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Marriage and Cohabitation Outcomes After Pregnancy Loss

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Abstract

OBJECTIVE—The goal was to evaluate marriage and cohabitation outcomes for couples who experienced a live birth or fetal death at any gestational age.

METHODS—For married and cohabitating women who experienced live births, miscarriages, or stillbirths, we conducted a survival analysis (median follow-up period: 7.8 years), by using data from the National Survey of Family Growth, to examine the association between birth outcomes and subsequent relationship survival. The Cox proportional-hazards models controlled for multiple independent risk factors known to affect relationship outcomes. The main outcome measure was the proportion of intact marriages or cohabitations over time.

RESULTS—Of 7770 eligible pregnancies, 82% ended in live births, 16% in miscarriages, and 2% in stillbirths. With controlling for known risk factors, women who experienced miscarriages (hazard ratio: 1.22 [95% confidence interval: 1.08–1.38]; $P = .001$) or stillbirths (hazard ratio: 1.40 [95% confidence interval: 1.10–1.79]; $P = .007$) had a significantly greater hazard of their relationship ending, compared with women whose pregnancies ended in live births.

CONCLUSIONS—This is the first national study to establish that parental relationships have a higher risk of dissolving after miscarriage or stillbirth, compared with live birth. Given the frequency of pregnancy loss, these findings might have significant societal implications if causally related.

Keywords

miscarriage; stillbirth; pregnancy loss; marriage; cohabitation

Maintaining a long-term relationship can be challenging. In the United States, only 57% of all first marriages and 31% of all first cohabitations survive ≥15 years, and it is well recognized

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that external stressors may put relationships at increased risk.[1] Miscarriage (loss of a fetus before 20 weeks of gestation) and stillbirth (loss at ≥20 weeks but before birth) may be difficult, traumatic events for surviving parents. Men and women tend to grieve differently after pregnancy loss, and parents may find themselves in conflict over coping styles and other matters at an already-stressful time.[2] At present, there is very limited information about what happens to marriages of parents who experience miscarriages or stillbirths, with even less about outcomes for cohabitating parents. Because miscarriage affects ~15% of pregnancies and stillbirths affect close to 1% of US births, a substantial number of parents experience these losses.[3,4] This study used data from a national US survey on relationships and reproductive health to evaluate marriage and cohabitation outcomes for couples who experienced a live birth or fetal death at any gestational age of pregnancy.

METHODS

The National Survey of Family Growth (NSFG) surveyed a nationally representative, cross-sectional, probability sample of noninstitutionalized male and female subjects, 15 to 44 years of age, in the United States. The study used in-person and computer-assisted interviews to query subjects for detailed information on their family and reproductive histories. Cycle 6 (2002) of the NSFG collected data between March 2002 and March 2003 and included information from 7643 female respondents who reported 13 593 pregnancies . There was an 80% female response rate for the NSFG. Only births to women living with or married to a partner at the time of the birth were included. Women who had never been pregnant were excluded, as were women who were not in an intact cohabitation or marriage at the time of the infant's birth (ie, separated, divorced, widowed, or not cohabitating). Cohabitations in the NSFG were defined as women living with a male intimate partner.

We excluded current pregnancies (the birth outcome was still unknown), pregnancies that ended in voluntary terminations (the decision to terminate might be based on the stability of the relationship), and pregnancies that ended in the same month that a relationship ended (because the data could not measure intervals of <1 month). For the remaining pregnancies, we identified the pregnancy outcomes (coded as live birth, miscarriage, or stillbirth). Miscarriages were defined as involuntary pregnancy losses at gestational ages of <20 weeks and included ectopic pregnancies. Stillbirths were defined as involuntary pregnancy losses at ≥20weeks of gestation but before birth. Infant deaths were not included because the data did not identify time of death, and these events could not be matched to specific relationships. A review of the current literature identified several variables that were associated with relationship survival, and these were used as covariates, including mother's age at the time the relationship started and mother's race, income (household income above or below 200% of the poverty level), education (more than or less than a high school education), previous live births, and presence or absence of religious affiliation.[1]

For each pregnancy, we identified the relationship status of the mother at the time the pregnancy ended and then evaluated the duration and outcome of that specific relationship over time. We excluded cases in which the data needed to link a relationship to a birth were inconsistent or ambiguous (for example, when the mother reported overlapping dates of 2 cohabitations or reported cohabitating and being married at the same time). In 83 cases, the mother was living with a partner at the time of the birth but ended the relationship in the same month, which made it seem that the relationship lasted 0 months. To include these subjects in our analyses, we recoded duration of relationship from 0 to 0.5. We separately tested the effect of excluding these 83 cases from the analysis, but this had no significant impact on the results.

We conducted a survival analysis of marriage duration, with time 0 (the starting point) being the date of pregnancy outcome (delivery of a live-born infant or a fetal loss) and the end point

being the date the relationship ended. If the relationship was still intact at the time of the NSFG interview, then subjects were right-censored so that the interview date, rather than the date the relationship ended, was assigned as the cutoff point. When a woman was cohabitating at the time of the birth and later married the same partner, this was considered to be a single relationship. Unfortunately, if a relationship dissolved, the NSFG did not identify whether the woman's future cohabitations and/or marriages were reunions with the same partner or relationships with new individuals.

Because the duration of the relationship before the birth could affect the rate of dissolution, the analysis controlled for this variable. For cohabitations that transitioned to marriage, duration was a sum of any time spent living together plus time spent in marriage before the end of the pregnancy. Descriptive statistics are reported for the interviewed cohort and with survey-weighting. Survival analysis using a Cox proportional-hazards model was used to obtain estimates of association of fetal loss with the risk of relationship dissolution. In addition to marriage duration before birth, the model controlled for various subject-level covariates, including race, maternal age at the time a relationship started, income (above or below the median), level of education (above or below high school level), presence or absence of religious affiliation, type of relationship (marriage, cohabitation resulting in marriage, or cohabitation not resulting in marriage), and history of a previous live birth to the mother. The model further controlled for all variables used for stratification in the complex sampling methods of the NSFG. There was no excessive multicolinearity identified through tolerance testing, and Schoenfeld's test demonstrated no violation of the proportional-hazards assumption. SEs of the hazard ratio estimates were adjusted for clustering attributable to a single mother potentially having >1 birth. The proportional-hazards assumption was tested for all covariates of interest by using the Schoenfeld residuals obtained from the Cox model. All analyses were conducted by using StataSE 10.1 (Stata, College Station, TX).

RESULTS

Of the 13 593 pregnancies in the NSFG, 4898 cases were excluded because the mother was not cohabitating or married at the time of the birth and so it was not possible to track relationship outcomes. A total of 324 pregnancies were excluded because they were still in progress at the time of the survey, 79 cases were excluded because information needed to determine the relationship at the time of the birth was conflicting or ambiguous, and 522 cases were excluded because the pregnancy was terminated through voluntary abortion. These exclusions left 7770 pregnancies to 3707 different mothers.

Of the 7770 pregnancies, 6409 (82%) ended in live births, 1225 (16%) in miscarriages, and 136 (2%) in stillbirths. There were significant differences between women with and without fetal losses (Table 1). Compared with women with live births, women with fetal losses were more likely to have higher household incomes and to be cohabitating rather than married. White women and women with higher educational attainment were more likely to have a miscarriage, whereas black women and women with lower educational attainment were more likely to have a stillbirth (Table 1). Women with losses also tended to be slightly older than women with live births at the time their current relationship began.

In the majority of cases, relationships involved first marriages or cohabitations. Of the 6423 births to women who were married or in a cohabitation that transitioned to marriage, 90% involved first marriages. Of the 1347 births to cohabitating women (not in a cohabitation ending in marriage), 78% involved first cohabitations. The median follow-up period for the survival analysis was 7.8 years.

Multivariate analysis using a Cox proportional-hazards model found several of our covariates to be statistically significant risk factors for relationship dissolution, including lower maternal age, cohabitation, previous live birth, black race, and shorter duration of relationship (Table 2). Even with controlling for known risk factors for relationship dissolution, women with miscarriages (hazard ratio: 1.22 [95% CI: 1.08–1.38]; $P = .001$) and stillbirths (hazard ratio: 1.40 [95% CI: 1.10–1.79]; $P = .007$) had higher risks of their relationships ending, compared with women whose pregnancies ended in live births (Table 2). As can be seen in Fig 1, most of this effect after miscarriages occurred between 1.5 and 3 years after the loss. In contrast, the effect for stillbirths persisted for up to 9 years after the loss. Interaction effects between the birth outcomes and each of the other independent variables were tested but revealed no significant interactions.

DISCUSSION

Pregnancy loss affects many couples every year. This is the first national study to establish that parental relationships have a higher risk of dissolving after a miscarriage or stillbirth, compared with a live birth. Although most of the effect after miscarriages was seen in the first 2 or 3 years, the effect after stillbirths persisted for nearly a decade. Although the size and duration of the effect were substantially greater for stillbirths than for miscarriages, miscarriages are quite common, and an increased hazard of 1.22 after miscarriage has important societal implications if the findings are causally related.

Although a causal mechanism cannot be assumed solely on the basis of the temporal relationship found in this observational study, there are plausible mechanisms by which miscarriage could increase relationship dissolution. The risk of relationship dissolution was appreciable in all socio-demographic groups, with >40% of relationships among women with live births dissolving within 10 years. However, fetal loss may be a significant source of additional stress in a relationship and, although the majority of couples are able to adjust to a loss and may even grow closer, there may be a subgroup whose relationships are particularly vulnerable to this major stress. Couples with an unstable relationship before the pregnancy and those with other risk factors for breaking up may find themselves unable to sustain their relationship after a miscarriage or stillbirth. It also is possible that having a live birth is protective, rather than miscarriage increasing dissolution rates.

Most of the existing research on parental risk of separation involves parents who have endured the loss of a child between birth and adulthood. However, the estimated risk of parental separation after the loss of a child has been quite controversial. Early studies reported a dramatically high risk, but others noted that those reports suffered from significant methodologic limitations, including lack of control groups, short follow-up periods, substantial study selection biases, and very small sample sizes.[5] Unfortunately, many newer studies have the same limitations; therefore, it has been difficult to ascertain true risk.[6] However, a recent, large, well-designed evaluation of parents surveyed nearly 20 years after their child's death reported that bereaved parents had a 30% rate of marital disruption, compared with 24% for 428 nonbereaved control subjects, which represents a significant difference between the groups.[7]

In the area of pregnancy loss, researchers demonstrated substantial marital strain resulting from the loss, but the size or design of most of those studies did not allow evaluation of relationship outcomes. One large study of parents interviewed 6 to 8 months after perinatal or infant loss found that 4% of bereaved parents ($N = 428$) had already experienced dissolution of their marriage or cohabitation, compared with 1% of nonbereaved control subjects ($N = 428$).[8] A survey of mothers 2 years after unexpected pregnancy loss found no difference in marital satisfaction but a higher divorce/separation rate (5.8% for parents with loss, compared with

3.7% for non-bereaved control subjects).[9] However, researchers for that survey concluded that loss was not a risk factor for breaking up, presumably because of small overall numbers and the potential for response bias. A recent UK study identified pregnant women either with no children or with previous pregnancy losses after 18 weeks of gestation. At follow-up times of 6 to 8 years, 37% of women (19 of 52 women) with previous losses reported breakdown of a partnership, compared with just 12% of control mothers (6 of 51 women).[10] Although our findings are based on a retrospective design and have potential recall bias, the study design does benefit from a large sample size, long follow-up periods, capture of longitudinal changes rather than cross-sectional analysis, use of a control group, and a lack of systematic selection bias.

These findings also present new information about risks to cohabitating couples. More than one-third of US births are to unmarried women, and it is estimated that one-half of unmarried parents are living together at the time of the birth; therefore, these findings apply to a significant proportion of US parents.[11,12] Data have shown that cohabitating couples are at higher risk of separation in general and, in our study, cohabitating parents accounted for more than one-half of the relationship separations after fetal loss. However, it is important to note that the relative increases in relationship dissolution rates after loss were very similar for married and cohabitating couples; the absolute effect was greater for cohabitating couples because of their higher baseline risk. National data trends show younger women and black women in the general population to be at higher risk for relationship instability, and our study suggests that these risks persist in the subgroup of women with pregnancy losses.[1] More study on the psychosocial impact of pregnancy losses in different populations might clarify some of these findings.

Women with stillbirths had a particularly high risk of relationship dissolution, and this risk persisted for up to 9 or 10 years, in contrast to miscarriages, for which the entire effect occurred over a 1.5- to 3-year period. Although it is well recognized that parents form attachments very early after conception, later losses allow for an even longer period for attachment and therefore may cause more psychological trauma and a longer duration of psychological stress.[2] Unlike with most miscarriages, both mothers and fathers of stillborn children often have experienced the infant kicking and have heard fetal heart sounds, which potentially makes the infant and the anticipated birth more tangible to both parents. In addition, there are clear gender differences in how individuals cope with death, and these can be significant for couples facing a major loss; parents with significantly different grieving patterns may be at particularly high risk for subsequent marital conflict or emotional withdrawal.[13–19]

The finding that a previous live birth was associated with greater hazard for relationship dissolution was somewhat surprising, because previous research measuring the effect of children on relationship stability suggested that, in general, the presence of younger children improves or is neutral in the stability of marriages and cohabitations, whereas older children may represent a risk for separation.[20–22] However, some studies found premarital births to be significantly disruptive to relationship stability and, in our analysis, one-fourth of women entering a marriage and one-half of women entering a cohabitation already had children, which suggests high levels of premarital births or possibly births with different partners.[21] In addition, studies on longitudinal relationship stability typically relied on existing data that were retrospective, were limited to younger women, or focused on relationships that started in the 1970s or 1980s.[20–22] It is likely that attitudes about marriage and cohabitation, as well as the impact of children on those relationships, have changed significantly in the preceding 2 decades.

Although these data are subject to recall bias by the mother, relying on self-reported marital status, relationship outcomes, and birth information, we have no reason to suspect systematic bias among the 3 birth-outcome groups evaluated. Although we noted a strong temporal

association of greater relationship dissolution after fetal loss, the study design cannot prove that one event was the cause of the other. Although the NSFG did not identify whether subsequent marriages and cohabitations were reunions with a previous spouse or cohabitation partner, we suspect this did not occur with enough frequency to affect the results significantly. In addition, there are a number of variables that were not measured in these data that are associated with the ending of relationships. For example, lower quality of the relationship before the loss, lower parental age, and greater grief and mental distress have all been associated with reduced relationship satisfaction.[9,23,24] One interesting hypothesis to consider is whether there might be characteristics that not only put a couple at risk for separation but also place their pregnancy at risk for miscarriage or stillbirth. For example, mental illness, such as depression and anxiety, has been associated with pregnancy loss and can be stressful for a relationship.[25] Although we controlled for such factors in the analysis as best we could, it is plausible that, in addition to mental illness, substance abuse, domestic violence, or chronic medical diseases might pose a danger for both the couple's relationship and the pregnancy outcome. Such influences warrant further exploration in subsequent research.

Understanding how a fetal loss affects the stability of the parental relationship has important implications for counseling and supporting couples after pregnancy loss. Although many parents find that a loss brings them closer together, the event also may create significant relationship stress. This study finds that married and cohabitating parents are at significantly greater hazard for separation after miscarriage, and this risk is even higher after stillbirth. Providers who care for bereaved families should recognize that, for some families, the stability of parental relationships may be at increased risk after loss, and they should consider whether selected parents would benefit from relationship support or counseling. Additional research is warranted to identify the specific risks and protective factors that influence relationship survival and to evaluate whether specific bereavement interventions can improve long-term marriage and cohabitation outcomes after miscarriages and stillbirths.

WHAT'S KNOWN ON THIS SUBJECT

When a child dies, parents are at slightly higher risk of divorce. Relationship outcomes for married and cohabitating parents who experience a miscarriage or stillbirth are largely unknown.

WHAT THIS STUDY ADDS

This is the first national study to establish that parental relationships have a higher risk of dissolving after miscarriage or stillbirth, compared with live birth. Given the frequency of pregnancy loss, these findings might have significant societal implications.

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ABBREVIATION

NSFG	National Survey of Family Growth

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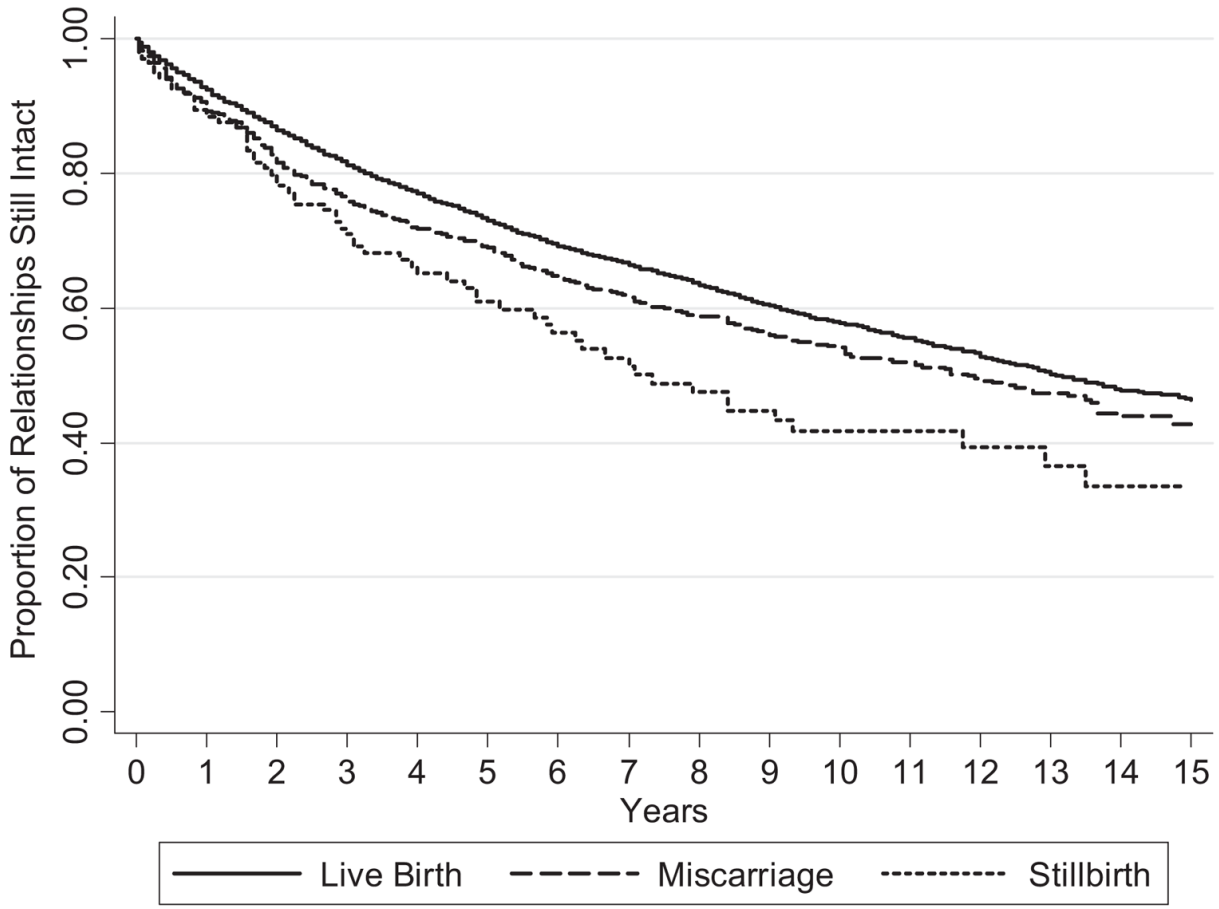

Number at Risk	0 Years	3 Years	6 Years	9 Years	12 Years	15 Years
Live Birth	6409	4234	2713	1634	875	392
Miscarriage	1225	739	474	265	142	72
Stillbirth	136	79	47	30	15	6

Number at risk indicates the number of women who are still in an intact relationship at each time point after the birth.

FIGURE 1.
Kaplan-Meier curves indicating survival of relationships after live births, miscarriages, or stillbirths.

TABLE 1

Maternal Risk Factors for Relationship Dissolution, According to Birth Outcome

	Live Birth (*N* = 6409)	Miscarriage (*N* = 1225)	Stillbirth (*N* = 136)
Age, mean ± SD, y[a]	21.5 ± 4.3	22.3 ± 4.8	22.4 ± 5.5
Race, %			
White	83	15	1.4
Black	82	15	2.3
Other	86	11	2.1
Lower education, %[b,c]	49	43	51
Lower income, %[b,d]	44	38	53
No religious affiliation, %	11	12	6

[a] $P < .005$.

[b] $P < .05$.

[c] Lower education indicates ≤ high school.

[d] Lower income indicates ≤200% of the poverty level.

TABLE 2

Independent Risk Factors for Relationship Dissolution

	Hazard Ratio (95% Confidence Interval)
Miscarriage (vs live birth)[a]	1.22 (1.08–1.38)
Stillbirth (vs live birth)[a]	1.40 (1.10–1.79)
Older maternal age (per 1 y)[a]	0.93 (0.92–0.95)
Cohabitation (vs marriage)[a]	3.15 (2.75–3.61)
Any religious affiliation	0.85 (0.72–1.00)
Previous live birth[a]	1.24 (1.12–1.37)
>200% of poverty level[a]	0.70 (0.62–0.81)
Black race (vs white)[a]	1.25 (1.10–1.45)
Other race (vs white)	0.87 (0.71–1.07)
Education more than high school	1.14 (1.00–1.30)
Duration of relationship (per 1 y)[a]	0.99 (0.99–0.99)

The multivariate survival analysis controlled for maternal age at the start of the relationship, whether the relationship was cohabitation or marriage, the presence of religious affiliation, maternal history of live birth, income, race, education, and duration of the relationship before the birth.

[a] $P < .05$.