Determinants of Depressive Symptoms in the Early Weeks after Miscarriage

ABSTRACT

Objectives. We tested whether and under what conditions miscarriage increases depressive symptoms in the early weeks following loss.

Methods. We interviewed 232 women within 4 weeks of miscarriage and 283 pregnant women and 318 community women who had not recently been pregnant. Depressive symptoms were measured with the Center for Epidemiologic Studies Depression (CES–D) Scale.

Results. Among women who had miscarried, the proportion who were highly symptomatic on the CES–D was 3.4 times that of pregnant women and 4.3 times that of community women. Among childless women, the proportion of women who had miscarried who were highly symptomatic was 5.7 times that of pregnant women and 11.0 times that of community women. Women who had miscarried were equally depressed regardless of length of gestation; among pregnant women, depressive symptoms declined with length of gestation. Among women who had miscarried, symptom levels did not vary with attitude toward the pregnancy; among pregnant women, depressive symptoms were elevated in those with unwanted pregnancies. Prior reproductive loss and advanced maternal age (35+ years) were not associated with symptom levels in any cohort.

Conclusions. Depressive symptoms are markedly increased in the early weeks following miscarriage. This effect is substantially modified by number of living children, length of gestation at loss, and attitude toward pregnancy. (*Am J Public Health.* 1992;82:1332–1339)

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Introduction

Twelve to fifteen percent of clinically recognized pregnancies end in spontaneous abortion;[1] approximately half a million women miscarry annually in the United States alone.[2] For many women, miscarriage is an unanticipated and physically traumatic event signaling an abrupt disruption of reproductive plans. It may also prompt doubts about reproductive competence and thereby provoke a loss of self-esteem. Despite these considerations and repeated calls in the medical and lay literature for studies of the emotional effects of reproductive loss,[3–6] systematic observational studies of the psychological impact of miscarriage are rare. We have located only four published studies that focused exclusively on miscarriage,[7–10] and six that included miscarriage in an investigation of perinatal death.[11–16] In general, these studies are compromised by small sample sizes that limit both the generalizability of their results and the use of statistical adjustment for potentially confounding factors. More importantly, these investigations' lack of a comparison group unexposed to recent reproductive loss precludes determination of the overall size of the effect of miscarriage on psychiatric symptoms and the role of potentially moderating factors, such as maternal age and number of living children.

The frequency of miscarriage as an adverse reproductive outcome and the expectation that it will raise maternal risk for depressive symptoms makes assessment of its psychological impact an important public health question. We investigated whether and under what conditions miscarriage was associated with a substantial increase in depressive symptoms. In this paper we report results for the first few postabortion weeks. We hypothesized that miscarriage would raise the level of depressive symptoms in this early period after loss and that the magnitude of the effect would vary with characteristics of the woman, her pregnancy, her attitude toward the pregnancy, and her reproductive history. Specifically, we hypothesized that the effect of miscarriage would be greater in women with few or no living children, in those with a history of prior reproductive loss, in those with a positive attitude toward the pregnancy, and in those aged 35 years or older. Further, we hypothesized that the impact of miscarriage would increase with length of gestation at the time of loss. We tested these hypotheses by comparing levels of depressive symptoms in women who had miscarried with those in

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two other groups of women, both unexposed to recent reproductive loss.

Methods

Study Design

The study comprised three cohorts: women who had miscarried, currently pregnant women, and women in the community who had not been pregnant in the preceding year. The pregnant cohort afforded an estimate of the level of depressive symptoms to be expected in an uninterrupted pregnancy; the community cohort, the level of such symptoms in the absence of any recent reproductive event.

Miscarriage and Pregnant Cohort

In this study miscarriage is defined as the involuntary termination of a nonviable intrauterine pregnancy before 28 completed weeks of gestation. The miscarriage and pregnant cohorts were taken from the case subjects and control subjects, respectively, of a hospital-based case-control investigation of risk factors for miscarriage.[17] The case-control study attempted to interview all women attending a New York City hospital for a miscarriage (cases) from late 1984 to 1986. The control patients were drawn from women registered for prenatal care before 22 weeks' gestation and selected to be similar to case subjects in age and payment status (i.e., private or public).[18] The case-control study succeeded in interviewing 81% of identified case and control subjects. Among women who had miscarried and pregnant women, interviewed and uninterviewed subjects in the case-control study were distributed similarly on sociodemographic and reproductive characteristics.[17,19]

At the conclusion of the case-control interview, women who had miscarried and pregnant women who were 18 years old or older, English- or Spanish-speaking, and accessible by telephone were invited to enter the present investigation, which was separate from the case-control study. For pregnant women, we required further that the case-control interview occur before 28 completed weeks' gestation.

For the present study, we interviewed 232 women within 4 weeks of miscarriage; 85% were interviewed between days 7 and 15 after loss (Table 1). These women represented 70% of the eligible subjects then available from the case-control study. (Of the remainder, approximately half declined to participate altogether. The rest could not be scheduled for an interview within this narrow time frame but were evaluated in subsequent months. Together with later recruits from the case-control study, these subjects constitute material for a separate report.[20])

Seventy-two percent (283) of the eligible pregnant women were interviewed, most in their second trimester. Twenty percent refused to participate in the study; the remainder postponed the study interview beyond 28 weeks' gestation. Interviewing of women who had miscarried and pregnant women was concluded in 1987.

Community Cohort

Recruits for the community cohort were located by random dialing of telephone numbers. They were residentially stratified by the area codes and exchanges of interviewed women who had miscarried. A screening interview determined whether an eligible subject—a woman aged 18 to 44 years who had not been pregnant in the preceding 12 months—resided at the location. (Eligibility status was determined for 92% of working telephone numbers.) Community women were frequency-matched to the miscarriage cohort on language and season of interview, age (in 5-year intervals), and education (less than high school, high school graduate, college graduate, postgraduate training). Ethnicity was also recorded. Eighty-two percent (318) of known eligible community women were interviewed; the remainder declined to participate in the study. Community interviews were conducted in 1986 and 1987.

Comparability of Interviewed and Uninterviewed Study-Eligible Subjects

Within each cohort, interviewed and all uninterviewed eligible women were generally similar in age, ethnicity, education, and language and season of interview. Interviewed and uninterviewed women who had miscarried and pregnant women (on whom additional sociodemographic data were available from the case-control study) did not differ in marital status, parity, length of gestation or prior reproductive loss. However, as we will explain, public patients with miscarriages were given priority when in-hospital interviews in the case-control study were scheduled. As a result, among miscarrying subjects, women interviewed in the early weeks after loss tended to be disproportionately Black and Hispanic and less educated than uninterviewed women.

At the time of recruitment, women who had miscarried and pregnant women entering in the second half of the study, and all community women, were administered a version of an established single-item measure of depressed mood.[21] Within each cohort, the adjusted mood scores of interviewed and uninterviewed women were indistinguishable, suggesting that the affective state of the women successfully interviewed in our study was representative of study-eligible women generally.

Study Measures

Depressive symptoms were evaluated by means of the Center for Epidemiologic Studies Depression (CES–D) Scale,[22] a 20-item symptom checklist that asks about the presence and duration of symptoms in the preceding 7 days. This scale measures affective and somatic aspects of depressive symptomatology and low self-esteem. Scale items offer a fixed, alternative-choice format for subjects' responses regarding symptom frequency, scored from 0 ("rarely") to 3 ("most of the time"); item scores are summed to produce an overall index. The CES–D correlates well with other self-report measures of depressive symptoms, distinguishes clinically depressed patients from the general population,[22–24] and has been used previously with samples of pregnant women.[25] The CES–D scores of our subjects were associated with their scores on the single-item measure of mood administered several weeks earlier. Internal consistency reliabilities (Cronbach's alpha) of the CES–D in our three study cohorts overall and in language, ethnic, and educational subgroups within cohorts are excellent (.83 to .92).

We assessed attitudes toward the pregnancy in women who had miscarried and pregnant women with three items concerning the woman's wish to conceive, her emotional reaction to learning of her pregnancy, and her consideration of elective abortion. A subject's score could range from 0 to 12. A woman who had been trying to conceive, who reported being "very happy" when she learned she was pregnant, and who had given no thought to an elective abortion received a score of 12. A woman who did not want to become pregnant, who indicated being "very unhappy" about being pregnant, and who had actually scheduled an elective abortion before she miscarried scored 0. The internal consistency reliabilities of this scale in our two obstetric cohorts overall and in sociodemographic sub-

TABLE 1—Selected Sociodemographic and Reproductive History Characteristics of Women in Cohorts

	Cohort		
	Miscarriage (n = 232)	Pregnant (n = 283)	Community (n = 318)
Sociodemographic Characteristics			
Mean age, y (SD)	29.2 (6.3)	29.0 (5.7)	30.0 (6.4)
Ethnicity, %*			
White	25.4	36.4	36.6
Black	23.3	15.5	19.6
Hispanic	43.5	44.9	38.2
Other	7.8	3.2	5.7
Interviewed in Spanish, %	33.6	25.8	26.4
Education, %*			
< High school	30.6	24.7	20.3
High school graduate	26.7	20.9	24.5
Some college	23.7	25.8	29.7
College grad +	19.0	28.6	25.5
Marital status, %**			
Currently single	27.6	22.6	46.5
Married	57.8	60.8	35.2
Other	14.6	16.7	18.3
Hospital payment status**			
Private, %	28.4	39.2	...
Reproductive Characteristics			
Nulliparous, %**	35.3	34.6	50.5
No. living children, %**			
0	36.6	35.3	50.5
1	25.0	37.8	15.7
2	22.8	18.4	19.7
3+	15.5	8.5	14.1
No. prior reproductive losses, %[a]**			
0	63.8	71.0	82.5
1	21.6	20.8	12.9
2+	14.7	8.2	4.6
Length of gestation, %[b]**			
First trimester	62.5	1.4	...
Second trimester	37.5	83.7	...
Third trimester	...	14.8	...

Note. Differences among the three groups were evaluated by an overall chi-square test for categorical variables and by a one-way analysis of variance for continuous variables.
[a]Includes spontaneous abortions (89.6%), fetal deaths (3.7%), ectopic pregnancies (3.2%), and neonatal deaths (3.4%).
[b]For the miscarriage cohort, the gestation interval refers to the time from last menstrual period (LMP) to date of expulsion of the conceptus; for pregnant women, the interval is from LMP to the miscarriage study interview. First trimester = ≤ 13 completed weeks' gestation; second trimester = 14 through 26 completed weeks' gestation; third trimester = > 26 completed weeks' gestation.
*$P < .05$. **$P < .01$.

groups are acceptable (.68 to .78). More importantly, the scale correlated strongly with contraceptive use, pregnancy status, and reproductive plans at 6 months after loss, thereby affording evidence of its predictive validity in the miscarriage cohort and suggesting that subjects were not simply reporting positive, more socially acceptable attitudes toward their pregnancies.

Procedure

The CES–D, together with the remainder of the interview questions covering reproductive history, sociodemographic characteristics, and aspects of social functioning, was administered by telephone. The general comparability of sociodemographic, psychiatric symptom, and medical history data obtained from telephone and in-person interviews is well documented.[26–28]

The content of the interview precluded blinding interviewers to subjects' group membership. However, the possibility that interviewers influenced subjects' responses was minimized by the use of a fully structured questionnaire with fixed response options and monthly training sessions proscribing ad hoc interviewer probes. Compliance with this aspect of the study protocol was confirmed by periodic auditing of taped interviews by the first author.

Analytic Strategy

CES–D depressive symptom levels are reported in terms of symptom means for each cohort and in terms of proportions of women who were highly symptomatic. Women were considered highly symptomatic if they received CES–D scores of 30 or more, which meant that they reported having at least half of the 20 depressive symptoms most of the time for a week or longer. Analyses using these proportions assessed whether findings based on the entire range of symptom scores held true for extreme symptom levels. Approximately two thirds of the women scoring ≥30 would be expected to meet diagnostic criteria for major depressive disorder.[29]

For descriptive purposes, the observed CES–D means for each cohort overall and by selected characteristics are provided at the outset (Table 2). Comparison of means within cohorts is accomplished with one-way analyses of variance.

Formal analyses of differences in means and proportions across cohorts were conducted using ordinary least squares multiple regression and maximum likelihood logistic regression, respectively, to permit adjustment for potentially confounding variables. Candidate variables for adjustment in these multivariate analyses were drawn from an a priori list of potential confounding variables (e.g., marital status) and moderating variables (e.g., maternal age). (The matching variables for the community cohort were also introduced as covariates, both as main effects and as all possible two-way interaction effects. The latter terms did not materially influence the regression coefficients of interest here. Hence, for parsimony they are omitted from the final regression equations.) Screening for potential confounders in the data set (with reference to the

remaining characteristics, listed in Table 1) did not disclose other variables requiring analytic control. The regression equations comparing the women who miscarried and the community women contained the following terms: marital status, maternal age (linear), ethnicity, socioeconomic status (using a standardized index that assigns equal weight to maternal education and family income), number of living children, and prior reproductive loss. Equations comparing the women who miscarried and the pregnant women added payment status, length of gestation at miscarriage/interview (linear), and attitude toward the pregnancy.

Results from the least squares regression analyses are presented in the form of the difference in adjusted means between the miscarriage cohort and a comparison cohort; results from logistic regression analyses are presented as the ratio of the adjusted proportion of highly symptomatic women in the miscarriage cohort to the adjusted proportion of highly symptomatic women in a comparison cohort (Table 3).[30] (Corresponding odds ratios are provided in the notes to the relevant table.) The association of a particular characteristic, for example, number of living children, with depressive symptoms within each cohort is measured by the unstandardized regression coefficient *b* (see Figure 1 notes). The slope *b* indicates the change in CES–D score per unit change in the characteristic of interest. The possibility that the effect of miscarriage varies with the number of living children or, specifically in the miscarriage-pregnant comparison, with length of gestation or attitude toward pregnancy, was tested as a first-order interaction term in the regression analysis. Significant interaction terms were introduced as "centered" terms into all equations from the outset. For example, in calculating the adjusted difference in CES–D means between women who miscarried and pregnant women (Table 3), the estimated differences between cohorts were represented at the mean values for number of living children, length of gestation, and attitude toward the pregnancy.

Unless indicated otherwise, statistical significance is assessed at $P < .05$.

TABLE 2—Center for Epidemiologic Studies Depression Scale Means of Women in Cohorts, Overall and by Selected Characteristics

	Cohort					
	Miscarriage (n = 232)		Pregnant (n = 283)		Community (n = 318)	
	Mean	(SE)	Mean	(SE)	Mean	(SE)
Overall	24.0	(0.8)	15.2	(0.7)	14.6	(0.8)
Sociodemographic Characteristics						
Age, y						
18–24	26.7	(1.5)*	18.0	(1.4)**	14.3	(1.3)
25–34	23.2	(1.2)	15.0	(0.8)	15.0	(0.9)
35+	22.3	(1.6)	12.8	(1.6)	13.9	(1.3)
Education						
< High school	25.0	(1.5)*	18.1	(1.4)****	20.7	(1.6)****
High school graduate	25.5	(1.7)	17.9	(1.7)	18.1	(1.4)
Some college	23.8	(1.7)	15.7	(1.2)	11.7	(0.9)
College grad +	20.3	(1.6)	10.4	(1.0)	11.0	(1.1)
Marital status						
Married	22.3	(1.1)*	12.4	(0.7)****	12.4	(1.0)***
Currently single	26.4	(1.6)	20.4	(1.5)	14.6	(0.9)
Other	25.8	(2.0)	18.6	(1.9)	18.6	(1.5)
Hospital payment status						
Private	19.9	(1.4)	10.0	(0.8)	...	
Public	25.6	(1.0)	18.6	(0.9)	...	
Reproductive History Characteristics						
No. living children						
0	26.0	(1.3)**	12.7	(1.0)***	13.6	(0.8)***
1	25.0	(1.6)	14.9	(1.0)	14.6	(1.8)
2	20.7	(1.6)	20.0	(1.8)	14.4	(1.3)
3+	22.1	(2.3)	16.7	(2.6)	20.2	(1.9)
No. prior reproductive losses						
0	23.9	(1.0)	15.1	(0.8)	14.3	(0.7)
1	25.8	(1.8)	15.1	(1.4)	18.6	(2.1)
2+	21.6	(2.3)	16.1	(2.3)	13.6	(3.5)
Length of gestation[a]						
First trimester	23.4	(1.0)	20.0	(5.1)*	...	
Second trimester	24.8	(1.3)	15.6	(0.7)	...	
Third trimester	...		12.8	(1.6)	...	
Attitude toward pregnancy[b]						
Wanted	24.1	(1.8)	11.1	(0.9)****	...	
Mixed	24.1	(1.0)	15.1	(0.9)	...	
Unwanted	23.1	(2.2)	25.6	(1.9)	...	

Note. *P* values are derived from ANOVA tests for within-cohort differences in means. For age, education, number of living children, number of prior reproductive losses, length of gestation, and attitude toward pregnancy, *P* values pertain to two-tailed ANOVA tests for linearity, using 1 degree of freedom.

[a]First trimester = ≤ 13 completed weeks' gestation; second trimester = 14 through 26 completed weeks' gestation; third trimester = > 26 completed weeks' gestation.

[b]In both the pregnant and miscarriage cohorts, roughly 15% of the women indicated unequivocally that they did not want the pregnancy. Approximately 55% indicated exclusively positive feelings of wanting the pregnancy, and the remainder expressed some reservations about their pregnancies.

*$P < .10$; **$P < .05$; ***$P < .01$; ****$P < .001$.

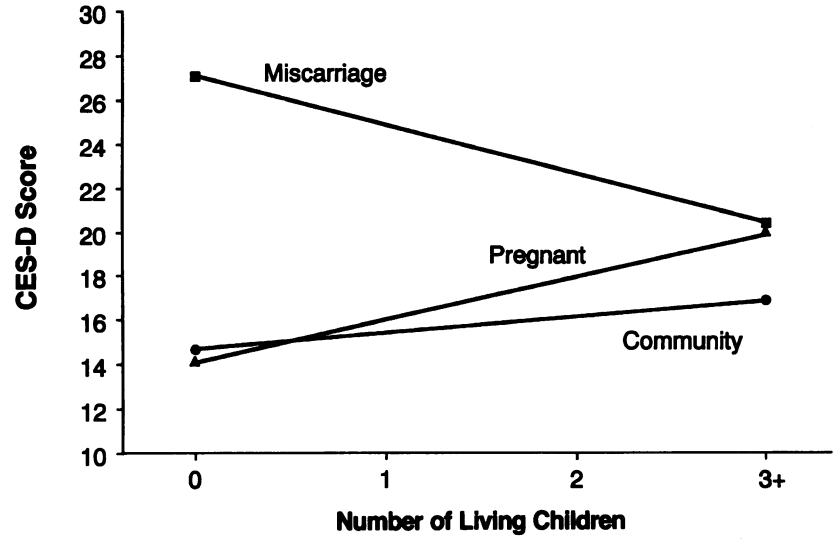
Sample Characteristics

Community women were selected to be sociodemographically similar to all interviewed women who had miscarried, including those assessed only in later months of the study. However, the case-control study gave priority to conducting in-hospital interviews with miscarrying women who were public patients; private patients were judged easier to reach after discharge. As a consequence, public patients are overrepresented among women interviewed in the present study in the early postabortion weeks. Therefore, the miscarriage cohort in this report differs from the other two groups in those characteristics associated with payment status, for example, ethnicity and educational level (Table 1). Also, as expected, the two obstetric cohorts contain a lower

TABLE 3—Center for Epidemiologic Studies Depression Scale (CES–D) Means and Proportions of Highly Symptomatic Women

	Miscarriage Cohort (n = 232)	Pregnant Cohort (n = 283)	Community Cohort (n = 318)
Means			
Observed CES–D mean (± SE)	24.0 (± 0.8)	15.2 (± 0.7)	14.6 (± 0.8)
Adjusted difference in means[a] (95% CI) between the miscarriage cohort and this cohort		7.5 (4.5, 10.5)	9.1 (6.9, 11.2)
Proportions			
Observed % scoring ≥ 30 (± SE)	36.2 (± 3.2)	12.4 (± 2.0)	10.1 (± 1.7)
Adjusted ratio of proportions[a] (95% CI) of highly symptomatic women in the miscarriage cohort to proportions of highly symptomatic women in this cohort		3.4 (2.0, 5.0)[b]	4.3 (3.0, 5.8)[c]

[a]Means are adjusted by ordinary least squares multiple regression analysis, proportions by maximum likelihood logistic regression analysis.
[b]The odds ratio for this comparison is 4.9 (95% CI = 2.4, 10.0).
[c]The odds ratio for this comparison is 6.2 (95% CI = 3.6, 10.5).



Note. CES–D = Center for Epidemiologic Studies Depression Scale. The slope of each line (*b*) represents the unstandardized regression coefficient for the term for number of children, from within-cohort least squares multiple regression. In the pregnant cohort, $b = 1.3$ per child (95% CI = −0.1, 2.8), $P < .11$; in the miscarriage cohort, $b = -2.1$ per child (95% CI = −3.8, −0.3), $P < .02$; in the community cohort, $b = 0.73$ per child (95% CI = −0.72, 2.2), $P < .32$. The interaction term in the pregnant/miscarriage analysis (cohort by number of children) is significant at $P < .002$. The interaction term in the community/miscarriage analysis is significant at $P < .0004$.

FIGURE 1—Number of children and adjusted CES–D scores in miscarriage, pregnant, and community cohorts.

proportion of nulliparous women and a higher proportion of women with prior reproductive loss than does the community cohort. The regression analyses adjust satisfactorily for the possible effect of these sociodemographic and reproductive history differences between cohorts on depressive symptoms.

Results

Overall CES–D Means and Proportions of Women Highly Symptomatic

Depressive symptom levels were higher in women who had miscarried than in women in the pregnant and community cohorts. The observed symptom mean of the miscarriage cohort was 24.0 (Table 2); 36.2% of the subjects were highly symptomatic (Table 3). In adjusted analyses, the mean of the miscarriage cohort exceeded those of the pregnant and community cohorts by 7.5 and 9.1 points, respectively (Table 3). Similarly, in adjusted analyses, the proportion of subjects highly symptomatic in the miscarriage cohort was 3.4 and 4.3 times the proportion in the pregnant and community cohorts, respectively (Table 3).

Number of Living Children

The presence of children strongly influenced the effect of miscarriage on depressive symptoms. In the pregnant and community cohorts, the observed symptom means exhibit a significant increase with an increase in the number of children. By contrast, in the miscarriage cohort, depressive symptoms declined with increasing numbers of children (Table 2). These differences are sustained in multivariate analyses. The slopes of the regression lines representing the association of numbers of children with depressive symptoms differ markedly between the pregnant and miscarriage cohorts (Figure 1). Therefore, despite the overall difference in symptom levels between pregnant women and women who had miscarried, average symptom levels did not differ between miscarrying and pregnant women with several children. The same pattern holds in the comparison of the miscarriage and community cohorts (Figure 1).

To delineate further an especially high-risk group, we dichotomized our subjects into those with and without children. Forty percent of the childless women who miscarried were highly symptomatic. In adjusted analyses, this proportion is 5.7 times that of childless pregnant women (95% CI = 2.5, 8.9) and 11 times that of childless community women (95% CI = 5.6, 16.7). Among women with children, the proportion highly symptomatic was 34.0 for women who had miscarried;

this proportion is 2.9 times that of pregnant women with children (95% CI = 1.5, 5.1) and 2.3 times that of community women (95% CI = 1.5, 3.3) in adjusted analyses.

Length of Gestation

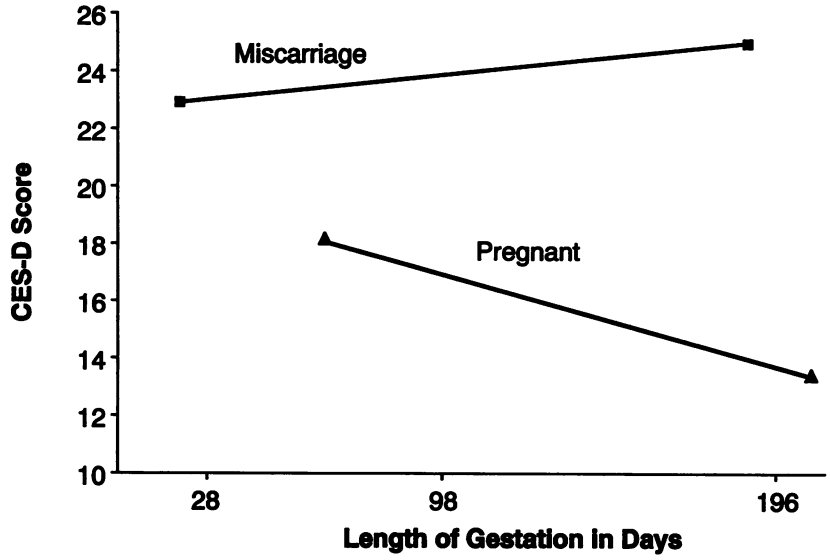
The association of length of gestation with depressive symptoms differs between the miscarriage and pregnant cohorts. In the pregnant cohort, observed symptom means declined with gestational advance (Table 2). In the miscarriage cohort, depressive symptoms were not associated with length of gestation; that is, women with early and late miscarriages had equally high levels of depressive symptoms. Hence, given the decline in symptom levels expected at later stages of an uninterrupted pregnancy, miscarriage is seen to exert a greater effect on women at later points in gestation (Figure 2). (This pattern of results persisted even after we restricted the analysis to gestational periods characterized by greater overlap between the two cohorts.)

Attitude toward the Pregnancy

The association of depressive symptoms with attitude toward pregnancy also varied between the miscarriage and pregnant cohorts. In the pregnant cohort, depressive symptom levels were higher in women with unwanted pregnancies; in the miscarriage cohort, depressive symptom levels were unrelated to the woman's attitude toward the pregnancy (Table 2, Figure 3). Hence, when pregnant women are used as the standard, miscarriage has a greater impact on women with wanted pregnancies than on women with unwanted pregnancies. However, these effects of attitude do not account for the pattern of results pertaining to number of children, described earlier, since that pattern persists when the analysis is restricted to women with wanted pregnancies.

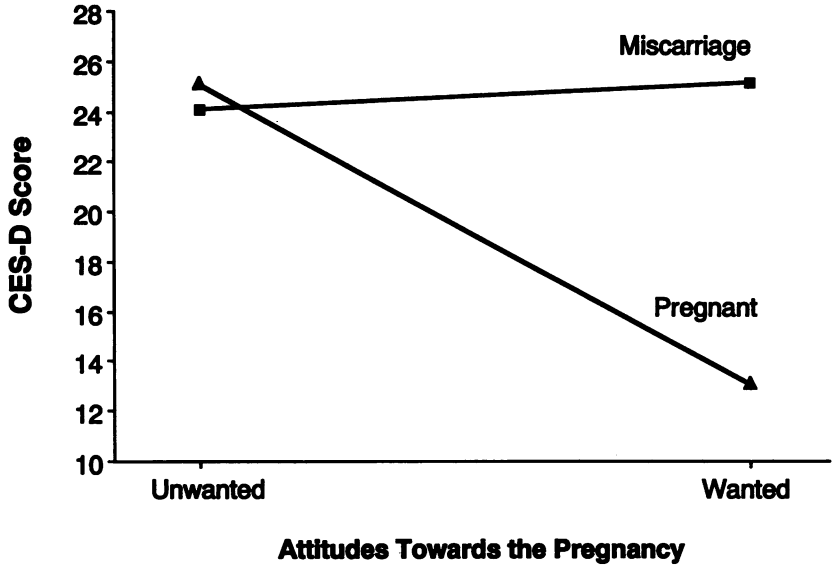
Prior Reproductive Loss, Maternal Age, Marital and Socioeconomic Status, and Religion

Depressive symptom levels were not raised in women with prior reproductive loss or in older women (aged 35 and older) within any study cohort in either uncontrolled (Table 2) or controlled analyses. Hence, miscarriage does not appear to exert a disproportionately greater effect on women with prior reproductive loss or on older women. These results did not change in analyses confined to nulliparous women. The effect of miscarriage on depressive symptoms also did not vary by marital status.



Note. CES–D = Center for Epidemiologic Studies Depression Scale. The slope of each line (*b*) represents the unstandardized regression coefficient for the term for length of gestation in days, from within-cohort least squares multiple regression equations. In the pregnant cohort, $b = -0.04$ per day (95% CI = −0.09, 0.008), $P < .11$; in the miscarriage cohort, $b = .02$ per day (95% CI = −0.03, 0.06), $P < .46$. The interaction term (cohort by length of gestation) is significant at $P < .08$.

FIGURE 2—Length of gestation and adjusted CES–D scores in miscarriage and pregnant cohorts.



Note. CES–D = Center for Epidemiologic Studies Depression Scale. The slope of each line (*b*) represents the unstandardized regression coefficient for the term for pregnancy attitude, from within-cohort least squares multiple regression equations. In the pregnant cohort, $b = -1.05$ (95% CI = −1.5, −0.6), $P < .00001$; in the miscarriage cohort, $b = 0.07$ (95% CI = −0.6, 0.7), $P < .82$. The interaction term (cohort by attitude) is significant at $P < .009$.

FIGURE 3—Attitude toward the pregnancy and adjusted CES–D scores in the miscarriage and pregnant cohorts.

Depressive Symptoms vs Somatic Complaints

The depressive symptoms reported by subjects in our study might have consisted largely of somatic complaints and affective disturbances arising from the physical sequelae of the miscarriage (or of the pregnancy). To evaluate this possibility, we repeated all of the preceding analyses after

first removing the somatic items (e.g., appetite and sleep disturbance) from the CES–D and then entering the summed score of the deleted items as a covariate in the regression equations. The preceding patterns persisted. Furthermore, although one third of the women who had miscarried had been hospitalized overnight and another third had been hospitalized for two or more nights, hospital stay was unassociated with symptom levels. Women who had had a dilation and curettage (approximately 85%) and those who had not also did not differ on level of depressive symptoms.

Discussion

Depressive symptoms were increased substantially in the early weeks after loss in this study sample. Symptom means in the miscarriage cohort approximated levels reported for heterogeneous samples of psychiatric inpatients.[22] The proportion of women who were highly symptomatic was 3.4 and 4.3 times greater in the miscarriage cohort than in the pregnant and community cohorts, respectively.

Childless women who had miscarried proved especially vulnerable to depressive symptoms. For example, the proportion highly symptomatic was 11 times higher among childless women who had miscarried than among childless community women. By contrast, the presence of several children is entirely protective. Several prior investigations of miscarriage, albeit not all,[9] have also reported lower symptom levels with increasing numbers of children.[11,15,31] However, since these studies lacked comparison groups they did not disclose the more striking finding that women with several children who miscarry do not exhibit significantly higher symptom levels than women with children who have not experienced a recent reproductive loss.

The apparent absence of a depressive effect of miscarriage on women with several children contradicts a large body of research linking life events involving loss to increases in depressive symptoms.[32] Recent stress research has focused on factors that buffer individuals from the pathogenic effects of negative life events, with much attention accorded to social supports.[33] For a woman who miscarries, the presence of living children may afford psychological support indirectly, by representing evidence of reproductive success in the past. This finding merits further investigation.

We found women with early and late miscarriages to be equally depressed, as has been noted in some other studies.[7,12,13] However, compared with pregnant women of similar gestational lengths, women with late loss apparently experienced a greater rise in depressive symptoms than women with earlier loss. This finding of a greater effect of miscarriage with length of gestation is consistent with the notion that maternal attachment to the unborn child progresses as the pregnancy advances and that the impact of loss corresponds to the strength of the preceding attachment.[31,34]

Again, when pregnant women are used as a reference group, loss of a wanted pregnancy is associated with a marked increase in symptom levels, whereas loss of an unwanted pregnancy is not. Women with unwanted pregnancies already have elevated symptoms and therefore apparently experience no further increase at the time of miscarriage. However, women losing wanted and unwanted pregnancies are equally depressed, as reported elsewhere.[8,15,31] Both situations warrant clinical and public health concern, as do pregnant women carrying unwanted conceptions.

Women with a history of prior reproductive loss, consisting predominantly of miscarriages, were not affected more strongly by their miscarriages than were women without prior loss. Previous studies of miscarriage[11,13,14,31] found no association between prior loss and current symptoms in their study cohorts. With one exception,[35] findings from previous investigations of perinatal death concur.[16,36–39] Our study findings also obtained in analyses restricted to nulliparous subjects.

With the current trend in industrialized societies of women postponing childbearing until later years, the effect of miscarriage on older women deserves special mention. Our finding that older women in the miscarriage cohort were not more depressed than younger women agrees with earlier results from research on women who had miscarried[10,11,13,14,31] and on women experiencing perinatal death.[16,36,37,39] Restriction of our analyses to nulliparous women did not alter these findings.

This study demonstrates for the first time that miscarriage powerfully influences maternal psychiatric status in the first few weeks after loss. Physicians in general practice, as well as gynecologists, should be aware both that nulliparous women may be in special need of attention following a miscarriage and that women experiencing even very early loss or the loss of an ostensibly unwanted pregnancy may exhibit markedly high levels of depressive symptoms. The possible persistence of these effects among certain subgroups of women awaits future investigation. □

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