Contraceptive Initiation Among Women in the United States: Timing, Methods Used, and Pregnancy Outcomes

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abstract

BACKGROUND: Timely contraceptive initiation is increasingly common, yet population trends by method and among subgroups with increased risk of unintended pregnancy are not well described. The impact of timing and type of contraceptive initiation on risk of unwanted pregnancy is unknown.

METHODS: We used nationally representative cross-sectional data from 4 cycles of the National Survey of Family Growth, 2002–2015. We calculated outcomes from self-reported dates of sexual debut, contraceptive initiation, and unwanted pregnancy. We compared trends in timely contraceptive initiation (within 1 month of sexual debut) by method and by race and/or ethnicity and income. Using multivariable regression, we identified predictors of delayed contraceptive initiation. We compared the risk of unwanted pregnancy for delayed versus timely contraceptive initiation.

RESULTS: We analyzed responses from 26 359 women with sexual debuts in 1970–2014. One in 5 overall and 1 in 4 African American, Hispanic, or low-income respondents reported delayed contraceptive initiation, which was associated with unwanted pregnancy within 3 months of sexual debut (adjusted risk ratio 3.7 versus timely contraceptive initiation; 99.9% confidence interval: 2.3–5.9; $P < .001$). Timely contraceptive initiation with less effective versus effective methods was not associated with unwanted pregnancy within 3 months.

CONCLUSIONS: Delayed contraceptive initiation is more common among African American, Hispanic, and low-income women and is strongly associated with short-term risk of unwanted pregnancy. Pediatricians play a key role in making timely contraception available to adolescents at or before sexual debut. More research is needed to understand the importance of early contraceptive methods on pregnancy risk.

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Dr Murray Horwitz conceptualized and designed the study, conducted the initial analysis, drafted the initial manuscript, and revised the manuscript; Drs Ross-Degnan and Pace helped interpret the results and refine the analysis and critically reviewed and revised the manuscript; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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WHAT'S KNOWN ON THIS SUBJECT: Timely contraceptive initiation is increasingly common, yet trends by method type and among subgroups with increased risk of unintended pregnancy are not well described. The impact of timing and type of contraceptive initiation on risk of unwanted pregnancy is unknown.

WHAT THIS STUDY ADDS: Increasing timely contraceptive initiation among women in the United States is mostly due to condom use. Racial and/or ethnic minority and low-income women are more likely to report delayed contraceptive initiation, which is associated with unwanted pregnancy within 3 months of sexual debut.

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The average woman in the United States becomes sexually active at ~17 years of age[1–3] and from 18 to 24 years of age, belongs to age groups with the highest rates of unintended pregnancy.[4] Unintended pregnancy is associated with delayed prenatal care, premature birth, and low birth weight[4–6] and is more common among African American, Hispanic, and low-income women than among white and high-income women in the United States.[4] Reducing unintended pregnancy and the associated socioeconomic disparities is a national public health priority.[4]

Previous research reveals that both the timing and type of a woman's first contraception may predict her future health reproductive behaviors and outcomes. According to 1 study, a woman's contraceptive method use at sexual debut predicts her method choice with her next sexual partner.[7] Other studies have revealed that contraceptive use around the time of sexual debut is associated with use of any contraception,[1,2,8] use of effective contraception,[9] and unintended pregnancies and abortions[9] up to 10 years later.

On the basis of interviews with US women born in the 1940s–1990s, contraceptive use around the time of sexual debut is increasingly common.[2] However, most teenagers still rely on condoms alone for pregnancy prevention at first sex.[1,10,11] In addition, African American or Hispanic women and women initiating sex at a younger age remain less likely to use condoms or any contraception at sexual debut.[1,10,11] Such differences in early contraceptive timing and method choice may contribute to long-term reproductive health disparities.

To our knowledge, there has been no comprehensive analysis of long-term trends and disparities in contraceptive initiation, in terms of timing and methods used, in the United States. In addition, the impact of contraceptive initiation timing and method choice on short-term reproductive health outcomes, such as unwanted pregnancy soon after sexual debut, is unknown.

In this study, we used nationally representative survey data collected from US women to analyze 45-year trends in contraceptive initiation, with a focus on race and/or ethnicity and income subgroups that experience reproductive health disparities.[3,4,12] We hypothesized that both timing and type of contraceptive initiation would affect short-term risk of unwanted pregnancy. To test our hypotheses, we examined associations of delayed initiation and timely initiation with less effective methods and unwanted pregnancy within 3 months of sexual debut.

METHODS

Data Sources

We analyzed data from the National Survey of Family Growth (NSFG), a nationally representative, multistage, probability-based survey of the US population 15 to 44 years old.[13] The NSFG collects data primarily through face-to-face interviews, with the additional use of audio computer-assisted self-interview software for sensitive information. The NSFG has been administered in cycles since 1973, with oversampling of African American, Hispanic, and adolescent participants since 2002. We used NSFG data from surveys conducted in 2002, 2006–2010, 2011–2013, and 2013–2015. Response rates were 80%, 78%, 73%, and 71% for all women in the 4 cycles, respectively.

Study Population

We used data from all respondents who identified as girls and reported sexual debut since 1970 and at least 12 months before the interview. Of 31 222 female respondents from 2002 to 2015, we excluded 4105 (12%) who reported no history of heterosexual sex and 848 (3%) on the basis of the date of sexual debut or previous sterilization for noncontraceptive purposes. We analyzed data from the remaining 26 359 respondents with sexual debuts between 1970 and 2014. After excluding 9 respondents with missing information about wanted or unwanted pregnancy, we analyzed risk of unwanted pregnancy within 3 months of sexual debut according to delayed versus timely contraceptive initiation (n = 26 350) and according to less effective versus effective method use among those reporting timely contraceptive initiation (n = 19 546; 74%).

Measures

All measures were self-reported. All dates were recorded by month and year.

Primary Outcomes

Sexual debut was defined as date of first heterosexual sex and calculated by subtracting date of birth from date of sexual debut. We developed an indicator for sexual debut at age <15 years, which has been associated with delays in contraceptive initiation.[1] We did not analyze nonheterosexual sex because our primary focus was contraception to prevent unintended pregnancy.

Contraceptive initiation was defined as date of first contraceptive use regardless of type and calculated by subtracting date of birth from date of contraceptive initiation. Consistent with other studies,[1] we defined timely contraceptive initiation as any contraceptive use before or within the month of sexual debut and delayed contraceptive initiation as first contraceptive use after the month of sexual debut (including never).

Contraceptive type was defined by the first contraceptive method used among those reporting timely contraceptive initiation. Respondents could report up to 4 different

methods at contraceptive initiation; we considered the most effective method as the method she used at initiation. Contraceptives were separated into 3 categories according to average failure rates in the first year of typical use[14]: highly effective methods, associated with <1 pregnancy per 100 women; effective methods, associated with 6 to 9 pregnancies per 100 women; and less effective methods, associated with ≥18 pregnancies per 100 women. Highly effective methods include intrauterine devices, subdermal contraceptive implants, and sterilization for contraceptive purposes. Effective methods include pills, patches, rings, and injections. Less effective methods include male condoms, other barrier methods, fertility awareness strategies, pulling out, and emergency contraception. We analyzed rates of male condom use separately because condoms are the most effective method for preventing sexually transmitted infections (STIs), which are prevalent in this age group.

Unwanted pregnancy within 3 months of sexual debut was defined as unwanted pregnancy with an estimated start date ≤3 months after sexual debut. In the NSFG, respondents were asked whether their pregnancy was "late/overdue," "right time," "too soon/mistimed," "didn't care/indifferent," or "unwanted." We focused on unwanted pregnancies because they are associated with worse prenatal health care, maternal health behaviors, and birth outcomes compared with intended or mistimed pregnancies.[15] Pregnancies with an estimated start date in the month before sexual debut (3.6% of all pregnancies and 4.7% of unwanted pregnancies within 3 months of sexual debut) were considered to have occurred at the time of sexual debut. Pregnancies with an estimated start date >1 month before sexual debut were excluded.

Key Covariates

Year of sexual debut was defined as the calendar year of sexual debut. We plotted population trends by year of sexual debut and conducted all statistical analyses by decade of sexual debut because of small cell sizes and ease of interpretation. The last decade was represented by only 5 years, 2010–2014, because the final survey cycle ended in 2015.

Recall duration was defined as the time from date of sexual debut to date of interview and rounded to the nearest year. One previous study of a US population–based cohort of adolescents revealed that recall of age at sexual debut was generally stable over time, with only slight regression to the mean.[16] When we restricted data to respondents with ≤5 years of recall, our results were stable; therefore, we did not exclude respondents on the basis of recall duration. We also adjusted for recall duration in all analyses unless otherwise specified.

Race and/or ethnicity was categorized according to 1997 Office of Management and Budget standards[17]: any respondent reporting Hispanic ethnicity was analyzed as Hispanic; the remainder were white, African American, or other race; multiple race was categorized as other. The 2002 survey did not allow for multiple race reporting; thus, respondents in 2002 were categorized according to 1977 standards.

Household income was based on self-reported total household income in the last year and expressed as a percentage of the annual federal poverty level (FPL) income for a household of the same size. We defined income categories at increments of 100% to 199% of the FPL and up to 400% of the FPL. We used household income at the time of interview because household income at the time of sexual debut was not available and because household income is often stable across generations in the United States.[18]

Additional covariates were selected on the basis of previous studies[1,8,9,19] or theoretical importance: age at sexual debut, birth country, diagnosis of ovulatory problems, religion raised, region of residence, urban or rural area, intact childhood family structure, ever lived in foster home, and mother's education level. We were unable to include region, sexual identity, and whether first sex was voluntary because these were only asked in the NSFG starting in 2011. Variable definitions can be found in Supplemental Table 5.

Statistical Analysis

We compared population-weighted characteristics of respondents in the 4 study samples. We tested for changes in means over time using linear regression with survey cycle indicators as predictors (2002 as the reference year) and for changes in proportions over time using Pearson's χ^2 test.

We then calculated average age at sexual debut and contraceptive initiation and proportion with timely contraceptive initiation by year of sexual debut. We calculated the proportion with timely contraceptive initiation by method type for each decade of sexual debut. We analyzed trends in these outcomes using logistic regression with indicator variables for each decade of sexual debut as predictors. All analyses were adjusted for recall duration, which had minimal effect on the results.

We used multivariable logistic regression to identify predictors of delayed contraceptive initiation. We then used bivariable and multivariable log-binomial regression to estimate the effects of delayed versus timely contraceptive initiation, and timely initiation with less effective versus effective (including highly effective) methods, on risk of unwanted pregnancy. We assessed

TABLE 1 Respondent Characteristics and Outcomes, by Survey Cycle (Part 1 of 2)

Respondent Characteristics (n = 26 359)	2002 (n = 6598)	2006–2010 (n = 10 286)	2011–2013 (n = 4734)	2013–2015 (n = 4741)	P
Age at interview, weighted mean (estimated SD), y	31.7 (7.8)	31.5 (9.8)	31.4 (6.6)	31.4 (6.5)	.57
Race and/or ethnicity, No. (weighted %)					.16
White non-Hispanic	3558 (66.1)	5262 (62.0)	2211 (59.0)	2286 (57.7)	
African American non-Hispanic	1368 (14.5)	2273 (16.9)	1217 (19.9)	1113 (20.0)	
Hispanic	1360 (14.2)	2208 (14.6)	1052 (14.9)	1022 (14.9)	
Other non-Hispanic and/or mixed race	312 (5.2)	543 (6.4)	254 (6.3)	320 (7.4)	
Household income, % of FPL, No. (weighted %)					
≥400	1723 (27.3)	1735 (19.3)	815 (22.5)	969 (25.9)	<.001
200–399	2080 (34.2)	3284 (36.1)	1223 (28.6)	1171 (27.7)	
100–199	1432 (20.2)	2477 (23.1)	1079 (21.6)	1018 (19.5)	
<100	1363 (18.3)	2790 (21.5)	1617 (27.4)	1583 (26.9)	
Born outside United States, No. (weighted %)[a]	1146 (14.6)	1828 (15.7)	749 (14.8)	885 (18.2)	.14
Ovulatory problem, ever diagnosed, No. (weighted %)[b]	1127 (17.6)	1764 (18.6)	821 (16.9)	810 (18.6)	.43
Religion raised, No. (weighted %)[c]					.003
None or missing	572 (8.2)	1068 (9.7)	467 (9.8)	572 (12.1)	
Catholic	2434 (35.5)	3478 (33.5)	1525 (32.6)	1447 (30.8)	
Protestant	3282 (51.4)	4912 (48.1)	2359 (48.1)	2355 (48.7)	
Other	310 (4.9)	828 (8.7)	383 (9.4)	367 (8.4)	
Region of residence, No. (weighted %)[d]					.67
Northeast	—	—	728 (18.1)	649 (14.6)	
Midwest	—	—	748 (20.2)	835 (22.2)	
South	—	—	1936 (36.0)	2108 (39.9)	
West	—	—	1322 (25.8)	1149 (23.4)	
Rural area of residence, No. (weighted %)	3117 (49.1)	4343 (31.8)	1940 (33.6)	1843 (34.4)	<.001
Family intact through childhood, No. (weighted %)	4148 (65.4)	5548 (59.2)	2460 (56.7)	2460 (57.0)	<.001
Ever lived in foster home, No. (weighted %)[d]	—	—	4533 (3.0)	4524 (3.1)	.85
Mother's education level, No. (weighted %)[e]					<.001
Less than high school	1831 (25.2)	2654 (24.0)	1186 (23.3)	1146 (21.0)	
High school or GED	2277 (37.6)	3401 (34.2)	1442 (31.2)	1475 (31.5)	
Some college	2442 (37.2)	4139 (41.8)	2063 (45.5)	2059 (47.5)	
Sexual identity, No. (weighted %)[f]					.099
Heterosexual	—	—	4305 (93.3)	4287 (92.6)	
Bisexual	—	—	327 (5.9)	328 (6.0)	
Lesbian	—	—	51 (0.8)	78 (1.4)	
Sexual partners, ever, No. (weighted %)[d]					.53
Male partners only	—	—	3796 (82.1)	3774 (81.4)	
Both male and female partners	—	—	938 (17.9)	967 (18.6)	

GED, general education development test; —, not applicable.

[a] Twenty-four missing data on being born outside United States (n = 26 335).

[b] Nine missing data on having been diagnosed with an ovulatory problem (n = 9136).

[c] Sixty missing data on religion raised (n = 26 299).

[d] Only available from 2011 and later (n = 9475); 2 missing data on ever lived in a foster home (n = 9473).

[e] Two hundred and forty-four missing data on maternal education level (n = 26 155).

[f] Only available from 2011 and later (n = 9475); 2 missing data on sexual identity (n = 9376).

the effects overall and by prespecified race and/or ethnicity and income strata, adjusting for potential confounders from previous research[15] and significant predictors of delayed initiation as identified above.

We conducted all analyses using Stata, version 13.0 (Stata Corp, College Station, TX), with survey commands accounting for complex survey design. We applied survey weights to past time periods as recommended by the NSFG[20] and done previously.[21] We determined statistical significance by a 2-sided $P < .001$ on the basis of a single test P value threshold of $<.05$ and a Bonferroni correction for 50 comparisons. All significant results had $P < .001$.

Ethics

The NSFG obtained informed consent from all respondents. Use of publicly available deidentified data in this study was considered exempt by the Harvard Pilgrim Health Institutional Review Board.

RESULTS

The mean age of sexual debut was 17.2 years. Age at interview, age at sexual debut, and recall duration did not vary by survey cycle (see Tables 1 and 2). In addition, stable proportions of respondents in each survey cycle reported many of the known factors associated with timing of contraceptive initiation: race and/or ethnicity, birth outside the United States, ever diagnosis of ovulatory problems, and sexual debut at <15 years of age. A few predictors of timely contraceptive initiation changed over time: a declining proportion of women reported intact family households through childhood (65% in 2002 to 57% in 2013–2015; $P < .001$), and an increasing proportion reported maternal higher education (37%–48%; $P < .001$).

Timely contraceptive initiation became more common over time (Figs 1 and 2A). Contraceptive initiation before sexual debut increased from <10% in the 1970s to >25% in the 2000s, whereas contraceptive initiation at sexual debut remained stable at ~40%. When contraception was initiated in a timely manner, the most commonly used method was the male condom (Fig 2C, Supplemental Fig 3). Effective methods accounted for one-third of timely contraceptive initiation, with a significant increase over time (see Fig 2B; $P < .001$). Only 12% of respondents reported timely use of both condoms and an effective method (results not shown).

In race- and/or ethnicity-stratified analyses (Fig 2, Supplemental Fig 3), all subgroups had a positive trend in timely contraceptive initiation ($P < .001$). Rates of timely contraception were highest among white respondents (~85% since the 1990s) and increased most dramatically among Hispanic respondents (38% in the 1970s to 72% in 2010–2014). Meanwhile, only white respondents experienced a significant increase in timely effective method use (21% to a peak of 40% in the 2000s; $P < .001$). Rates of timely effective method use were stable at ~15% among Hispanic respondents ($P = .002$) and declined substantially but nonsignificantly among African American respondents (31% to 17%; $P = .13$). We did not detect significant changes in timely effective contraceptive use among those in the other and/or mixed-race category ($P = .21$). Timely contraceptive initiation with male condoms increased significantly in all subgroups ($P < .001$).

In income-stratified analyses, all subgroups had a positive trend in timely contraceptive initiation ($P < .001$), and the 2 highest income groups also had positive trends in timely effective method use ($P < .001$). The lowest income group had a negative trend in effective method use (24% to 20%; $P < .001$).

In our multivariable model (Supplemental Table 6), significant predictors of delayed contraceptive initiation were sexual debut in the

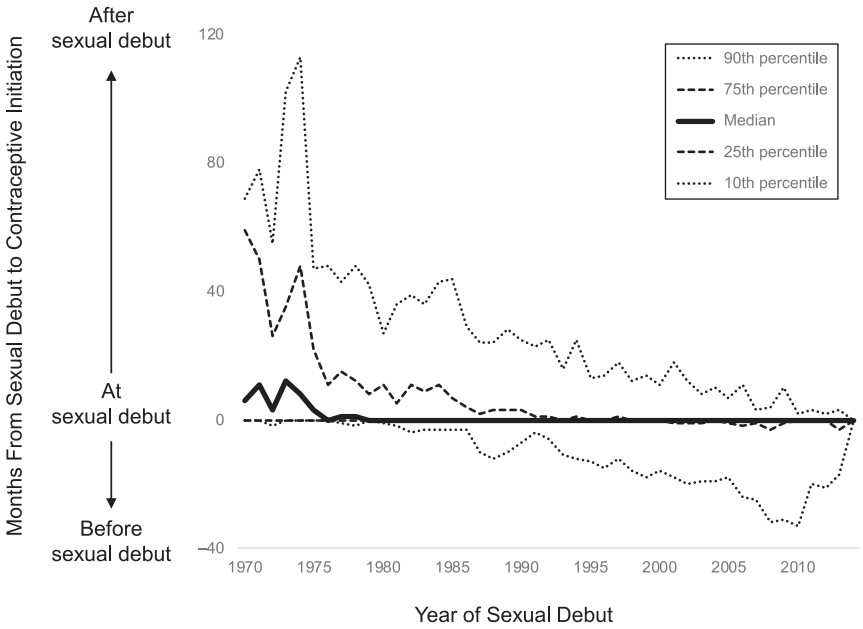

FIGURE 1
Timing of contraceptive initiation relative to sexual debut, 1970–2014: self-reported timing of contraceptive initiation relative to sexual debut (1970–2014) among female respondents of that NSFG, 2002–2015.

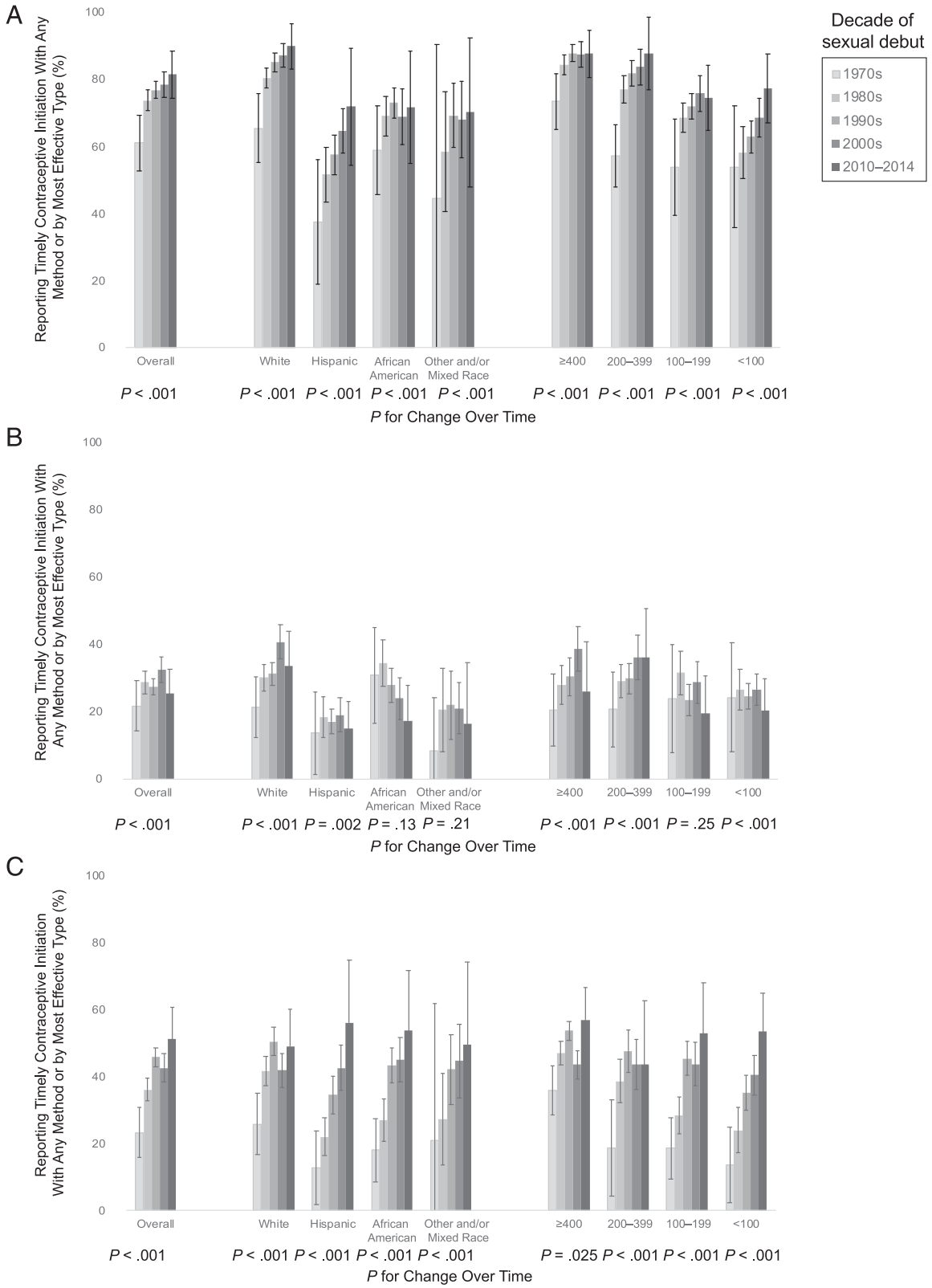

FIGURE 2

Timely contraceptive initiation by race and/or ethnicity and by income subgroup, estimated rates (99.9% CI) for any and selected methods: estimated rates (99.9% CI) of timely contraceptive initiation among female respondents of the NSFG, 2002–2015. A, Any method. B, Effective and/or highly effective methods. C, Male condoms.

TABLE 2 Respondent Characteristics and Outcomes, by Survey Cycle (Part 2 of 2)

Outcome Events (n = 26 359)	2002 (n = 6598)	2006–2010 (n = 10 286)	2011–2013 (n = 4734)	2013–2015 (n = 4741)	P
Year of sexual debut, weighted mean (estimated SD)	1987.7 (7.8)	1993.8 (9.9)	1998.0 (6.6)	2000.0 (6.7)	<.001
Range	1970–2002	1970–2009	1976–2012	1977–2014	—
Age at sexual debut, weighted mean (estimated SD), y	17.3 (3.2)	17.2 (4.2)	17.1 (2.7)	17.2 (2.8)	.33
Age <15 y at sexual debut, No. (weighted %)	1023 (14.7)	1751 (15.1)	842 (15.9)	832 (15.1)	.56
Sexual debut involuntary, No. (weighted %)[a]	—	—	348 (6.6)	344 (6.3)	.67
Recall duration, mean (estimated SD), y	14.6 (7.8)	14.3 (9.8)	14.3 (6.6)	14.3 (6.6)	.59
Pregnancy within 3 mo of sexual debut, No. (weighted %)	785 (11.7)	1046 (9.9)	414 (8.2)	407 (7.6)	<.001
Unwanted, No. (weighted %)[b]	155 (2.0)	174 (1.7)	92 (1.8)	72 (1.4)	.40

—, not applicable.

[a] Only available from 2011 and later; respondents were ≥18 y old (n = 9249), of whom 114 were missing data on involuntary sexual debut (n = 9135).

[b] Nine missing data on wanted pregnancy (n = 26 350).

1970s–1980s versus 2010–2014 (adjusted odds ratio [aOR] 2.1–4.3), birth outside the United States (aOR 2.0), racial and/or ethnic minority status (aOR 1.6–2.1), and household income <400% of the FPL (aOR 1.4–2.3). Higher levels of maternal education were protective (aOR 0.6–0.8 for those whose mothers graduated from high school versus not).

In the study sample, 493 women (1.8%) reported an unwanted pregnancy occurring within 3 months of sexual debut (Tables 1–3). Delayed contraceptive initiation was associated with a significantly increased risk of unwanted pregnancy (risk ratio [RR] 4.8 [99.9% confidence interval (CI): 3.0–7.6]) when compared with timely contraceptive initiation. This remained true for all racial and/or ethnic and income subgroups and after adjustment for potential confounders (adjusted RR 3.7 [99.9% CI: 2.3–5.9]). Among those reporting timely contraceptive initiation, 229 (0.9%) reported an unwanted pregnancy within 3 months of sexual debut (Table 4). There was no effect of method type on risk of unwanted pregnancy at 3 months after sexual debut.

DISCUSSION

In this study, using nationally representative survey data from women in the United States, we found that rates of timely contraceptive use increased steadily from 1970 to 2014, with condoms accounting for most of the increase. Timely use of effective contraceptive methods, such as long-acting reversible and short-acting hormonal methods, remained low, especially among racial and/or ethnic minority and low-income women. Delayed contraceptive initiation was a strong predictor of unwanted pregnancy within 3 months of sexual debut, regardless of race and/or ethnicity or income.

Our results are consistent with others' findings that timely contraceptive initiation became more common over the past several decades in the United States, with persistent socioeconomic disparities.[1,2] As recently as 2010–2014, 1 in 5 respondents overall used no contraception within a month of sexual debut. This ratio increased to 1 in 4 for racial and/or ethnic minority and low-income respondents.

Our study is unique in providing a comprehensive overview of trends in timing and type of contraceptive initiation, with a focus on population subgroups that experience disparities in reproductive health care and outcomes.[12] In addition, we provide strong evidence that delayed contraceptive initiation increases risk of unwanted pregnancy substantially and almost immediately at the start of young adulthood. Unintended pregnancies, especially unwanted pregnancies, are associated with adverse birth outcomes[4–6,22] and disproportionately affect African American, Hispanic, and poor women.[4] Our findings suggest that access to contraception before or at sexual debut is essential to reducing unintended pregnancies among young women.

According to the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists, long-acting reversible contraceptives (intrauterine devices and subdermal implants) should be the first-line contraception for adolescents to prevent unintended pregnancy.[23,24] Condoms provide less effective contraception and may be particularly challenging to use in adolescent relationships because of low levels of sexual communication and high rates of intimate partner violence.[25,26] However, condoms protect against STIs, which are prevalent among adolescents and young adults.[27] Therefore, for optimal prevention of both STIs and

TABLE 3 Effect of Contraceptive Initiation Timing on Risk of Unwanted Pregnancy Within 3 Months of Sexual Debut, RR (99.9% CI)

	No. (Weighted %)	Unadjusted RR (99.9% CI),[a] n = 26 350	P	Adjusted RR (99.9% CI),[b] n = 26 093	P
Overall					
Timely (n = 19 546)	229 (0.9)	Reference		Reference	
Delayed (n = 6804)	264 (4.3)	4.78 (3.00–7.63)	<.001	3.66 (2.29–5.86)	<.001
Stratified by race and/or ethnicity					
White non-Hispanic					
Timely (n = 10 951)	66 (0.5)	Reference		Reference	
Delayed (n = 2365)	65 (3.4)	5.66 (2.23–14.38)	<.001	4.54 (1.85–11.10)	<.001
Hispanic					
Timely (n = 3621)	58 (1.5)	Reference		Reference	
Delayed (n = 2344)	78 (4.3)	3.24 (1.22–8.58)	<.001	3.71 (1.15–11.94)	<.001
African American non-Hispanic					
Timely (n = 3979)	98 (2.3)	Reference		Reference	
Delayed (n = 1661)	107 (6.6)	2.79 (1.45–5.38)	<.001	2.66 (1.41–5.00)	<.001
Other non-Hispanic and/or mixed race					
Timely (n = 995)	7 (0.7)	Reference		Reference	
Delayed (n = 434)	14 (4.1)	4.72 (0.99–22.36)	.001	3.05 (0.27–28.62)	.124
Stratified by household income, % of FPL					
≥400					
Timely (n = 4404)	13 (0.2)	Reference		Reference	
Delayed (n = 838)	21 (1.9)	8.45 (1.95–36.59)	<.001	6.77 (1.31–33.56)	<.001
200–399					
Timely (n = 6113)	47 (0.7)	Reference		Reference	
Delayed (n = 1644)	53 (4.2)	6.20 (1.90–20.26)	<.001	5.00 (1.71–14.53)	<.001
100–199					
Timely (n = 4274)	68 (1.3)	Reference		Reference	
Delayed (n = 1728)	65 (4.6)	3.05 (1.17–7.96)	<.001	2.58 (0.92–7.24)	.003
<100					
Timely (n = 4755)	101 (1.7)	Reference		Reference	
Delayed (n = 2594)	125 (5.3)	2.85 (1.64–4.95)	<.001	2.74 (1.43–5.25)	<.001

[a] Nine missing data on wanted or unwanted pregnancy response.

[b] Adjusted for single y of recall plus known predictors of delayed contraceptive initiation and/or unwanted pregnancy: decade of sexual debut, age <15 y at sexual debut, race and/or ethnicity (except when stratified by race and/or ethnicity), household income (except when stratified by household income), born outside the United States, and maternal education; 16 missing data on being born outside the United States (n = 26 334) and an additional 241 missing data on maternal education (n = 26 093).

unintended pregnancy, adolescents and young adults who are sexually active should use condoms in combination with more effective contraception.[28] Unfortunately, we found persistently low levels of effective method use and even lower levels of combined condom and effective method use among US women within 1 month of sexual debut.

The observed low levels of timely effective method use may reflect adolescents' poor health care access,[12,29] financial constraints,[30] provider biases,[30] and confidentiality concerns[23,30,31] related to contraceptive care. Such barriers appear to be even greater for African American, Hispanic, and immigrant women,[12,32] compounding disparities in reproductive health behaviors and outcomes. Authors of future research should seek to understand and address provider and health system barriers to early and effective contraception use, especially among groups experiencing disparities. Pharmacist-prescribed contraception is a potential means to improve access, but to date, only a handful of states allow it, a minority of pharmacies participate, and many pharmacists say they would not prescribe for women <18 years of age.[33] Other nontraditional settings for family planning, such as emergency departments, urgent care clinics, and schools, may provide additional opportunities for adolescents to learn about and access contraception.[34–36]

Differences in contraceptive timing and method choice may also be due in part to patient preferences, experiences, and cultural norms and beliefs. Adolescents' concerns about side effects are a significant barrier to effective method use.[31] Providers must be a source of unbiased information and support woman-centered decision-making around the deeply personal and sensitive subject of family planning.[23,24,37]

This study has several limitations. First, all data were self-reported and therefore subject to recall inaccuracy and/or bias. However, restricting or adjusting for recall duration did not change our findings. Second, because most survey data reflected the time of the interview rather than the time of sexual debut and contraceptive initiation, we were limited in the variables we could include in our model to predict delayed

TABLE 4 Effect of Contraceptive Initiation Method Type on Risk of Unwanted Pregnancy Within 3 Months of Sexual Debut, RR (99.9% CI)

	No. (Weighted %)	Unadjusted RR (99.9% CI),[a] n = 19 546	P	Adjusted RR (99.9% CI),[b] n = 19 385	P
Overall					
Timely initiation with effective and/or highly effective methods (n = 7292)	88 (0.9)	Reference		Reference	
Timely initiation with less effective methods (n = 12 254)	141 (0.9)	0.96 (0.47–2.00)	.87	1.01 (0.47–2.14)	.98
Stratified by race and/or ethnicity					
White non-Hispanic					
Timely with effective (n = 4331)	25 (0.5)	Reference		Reference	
Timely with less effective (n = 6620)	41 (0.5)	1.04 (0.26–4.22)	.93	1.03 (0.26–4.06)	.93
Hispanic					
Timely with effective (n = 1089)	16 (1.3)	Reference		Reference	
Timely with less effective (n = 2532)	42 (1.6)	1.02 (0.25–4.15)	.95	1.06 (0.26–4.42)	.86
African American non-Hispanic					
Timely with effective (n = 1589)	44 (2.5)	Reference		Reference	
Timely with less effective (n = 2390)	54 (2.2)	0.88 (0.30–2.57)	.70	1.08 (0.36–3.33)	.80
Other non-Hispanic and/or mixed race					
Timely with effective (n = 283)	3 (1.4)	Reference		Reference	
Timely with less effective (n = 712)	4 (0.4)	0.39 (0.01–10.76)	.34	0.80 (0.02–21.10)	.83
Stratified by household income, % of FPL					
≥400					
Timely with effective (n = 1561)	7 (0.2)	Reference		Reference	
Timely with less effective (n = 2843)	6 (0.2)	1.10 (0.12–9.77)	.88	1.13 (0.09–13.42)	.87
200–399					
Timely with effective (n = 2229)	16 (0.8)	Reference		Reference	
Timely with less effective (n = 3884)	31 (0.7)	0.79 (0.12–5.10)	.67	0.77 (0.14–4.17)	.61
100–199					
Timely with effective (n = 1618)	26 (1.2)	Reference		Reference	
Timely with less effective (n = 2656)	42 (1.4)	1.03 (0.30–3.52)	.93	1.10 (0.26–4.65)	.83
<100					
Timely with effective (n = 1884)	39 (1.7)	Reference		Reference	
Timely with less effective (n = 2871)	62 (1.6)	1.09 (0.42–2.84)	.76	1.18 (0.47–2.99)	.55

[a] One missing wanted or unwanted pregnancy response.

[b] Adjusted for single years of recall plus known predictors of delayed contraceptive initiation and/or unwanted pregnancy: decade of sexual debut, age <15 y at sexual debut, race and/or ethnicity (except when stratified by race and/or ethnicity), household income (except when stratified by household income), born outside the United States, and maternal education; 6 missing data on being born outside the United States (n = 19 540) and an additional 155 missing data on maternal education (n = 19 385).

contraceptive initiation. We present results stratified by household income, but a respondent's household income might have changed from the time of sexual debut to the time of interview. However, family income rank is generally stable across generations,[18] and our income-stratified results were robust to a ≤5-year restriction on recall duration. Finally, we did not detect an association between contraceptive method type and unwanted pregnancy, perhaps because of early method discontinuation, incorrect use, or nonadherence not captured by the survey. More research is needed to understand the effects of early contraceptive method choice and adherence on reproductive health outcomes.

CONCLUSIONS

A growing proportion of timely contraceptive initiation use is due to condom use, revealing opportunities to promote use of more effective contraceptive methods around the time of sexual debut. We identified significant differences in timing and type of timely contraceptive initiation by race and/or ethnicity and income. Delays in contraceptive initiation appear to significantly increase short-term risk of unwanted pregnancy. Pediatricians and other health care providers (including pharmacists in select states) play a key role in making timely contraception available to adolescents[38] when (and ideally before) they become sexually active.

ABBREVIATIONS

aOR: adjusted odds ratio
CI: confidence interval
FPL: federal poverty level
NSFG: National Survey of Family Growth
RR: risk ratio
STI: sexually transmitted infection

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