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Experiences of discrimination across the life course among pregnancy planners in the United States and Canada

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ABSTRACT

Little is known about discrimination among pregnancy planners. We used questionnaire data from Pregnancy Study Online (PRESTO), a preconception cohort study, to characterize experiences, attributions, and responses to discrimination (n = 10,460). Eligible participants were assigned female at birth, aged 21–45 years, U.S. or Canadian residents, and not using contraception or fertility treatment. Participants completed a supplemental questionnaire (2013–2024) that included the Philadelphia Urban ACE Survey, Williams' Everyday Discrimination and Major Experiences of Discrimination scales, and Krieger's instrument on responses to discrimination. Mean age at enrollment was 30.9 years. Overall, 83.8 % of participants identified as non-Hispanic White, and 50.4 % had ≥17 years education. Discrimination across the life course varied: 11 % of participants reported childhood racial discrimination, 80.3 % reported ever experiencing everyday discrimination, and 47.2 % reported ever experiencing lifetime discrimination. The most prevalent types of everyday discrimination included being perceived as not smart (63.4 %) and being treated with disrespect (62.6 %), while job-related discrimination was the most frequently-reported lifetime experience (33.9 %). Most Black participants (non-Hispanic and Hispanic) reported their race or ethnicity as one of the main reasons they were discriminated against (87.7 % and 80 %, respectively), while sex or gender was most commonly-reported by other racial and ethnic groups (range: 75.9–82.4 %). Most participants responded passively to discrimination: keeping it to themselves and accepting it as a fact of life (37.4 %). All participants other than non-Hispanic White reported greater exposure to discrimination across the life course, and attributions for discrimination (*e.g.,* race, gender, education, income level) varied across racial and ethnic groups.

1. Introduction

Discrimination, defined as prejudicial treatment of others based on characteristics such as race and gender (Krieger, 2014; Pager & Shepherd, 2008), has received increased attention for its (direct or indirect) contribution to health disparities (Fleras, 2011; Pager & Shepherd, 2008; Pascoe & Smart Richman, 2009; Williams, Lawrence, Davis, et al., 2019; Williams & Mohammed, 2009). Discrimination is not a random act; it is expressed as systemic unfair treatment occurring between individuals or institutions where members of a socially-defined group can maintain privilege at the cost of others' deprivation (Krieger, 2014). Although racial and ethnic minority groups have historically experienced disproportionate exposure to discrimination, one nationally representative study found that the majority of U.S. adults believe contemporary discrimination against their own race and ethnicity, or gender and sexual identity, exists today (National Public Radio et al., 2018). These findings are consistent with several studies (Byrd & Mirken, 2011; Pager & Shepherd, 2008; Pew Research Center, 2016), suggesting many U.S. adults perceive discrimination as widespread and a significant problem. Discrimination in Canada is also pervasive (Cotter, 2022; Godley, 2018; Hyman et al., 2019; Kogan et al., 2022;

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Abbreviations

ACE	adverse childhood experiences
AI/AN	American Indian, Alaskan Native, or Indigenous
BIPOC	Black, Indigenous, and People of Color
LCEQ	Life Course Experiences Questionnaire
MDI	Major Depression Inventory
PRESTO	Pregnancy Study Online
PSS	Perceived Stress Scale
PTSD	post-traumatic stress disorder

Mooten, 2021; Nangia, 2013; Noh et al., 1999; Siddiqi et al., 2017; Statistics Canada, 2024), with more frequent occurrences among Canadian-born Black and Indigenous people.

Historical origins of racism and reproductive injustice have long fostered and sustained inequitable systems (Fig. 1) (Austin, 2010; Bailey et al., 2017, 2021; Fleras, 2011; Kwak, 2020; McKenzie et al., 2022). These systems, in turn, have led to discriminatory policies, practices, and beliefs, creating racialized economic patterns of (dis)investment and bias. Worldwide, individuals have also encountered gender- and education-based discrimination, which has been spotlighted in social movements (*e.g.,* #MeToo, #TimesUp) and prominent legal cases (*e.g.,* Brown v. Board of Education [1954] with the Supreme Court of the U.S., R v. Morris [2006] and R v. Anderson [2014] with the Supreme Court of Canada) (Chan et al., 2008; Graf, 2018; Parker & Funk, 2017; Pavalko et al., 2003; SteelFisher et al., 2019). Despite policies related to healthcare, fair housing, and affirmative action that were established to advance access to opportunity and reduce discrimination, some of these policies have been overturned while others have been effectively rolled back for new practices acting counter to the original policy aimed to address discrimination (Green et al., 2018; O'Donnell, 2018; O'Donnell & Guida, 2020; Stolberg & Pear, 2010; Totenberg, 2023). Ongoing research suggests that the reversal of these policies highlights the role politics play in driving systems and structures that lead to disparate health outcomes (Beagan et al., 2024; Bleich et al., 2019).

Discrimination is a well-established stressor and social determinant of health in North America (Fleras, 2011; Paradies, 2006; Paradies et al., 2015; Williams, Lawrence, & Davis, 2019; Williams, Lawrence, Davis, et al., 2019; Williams & Mohammed, 2009). However, no study to date has examined patterns of discrimination (prevalence and distribution) among pregnancy planners. Further, few studies on discrimination include a transnational sample of the U.S. and Canada or ascertain attributions of discrimination (*e.g.,* race, ethnicity, gender) and ways in which individuals respond to unfair treatment (Pager & Shepherd, 2008). The preconception period is a critical time window during which discrimination could have long-lasting effects on reproductive, perinatal, and pediatric health (Harper et al., 2023; Mumford et al., 2014). Optimizing preconception health necessitates understanding mechanisms through which discrimination perpetuates social and economic adversities (Fig. 1) (Fleras, 2011; Pager & Shepherd, 2008; Pascoe & Smart Richman, 2009; Williams, 2018; Williams, Lawrence, Davis, et al., 2019; Williams & Mohammed, 2009).

Recent studies have examined discrimination at multiple time points along the reproductive continuum, including pregnancy and childbirth (Alhusen et al., 2016; Bohren et al., 2015; Larrabee Sonderlund et al., 2021; Spann et al., 2024). Given that optimal preconception health is associated with better reproductive, perinatal, and pediatric outcomes (Harper et al., 2023), it is critical to understand how structural, institutional, and interpersonal factors shape socio-environmental exposures and the realities of discrimination. Several studies of discrimination based in North America are also limited by the populations investigated (*e.g.,* geographic diversity, sufficient representation of Black, Indigenous, and People of Color [BIPOC] across disaggregated categories) or exclusive to a single type of discrimination (*e.g.,* race-based), which may contribute to conflicting results across studies and a narrow understanding of how discrimination affects preconception health. For example, most studies of discrimination in North America are restricted to U.S. adults (Blendon & Casey, 2019; Borrell et al., 2006, 2010; Brown et al., 2006; Canady et al., 2008; Ertel et al., 2012; Gaston et al., 2020; Gee et al., 2008; Lewis et al., 2012; Mujahid et al., 2011; Puhl et al., 2008; Rosenberg et al., 2002; Sutin et al., 2016), and the few studies that investigate discrimination among Canadian adults are limited to immigrant and Indigenous populations (Cotter, 2022; Godley, 2018; Hyman et al., 2019; Mooten, 2021; Nangia, 2013; Noh et al., 1999; Siddiqi et al., 2017; Statistics Canada, 2024). Addressing these gaps in the literature would improve our understanding of pathways through which discrimination affects preconception health among pregnancy planners.

Using questionnaire data from Pregnancy Study Online (PRESTO),

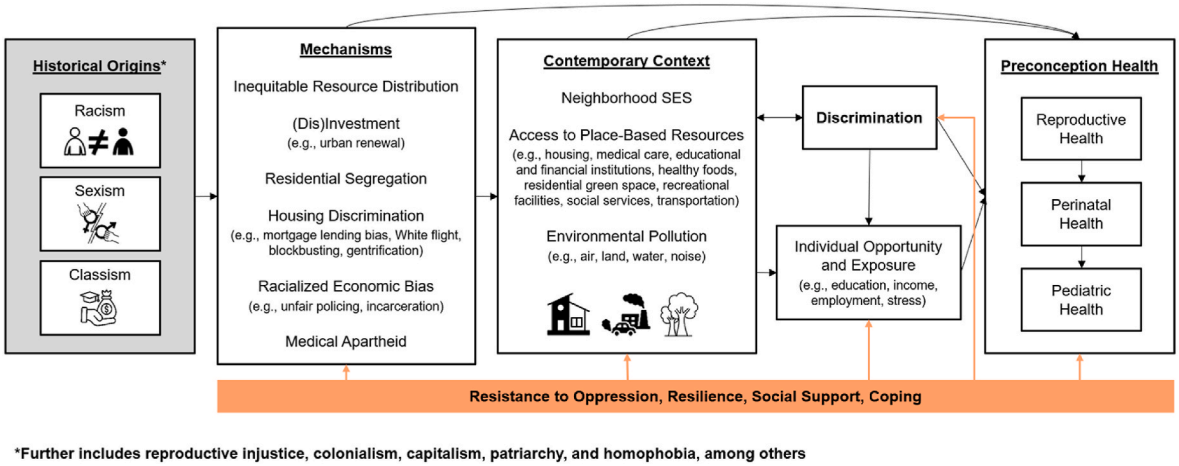

Fig. 1. Conceptual diagram for studying discrimination and its implications for preconception health
Examples of historical origins include immigration (1600s-), slavery (1610s–1860s), the Eugenics movement (1883-), racial zoning (1910s-1917), coercive sterilization with and without legislation (1920s–1970s), racially restrictive covenants (1920s-1948), redlining (1930s), Negro Project (1939–1942), and Mississippi appendectomy (1961). This diagram was informed in part by Krieger N. Methods for the scientific study of discrimination and health: An ecosocial approach. Am J Public Health. 2012; 102 (5):936–44. doi: 10.2105/AJPH. 2011.300544 and Krieger N, Van Wye G, Huynh M, Waterman PD, Maduro G, Li W, Gwynn RC, Barbot O, & Bassett MT. Structural racism, historical redlining, and risk of preterm birth in New York City, 2013–2017. Am J Public Health. 2020; 110 (7):1046–1053. doi: 10.2105/AJPH. 2020.305656.

we characterized experiences, attributions, and responses to discrimination among pregnancy planners in the U.S. and Canada. Documenting experiences of, attributions for, and responses to discrimination during the preconception period can facilitate further study of their health impacts.

2. Materials and methods

2.1. Study population

Data were drawn from PRESTO, an ongoing internet-based preconception cohort study of pregnancy planners that began in June 2013 (Wise et al., 2015). Participants were recruited using online advertisements, posted flyers in community health centers or shops, and word of mouth (Wise et al., 2015). Eligible participants were assigned female at birth, aged 21–45 years, residents of the U.S. or Canada, in a relationship with a male partner, and trying to conceive without using contraception or fertility treatment at enrollment. Participants completed a detailed baseline questionnaire at enrollment and bimonthly follow-up questionnaires (~8 weeks) for 12 months or until pregnant. In July 2019, we launched a supplemental Life Course Experiences Questionnaire (LCEQ) on stressful events, access to economic resources, coping strategies, and factors affecting resilience. We invited newly enrolled participants to complete the LCEQ 30 days after enrollment. We also invited all former PRESTO participants (who enrolled from June 2013–July 2019) to complete the LCEQ retrospectively. Participants were informed that the LCEQ was optional and could be completed at any time. PRESTO was approved by the Institutional Review Board at Boston University Medical Campus, and informed consent was obtained online from each participant.

2.2. Assessment of discrimination

On the LCEQ, we asked participants about their experiences of discrimination across the life course. We ascertained **childhood racial discrimination** using a single item from the Philadelphia Urban ACE Survey, an expanded version of the adverse childhood experience (ACE) scale, because it includes racial discrimination and neighborhood/community-level stressors (Cronholm et al., 2015; Wade et al., 2014). The item on childhood racial discrimination was phrased as follows: "Before you were 18 years of age, how often did you feel that you were treated badly or unfairly because of your race or ethnicity?" Response options included "none of the time," "some of the time," "most of the time," "all the time," and "prefer not to answer."

We assessed **everyday discrimination in adulthood** using Williams' Everyday Discrimination scale (Short Version) (Forman, 1997; Sternthal et al., 2011; Williams et al., 1997). These items queried about the frequency of five experiences in participants' day-to-day lives (prior to enrollment in PRESTO): "you were treated with less courtesy or respect than other people" (hereafter "disrespect"), "you received poorer service than other people at restaurants or stores" (hereafter "poor service"), "people acted as if they thought you were not smart" (hereafter "not smart"), "people acted as if they were afraid of you" (hereafter "afraid of you"), and "you were threatened or harassed" (hereafter "harassed"). Response options were "never," "less than once a year," "a few times a year," "a few times a month," "at least once a week," and "almost every day."

We assessed **lifetime discrimination** using an abbreviated inventory of Williams' Major Experiences of Discrimination scale (Forman, 1997; Williams et al., 1997). Six questions asked participants if they had "ever been treated unfairly" in various situations or settings: "on the job (hiring, promotion, firing)," "in housing (renting, buying, mortgage)," "by the police (stopped, searched, threatened)," "in the courts," "at school," or while "getting medical care." Response options for each of these questions were "yes" or "no."

2.3. Assessment of attributions and response to discrimination

If participants reported any everyday or lifetime discrimination, a single follow-up question asked them to report what they believed were the main reason(s) for their experiences (Krieger et al., 2005; Williams et al., 1997). Response options included "race or ethnicity," "sex or gender," "education or income level," and "other." Participants could select all that applied and specify in an open-text field what they meant by "other."

Among participants responding affirmatively to everyday or lifetime discrimination, we also asked about how they reacted when they "felt they were treated unfairly" using two questions from Krieger et al. (Krieger, 1990; Krieger et al., 2005) (choose one from each set of response options): "keep it to yourself' (hereafter "quiet") or "talk to other people about it" (hereafter "talk") and "accept it as a fact of life" (hereafter "accept") or "try to do something about it" (hereafter "act").

2.4. Assessment of other characteristics

On the baseline questionnaire, participants reported their race and ethnicity. For race, participants were asked to select all that applied from the following: "White," "Black or African American," "Asian" (please specify: "Indian," "Chinese," "Japanese," "Korean," "Vietnamese," "Filipino," "Other"), "American Indian or Alaskan Native," "Middle Eastern or North African," "Native Hawaiian or Pacific Islander," "some other race" (please specify), "don't know," and "refused." Participants were then asked if they were of Hispanic origin or descent, such as Mexican, Puerto Rican, Cuban, or other Spanish background with response options as "yes," "no," "don't know," and "refused." Starting August 2021, participants could provide additional details about their race and ethnicity in an open-text field, if desired. We categorized race and ethnicity as follows: non-Hispanic White; non-Hispanic Black; non-Hispanic Asian; non-Hispanic American Indian, Alaskan Native, or Indigenous (AI/AN); non-Hispanic Multiracial; non-Hispanic Other Race (defined as Middle Eastern or North African; Native Hawaiian or Pacific Islander; some other race; unknown race); Hispanic White; Hispanic Black; Hispanic Multiracial; and Hispanic Other Race (defined as Asian; AI/AN; Middle Eastern or North African; Native Hawaiian or Pacific Islander; some other race; unknown race (Flanagin et al., 2021)).

Participants also reported their residential address, sociodemographics (*e.g.,* age, marital status, mother's age at birth, highest level of parental education, attained education, annual household income, employment status) and lifestyle (*e.g.,* alcoholic beverages, current smoking status, sleep duration, sleep trouble, prenatal vitamin or multivitamin use on a regular basis), anthropometrics (current weight and height), medical (*e.g.,* perceived stress using the 10-item Perceived Stress Scale [PSS] (Cohen et al., 1983), depressive symptoms via the Major Depression Inventory [MDI] (Bech, 1997), probable diagnosis of post-traumatic stress disorder [PTSD], physician-diagnosed depression or anxiety) and reproductive histories (*e.g.,* age at menarche, cycle regularity, menstrual cycle length, gravidity, previous live births, last method of contraception [*e.g.,* oral contraceptives, other hormonal contraceptives, barrier methods, withdrawal, rhythm, and/or other methods], intercourse frequency, doing anything to improve chances of conception [*e.g.,* timing intercourse, charting menses, using an ovulation predictor kit, checking basal body temperature, monitoring changes in position of cervix]). We ascertained infertility history by asking participants if they "ever tried to conceive for ≥12 months without becoming pregnant" and history of spontaneous abortion by asking participants if they "ever had a miscarriage (including chemical pregnancy)." Access to private health insurance was defined as being "purchased directly from the insurer" or "through my or my partners' employer or workplace." Non-private health insurance included "health insurance accessed through a government program," "a free clinic," "health department," or "purchases made completely out-of-pocket." We calculated body mass

index using weight (kilograms) divided by height (meters) squared.

On the LCEQ, participants reported financial hardship across various life stages (child: ≤11 years; teen: 12–17 years; adult: ≥18 years; in the past year) (Krieger & Chen, 1996; Wise et al., 2002): "not having enough money to pay for food, rent, or mortgage," "having to borrow money to pay for medical expenses," or "receiving public assistance or welfare," each with response options of "yes," "no," or "prefer not to answer." We defined childhood financial hardship as any experience before age 18.

2.5. Statistical analysis

From June 2013 through October 2024, 21,585 eligible participants completed the baseline questionnaire. We restricted analyses to 10,460 participants who completed the LCEQ, which elicited data on discrimination (Supplementary Table S1). Among them, 4084 (39 %) participants completed the LCEQ retrospectively (defined as >60 days after enrollment) and 6376 (61 %) participants completed the LCEQ prospectively (defined as within 60 days of enrollment).

We multiply imputed data using fully conditional specification methods, assuming data were missing conditional on observed data (Liu & De, 2015; Zhou et al., 2001). Missingness for childhood racial discrimination was 3.2 % while everyday and lifetime discrimination was 1.1 %. Missingness for other covariates ranged from <0.1 % (intercourse frequency) to 18.9 % (health insurance; added to the baseline questionnaire in January 2018). There were no missing values for age, education, or geographic region of residence (Supplementary Table S2).

Given that exposure to everyday discrimination was ascertained as a frequency, we created binary variables for each type of everyday discrimination categorized as any frequency to that specific type of discrimination vs. none (*i.e.,* disrespect, poor service, not smart, afraid of you, harassed). We also created a summary variable for everyday discrimination by assigning a score to each Likert scale: 0 = never, 1 = less than once a year, 2 = a few times a year, 3 = a few times a month, 4 = at least once a week, and 5 = almost every day, summing across each type of discrimination (range: 0–25) and divided into five categories based on the distribution in the cohort: none (score 0), low (score 1–2), medium (score 3–4), high (score 5–6), and very high (score ≥7) everyday discrimination. For attributions specified by participants in an open-text field, we reviewed and classified responses for commonalities (Nowell et al., 2017). Commonly-reported responses included age, appearance (*e.g.,* clothing, hair), sexual orientation, gender expression, body size (weight or height), religion, nationality/language/accent, and health status (*e.g.,* disability status). For responses to discrimination ("response types"), we created a summary variable consistent with previous studies (Ertel et al., 2012; Krieger, 1990; Krieger et al., 2005; Krieger & Sidney, 1996; Stancil et al., 2000): quiet and accept (defined as "keep it to yourself" and "accept it as a fact of life"), talk and accept (defined as "talk to other people about it" and "accept it as a fact of life"), quiet and act (defined as "keep it to yourself" and "try to do something about it"), and talk and act (defined as "talk to other people about it" and "try to do something about it").

We conducted a descriptive analysis to characterize patterns of discriminatory experiences, attributions, and response types. Specifically, we described: 1) characteristics of the cohort overall and in relation to discrimination (Table 1), 2) discrimination, attribution, and response by selected variables (*e.g.,* race and ethnicity, attained education, geographic region of residence in adulthood) (Fig. 2a–c; Fig. 3a–c; Fig. 4a–c; Supplementary Tables S3-S5), 3) race and ethnicity, discrimination, and response by attribution within strata of participants reporting one or multiple reasons (Supplementary Tables S6), and 4) response by attribution across racial and ethnic groups (Supplementary Table S7). All analyses were performed in SAS version 9.4 (SAS Institute Inc., 2013).

3. Results

3.1. Characteristics overall and in relation to discrimination

In total, 83.8 % of participants identified as non-Hispanic White, 88.5 % were married, 50.4 % had ≥17 years education (*e.g.,* college degree plus some graduate-level education), and 86.4 % resided in the U.S. (Table 1). Additionally, 24.1 % reported age at menarche <12 years, 30.8 % were parous, 11.8 % had infertility history, and 24.7 % had a history of spontaneous abortion.

Nearly 11 % of participants reported some frequency of racial discrimination during childhood (Table 1), with BIPOC participants reporting more frequent exposure than non-Hispanic White participants (some, most, or all the time: 45.2 % vs. 4.4 %; Fig. 2a). Participants reporting childhood racial discrimination all the time were less likely to be married (69.4 % vs. 89.2 %), but more likely to have lower attained education (≤12 years: 19.4 % vs. 2.8 %), lower household income (<$50,000: 30.6 % vs. 11.5 %), and infertility history (25 % vs. 10.8 %) than those reporting childhood racial discrimination none of the time (Table 1). Childhood financial hardship was also more commonly reported among participants with childhood racial discrimination all the time: not having enough money (25 % vs. 19.3 %) and receipt of public assistance or welfare (19.4 % vs. 13.6 %).

Similar characteristic profiles emerged for participants reporting everyday and lifetime discrimination (Table 1). Participants who reported very high scores of everyday discrimination (score ≥7), compared with those who reported no everyday discrimination (score 0), were more likely to have received public assistance or welfare in childhood (24.8 % vs. 10.3 %). Participants who reported ≥3 events of lifetime discrimination were more likely than those who reported no lifetime discrimination to have lower attained education (≤12 years: 7.7 % vs. 2.4 %), age at menarche <12 years (31.6 % vs. 21.9 %), and receipt of public assistance or welfare in childhood (31.1 % vs. 10.4 %).

3.2. Everyday discrimination

Seventeen percent of participants reported very high scores of everyday discrimination (score ≥7), while 80.3 % reported ever experiencing everyday discrimination (Supplementary Table S3). The most prevalent types of everyday discrimination were being perceived as not smart (63.4 %) and being treated with disrespect (62.6 %). There was also a relatively high prevalence of participants who reported being harassed (52.1 %), receiving poorer service than others (33.9 %), and others being afraid of them (15.2 %). BIPOC participants were often more likely to report experiencing everyday discrimination compared with non-Hispanic White participants (range: 75.0–92.8 % vs. 79.6 %; Fig. 2b; Supplementary Table S3). As an example, BIPOC participants were more likely to report receiving poor service compared with non-Hispanic White participants (range: 40.7–70.5 % vs. 30.4 %). When we cross-classified race and ethnicity with education, non-Hispanic Black participants with ≥16 years education generally reported a higher prevalence of everyday discrimination compared to non-Hispanic Black participants with <16 years education (Supplementary Table S4). Everyday experiences across categories of attained education varied, with the highest prevalence often observed among participants with ≤12 years education (Fig. 3b; Supplementary Table S5). Everyday discrimination by geographic region of residence in adulthood varied slightly, with the highest prevalence observed among participants who resided in Western U.S. (82.7 %), followed by Canada (82.5 %) and Southern U.S. (80 %; Fig. 4b; Supplementary Table S5).

3.3. Lifetime discrimination

The prevalence of ≥1 and ≥3 events of lifetime discrimination was 47.2 and 10.6 %, respectively. Participants most often reported discrimination on the job (33.9 %), at school (21.8 %), and while

Table 1
Characteristics by experiences of discrimination across the life course, PRESTO 2013–2024.

	All	Childhood Racial Discrimination				Everyday Discrimination in Adulthood[1]					Lifetime Discrimination[2]			
		None of the time	Some of the time	Most of the time	All the time	None (Score 0)	Low (Score 1–2)	Medium (Score 3–4)	High (Score 5–6)	Very high (Score ≥7)	0 events	1 event	2 events	≥3 events
Number (%)	10,460	9311 (89.0)	1031 (9.9)	82 (0.8)	36 (0.3)	2059 (19.7)	2115 (20.2)	2513 (24.0)	1960 (18.7)	1813 (17.3)	5523 (52.8)	2428 (23.2)	1398 (13.4)	1111 (10.6)
Age (years), mean	30.9	30.9	31.4	32.2	32.9	30.7	31.0	30.8	31.3	30.9	30.7	31.2	31.0	31.6
Body mass index (kg/m^2), mean	27.4	27.2	28.4	31.1	28.7	27.1	26.2	27.0	27.8	29.2	26.4	27.6	28.9	30.2
Married, %	88.5	89.2	84.2	69.5	69.4	90.7	90.9	90.3	87.5	82.0	91.0	89.0	86.3	78.0
Race and ethnicity, %														
Non-Hispanic White	83.8	90.0	34.5	18.3	33.3	87.0	86.5	85.6	82.1	76.6	87.1	84.8	78.3	72.4
Non-Hispanic Black	2.7	1.3	13.2	18.3	16.7	2.2	1.4	2.1	2.4	5.7	1.7	2.1	4.4	6.7
Non-Hispanic Asian	2.6	1.1	14.7	12.2	16.7	1.9	2.4	2.8	3.0	2.8	2.4	2.5	3.8	2.1
Non-Hispanic AI/AN	0.2	0.1	0.9	2.4	2.8	0.2	0.1	0.0	0.4	0.4	0.1	0.2	0.5	0.5
Non-Hispanic Multiracial	3.7	2.5	12.8	22.0	11.1	3.1	3.1	3.1	4.4	5.0	3.0	3.4	4.2	7.0
Non-Hispanic Other Race[3]	0.6	0.4	1.8	3.7	2.8	0.5	0.4	0.6	0.6	0.8	0.4	0.7	0.7	0.9
Hispanic White	4.4	3.5	12.2	6.1	8.3	3.8	4.4	3.9	4.7	5.2	3.8	4.6	5.2	5.4
Hispanic Black	0.2	0.1	0.9	2.4	2.8	0.2	0.1	0.2	0.2	0.3	0.2	0.1	0.1	0.6
Hispanic Multiracial	0.8	0.4	3.7	9.8	5.6	0.3	0.6	0.6	1.1	1.5	0.5	0.8	1.0	2.1
Hispanic Other Race[4]	1.2	0.7	5.4	4.9	0.0	0.8	1.1	1.2	1.3	1.7	0.9	1.0	1.9	2.4
Geographic region of residence at birth, %														
Northeastern U.S.	22.7	23.3	18.2	14.6	8.3	24.2	23.4	22.0	22.5	21.4	24.0	22.4	20.0	19.9
Southern U.S.	18.1	17.5	22.2	26.8	33.3	17.2	18.8	18.5	18.3	17.5	17.1	18.4	18.5	22.0
Midwestern U.S.	24.2	25.2	16.1	19.5	16.7	27.0	22.6	23.4	23.5	24.8	25.6	23.0	22.4	22.0
Western U.S.	16.2	15.7	21.6	12.2	11.1	14.3	16.7	16.3	16.0	17.8	15.8	17.1	15.6	17.4
Canada	12.5	13.2	7.0	7.3	8.3	11.2	11.6	13.4	13.4	12.6	12.0	12.4	15.2	11.8
Other countries	6.3	5.2	14.8	19.5	22.2	6.0	6.9	6.5	6.3	5.9	5.5	6.7	8.3	7.0
Geographic region of residence at age 15, %														
Northeastern U.S.	22.5	23.0	18.0	17.1	13.9	23.6	22.6	22.6	22.5	20.8	23.8	22.5	19.7	19.3
Southern U.S.	19.7	18.8	26.3	29.3	33.3	19.8	20.2	18.8	19.6	20.3	18.7	19.7	20.0	24.0
Midwestern U.S.	25.0	25.7	19.5	18.3	16.7	26.9	23.8	24.1	25.0	25.3	26.4	23.7	23.0	23.2
Western U.S.	16.0	15.4	21.7	17.1	13.9	13.7	16.6	16.9	15.4	17.4	15.4	17.2	15.8	16.5
Canada	12.8	13.2	8.9	11.0	8.3	11.8	12.0	13.7	13.6	12.5	12.2	12.5	15.5	12.8
Other countries	4.2	3.9	5.5	7.3	13.9	4.3	4.8	3.9	4.0	3.7	3.5	4.4	6.2	4.2
Geographic region of residence in adulthood, %														
Northeastern U.S.	21.7	21.8	21.1	11.0	19.4	23.4	22.3	21.0	21.3	20.2	22.9	21.3	21.0	17.3
Southern U.S.	24.0	23.1	30.2	41.5	38.9	24.4	24.1	24.2	23.3	24.1	22.7	24.7	24.0	29.2
Midwestern U.S.	22.4	23.2	15.8	19.5	16.7	24.0	20.8	21.5	22.4	23.7	24.2	20.3	19.7	21.4
Western U.S.	18.3	17.9	22.6	15.9	13.9	16.1	19.8	18.8	18.8	18.1	17.8	20.1	18.1	17.3
Canada	13.6	14.0	10.3	12.2	11.1	12.0	13.1	14.5	14.2	14.0	12.4	13.6	17.1	14.9
Mother's age at birth, mean	28.1	28.2	27.3	26.8	26.0	28.1	28.7	28.3	28.1	27.3	28.5	28.2	27.5	27.0
Highest level of parental education (years), %														
≤12 years	12.3	11.5	18.5	19.5	25.0	12.6	9.8	11.3	12.9	15.5	10.9	11.0	15.8	17.7
13–15 years	23.2	23.1	24.0	28.1	16.7	22.2	21.6	21.1	25.4	26.8	21.6	23.2	25.4	28.3
16 years	30.5	30.8	26.9	28.1	41.7	31.4	30.1	31.3	28.5	30.7	31.1	30.7	29.5	27.9
≥17 years	34.1	34.6	30.7	24.4	16.7	33.8	38.5	36.4	33.2	27.1	36.5	35.1	29.3	26.1
Attained education (years), mean	16.1	16.1	15.9	15.5	15.3	16.1	16.3	16.2	16.1	15.7	16.2	16.2	15.9	15.6
Attained education (years), %														
≤12 years	3.2	2.8	5.6	9.8	19.4	3.3	1.6	2.4	3.2	6.1	2.4	2.4	4.3	7.7
13–15 years	13.6	13.2	16.6	24.4	16.7	13.6	9.9	11.7	12.7	21.6	10.3	12.5	20.0	24.8
16 years	32.7	33.1	30.1	32.9	25.0	34.1	31.7	32.8	34.0	30.9	33.2	34.0	31.2	29.4

(*continued on next page*)

Table 1 (*continued*)

	All	Childhood Racial Discrimination				Everyday Discrimination in Adulthood[1]					Lifetime Discrimination[2]			
		None of the time	Some of the time	Most of the time	All the time	None (Score 0)	Low (Score 1–2)	Medium (Score 3–4)	High (Score 5–6)	Very high (Score ≥7)	0 events	1 event	2 events	≥3 events
≥17 years	50.4	50.9	47.7	32.9	38.9	49.0	56.8	53.1	50.1	41.4	54.1	51.2	44.5	38.1
Household income (U.S. dollars/year), mean	115,244	116,070	111,448	80,616	89,333	116,005	123,654	118,156	115,136	100,651	122,346	116,167	104,051	92,008
Household income (U.S. dollars/year), %														
<$50,000	12.2	11.5	15.3	37.8	30.6	10.8	9.0	9.7	12.5	20.3	8.9	10.4	16.7	26.6
$50,000-$99,999	30.5	30.3	31.5	31.7	41.7	30.7	26.2	31.2	30.6	34.3	28.2	32.0	34.6	33.6
$100,000-$149,000	28.8	29.4	25.0	17.1	5.6	30.3	31.4	29.1	28.0	24.3	30.1	29.4	26.7	23.1
≥$150,000	28.6	28.8	28.1	13.4	22.2	28.2	33.4	30.0	28.9	21.2	32.9	28.2	22.0	16.7
Unemployed, %	11.4	11.2	12.2	17.1	22.2	11.7	10.3	10.5	11.0	14.2	9.4	9.8	14.5	21.1
Alcoholic beverages/week, mean	2.7	2.8	2.2	2.1	1.2	2.6	2.8	2.9	2.7	2.6	2.8	2.9	2.6	2.3
≥7 Alcoholic beverages/week, %	11.4	11.9	8.1	6.1	0.0	10.3	11.6	12.3	11.4	11.1	11.4	12.6	10.7	9.6
≥14 Alcoholic beverages/week, %	1.9	2.0	1.5	0.0	0.0	1.6	2.1	2.1	1.7	2.3	1.7	2.2	2.0	2.7
Current smoker, %	4.5	4.2	6.3	13.4	2.8	3.8	2.7	3.7	4.4	8.3	3.2	4.2	5.1	10.4
Sleep duration <7 h/night, %	20.5	19.4	28.9	32.9	38.9	16.0	15.1	18.5	23.0	31.9	16.4	20.5	26.2	33.6
Frequency of sleep trouble in the past 2 weeks, %														
Never	35.6	36.4	29.2	28.1	41.7	45.4	40.4	35.5	31.4	23.6	40.9	33.9	28.9	21.5
<50 % of time	46.6	46.9	45.8	39.0	22.2	42.4	47.0	49.1	48.3	45.7	46.2	49.0	46.9	43.0
>50 % of time	17.8	16.8	25.0	32.9	36.1	12.2	12.6	15.4	20.3	30.8	12.9	17.2	24.2	35.5
High perceived stress (PSS score: ≥25), %	8.1	7.5	12.9	20.7	16.7	4.1	4.9	7.3	9.3	16.3	5.1	8.3	11.5	18.6
Severe depressive symptoms (MDI score: ≥30), %	4.0	3.4	7.9	11.0	27.8	1.8	2.1	2.6	4.0	10.4	1.9	3.0	6.2	13.5
Probable diagnosis of PTSD, %	4.7	4.4	6.3	15.9	11.1	2.3	2.7	4.1	5.8	9.4	2.0	4.5	7.2	14.9
Diagnosed with depression, %	27.0	26.7	28.6	35.4	30.6	20.4	24.0	25.3	29.5	37.5	21.9	26.8	33.8	44.0
Diagnosed with anxiety, %	29.8	29.7	29.2	43.9	16.7	24.9	26.1	28.0	33.2	38.3	25.2	30.2	36.6	43.0
Age at menarche <12 years, %	24.1	23.1	32.2	29.3	30.6	21.3	20.4	23.7	26.8	29.3	21.9	24.6	26.0	31.6
Irregular cycles, %	14.1	13.7	16.7	14.6	30.6	12.8	11.9	13.0	14.9	18.8	12.1	13.7	16.6	21.6
Infrequent menstrual cycles (>38 days), %	3.6	3.5	4.6	6.1	8.3	3.9	3.5	3.1	4.1	3.8	3.6	3.2	4.1	4.2
Frequent menstrual cycles (<24 days), %	1.7	1.6	2.0	6.1	5.6	1.3	1.6	1.8	1.2	2.5	1.5	1.7	2.0	2.2
Gravid, %	48.2	47.6	52.8	53.7	58.3	50.4	45.4	46.0	47.8	52.3	45.7	46.1	51.7	60.7
Parous, %	30.8	30.6	32.3	29.3	36.1	34.4	29.4	29.5	28.9	32.1	29.4	30.3	31.6	38.3
Number of previous births, %														
0	69.2	69.4	67.7	70.7	63.9	65.6	70.6	70.5	71.1	67.9	70.7	69.7	68.5	61.8
1	22.1	22.2	21.6	9.8	16.7	23.2	21.8	23.2	20.5	21.2	22.1	21.9	22.3	21.8
≥2	8.7	8.4	10.7	19.5	19.4	11.2	7.6	6.4	8.5	10.9	7.2	8.4	9.2	16.5
Last method of contraception: Hormonal[5], %	33.0	32.8	34.0	37.8	27.8	33.2	31.5	33.4	31.8	35.0	33.0	33.7	33.0	31.1
Prenatal vitamin or multivitamin use, %	83.4	84.2	77.9	64.6	69.4	83.2	84.7	84.6	84.2	79.7	85.7	83.2	81.3	75.3
Intercourse frequency, %														
<1 time/week	24.4	24.3	26.4	20.7	19.4	22.9	25.2	25.9	24.2	23.4	23.5	25.8	26.0	24.2
≥4 times/week	12.0	11.6	13.6	18.3	30.6	12.3	11.1	10.8	11.4	14.8	11.4	11.0	12.5	16.2
Doing something to improve chances of conception, %	81.2	81.5	79.4	72.0	72.2	81.4	82.1	82.3	81.2	78.3	81.4	81.2	82.0	79.0
History of infertility, %	11.8	10.8	19.3	28.1	25.0	10.8	8.8	9.8	13.2	17.7	9.0	11.2	15.4	22.1
History of spontaneous abortion, %	24.7	24.2	28.7	32.9	27.8	24.2	22.1	23.1	25.9	29.3	22.3	23.2	28.8	35.0
Private health insurance, %	85.2	85.5	84.0	72.0	75.0	85.5	88.4	87.1	85.0	79.0	87.8	86.8	80.3	75.3
≥1 visit to a primary care provider in the past year, %	87.2	87.1	88.1	86.6	94.4	86.0	86.8	87.8	88.0	87.6	86.5	87.3	89.6	88.1

(*continued on next page*)

Table 1 (*continued*)

	All	Childhood Racial Discrimination				Everyday Discrimination in Adulthood[1]				Lifetime Discrimination[2]			
		None of the time	Some of the time	Most of the time	All the time	None (Score 0)	Low (Score 1–2)	Medium (Score 3–4)	High (Score 5–6)	Very high (Score ≥7)	0 events	1 event	2 events	≥3 events
Difficulty paying for food, rent, or mortgage in childhood, %	20.8	19.3	32.4	50.0	25.0	12.6	15.4	18.9	24.9	34.9	14.1	20.6	30.3	42.6
Had to borrow money to pay for medical expenses in childhood, %	9.1	8.3	14.7	25.6	13.9	5.2	6.0	7.8	11.0	16.9	5.4	9.2	12.5	23.0
Received public assistance or welfare in childhood, %	15.2	13.6	28.0	31.7	19.4	10.3	10.8	13.8	18.0	24.8	10.4	15.0	22.0	31.1
<3 cycles of pregnancy attempt time at enrollment, %	62.2	62.9	56.8	48.8	50.0	63.2	65.4	62.2	61.8	57.5	64.0	62.4	59.6	55.5

Note: Column percentages are displayed; Includes multiply imputed data; AI/AN = American Indian, Alaskan Native, or Indigenous; MDI = Major Depression Inventory; PRESTO = Pregnancy Study Online; PSS = Perceived Stress Scale; PTSD = post-traumatic stress disorder; [1]Summary variable for everyday discrimination (**disrespect, poor service, not smart, afraid of you, harassed**) created after assigning a score to each Likert scale and summing across (where 0 = "never," 1 = "less than once a year," 2 = "a few times a year," 3 = "a few times a month," 4 = "at least once a week," and 5 = "almost every day"); [2]Includes **on the job** (hiring, promotion, firing), **in housing** (renting, buying, mortgage), **by police** (stopped, searched, threatened), **in the courts, at school,** or **getting medical care**; [3]Includes Middle Eastern or North African; Native Hawaiian or Pacific Islander; some other race; unknown race; [4]Includes Asian; AI/AN (American Indian, Alaskan Native, or Indigenous); Middle Eastern or North African; Native Hawaiian or Pacific Islander; some other race; unknown race; [5]Defined as oral contraceptive pill, contraceptive patch, injectable (*e.g.,* Depo-Provera), vaginal ring, implantable rods, or hormone-containing intrauterine device (*e.g.,* Mirena, Progestasert)

receiving medical care (15.9 %; Supplementary Table S3). Discrimination in housing, when interacting with police, and while in the courts were reported less frequently.

We found lifetime discrimination was elevated across BIPOC participants (Fig. 2c; Supplementary Table S3). The prevalence of housing discrimination among non-Hispanic Black, non-Hispanic AI/AN, and Hispanic Black participants was 18 %, 28.6 %, and 30 %, respectively. The prevalence of police-related discrimination was also highest for these same racial and ethnic groups. The distribution of discrimination varied when we cross-classified race and ethnicity with education (Supplementary Table S4). For example, non-Hispanic Black participants with ≥16 years education reported a higher prevalence of discrimination on the job (47.3 % vs. 44 %), by police (29.6 % vs. 22 %), at school (41.4 % vs. 29.4 %), and while receiving medical care (27.2 % vs. 25.7 %) compared to non-Hispanic Black participants with <16 years education.

High prevalence of lifetime discrimination varied by attained education and geographic region of residence in adulthood (Supplementary Table S5; Fig. 3c; Fig. 4c). Nearly half of participants with 13–15 years education reported job-related discrimination (44.8 %). Participants with ≤12 years education were more likely to report discrimination at school (37.7 % vs. 18.7 %) and when getting medical care (28.1 % vs. 13.7 %) compared to participants with ≥17 years education. Participants who resided in Canada (37.3 %), Southern U.S. (36.5 %), and Western U.S. (35.1 %) were most likely to report discrimination on the job. Participants who resided in Canada were also more likely to report housing-related discrimination (9.2 %) compared to all U.S. regions (range: 5.3–6.9 %), but less likely to report discrimination by police (4.6 % vs. range: 5.9–8 %). Within the U.S., police-related discrimination was most frequently reported in the Southern region, followed by the Western region. Regarding the number of experiences, participants in Canada or Southern U.S. were most burdened (51.7 % and 50.1 %, respectively).

3.4. Attributions for discrimination

Non-Hispanic Black and Hispanic Black participants most frequently attributed their experiences of discrimination to "race or ethnicity" (87.7 % and 80 %, respectively; Supplementary Table S3). Non-Hispanic Asian, non-Hispanic AI/AN, and Hispanic Other Race participants also attributed their experiences to "race or ethnicity" (range: 57.9–81.5 %). All other racial and ethnic groups most frequently reported "sex or gender" (range: 75.9–82.4 %). "Sex or gender" was the most common attribution reported across all subpopulations defined by attained education and geographic region of residence in adulthood (Supplementary Table S5). The percentage of participants attributing discrimination to "education or income level" decreased with increasing education, ranging from 43.8 % among participants with ≤12 years education to 12.8 % among participants with ≥17 years education. Other attributions included discrimination based on age (15.2 %), appearance (12.1 %), and body size (10.1 %). Of note, participants with ≤12 years education were less likely to report discrimination due to age compared to those with ≥17 years education (8 % vs. 16.4 %).

3.5. Response to discrimination

The most common responses to discrimination were "talk to other people about it" (57.7 %) and "accept it as a fact of life" (71.3 %; Supplementary Table S3). When responses were cross-classified, we observed participants more often reported being passive (quiet and accept: 37.4 %) instead of moderately involved (talk and accept: 33.8 %; quiet and act: 4.8 %) or engaged (talk and act: 23.9 %) following experiences of discrimination. Passive response persisted as the most prevalent response to discrimination regardless of attribution, including whether one or multiple attributions were reported (Supplementary Table S6).

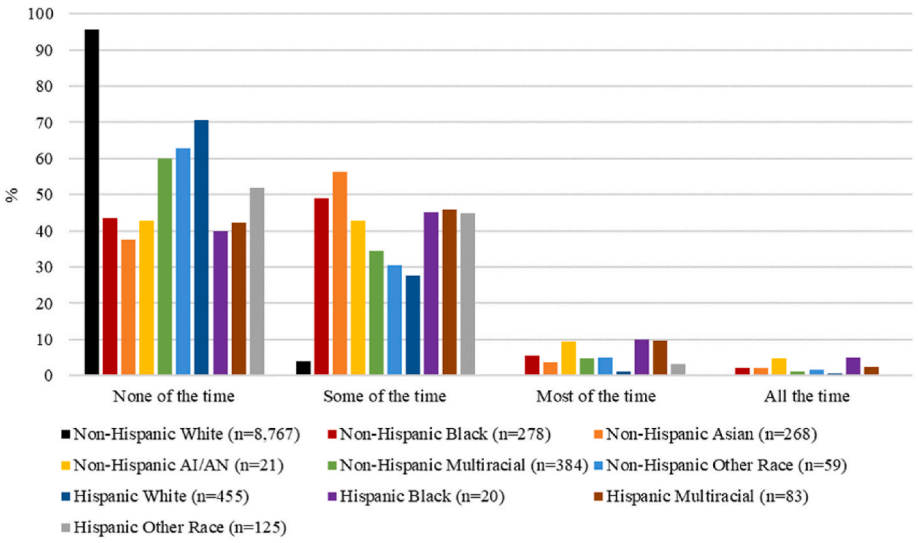

Fig. 2a. Distribution of childhood racial discrimination stratified by race and ethnicity, PRESTO 2013–2024

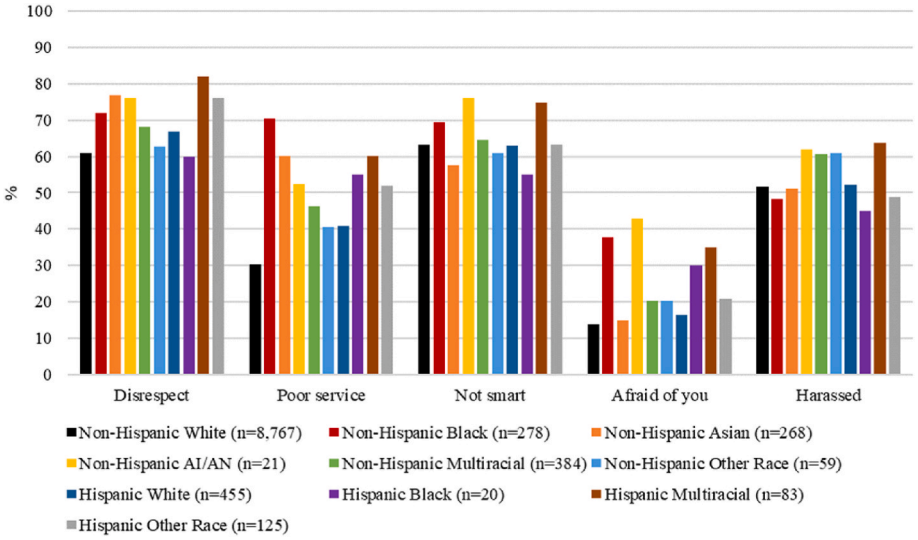

Fig. 2b. Distribution of ever experiencing everyday discrimination in adulthood[1] stratified by race and ethnicity, PRESTO 2013–2024

When we explored the extent to which response types may have been influenced by attribution across racial and ethnic groups, we observed more engaged response types corresponding to selected attribution(s) (Supplementary Table S7). For instance, non-Hispanic Black participants reporting "sex or gender" as an attribution tended to accept the experiences as a fact of life (*i.e.,* quiet and accept, talk and accept). However, non-Hispanic Black participants most engaged ("talk and act") when "other" was their reported attribution. In contrast, non-Hispanic Multiracial participants tended to talk to others and accept the experiences ("talk and accept") regardless of the attribution. The most common response among Hispanic White participants citing "other" as their attribution was to talk to other people and accept the discriminatory experiences as a fact of life ("talk and accept").

4. Discussion

In this descriptive study, we characterized experiences, attributions, and responses to discrimination among U.S. and Canadian pregnancy planners. Given that the preconception period is a critical window during which multiple stressors (such as discrimination (Williams, Lawrence, Davis, et al., 2019)) can have a deleterious effect on reproductive, perinatal, and pediatric health (Harper et al., 2023; Harville et al., 2019; Mumford et al., 2014; Robbins et al., 2014; Stephenson et al., 2014), descriptive data assessing these patterns fill an important gap in the literature. Our results are generally consistent with other U.S.-based all-female cohorts reporting discrimination using comparable measures (Brown et al., 2006; Canady et al., 2008; Ertel et al., 2012; Gaston et al., 2020; Lewis et al., 2012; Rosenberg et al., 2002), and findings from Statistics Canada (Cotter, 2022; Statistics Canada, 2024). However, this study is the first to describe such experiences in a population planning pregnancy.

Discrimination, including racism and other forms (*e.g.,* sexism, classism), persists because of exclusion and differential treatment (Fleras, 2011; Paradies et al., 2015), leading to inequality. Exposure to discrimination at any life stage can reduce access to timely and quality societal resources (*e.g.,* education, employment, medical care) and increase allostatic load, adverse psychological processes, and participation in unhealthy behaviors because of self-regulation or coping (Paradies et al., 2015; Williams, Lawrence, & Davis, 2019; Williams, Lawrence, Davis, et al., 2019). Discrimination has the potential to trigger a cascade of losses (*e.g.,* job-related discrimination could lead to early job loss, subsequent financial hardship, followed by delayed childbearing and

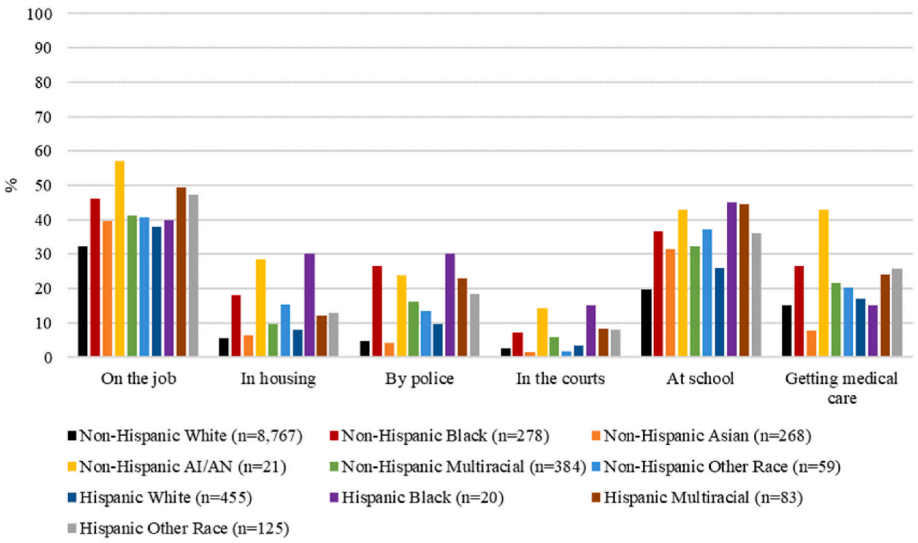

Fig. 2c. Distribution of lifetime discrimination[2] stratified by race and ethnicity, PRESTO 2013-2024

Note: Bar graphs showing prevalence of discrimination across the life course via the Philadelphia Urban ACE Survey as well as Williams' Everyday Discrimination and Major Experiences of Discrimination scales; Includes multiply imputed data; AI/AN = American Indian, Alaskan Native, or Indigenous; PRESTO = Pregnancy Study Online; Participants in the "non-Hispanic Other Race" category includes Middle Eastern or North African; Native Hawaiian or Pacific Islander; some other race; unknown race; Participants in the "Hispanic Other Race" category includes Asian; AI/AN (American Indian, Alaskan Native, or Indigenous); Middle Eastern or North African; Native Hawaiian or Pacific Islander; some other race; unknown race; [1]Reported yes (*i.e.,* "less than once a year," "a few times a year," "a few times a month," "at least once a week," or "almost every day"): **disrespect** ("You were treated with less courtesy or respect than other people?"), **poor service** ("You received poorer service than other people at restaurants or stores?"), **not smart** ("People acted as if they thought you were not smart?"), **afraid of you** ("People acted as if they were afraid of you?"), **harassed** ("You were threatened or harassed?"); [2]Reported yes vs. no: **on the job** (hiring, promotion, firing), **in housing** (renting, buying, mortgage), **by police** (stopped, searched, threatened), **in the courts, at school, getting medical care**

natural decline of fertility). Discrimination can also influence reproductive, perinatal, and pediatric outcomes via pathways of altered hormones, compromised immune function, inflammation, metabolic syndrome, accelerated aging, and environmental hazards (Williams, Lawrence, Davis, et al., 2019; Williams & Mohammed, 2009), emphasizing the importance of its study among pregnancy planners.

In PRESTO, we observed that experiences of discrimination across the life course varied across racial and ethnic groups. Comparing the prevalence and distribution of discrimination in PRESTO with previous studies is challenging given differences in 1) study population in terms of decade of enrollment, age at enrollment, or socio-demographics, 2) geographic diversity, and 3) the discriminatory experiences ascertained. All these factors contribute to the complexity of comparing patterns of discrimination across cohorts. For example, childhood racial discrimination in PRESTO was 11 %, a lower prevalence than that reported in other studies in North America but do not reflect populations planning pregnancy (range: 18.9–72.3 %) (Currie et al., 2019; Rosenthal et al., 2023; Wade et al., 2014). However, in PRESTO, this prevalence varied according to participants' racial and ethnic identity. Among BIPOC participants, childhood racial discrimination was 45.2 %, which is comparable to studies with greater representation of racial and ethnic minority groups.

The prevalence of everyday discrimination in PRESTO was consistent with cohorts of reproductive-aged participants in the U.S. (Brown et al., 2006; Canady et al., 2008; Ertel et al., 2012; Lewis et al., 2012), such as Project Viva. Moreover, among BIPOC participants, the prevalence of everyday discrimination was higher relative to non-Hispanic White participants, but similar in PRESTO and the Sister Study (Gaston et al., 2020). The higher prevalence of everyday discrimination among BIPOC women was expected as they are more likely to be exposed to subtle and routine discrimination in their day-to-day lives because of cultural racism (which fosters racial stereotypes and prejudice (Williams, Lawrence, & Davis, 2019; Williams, Lawrence, Davis, et al., 2019)), sexism (manifested by gender segregation and "traditional" gender roles (Krieger et al., 1993)), and their intersection (Bowleg, 2012; Crenshaw, 1989). Similar patterns were observed for lifetime (major) experiences of discrimination across cohorts.

Differences in the prevalence of everyday and lifetime (major) experiences of discrimination across studies could be related to the discrimination instrument used, specifically the number and type of items queried. The original version of Williams' Everyday Discrimination scale includes 9 items (Krieger et al., 2005; Taylor et al., 2004; Williams et al., 1997). The short 5-item version of Williams' Everyday Discrimination scale, which was implemented in PRESTO, was shown to have high consistency (alpha = 0.77) in the Chicago Community Adult Health Study (CCAHS) (Sternthal et al., 2011). The original version of Williams' (Lifetime) Major Experiences of Discrimination scale also includes 9 items (Forman, 1997; Williams et al., 1997). PRESTO used a modified 6-item version of Williams' Major Experiences of Discrimination scale that included an item from the expanded 19-item version about discrimination in receiving medical care (Williams et al., 2012). As shown in Supplementary Table S8, studies among reproductive-aged participants in the U.S. have used different versions of both scales. For example, some studies, including PRESTO, used the short 5-item version of Williams' Everyday Discrimination scale (Rosenberg et al., 2002), whereas other studies used a longer version (Brown et al., 2006; Lewis et al., 2012) or a shorter 3-item version (Gaston et al., 2020). Likewise, some studies used a shorter version of Williams' Major Experiences of Discrimination scale (3-item version (Gaston et al., 2020; Rosenberg et al., 2002)), while other studies used a longer version (7-item version (Canady et al., 2008), 8-item version (Ertel et al., 2012):); PRESTO used a modified 6-item version.

In the overall analytic sample of PRESTO participants, those with lower levels of education reported a higher prevalence of discrimination across the life course. However, when we cross-classified education with race and ethnicity, we found that non-Hispanic Black participants with ≥16 years education generally reported a higher prevalence of everyday and lifetime discrimination. These results are consistent with previous research that shows Black Americans with higher levels of education (*e.g.,* college degree) may be most burdened by distinct experiences of

discrimination such as prejudice, racial slurs, or offensive comments (*e.g.,* microaggressions) in predominantly White workplaces (Anderson, 2016, 2019; National Public Radio et al., 2017; Williams & Mohammed, 2009). These everyday experiences can isolate and ostracize individuals, limiting their access to societal resources and increasing physiologic stress (Williams, Lawrence, & Davis, 2019; Williams, Lawrence, Davis, et al., 2019).

Lifetime discrimination on the job, at school, and while receiving medical care were the most frequently reported, with BIPOC participants reporting greater exposure compared to non-Hispanic White participants. These findings align with prior literature, which has repeatedly shown racial and ethnic minority groups to have generally lower household income and more often concentrate in disadvantaged neighborhoods, increasing exposure to additional stressors (*e.g.,* violent crime, environmental pollution) and poorer quality conditions (*e.g.,* overcrowding) (Fig. 1). Lifetime discrimination can directly impact the treatment one receives when navigating institutions —which can vary concurrently across geographic regions— owing to racism (*e.g.,* bias in policing and judicial settings, obstetric racism), sexism (*e.g.,* medical "victim blaming," discounting symptoms as psychosomatic complaints, gender wage gap, timeline of promotion, underrepresentation in leadership), and social class (Davis, 2019, 2020; Krieger et al., 1993). Given these complex systems and structures, acute experiences of lifetime discrimination, even if they occur less frequently or only once (*e.g.,* being denied a mortgage loan, not being hired for a job, unfair treatment by the police), can have a detrimental effect on health above and beyond that of everyday discrimination.

Regarding attributions, it was not surprising that "sex or gender" would be most frequently reported by other racial and ethnic groups except non-Hispanic Black and Hispanic Black participants, among whom "race or ethnicity" was the most frequently reported attribution. This finding is comparable with empirical evidence from two studies that found White (vs. BIPOC) participants less often attributed discrimination to "race and ethnicity" (Brown et al., 2006; Potter et al., 2019), highlighting that the primary basis for unfair treatment is perceived differently across subpopulations. A 2024 report from Statistics Canada also indicated that racialized people, especially Canadian-born Black people, are more likely to face race-based discrimination (Statistics Canada, 2024). Other attributions (*e.g.,* age, body size), though less frequently reported in PRESTO, may still be stressful and have been associated with adverse health outcomes in other studies (Gee et al., 2008; Jackson et al., 2019; Puhl et al., 2008; Sutin et al., 2016). Intersectionality, as a theoretical framework, may provide insight into our results by illustrating how interconnected social categories (*e.g.,* race, ethnicity, gender, social class) at the micro level interact with systems of privilege and oppression at macro levels of society (Bowleg, 2012; Crenshaw, 1989). Intersectionality sheds light on challenges that arise when framing individuals' identities as disconnected and mutually exclusive, as all individuals embody, biologically, their lived experience. This embodiment has implications for health inequities observed at the population level (Krieger, 2012), especially preconception health.

Finally, we observed clear patterns in responses to discrimination. Most participants in PRESTO reported accepting experiences as a fact of life, which persisted regardless of whether participants kept to themselves or talked with others. This pattern parallels some literature examining the distribution of said response (Dong et al., 2014; Krieger et al., 2011; McLaughlin et al., 2010), but differs from others (Casagrande et al., 2007; Ertel et al., 2012; Krieger, 1990; Krieger & Sidney, 1996). In prior literature and within strata of race and ethnicity (*e.g.,* Black women), some studies have also shown that not talking to other people ("not disclosing") is associated with unfavorable health outcomes (*e.g.,* elevated blood pressure) (Krieger, 1990; Krieger & Sidney, 1996; McLaughlin et al., 2010). These findings raise concern that one of the biggest threats to disclosure is that participants might not be willing or able to report discrimination (Krieger et al., 2005), which could further disadvantage subpopulations benefitting from stress-buffering effects (*e.g.,* social support) and the utilization of societal resources (*e.g.,* medical care services). Nevertheless, an interesting finding in PRESTO is that non-Hispanic Black participants provided more engaged responses (*e.g.,* "talk and accept," "talk and act") following experiences of discrimination attributed to "sex or gender" or "other."

4.1. Limitations

Study limitations include optional completion of the LCEQ (Lovett et al., 2024). We also acknowledge that PRESTO has limited racial and socioeconomic diversity. Couples actively planning pregnancy fundamentally differ from the general population and reproductive-age individuals. Pregnancy planners often have a higher-than-average socioeconomic position and reside in neighborhoods with more access to societal resources, which may partially explain why they tend to be healthier and older than the average pregnant female (Arteaga et al., 2019; Enthoven et al., 2022; Harville et al., 2019). Findings in our study may have limited generalizability to socio-economically disadvantaged populations or those with unplanned pregnancies.

Our measures of discrimination do not capture severity and recency of childhood or lifetime experiences. These measures also do not consider the impact of reporting before and after contemporary events (*e.g.,* the murder of George Floyd), which may contextualize how some participants view discrimination that directly or indirectly affects them. We did not ascertain changes in discrimination over time (precluding analysis of its variability), though we recognize that the number and frequency of experiences may change with increasing age. The present study centers personal or interpersonal discrimination and does not reflect direct measures of structural and/or institutional discrimination (*e.g.,* redlining, segregation).

Finally, we did not conduct in-depth exploration of discrimination in relation to coping strategies (*e.g.,* the "John Henryism" effect [defined as "high-effort" strategy for coping with external stressors (Hudson et al., 2016; James et al., 1983)]). Furthermore, because participants were allowed to select multiple main reasons for discrimination, we cannot rule out the possibility that these attributions likely work in combination and there are other combinations of intersectional attributions that were not explored in our study. Specifically, previous studies have utilized person-centered approaches (*e.g.,* latent class analysis) to better understand multifaceted or co-occurring attributions (Becares & Zhang, 2018; Cobb et al., 2023; Garnett et al., 2014; Lu et al., 2022), which future research should consider and attempt to replicate. The "compounded effect" of multiple attributions may also lead to differential health outcomes.

4.2. Strengths

Despite these limitations, the main strength of our study is the characterization of preconception discrimination in a large, geographically diverse sample of females across the full fertility spectrum (spanning all U.S. states and Canadian provinces), increasing generalizability to populations planning pregnancy. PRESTO's internet-based recruitment and data collection methods may reduce social desirability bias relative to traditional methods (Kesse-Guyot et al., 2016; van Gelder et al., 2010). We leveraged widely used and validated measures of childhood racial discrimination (modeled independent of other ACEs) (Cronholm et al., 2015; Wade et al., 2014) as well as everyday and lifetime discrimination (Forman, 1997; Sternthal et al., 2011; Williams et al., 1997). Specifically, Williams' Everyday Discrimination and Major Experiences of Discrimination scales have greater reliability than single-item questions in ascertaining discrimination (Forman, 1997; Krieger et al., 2005; Sternthal et al., 2011; Williams et al., 1997). Our study also facilitated the investigation of within-group racial and ethnic heterogeneity via multiple attributions and response types, expanding

on current literature that emphasizes socially patterned determinants and looking-*within* groups (Lewis & Van Dyke, 2018).

4.3. Implications for future research

Our results may inform future investigations of and interventions for preconception discrimination in relation to reproductive, perinatal, and pediatric health (Frederiksen et al., 2015; Macaluso et al., 2010; Quenby et al., 2021; Seibel & Taymor, 1982; Szkodziak et al., 2020). This work also has implications for the improvement and transformation of public health systems, polices, and practices that foster societal change. While several mechanisms likely influence racial and socioeconomic disparities observed across the fertility spectrum (Chin et al., 2015; Currie & Schwandt, 2014; Fleras, 2011; Galic et al., 2021; Lovett et al., 2024; Olig et al., 2019; Sabbath et al., 2023; Schrager et al., 2020; Wesselink et al., 2018, 2020, 2022, 2023; Willis et al., 2022, 2023; Wise et al., 2023, Wise et al., 2025), the implementation of equitable policies and practices has the potential to alleviate strong disparities and promote systemic investment in under-resourced communities (Bailey et al., 2021; Lindberg et al., 2010; Mehdipanah et al., 2018; Smith et al., 2020; White & Borrell, 2011). Membership in a racial and ethnic minority group has also been linked to internalized racism (Howe et al., 2022; Jones, 2001), which can affect individual opportunity and exposure. In fact, previous studies have reported participants from a young age (beginning age 3) are not "colorblind" but very aware of racial differences and negative attitudes (*e.g.,* internalizing colorism (Hunter, 2002; Mathews & Johnson, 2015; Thompson & Keith, 2001) and European standards) in society (Clark & Clark, 1947; CNN Pilot Demonstration, 2010), though they often are not yet able to articulate the reason why they think the way they do. Thus, optimizing preconception health is important for reproductive intervention as many women may not acknowledge or report discriminatory experiences without consciously being aware of it (a phenomenon referred to as "internalized oppression" for which they perceived unfair treatment as normalized and "deserved" (Fleras, 2011; Krieger et al., 1993; Krieger & Sidney, 1996)); downplaying their experiences as an extension of whether their surroundings (*e.g.,* parents, mentors, teachers, co-workers, providers) encouraged them to embrace or reject these biases.

Discrimination is woven into the foundation of societal culture, resulting in the development of prejudice and differential treatment for certain groups that have withstood the test of time. Though it may be difficult to "see or hear" discrimination operating at the institutional and societal level, broadening our understanding of discriminatory experiences among subpopulations, such as pregnancy planners, is critical for advancing health equity. There is also burgeoning evidence documenting disparities in infertility (Chandra et al., 2013; Snow et al., 2022; Thoma et al., 2013; Wellons et al., 2008), access to infertility care (Chin et al., 2015; Correia et al., 2023; Dongarwar et al., 2022; Galic et al., 2021; Merkison et al., 2023; Olig et al., 2019; Seifer et al., 2008), and treatment success rates (Correia et al., 2023; Humphries et al., 2016; McQueen et al., 2015; Merkison et al., 2023; Seifer et al., 2010, 2020). Greater examination of drivers of health disparities, including discrimination in various settings (*e.g.,* job, housing, medical care), is needed and the current study contributes to advancing research in this area. Our study also lends credibility that historically disenfranchised subpopulations may differentially experience, attribute, and respond to discrimination (Fleras, 2011; Williams, 2018). There is high demand for policies and practices of accountability aimed to reduce discrimination fueled by racism, sexism, and differences in social class via extending and standardizing services (*e.g.,* medical care) or resources for all those who not only can access it but are entitled to it. We believe health for all is a fundamental human right and inequitable treatment of others should be mitigated. Key priorities of future research should involve thorough assessments of stress proliferation, sensitive periods, and trajectories following historical or contemporary events (Gee et al., 2012, 2019; Pearlin et al., 2005). Future investigations should also examine intersections of how multiple identities may influence attribution as well as response to discrimination, and how these exposures influence health outcomes.

4.4. Conclusion

The prevalence of discrimination across the life course was high among pregnancy planners, especially when restricted to BIPOC participants. This population most often responded to such stressors by accepting the experiences as a fact of life. This descriptive study highlights the importance of investigating discrimination during the preconception period in efforts to better understand reproductive, perinatal, and pediatric health, supporting the demand for more timely interventions aimed to prevent widespread prejudicial treatment of others.

CRediT authorship contribution statement

Sharonda M. Lovett: Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Formal analysis, Conceptualization. **Lauren A. Wise:** Writing – review & editing, Supervision, Resources, Project administration, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Jasmine Abrams:** Writing – review & editing. **Amelia K. Wesselink:** Writing – review & editing. **Erika L. Sabbath:** Writing – review & editing. **Ruth J. Geller:** Writing – review & editing, Formal analysis. **Chad M. Coleman:** Writing – review & editing, Formal analysis. **Andrea S. Kuriyama:** Writing – review & editing, Formal analysis. **Molly N. Hoffman:** Writing – review & editing, Software. **U. Vivian Ukah:** Writing – review & editing. **Renée Boynton-Jarrett:** Writing – review & editing. **Collette N. Ncube:** Writing – review & editing, Supervision, Methodology, Formal analysis, Conceptualization.

Data availability statement

PRESTO participants have not provided informed consent to share their data.

IRB approval

PRESTO was approved by the Institutional Review Board at Boston University Medical Campus (H-31848). Informed consent was obtained online from each participant.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2025.101803.

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