care setting, in sexual education classes, or through high school nurses or university health clinics for teens and younger women. Mental health care providers could also identify their patients with high impulsivity and counsel them about effective contraception or refer or coordinate reproductive health care.²⁵

This study has several strengths. Our sample was diverse with respect to race/ethnicity, educational attainment, and financial strain, and we evaluated several known risk factors for unplanned pregnancies for potential confounding, including age, marital status, education, financial strain, and race/ethnicity.^{18,19} We add to the findings from previous qualitative studies⁷ by examining the association between impulsivity and pregnancy intention with a quantifiable and validated impulsivity measure^{15,16} that has been used in previous research.^{16,26,27}

This study has several limitations. Our sample size was modest, which limited statistical power. We measured pregnancy intention with a single question which may not capture the complexity of pregnancy intentions.²⁸ For example, pregnancy intention can include situations when a woman or couple wants to have a child but has not made an active decision to plan a pregnancy, or when the ‘costs’ of contraception (e.g., side effects, inconvenience, discomfort) outweigh the benefits of preventing a pregnancy.²⁹ We also lacked information on women’s use of contraceptives at the time of conception. Future research should examine whether impulsivity is associated with not seeking out contraceptives, inconsistent use of contraceptives, or contraceptive failure.. Additionally, as the current study is a secondary

analysis of data from a prospective cohort study of predictors of gestational weight gain, all participants had chosen to carry their pregnancies to term and were receiving prenatal care, and thus our sample likely over-represents women with planned pregnancies or who decided to carry an unplanned pregnancy to term, and the sample did not include women who had low pregnancy intention and did not become pregnant. Future prospective studies comparing pregnancy rates of women with low versus high impulsivity would be valuable for confirming the observed pattern of findings.

The current study suggests that pregnant women with higher levels of nonplanning impulsivity may be more likely to report an unplanned pregnancy than pregnant women with lower levels of nonplanning impulsivity. Further research avenues include investigating whether increasing LARC use or integrating if-then planning into contraceptive counseling^{22–24} among women with higher nonplanning impulsivity can lower unplanned pregnancy rates.

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Current Knowledge on the Subject

- Half of US pregnancies are unintended
- Many unintended pregnancies are due to lack of access to or use of contraception or contraceptive failure
- Little is known about behavioral factors associated with unplanned pregnancy, and no previous studies have used quantitative methods to examine trait impulsivity in relation to pregnancy intention

What This Study Adds

- We examined pregnancy intentionality in relation to impulsivity among pregnant women using a quantitative measure of impulsivity
- We found that pregnant women with high nonplanning impulsivity were significantly more likely to report that the current pregnancy was unplanned
- Long-acting reversible contraceptives are likely to be appropriate contraceptive choices to prevent unplanned pregnancy in women with high nonplanning impulsivity

Table 1

Characteristics of pregnant women, overall and proportion of each subgroup with high* impulsivity, n (%)

		Percent of each subgroup with high impulsivity		
	Overall sample, n (%)	High motor impulsivity, n (%)	High attention impulsivity, n (%)	High non-planning impulsivity, n (%)
Overall sample		12 (10)	24 (21)	37 (32)
Age				
18–24 years	20 (17)	1 (5)	3 (15)	7 (35)
25–29 years	35 (30)	5 (14)	8 (23)	11 (31)
30–34 years	51 (44)	5 (10)	13 (25)	16 (31)
35+ years	10 (9)	1 (10)	0 (0)	3 (30)
Pre-pregnancy weight status				
Normal weight	61 (53)	7 (11)	14 (23)	16 (26)
Overweight	30 (26)	4 (13)	4 (13)	10 (33)
Obese	25 (22)	1 (4)	6 (24)	11 (44)
Race/ethnicity				
Non-Hispanic White	69 (59)	9 (13)	15 (22)	22 (32)
Asian	11 (9)	1 (9)	3 (27)	4 (36)
Non-Hispanic Black or African-American	13 (11)	1 (8)	1 (8)	4 (31)
Hispanic or Latina	21 (18)	1 (5)	5 (24)	7 (33)
Other race/ethnicity or multiracial	2 (2)	0 (0)	0 (0)	0 (0)
Marital status				
Married	69 (59)	8 (12)	14 (20)	19 (28)
Living with partner	20 (17)	1 (5)	3 (15)	8 (40)
Single, separated, or divorced	27 (23)	3 (11)	7 (26)	10 (37)
Education				
High school/GED or less	32 (28)	3 (9)	7 (22)	14 (44)
Trade/technical school, some college/Associate's degree	22 (19)	2 (9)	6 (27)	9 (41)
Bachelor's degree/some post-graduate work	23 (20)	2 (9)	5 (22)	7 (30)
Graduate degree	39 (34)	5 (13)	6 (15)	7 (18)
Difficulty paying for basics				
No difficulty	75 (65)	9 (12)	14 (19)	22 (29)
Somewhat or very difficult	41 (35)	3 (7)	10 (24)	15 (37)
Gravidity				
Primigravida	41 (35)	4 (10)	6 (15)	8 (20)

		Percent of each subgroup with high impulsivity		
	Overall sample, n (%)	High motor impulsivity, n (%)	High attention impulsivity, n (%)	High non-planning impulsivity, n (%)
Multigravida	75 (65)	8 (11)	18 (24)	29 (39)

*“Low” signified by subscale scores 5–10, “high” signified by subscale scores 11–20

Table 2

Pregnancy intention in relation to impulsivity among pregnant women

Model	Motor impulsivity	Attention impulsivity	Nonplanning impulsivity
Unplanned pregnancy, n (%)			
Low impulsivity [*]	36 (35)	30 (33)	20 (25)
High impulsivity	3 (25)	9 (38)	19 (51)
Crude OR ^{**} (95% CI)	0.63 (0.16–2.47)	1.24 (0.49–3.16)	3.11 (1.37–7.07)
Adjusted ^{***} OR (95% CI)	0.75 (0.15–3.60)	0.84 (0.25–2.80)	3.25 (1.17–9.08)
Adjusted ^{****} OR (95% CI)	0.55 (0.10–2.90)	0.84 (0.25–2.84)	3.53 (1.23–10.14)

^{*} “Low” signified by subscale scores 5–10, “high” signified by subscale scores 11–20

^{**} Low impulsivity serves as the reference category for each facet of impulsivity and planned pregnancy serves as the reference for pregnancy intention. Bolded ORs and 95% CIs indicate those statistically significant at the p<0.05 level.

^{***} Adjusted for education, marital status, and financial strain.

^{****} Adjusted for education, marital status, and financial strain, plus the other BIS subscales (high versus low impulsivity).