Patterns of Sexual Partnering and Reproductive History: Associations with Timing of First Birth in a Birth Cohort

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CONTEXT: *The associations between timing of first live birth and previous sexual behavior and pregnancies are not well understood.*

METHODS: *Members of a 1972–1973 New Zealand birth cohort were surveyed at ages 21, 26 and 32 about their sexual and reproductive histories; 506 men and 479 women participated in at least one assessment. Relative risks and 95% confidence intervals were calculated using Poisson regression to examine associations between the likelihood of first live birth at specific ages (prior to age 21, at age 21–25, at age 26–31) and selected characteristics.*

RESULTS: *Birth prior to age 21 was more likely for men and women who initiated intercourse before age 15 (relative risks, 3.1 and 2.0, respectively), and less likely for those who initiated at age 18 or later (0.3 and 0.1, respectively), than for those aged 15–17 at first coitus. Prior miscarriage was associated (although sometimes marginally) with an elevated likelihood of first birth across genders and ages (1.7–1.8). Prior abortion was associated with an elevated likelihood of first birth at age 21–25 for women (1.6) and a reduced likelihood at age 26–31 for men (0.5). Having multiple sexual partners at age 21–25 was negatively associated with the likelihood of a first birth at age 26–31 for men. Marriage and cohabitation were positively associated with birth timing.*

CONCLUSIONS: *Early sexual initiation and relationship instability may promote parenthood at younger ages, whereas greater relationship stability may do so at older ages.*

Perspectives on Sexual and Reproductive Health, 2012, 44(1):48–56, doi: 10.1363/4404812

In recent decades, there has been a profound shift to smaller families in developed countries.[1] In many of these countries, this has been accompanied by postponement of childbearing, a reflection of both increasing mean age at first birth (which now approaches 30 years) and voluntary and involuntary childlessness.[1,2]

A number of factors have been proposed to influence postponement of childbearing and the consequent variation in age at first birth within a society. Of these, social and demographic factors—education, occupation and income—have been most widely studied.[3] Less attention has been paid to factors more closely related to a birth, such as patterns of sexual partnering and prior pregnancies that do not go to term. Examining patterns of sexual partnering is necessary to understand both the opportunities for pregnancy to occur and the differences in interpersonal relationships that may lead to variations in the timing of childbearing for individuals. Consideration of prior induced abortions or miscarriages offers insight into differences in birth intentions and the possible impact of biological constraints on fertility.

Aspects of sexual partnering that may be relevant to the timing of first birth are age at first coitus, union formation and status of relationships, and number of sexual partners. Generally, the younger one is at first coitus, the more opportunities one has for pregnancy involvement.[4] Early intercourse may also be important if adolescents are vulnerable to unplanned pregnancy because of inadequate contraceptive use.[5,6] Although associations between early sexual activity and adolescent pregnancy and parenthood have been demonstrated,[6–10] the relationship between age at first coitus and postponement of childbearing for men and women is unclear. Furthermore, if age at first coitus acts as a marker for years of exposure to pregnancy risk, accounting for this may be important.

Union formation, and marriage in particular, is proposed to facilitate first birth mainly through increased sexual frequency or expectations of having children.[11] Union dissolutions, the absence of or delays in finding a suitable partner, and not wanting to be a single mother have all been highlighted as reasons for postponement.[2,12–14] However, studies that have examined partnering have tended to concentrate on type and duration of union,[11,15–23] and have been limited in a number of ways. Many have been cross-sectional with wide age ranges, and measured union formation at the time of assessment or in restricted samples; the results may have been influenced by cohort differences in the likelihood of union formation, the age at which union formation commonly occurs and the likelihood of postponement.[24] Among existing longitudinal studies, attrition may have biased the findings.[17,23,25] Moreover, if the date of the live birth was used, rather than the date of conception, the temporal ordering of union formation and pregnancy could not be determined, and a causal relationship could not be assessed.

Another aspect of partnering, number of sexual partners, has not been well considered. Examination of this characteristic may provide insight into the associations between relationship stability and partner change and age at first birth.

Biologically, miscarriages and abortions result in some delay before the next possible pregnancy. Miscarriages may indicate issues that make conception or carrying a pregnancy to term difficult.[26] The relationship between pregnancies ending in miscarriage and age at first birth is complicated by fertility intentions. Abortion represents an intentional fertility delay that avoids an unwanted birth; considering how other potential determinants of age at first birth may operate through differential use of abortion is of considerable interest and has not been explored. Although prior pregnancies are proposed to increase postponement, findings in the few studies that have examined the relationship have been contradictory.[23,27–29]

Thus, a thorough investigation of the associations between these characteristics and age at first birth is needed, using representative samples, with data on women and men. Furthermore, it is necessary to confirm that all potential factors precede first birth and to consider differences by age. To this end, we used a birth cohort to examine the associations between patterns of sexual partnering and prior pregnancies that did not go to term and the occurrence of a first birth within different age periods up to age 31. We considered whether any associations could be explained in part by the timing of first coitus or use of abortion. As reproductive processes are inherently different, each gender was considered separately.

METHODS

Sample and Measures

The participants were enrolled in the Dunedin Multidisciplinary Health and Development Study, a longitudinal study of a cohort born in Dunedin, New Zealand, between April 1, 1972, and March 31, 1973. The history of the sample has been described by Silva and Stanton.[30] The sample comprised 1,037 of 1,139 children born at Queen Mary Hospital, whose mothers resided in the province of Otago when the cohort was first followed up, at age three. The sample was seen biennially until age 15, then at ages 18, 21, 26 and 32. Data were stored using a unique identification number for each participant. Ethics approval was obtained from the Otago Ethics Committee.

Information on sexual behavior and full reproductive histories were sought through a computer-presented questionnaire at the age 21, 26 and 32 assessments. Questions were consistent across assessments and were based largely on the 1990 British National Study of Sexual Attitudes and Lifestyles.[31]

At ages 21 and 26, participants were asked a series of questions about pregnancies they had ever experienced or caused; at age 32, they were asked about pregnancies "since the previous assessment at age 26." They were asked their age at the start of each pregnancy and the outcome (live birth, miscarriage, abortion, ectopic pregnancy, stillbirth or ongoing). At the age 26 and 32 assessments, those who reported an abortion were asked whether it had been because of a fetal abnormality. At the age 21 and 26 assessments, men were able to answer that they did not know the outcome.

At each assessment, participants were asked if they had ever had intercourse, whether they were in a current sexual relationship and the status of this relationship. Information on first heterosexual intercourse (including age) and total number of sexual partners were collected at the age 21 assessment; number of partners "since the last assessment" was collected at the age 26 and 32 assessments.

Data from multiple assessments were used to determine the occurrence of a conception leading to a first live birth within three age periods—prior to age 21, at age 21–25, and at age 26–31. The prior reproductive events examined were failed pregnancy and induced abortion. Induced abortions excluded those obtained because of fetal abnormality. Failed pregnancies included those ending in miscarriages, abortions performed because of fetal abnormality and stillbirths, as well as ectopic pregnancies. The majority of failed pregnancies were miscarriages.[32] Only failed pregnancies and induced abortions that occurred prior to a first birth were relevant; pregnancies for which it was not possible to confirm this were excluded.

Age at first coitus was categorized as 14 or younger, 15–17, or 18 or older. Participants not sexually active by age 21, but sexually active by 26 or 32, were categorized as having initiated intercourse at age 18 or older. Participants who were not assessed at 21, but were assessed later, were excluded, as we could not confirm when they first had intercourse. The number of years sexually active within each age period was calculated, and estimated where necessary, according to a method described for a prior study of the sample.[33] Number of sexual partners was categorized as 0, 1, 2–4, 5–9, or 10 or more. Status of relationship was assessed, and participants were categorized as having no regular relationship, having a regular partner, cohabiting or married.

Analysis

The cumulative incidence of first birth was calculated for men and women separately in each age period. Only participants who had not had a live birth at the start of a given period were considered at risk. Poisson regression was used to estimate the relative risks and 95% confidence intervals with robust standard errors to account for the binary outcome. Separate regressions were fitted for each age period. To assess whether the pattern varied by age, all age periods were included in a single Poisson regression, modeled with robust standard errors. Age period was included as a main effect and in interaction terms, with participants clustered on identification number. The Wald test was used to obtain p values for interaction.

To determine if associations persisted when time at risk for pregnancy was accounted for, analyses were repeated

using the number of years sexually active during each age period as an approximate measure of time at risk. Including this exposure time in the Poisson regression provided the incidence rate ratios and 95% confidence intervals. Analyses were repeated including prior abortion as a covariate.

Cumulative measures of the occurrence of at least one conception leading to a failed pregnancy or abortion by age 25 and by age 31 were constructed. Cumulative measures were chosen because any prior pregnancy was of interest. The analyses were restricted to first births at ages 21–25 and 26–31, as few participants reported more than one pregnancy prior to age 21 and the timing of these earlier pregnancies was difficult to ascertain in some instances.

Chi-square and negative binomial regression were used for comparison of groups; Fisher's exact was used where expected values were less than four. Stata version 10.0 was used for all analyses.

RESULTS

At each assessment, 91–96% of birth cohort members still alive answered the sexual behavior and reproductive health questions: 477 men and 458 women at the age 21 assessment, 490 men and 476 women at age 26, and 487 men and 472 women at age 32. In all, 506 men and 479 women participated in at least one assessment.*

By age 31, 60% of men and 46% of women had not had a child; two of these women reported a live birth by age 32. Among men who had not had a child, 65% reported wanting a child in the future, 10% did not want a child and 19% were unsure; among the women, those proportions were 65%, 12% and 18%, respectively. Furthermore, of those without a child, 4% of men and 7% of women had attempted to conceive for 12 or more months. In the complete cohort, these proportions were 6% for men and 11% for women.

First live births were reported by 7% of men and 12% of women prior to age 21; by 13% of men and 17% of women still at risk at age 21–25; and by 26% and 37%, respectively, at age 26–31 (Table 1). Thirteen percent of men and 11% of women reported failed pregnancy by age 31; abortion by age 31 was reported by 20% of men and 17% of women.

Age at First Coitus

Among men, 18% reported first coitus at age 14 or younger, 45% at age 15–17 and 38% at 18 or older (not shown). Among women, those proportions were 15%, 55% and 29%, respectively. For both men and women, in general, the likelihood of first birth within each age period was inversely associated with age at first coitus (Table 2). The relationship was most pronounced for first birth prior

*The distributions of the full sample and the analytic sample did not differ on key socioeconomic characteristics such as socioeconomic status, education or income at age 32, or on socioeconomic status of the family of origin.

TABLE 1. Percentage distribution of members of a 1972–1973 birth cohort, by selected reproductive and relationship characteristics, according to age at assessment, New Zealand

Age at assessment and characteristic	Men	Women
AGE 21	(N=499)	(N=479)
Any first birth		
No	92.6	88.3
Yes	7.4	11.7
AGE 26†	(N=444)	(N=417)
First birth at age 21–25		
No	87.4	82.7
Yes	12.6	17.3
Failed pregnancy by age 25‡		
No	90.6	92.6
Yes	9.4	7.4
Induced abortion by age 25‡		
No	84.7	85.1
Yes	15.3	14.9
In a relationship at age 21		
No	44.1	27.8
Yes	56.0	72.3
Status of relationship at age 21		
No regular relationship	46.3	32.5
Regular partner	36.0	32.5
Cohabiting	16.2	29.7
Married	1.5	5.3
No. of sexual partners before age 21		
0	12.0	8.4
1	14.3	16.9
2–4	21.8	29.5
5–9	21.6	25.5
≥10	30.3	19.8
AGE 32†	(N=371)	(N=336)
First birth at age 26–31		
No	74.4	62.8
Yes	25.6	37.2
Failed pregnancy by age 31‡		
No	87.3	89.0
Yes	12.7	11.0
Induced abortion by age 31‡		
No	79.9	83.0
Yes	20.1	17.0
In a relationship at age 26		
No	33.2	21.4
Yes	66.8	78.6
Status of relationship at age 26		
No regular relationship	37.2	23.3
Regular partner	17.0	16.2
Cohabiting	33.9	37.4
Married	12.0	23.1
No. of sexual partners at age 21–25		
0	4.0	2.7
1	18.1	32.0
2–4	31.8	34.9
5–9	21.5	20.3
≥10	24.6	10.2
Total	100.0	100.0

†Excludes those who had a live birth in an earlier age period. ‡Includes only failed pregnancies and abortions that occurred prior to a first birth. *Note:* Percentages may not add to 100.0 because of rounding.

to age 21. A lower proportion of those who waited until age 18 or older to initiate sexual activity than of those who were aged 15–17 reported a first birth within each period. Men who waited were 0.3 times as likely to report a first birth prior to age 21 as were those aged 15–17 at first coitus; women who waited were 0.1 times as likely to report a first birth prior to age 21 as were those aged 15–17 at first coitus. Men and women who were 14 or younger at first coitus were 3.1 and 2.0 times as likely, respectively, to report a first birth prior to age 21 as were those who were 15–17 at first coitus.

Among men who had not had a child by age 26, early sexual initiation was not associated with an elevated likelihood of first birth at age 26–31; indeed, the relative risk was 0.5, and the upper confidence limit was 1.1. To understand this finding, we investigated sexual partnerships and contraceptive use for these men, comparing those who initiated intercourse at age 14 or younger with all others (not shown). Similar proportions of the two groups were in a relationship at age 26. However, a lower proportion of early initiators than of their counterparts were married or cohabiting (31% vs. 44%). At age 21–25 and at age 26–31, the mean number of sexual partners among early initiators was 1.8 times that among those who initiated later. Of those sexually active in the prior 12 months, a lower proportion of early initiators than of other men always used contraceptives—43% vs. 51% at age 26.

In general, men and women who waited until 18 or older to initiate coitus were less likely than those reporting first coitus at age 15–17 to have a first birth at all ages (Table 2). To account for this finding, we explored differences in sexual partnerships and contraceptive use between those who were 18 or older at first coitus and all others (not shown). Late initiators were less likely than others to be in sexual relationships, and they had fewer partners: For men, 32% of late initiators were in a relationship, compared with 55% of others at age 21; the proportions were 54% and 71% at age 26, and 74% and 84% at age 32. For women, the respective proportions were 49% and 70% at age 21, 72% and 82% at 26, and 75% and 85% at 32. Among men, late initiators had, on average, 0.2 times as many partners as others prior to age 21, and 0.6 times as many at ages 21–25 and 26–31. Similarly, among women, on average, late initiators had 0.3 times as many partners as others prior to age 21, 0.7 times as many at age 21–25 and 0.8 times as many at age 26–31. Of those sexually active in the prior 12 months, a significantly higher proportion of men who were late initiators than of other men always used contraceptives: 61% versus 52% at age 21, 57% versus 44% at 26 and 51% versus 26% at 32. For women, there was little variation between late initiators and others: 74% versus 72% at age 21, 67% versus 64% at 26 and 47% versus 48% at 32.

Prior Reproductive Events

The proportion having a first birth was consistently higher for men and women who reported a prior failed pregnancy, and significantly so at ages 26–31 (Table 2). Men and women who reported a failed pregnancy were 1.7 times as likely as those who did not to report a first birth at age 26–31. The point estimates were similar, but of marginal significance, for first birth at age 21–25. Accounting for number of years sexually active within each period made little difference to the findings.

Findings for abortion differed for men and women. Among men, abortion experience was not related to the likelihood of a first birth at age 21–25, but was associated with reduced likelihood of a first birth at age 26–31 (relative risk, 0.5); the pattern varied by age period. For women, the data suggest that those reporting an abortion were more likely than others to have a first birth at age 21–25, but this finding was of borderline significance; the relative risk for first births at age 26–31 was not significant. Accounting for the number of years sexually active within each period did not alter the findings.

To explore the association between prior abortion and men's likelihood of reporting a first birth at age 26–31, differences in sexual partnerships and contraceptive use were considered (not shown). We found that at age 26,

TABLE 2. Percentage of men and women reporting a first live birth, by prior sexual and reproductive events, according to age at first birth, and relative risks (and 95% confidence intervals) from Poisson regression analyses examining associations between these events and the likelihood of a first birth

Event and age at first birth	Men		Women	
	%	Relative risk	%	Relative risk
AGE AT FIRST COITUS				
First birth prior to age 21				
≤14	21.0	3.1 (1.6–6.0)	25.7	2.0 (1.2–3.4)
15–17 (ref)	6.8	1.0	12.8	1.0
≥18	2.3	0.3 (0.1–1.0)	0.8	0.1 (0.0–0.4)
First birth at age 21–25				
≤14	19.4	1.4 (0.7–2.5)	27.5	1.3 (0.8–2.3)
15–17 (ref)	14.1	1.0	20.4	1.0
≥18	8.5	0.6 (0.3–1.1)	8.5	0.4 (0.2–0.8)
First birth at age 26–31				
≤14	17.4	0.5 (0.3–1.1)	55.6	1.4 (1.0–2.0)
15–17 (ref)	32.0	1.0	39.8	1.0
≥18	20.6	0.6 (0.4–1.0) *p=.0001*	29.1	0.7 (0.5–1.0) *p=.0004*
FAILED PREGNANCY				
First birth at age 21–25				
No (ref)	12.6	1.0	16.7	1.0
Yes	23.1	1.8 (1.0–3.5)	30.0	1.8 (1.0–3.2)
First birth at age 26–31				
No (ref)	23.9	1.0	35.4	1.0
Yes	40.9	1.7 (1.1–2.6) *p=.85*	60.0	1.7 (1.2–2.3) *p=.87*
INDUCED ABORTION				
First birth at age 21–25				
No (ref)	13.2	1.0	15.8	1.0
Yes	15.9	1.2 (0.6–2.3)	25.8	1.6 (1.0–2.7)
First birth at age 26–31				
No (ref)	28.8	1.0	36.8	1.0
Yes	14.7	0.5 (0.3–0.9) *p=.05*	39.3	1.1 (0.7–1.5) *p=.17*

Notes: p values are from Wald tests and indicate whether associations differ by age period at first birth. ref=reference category.

a higher proportion of those reporting abortions than of their counterparts were cohabiting (50% vs. 31%), and a lower proportion were married (2% vs. 11%). Men reporting abortions had, on average, 1.7 times as many sexual partners at age 21–25 as those reporting no abortions, but the difference was not significant at age 26–31. Furthermore, of those sexually active in the 12 months prior to age 26, a much lower proportion of men reporting abortions than of others always used contraceptives (29% vs. 53%). No difference was evident for the 12 months prior to age 32.

Relationship Characteristics

Men and women who were in a current relationship at the start of the period were approximately three times as likely to report a first birth at age 26–31 as those who were not (Tables 3 and 4). Although the pattern did not vary significantly by age for men, it did for women, indicating that the association between first birth and being in a relationship was stronger for first birth at age 26–31 than earlier. Accounting for prior abortion and the number of years sexually active within each period made little difference to these findings.

Examination of the status of relationship in more detail showed that those who were married or cohabiting were much more likely to report a first birth within each age period than were those who were not in a regular relationship, particularly at age 26–31. In this age period, cohabiting and married men were 2.6 and 5.3 times as likely, respectively, as those not in a regular relationship to report a first birth. Similarly, women who were cohabiting were 2.7 times as likely to report a first birth at age 26–31, and those married were 3.6 times as likely to do so, as women who were not in a regular relationship. Accounting for the number of years sexually active within each period somewhat reduced the associations, in particular for men who were cohabiting or married (incidence rate ratios, 2.4 and 4.9, respectively). For men, adjustment for prior abortion further weakened the relationship between marriage and first birth at age 26–31, though the association remained strong (4.4). For women, adjustment for abortion did not alter the findings.

Relative risks associated with having had multiple partners were 1.0 or greater for participants reporting a first birth at age 21–25, and were less than 1.0 for those reporting a first birth at age 26–31. For men, the data suggest an inverse relationship between multiple partners at age 21–25 and the likelihood of a first birth at age 26–31; no such pattern was apparent for women. That the pattern varied by age was not formally supported either for men or for women. Accounting for the number of years sexually active and prior abortion did not appreciably affect the comparisons between those with two or more partners and those with only one; accounting for number of years sexually active did alter the comparisons between those with no sexual partners and those with one, though the confidence intervals were extremely wide and included 1.0.

TABLE 3. Percentage of men reporting a first birth, by selected relationship characteristics, and relative risks (and 95% confidence intervals) from Poisson regression analyses examining associations between these characteristics and the likelihood of a first birth

Characteristic and age at first birth	%	Relative risk	Incidence rate ratio	
			Model 1†	Model 2‡
IN A RELATIONSHIP AT 21				
First birth at age 21–25				
No (ref)	12.4	1.0	1.0	1.0
Yes	17.6	1.5 (0.9–2.6)	1.3 (0.7–2.1)	1.2 (0.7–2.1)
IN A RELATIONSHIP AT 26				
First birth at age 26–31				
No (ref)	12.6	1.0	1.0	1.0
Yes	33.2	2.8 (1.7–4.5) *p=.11*	2.6 (1.5–4.2)	2.5 (1.5–4.1)
STATUS OF RELATIONSHIP AT 21				
First birth at age 21–25				
No regular relationship (ref)	12.4	1.0	1.0	1.0
Regular partner	13.2	1.1 (0.6–2.1)	0.9 (0.5–1.7)	0.9 (0.5–1.7)
Cohabiting	29.2	2.5 (1.4–4.7)	2.1 (1.1–3.8)	2.2 (1.2–4.0)
Married	33.3	2.9 (0.6–15.2)	2.4 (0.5–12.5)	2.2 (0.4–11.6)
STATUS OF RELATIONSHIP AT 26				
First birth at age 26–31				
No regular relationship (ref)	13.4	1.0	1.0	1.0
Regular partner	18.8	1.5 (0.8–2.8)	1.4 (0.7–2.6)	1.3 (0.7–2.5)
Cohabiting	32.8	2.6 (1.6–4.2)	2.4 (1.5–3.9)	2.3 (1.4–3.8)
Married	67.7	5.3 (3.3–8.5) *p=.86*	4.9 (3.0–8.0)	4.4 (2.7–7.1)
NO. OF SEXUAL PARTNERS BEFORE 21				
First birth at age 21–25				
0	7.1	0.7 (0.2–2.6)	1.4 (0.4–5.6)	1.4 (0.4–5.7)
1 (ref)	8.5	1.0	1.0	1.0
2–4	12.4	1.5 (0.5–4.0)	1.5 (0.5–4.0)	1.5 (0.6–4.1)
5–9	12.8	1.5 (0.8–5.3)	1.5 (0.6–4.1)	1.5 (0.6–4.1)
≥10	17.7	2.1 (0.8–5.3)	2.1 (0.8–5.3)	2.2 (0.9–5.6)
NO. OF SEXUAL PARTNERS AT AGE 21–25				
First birth at age 26–31				
0	36.4	0.6 (0.2–1.4)	1.4 (0.5–3.5)	1.3 (0.5–3.3)
1 (ref)	41.7	1.0	1.0	1.0
2–4	24.4	0.6 (0.4–0.9)	0.6 (0.4–0.9)	0.6 (0.4–0.9)
5–9	26.3	0.6 (0.4–1.0)	0.6 (0.4–1.0)	0.7 (0.4–1.1)
≥10	17.6	0.4 (0.2–0.7) *p=.21*	0.4 (0.3–0.7)	0.5 (0.3–0.8)

†Includes years sexually active as exposure. ‡Includes years sexually active as exposure and abortion prior to a first birth as a covariate. *Notes:* p values are from Wald tests and indicate whether associations differ by age period at first birth. ref=reference category.

DISCUSSION

Age at first coitus, union formation and number of sexual partners were strongly associated with age at first birth, and associations differed by gender and age period. Prior failed pregnancies (mainly miscarriages) were associated with an increased risk of first birth for both genders across early adulthood, whereas associations between abortion and first birth differed by gender and age period.

Our study, within a birth cohort for whom temporal relationships are clear, confirms that union formation and current relationship status are strongly associated with first birth. Married participants were the most likely to report a birth. This finding may reflect an alignment of marriage with intentions to have children and an elevated likelihood that married individuals will carry an unintended pregnancy to term. Both of these hypotheses

are supported by the finding that for men, the adjustment for prior abortion reduced the association between first birth and marriage.

Investigation of differences in age at first birth according to the number of sexual partners was used to gain insight into the impact of relationship stability. While there was not sufficient power for definitive conclusions to be drawn, the data suggest that the association changes from positive to negative over time for men. The associations between marriage and cohabitation and first birth were also strongest at older ages, supporting this pattern. Possible explanations for this pattern are that births at older ages were more likely to be intended and that individuals who have multiple partners use contraceptives better at older ages. Moreover, the period from the late 20s to early 30s aligns with the mean age for first marriage for many developed countries, including New Zealand.[1] This supports later age as a normative time for many life transitions, such as forming stable relationships and starting a family. The reduced likelihood of parenthood for those not in a stable union by this age suggests that lack of a suitable partner may act as a barrier to parenthood, or indicates less desire to settle into unions and form families. Alternatively, men who have had multiple sexual partners may be relatively unlikely to know they have fathered a child or to report having done so. However, the positive association between number of partners and first birth for younger men does not support this. Nor does it explain the gender difference in the likelihood of first birth at young ages.

For both men and women, age at first coitus was strongly associated with entering parenthood across adulthood. A prior study of this cohort found that men who engaged in intercourse before age 16 were significantly more likely than those who did not to become fathers by age 26.[34] Here we demonstrate that the relationship is strongest between early sexual initiation and fatherhood by age 21. Our study, like others,[6,7,35,36] demonstrates that women who engaged in early sexual activity were more likely than others to enter parenthood before age 21. This association remained for women to age 31, but not for men. Men who initiated intercourse at an early age had less stable relationships and lower first-birth rates than those initiating later; this corresponds with our finding that greater relationship stability was associated with first birth.

For those who waited longer to initiate coitus, we found a relationship for both men and women with age at first birth across all three periods, although it attenuated over time. A lower proportion of those who were 18 or older at first coitus than of men who first had coitus at age 15–17 reported being in a sexual relationship at each age, and they had fewer sexual partners over time. This might suggest fewer opportunities for pregnancy because of lack of a suitable partner across adulthood or different intentions regarding family formation and childbearing. Men who waited longer to initiate intercourse used contraceptives more consistently than other men, supporting the possibility of different fertility intentions.

TABLE 4. Percentage of women reporting a first birth, by selected relationship characteristics, and relative risks (and 95% confidence intervals) from Poisson regression analyses examining associations between these characteristics and the likelihood of a first birth

Characteristic and age at first birth	%	Relative risk	Incidence rate ratio	
			Model 1†	Model 2‡
IN A RELATIONSHIP AT 21				
First birth at age 21–25				
No (ref)	17.5	1.0	1.0	1.0
Yes	20.0	1.2 (0.8–2.0)	1.0 (0.6–1.7)	1.0 (0.6–1.6)
IN A RELATIONSHIP AT 26				
First birth at age 26–31				
No (ref)	14.7	1.0	1.0	1.0
Yes	44.2	3.1 (1.8–5.5)	2.9 (1.7–5.1)	2.9 (1.7–5.1)
		p=.01		
STATUS OF RELATIONSHIP AT 21				
First birth at age 21–25				
No regular relationship (ref)	18.3	1.0	1.0	1.0
Regular partner	12.7	0.7 (0.4–1.3)	0.6 (0.3–1.1)	0.6 (0.3–1.1)
Cohabiting	25.5	1.5 (0.9–2.5)	1.3 (0.8–2.1)	1.2 (0.7–2.0)
Married	46.2	2.7 (1.3–5.4)	2.3 (1.1–4.6)	2.5 (1.2–5.0)
STATUS OF RELATIONSHIP AT 26				
First birth at age 26–31				
No regular relationship (ref)	16.9	1.0	1.0	1.0
Regular partner	28.6	1.8 (0.9–3.3)	1.6 (0.9–3.1)	1.6 (0.9–3.1)
Cohabiting	44.4	2.7 (1.6–4.6)	2.6 (1.5–4.3)	2.5 (1.5–4.2)
Married	59.0	3.6 (2.1–6.1)	3.4 (2.0–5.7)	3.4 (2.0–5.7)
		p=.21		
NO. OF SEXUAL PARTNERS BEFORE 21				
First birth at age 21–25				
0	13.3	0.8 (0.3–2.4)	1.6 (0.6–4.8)	1.6 (0.5–4.8)
1 (ref)	13.3	1.0	1.0	1.0
2–4	13.3	1.0 (0.5–2.1)	1.0 (0.5–2.1)	1.0 (0.5–2.0)
5–9	24.0	1.8 (0.9–3.5)	1.8 (0.9–3.5)	1.7 (0.8–3.3)
≥10	21.5	1.6 (0.8–3.4)	1.6 (0.8–3.4)	1.5 (0.7–3.2)
NO. OF SEXUAL PARTNERS AT AGE 21–25				
First birth at age 26–31				
0	12.5	0.2 (0.0–1.5)	0.4 (0.1–2.6)	0.5 (0.1–2.6)
1 (ref)	40.6	1.0	1.0	1.0
2–4	37.2	0.9 (0.7–1.3)	0.9 (0.7–1.3)	0.9 (0.6–1.3)
5–9	37.0	0.9 (0.6–1.3)	0.9 (0.6–1.3)	0.9 (0.6–1.3)
≥10	35.5	0.9 (0.5–1.5)	0.9 (0.5–1.5)	0.8 (0.5–1.5)
		p=.13		

†Includes years sexually active as exposure. ‡Includes years sexually active as exposure and abortion prior to a first birth as a covariate. *Notes:* p values are from Wald tests and indicate whether associations differ by age period at first birth. ref=reference category.

Our study found that those who experienced a failed pregnancy were more likely than others to have a first birth between ages 21 and 31. This contradicts the initial hypothesis that failed pregnancy would delay first birth because it is a biological constraint. This initial hypothesis was supported by survey data from the United States and Greece.[28,29] However, there are several important differences between samples. The U.S. survey covered women aged 35–45 in 1970; these women were nearing, or at the end of, their reproductive years, in an era when postponement was not yet common.[28] The survey from Greece was more recent (1999), but included only married women aged 18–49, who may have had quite different fertility intentions from our sample.[29] Indeed, differences in intentions were suggested to explain findings similar to ours from a longitudinal study in France of men and women aged 20–45.[23] That study suggested that both women and men with prior reproductive difficulties were nearly

twice as likely as those with no such difficulties to become parents between assessments, though the differences were not significant. Bias could explain the findings, as attrition was extremely high in the French study, but in our study, retention was excellent. If differences in intention could be documented, they might offer some plausible explanations for the finding in our cohort. First, a substantial proportion of these failed pregnancies likely were intended, and thus a subsequent pregnancy and live birth would be more likely. Second, the experience of a failed pregnancy may have altered fertility intentions because of feelings of loss or a changed perception of personal fecundity. Differences in intention may be offset when biological constraints increase as the cohort ages, and the hypothesized relationship of a lower likelihood of first birth may be evident at later ages. The observed relationship of an elevated likelihood of first birth found here, while stronger for women, was also displayed for men.

The associations between prior abortion and first live birth varied by gender and across age periods. That abortion was not associated with a delay in first birth for women was surprising, as it is an intentional fertility delay and represents an unwanted birth. This finding was also contrary to that from the survey of married women in Greece.[29] However, in a population-based sample such as ours, the fertility intentions of women who opt for an abortion may be quite similar to those of women who delay pregnancy with contraceptive use. In our sample, entry into parenthood at age 21–25, but not later, was more common for those who had had an abortion than for those who had not. The association for first birth at age 21–25 may indicate that fertility intentions change after abortion because of feelings of loss, or that similar patterns of behavior and contraceptive use persisted, leading to a subsequent pregnancy at a time when parenthood is an acceptable choice. The lack of association at age 26–31 may reflect that this is a normative time for entry into parenthood for all women.

Given the findings for women, the positive association for men between prior abortion and a first birth at age 26–31 is notable. However, abortion is inherently a different experience for men and women, and our results for men represent the cumulative reproductive history of multiple female partners. Although these men had a higher mean number of sexual partners at age 21–25 than those who did not report abortions, they did not at age 26–31. Similar proportions were in stable relationships at 26, but men reporting abortions were more likely than others to be cohabiting and were less likely to be married. This corresponds with the finding that marriage was very strongly associated with first birth, and would be consistent with these men's settling into stable relationships at an older age and having a corresponding lag in family formation. We would expect that contraceptive use would be similar or more consistent from age 26 by men with a prior abortion than for other men, as first-birth rates were lower from this age. However, at age 26, the reverse was true. Interpretation of measures of contraceptive use is difficult, as use is affected by a number of factors—for example, frequency of intercourse, fecundity and fertility intentions—and may change over time.

Strengths and Limitations

Strengths of this study are the longitudinal design using a community-based sample, with data on women and men and an exceptionally high rate of follow-up. The use of a computer-based questionnaire and the trust established over the years regarding confidentiality likely enhanced disclosure. Also, complete reproductive histories, with age at each conception, and information on sexual partnering were collected in a consistent manner at the three assessments. This allowed all exposures to be restricted to those that occurred prior to a conception leading to a birth. The longitudinal nature of the study allowed possible mechanisms to be explored and age patterns to be considered. The use of a birth cohort allows exploration of the issues free from cohort effects. Furthermore, with the extremely high retention, the differences evident here are unlikely to have been caused by selection bias and attrition.

Limitations include the reliance on self-reports of events. Faulty recall of the timing of events could have resulted in misclassification, as could the limitations of men's knowledge of their partners' reproductive histories. However, to minimize reporting errors regarding timing, a number of strategies were employed. At each interval, exposures were restricted to those occurring during earlier intervals, to ensure that temporal relationships were correct. Also, cumulative measures were constructed for failed pregnancy and abortion. Furthermore, the collection of information on reproductive events at multiple assessments enabled us to make a better estimate of prior reproductive events than we would have obtained from one period alone, particularly for men.[32] Because of data limitations, we could not consider the associations between similar measures of sexual partnering and births prior to age 21. Nor could we construct a full relationship history, as we did for reproductive events. Participants' relationship status and number of sexual partners were used to assess relative levels of opportunity for pregnancy and relationship stability, which may promote childbearing. Moreover, in some instances, there was not adequate power to yield definitive conclusions, as was evidenced by wide confidence intervals. Individuals who had been sterilized were included in the analyses; however, they likely represent an extremely low proportion of men and women in their 20s who had not had a child; thus, their inclusion is unlikely to have appreciably affected the findings.

Conclusions

Our study suggests that individuals who initiate intercourse early and those with relatively low relationship stability may become parents at young ages. This may lead to disadvantage for their children, who may be raised

in relatively unstable home environments. At older ages, greater relationship stability promotes parenthood.

Further research should examine the relationship between prior reproductive outcomes and first birth. A larger sample is required to adequately consider this in adolescence, when fertility intentions may be quite different than at older ages. Additional follow-up is required in this cohort for an examination of the association between failed pregnancy and first birth after age 31. The results for abortion and failed pregnancy further highlight the importance of examining fertility intentions prior to pregnancy, to better understand the importance of these factors.

One aspect of sexual partnering that was not considered is the role of sexual orientation and same-sex partnering. Research is needed that considers the association between sexual orientation and age at first birth, as well as the overall likelihood of becoming a parent. Moreover, sexual orientation and same-sex partnering may be highly relevant when considering the use of assisted reproductive technologies or how well fertility intentions and desires are fulfilled.

Our findings on age at first coitus and union formation illustrate the importance of considering proximal factors related to childbearing when attempting to evaluate more distal factors, such as adult socioeconomic status and education. Future research should examine the complex interrelationships between partnering and adult socioeconomic characteristics that were beyond the scope of this study.

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Acknowledgments

The study was funded by the Health Research Council of New Zealand, the U.S. National Institute of Mental Health and the United Kingdom Medical Research Council. The authors thank the participants and staff of the Dunedin Multidisciplinary Health and Development Study.

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