Incidence and outcome of bleeding before the 20th week of pregnancy: prospective study from general practice

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Abstract

Objective: To estimate the miscarriage rate in a cohort of pregnant women and the final outcome of pregnancy.
Design: Two year prospective community study.
Setting: Women registered with four semirural practices at one health centre.
Subjects: 626 pregnant women from a population 21 448, 5140 of whom were women aged 15-44 years.
Main outcome measures: Vaginal bleeding and outcome of pregnancy.
Results: 76 of the 89 women with an unwanted pregnancy requested a termination. In the 550 ongoing pregnancies bleeding occurred before the 20th week in 117 (21%), and 67 (12%) ended in miscarriage. The risk of miscarriage was not significantly increased after a miscarriage in the previous pregnancy (11 (15%) women had miscarriage *v* 55 (12%) women who had not had miscarriage) who had previously had a live birth). Of the 117 women with bleeding, 64 were not admitted to hospital by the general practitioner; 42 of these women had an ultrasound examination at the health centre and 19 subsequently miscarried at home. In hospital 41 of 46 women who miscarried had evacuation of the uterus.
Conclusions: Bleeding occurred in one fifth of recognised pregnancies before the 20th week and over half of these miscarried. Treatment of women with miscarriage at home means current statistics on miscarriage in Britain are missing many cases.

Introduction

No statistics about miscarriages are published in Britain except the hospital episode statistics,[1] which report only on hospital admissions in England. Bleeding in early pregnancy is common. It occurs in a fifth of all pregnancies and with a miscarriage rate of about 15%[2] represents appreciable morbidity in the community. Previous reports on the incidence of miscarriages (spontaneous abortions) in early pregnancy have been carried out on selected groups of women in hospital clinics.[3] No published study could be found about the incidence of bleeding in pregnancy, and the only prospective community study of miscarriages was done in Hawaii.[4] Retrospective studies after delivery have been shown to be unreliable because of the problem of recall.[5]

Subjects and methods

The cohort consisted of women with a positive pregnancy test result whose last menstrual period was between 1 January 1989 and 31 December 1990. A weekly check was made on the practice pregnancy test results book, hospital discharge letters about bleeding, and attenders at ultrasound, antenatal, and midwife clinics. Access to notes was possible because all Alton general practitioners are in one building. Data were recorded on an Amstrad PCW 8256 and analysed with Microsoft Foxpro 2.5 and Excel.

Results

During the two year study 657 pregnant women were seen by the general practitioners. Table 1 shows the outcome of their pregnancies and table 2 their previous obstetric history. The average age was 26.7 years. Forty eight women were aged 14-19, 143 were 20-24, 202 were 25-29, 172 were 30-34, 51 were 35-39, and 10 were 40-46 years old.

At the first consultation 234 (37%) of the 626 pregnancies for which data were available at the 20th week were reported as unplanned. Of these, 89 were unwanted, and 70 women requested a termination. Of the 550 ongoing pregnancies, bleeding occurred in 117 (21%). Two confirmed pregnancies were lost without bleeding; one woman subsequently had a normal

Table 1 Outcome of pregnancy from conception to 20th week and from 20th week onwards

	No of women (n=657)
Outcome before 20th week:	
Termination	76
Miscarriage	67
Ectopic	6
Moved away	31
Still pregnant	477
Outcome after 20th week:	
Termination	1
Miscarriage	0
Moved away	27
Registrable births*	449

*Includes stillbirths.

uterus on ultrasound and the other woman with a missed abortion had an evacuation. Four of eighteen pregnancies survived despite a heavy loss with clots and moderate pain. Bleeding occurred in half the six ectopic pregnancies. Ultrasound examinations were done at our health centre[6] to establish fetal viability in 85 of the 117 women with bleeding and 49 women were admitted to hospital (table 3).

Table 4 gives the gestational age at miscarriage. The risk of having a second successive miscarriage after a previous miscarriage was not significantly increased in the 74 women who had miscarried previously (15%, 95% confidence interval 8% to 25%) compared with that for women who had had other outcomes (table 5).

The 20th week of pregnancy was reached by 477 women, after which one late termination was performed on a hydrocephalic fetus. Bleeding was experienced by 10 women, of whom three had bled before the 20th week. No bleeding occurred in 10 sets of twins or the four children born with severe abnormalities (one with exomphalos and three with heart problems).

Table 2 Numbers of previous terminations, miscarriages, and live births among 626 women in Alton cohort

Outcome	No of pregnancies in each woman								Total No of pregnancies
	0	1	2	3	4	5	6	7	
Termination	554	60	9	3	0	0	0	0	87
Miscarriage	517	84	17	4	2	1	0	1	150
Birth	288	203	91	34	7	1	2	0	532
Total									769

Table 3 Hospital admission, outcome, and treatment of 117 women who bled in early pregnancy

	No (%) of women (n=117)
Admitted to hospital (n=49):	
Miscarriage and evacuation	42 (36)
Miscarriage, no evacuation	4 (3)
Pregnancy continued	3 (3)
Not admitted to hospital (n=64):	
Spontaneous miscarriage	20 (17)
Pregnancy continued	44 (37)
No information (n=4):	
Miscarriage	3 (3)
Pregnancy continued	1 (1)

Discussion

In this community cohort study the miscarriage rate was 12%, which is comparable with previous reports ranging from 11% to 16%.[2 7 8] These figures do not include reports on unsuspected early pregnancy loss, which vary from 8% to 22%[9 10] or the further 10% of women who do not contact any health professional after a miscarriage.[11]

Regan et al reported a risk of miscarriage of 19% in women who had had a previous miscarriage compared with 5% in nulliparous women or those who had had a live birth,[12-14] but this fourfold increase has not been confirmed by other authors.[7 15] Selection bias might have occurred in Regan and colleagues' group of 407 volunteers as women whose previous pregnancy had ended in a miscarriage accounted for half of the sample compared with 10.5% (1687/16 015) in a report by Naylor and Warburton[16] and 13% (74/550) in this study.

The national incidence of miscarriages has never been published by the Office for National Statistics.[17] The Department of Health collects general practitioner item of service claims for miscarriages (FP24/GMS2), and the number of these ranged from 46 440 to 98 640 a year (average 73 230) in England and Wales between 1991 and 1995. The figure would be larger if general practitioners had also recorded unbooked pregnancies under eight weeks' gestation. (Ian Hughes, personal communication)

The Birmingham Research Unit of the Royal College of General Practitioners has 53 general practices throughout England and Wales which report by electronic link on a population of 323 739 (D M Fleming, personal communication). In 1993 they recorded a rate of 55.8 miscarriages/10 000 women aged 15-44. This extrapolates to 60 134 miscarriages among the 10 769 000 women in England and Wales. This total excludes those women admitted directly to hospital and those in whom the diagnosis was delayed.

In my study there were 67 miscarriages and 449 registerable births representing 14.9 miscarriages/100 births. Extrapolation to the 675 000 births in England and Wales[18] suggests that there were 70 000-90 000 miscarriages during 1993, assuming a 12.2% miscarriage rate. However, many problems exist with such extrapolations, and the estimate cannot be relied on. There would be an equal number of pregnancies that survived after some bleeding in early pregnancy.

Hospital admissions for bleeding in England only are reported in the hospital episode statistics and averaged 51 000 during 1989-95: the equivalent figure for England and Wales would be 54 000 (Suzanne Dunn, personal communication). Assuming that there are 70 000-90 000 miscarriages a year about 14 000-40 000 (23-40%) women are not included in the current Department of Health statistics and would have been cared for at home.

For many years detailed epidemiological data about every miscarriage treated has been sent to local Family Health Service Authorities by general practitioners in the maternity form FP24/GMS2. As an increasing number of practices are now transmitting this information electronically the system has great potential and could be developed by the Department of Health to produce useful epidemiological data.

Table 4 Week of pregnancy at which 117 miscarriages occurred in 626 pregnancies

Week	6	7	8	9	10	11	12	13	14	15	16	17	18	Not known	Total
No of women	8	6	11	4	3	6	12	4	5	0	2	1	2	3	67

Table 5 Outcome of last pregnancy and risk of miscarriage in study pregnancy

Outcome of last pregnancy	Total No of women	No (%) with miscarriage in study pregnancy	95% CI (%)
None	183	19 (10)	6 to 15
Termination	29	5 (17)	6 to 36
Miscarriage	74	11 (15)	8 to 25
Live birth	263	31 (12)	8 to 16
Unknown	1	1	—
Total	550	67 (12)	9 to 15

Key messages

- No national statistics for Britain are published on miscarriages
- Extrapolations from this survey indicate that in 1993 there may have been 70 000-90 000 miscarriages in England and Wales
- Bleeding in early pregnancy is followed by a live birth in about half the affected pregnancies
- At least a quarter of all miscarriages were treated at home by general practitioners and would therefore not be recorded in any published statistics
- Women who had had a miscarriage did not have a significantly higher chance of a second consecutive miscarriage

In the absence of any official statistics many thousands of women who miscarry may be excluded from important health planning processes. It may also be important to monitor miscarriage rates if environmental influences are capable of altering miscarriage rates.[19]

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1 Hospital episode statistics (HES) financial year 1993-4. London: HMSO, 1994.
2 Huisjes HJ. *Spontaneous abortion.* London: Churchill Livingstone, 1984:6.
3 Everett CB, Ashurst H, Chalmers I. Reported management of threatened miscarriage by general practitioners in Wessex. *BMJ* 1988;295:583-6.
4 French FE, Bierman JM. Probabilities of fetal mortality. *Public Health Reports* 1962;77:835-47.
5 Weinberg CR, Baird DD, Wilcox AJ. Bias in retrospective studies of spontaneous abortion based on the outcome of the most recent pregnancy. *Ann N Y Acad Sci* 1994;709:280-6.
6 Everett CB, Preece E. Women with bleeding in the first 20 weeks of pregnancy: value of general practice ultrasound in detecting fetal heart movement. *Br J Gen Pract* 1996;46:7-9.
7 Knudsen UP, Hansen V, Juul S, Secher NJ. Prognosis of new pregnancy following previous spontaneous abortions. *Eur J Obstet Gynaecol Reprod Biology* 1991;39:31-6.
8 Stabile I, Grudzinskas G, Chard T. *Spontaneous abortion.* London: Springer-Verlag, 1992.
9 Whittaker PG, Taylor A, Lind T. Unsuspected pregnancy loss in healthy women. *Lancet* 1983;i:1126-7.
10 Wilcox AJ, Weinberg CR, O'Connor JF, Baird DD, Schlatterer JP, Canfield RE, et al. Incidence of early loss of pregnancy. *N Engl J Med* 1988;319:189-94.
11 Oakley A, McPherson A, Roberts H. *Miscarriage.* London: Fontana, 1984.
12 Regan L, Braude PR, Trembath PL. Influence of past reproductive performance on risk of spontaneous abortion. *BMJ* 1989;299:541-5.
13 Regan L. Recurrent miscarriage. *BMJ* 1991;302:543-4.
14 Rai R, Clifford K, Regan L. Early pregnancy loss. *The Diplomate* 1994;1:269-75.
15 Cohen-Over-beek TN, Hop WCJ, den Ouden M, Pijpers L, Jahoda MGJ, Wladirmiroff JW. Spontaneous abortion rate and advanced maternal age: consequences for prenatal diagnosis. *Lancet* 1990;336:27-9.
16 Naylor AF, Warburton D. Sequential analysis of spontaneous abortion. *Fertil Steril* 1979;31:282-6.
17 Department of Health. *On the state of the public health. Annual report 1993.* London: HMSO, 1993.
18 Office of Population Censuses and Surveys. *Population Trends* 1995;79.
19 James WH. Are spontaneous abortion rates useful in monitoring reproduction hazards. *Human Reproduction* 1996;11:2333-5.

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Predicting stress in general practitioners: 10 year follow up postal survey

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High levels of stress in general practitioners have been described in numerous cross sectional studies,[1] but few have used longitudinal data to explore possible precursors that might allow early prevention or intervention. Such precursors may relate to previous signs of psychological distress or may involve individual differences, such as personality. The importance of a self critical or perfectionist disposition in predicting stress has been noted in preregistration doctors over a two year period,[2] and Blatt and Zuroff have investigated its influence on depression.[3] I followed up a group of general practitioners from their fourth undergraduate year to investigate the importance of early symptoms of stress and self criticism in predicting stress levels 10 years later.

Subjects, methods and results

During the autumn and winter of 1993-4, I sent a questionnaire on stress levels and work related factors to the 302 subjects who had been investigated for self criticism and stress as fourth year medical students in 1983-4. I received responses from 224 individuals (74%), of whom 131 were general practitioners. These general practitioners form the sample for this study. The design and measures used are described in detail elsewhere.[2]

In all, 43 (33%) general practitioners scored above threshold for stress symptoms. This proportion is considerably higher than in the general working population but lower than the 48% reported by Caplan,[1] which might reflect either his older and more geographically concentrated sample or differences in assessment. Stress levels were not significantly correlated over the 10 years ($r=0.15$, $P<0.1$), and current stress levels were not correlated with hours worked in the past week ($r=0.16$, $P<0.1$). Self criticism as students, however, was highly correlated with current stress levels ($r=0.34$, $P<0.0001$), accounting for 12% of the variance.

Comment

It is clear from this that, although early stress levels are much less important, high self criticism is a strong predictor of stress symptoms over a long period during

which environmental factors such as marriage, children, and several different jobs and homes are likely to have occurred—life changes that might have been expected to overrule the influence of disposition. Nevertheless, some work related stressors, such as tiredness, are likely to contribute independently to stress, whereas others might interact with self criticism to exacerbate its effect. Blatt and Zuroff, for example, have written about depression that is coloured by high self criticism, describing those affected as engaging in harsh self evaluation, striving for achievement, and having a strong fear of criticism.[3] Such characteristics would undoubtedly be particularly difficult within a competitive, humiliating, or status-conscious work culture, which medicine sometimes is.[4]

This study shows that it should be possible to reduce stress symptoms in future general practitioners by recognising those students who may be vulnerable—for example, those in whom their tutors see signs of self blame in clinical discussions. High self criticism is a way of thinking, a cognitive style in which self blame occurs whenever things go wrong; it can therefore be changed by teaching how to allocate responsibility less destructively. This is not about blaming others, as particularly low self criticism is related longitudinally to having poor relationships with patients and colleagues[4]; rather it entails learning to judge events, both good and bad, more reasonably.[5] This finding has important implications in terms of counselling interventions, both for undergraduates and for professionals, and a prevention strategy may also be used as part of the general curriculum, perhaps within the context of mistakes and accidents or as part of stress management.

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1 Caplan RP. Stress, anxiety, and depression in hospital consultants, general practitioners, and senior health service managers. *BMJ* 1994;309:1261-3.
2 Firth-Cozens J. The role of early family experiences in the perception of organizational stress: fusing clinical and organizational perspectives. *JOccup Organ Psychol* 1992;65:61-75.
3 Blatt SJ, Zuroff DC. Interpersonal relatedness and self-definition: two prototypes for depression. *Clin Psychol Rev* 1992;12:527-62.
4 Firth-Cozens J. Depression in doctors. In: Katona C, Robertson MM, eds. *Depression and physical illness*. Chichester: Wiley, 1997.
5 Jaycox LH, Reivich, KJ Gillham J, Seligman MEP. Prevention of depressive symptoms in school-children. *Behav Res Ther* 1994;32:801-16.

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A randomised controlled trial of feedback to general practitioners of their prophylactic aspirin prescribing

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Although low dose aspirin reduces risk in patients with heart disease, many such patients do not receive daily prophylactic aspirin.[1] We report a trial of feedback of general practitioners' data on aspirin prescribing aimed at increasing coded aspirin prescribing in patients with heart disease.

Subjects, methods, and results

Computerised practices were randomised to receive feedback on their prescribing, either of aspirin for patients with ischaemic heart disease or of hormone replacement therapy for women who had had hysterectomies. We approached 48 practices in north London; nine refused, and 11 were excluded. Of the 28 (58%) practices in the study, seven were single handed and six had five or more partners. All participating practices used the EMIS computer system except two that used Paradoc; both systems yielded sufficiently reliable and comparable data. Eligible practices had to have computerised information on hysterectomies and ischaemic heart disease and use their systems for repeat prescribing. Practices were then randomised by using sealed envelopes to an intervention or a control group.

Patients were considered to have ischaemic heart disease if they had such a diagnosis coded; had had a myocardial infarction or angina; had had a revascularisation procedure; or were taking a nitrate by repeat prescription. We collected data for prescribing of both aspirin and hormone replacement therapy in all practices at baseline and follow up (at least three months later).

Feedback on the baseline data—together with appropriate educational input—was given at a practice meeting.[2 3] The one hour session had approval for the postgraduate education allowance. We encouraged practices to audit certain patients—for example, patients with ischaemic heart disease not apparently taking aspirin—and facilitated support through medical audit advisory groups. We calculated the change in the proportion of patients with ischaemic heart disease taking daily aspirin over four months (the average time to follow up). The standard error of this change was calculated:

$$\text{Estimated variance } (P_{a2}-P_{a1}-P_{c1}+P_{c2}) = P_{a1}\left(\frac{100-P_{a1}}{n1}\right)+P_{a2}\left(\frac{100-P_{a2}}{n2}\right)+P_{c1}\left(\frac{100-P_{c1}}{n3}\right)+P_{c2}\left(\frac{100-P_{c2}}{n4}\right)$$

where P_{a1} represents proportion of patients taking aspirin in the aspirin group at baseline, P_{c1} represents these patients at follow up, P_{c2} represents the control group, and n1, n2, n3, and n4 are the appropriate denominators.

There were 14 practices in each arm and a total of 182 200 patients. We identified from computer searches a diagnosis of coronary heart disease or repeat prescriptions for nitrates, or both, in 2813 patients, of whom 1354 took aspirin. In three randomly selected practices we validated the computerised data. We examined a random sample of 20% of the written records of patients aged 40-69 years for missed

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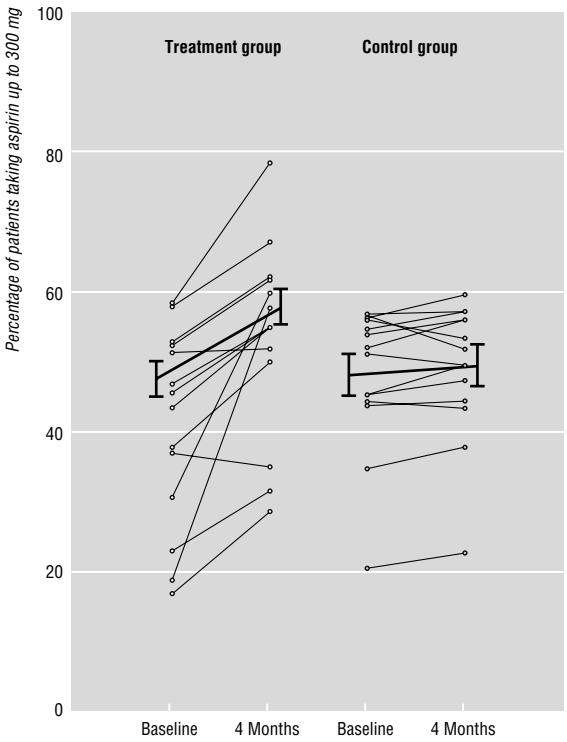

Fig 1 Average percentage of patients with ischaemic heart disease taking aspirin at entry to study and at follow up (on average four months after feedback) for treatment and control groups (14 practices in each group). Vertical bars represent 95% confidence intervals around the overall mean

computer diagnoses of ischaemic heart disease and a random 50% of the written records of patients identified by computer searches as having ischaemic heart disease. There were no important discrepancies.

Figure 1 shows the proportion of patients with ischaemic heart disease prescribed daily aspirin before and after the intervention. Such prescribing rose from 787/1646 (47.8%) to 1004/1725 (58.2%) in the intervention group, compared with 567/1167 (48.6%) to 610/1220 (50.0%) in the control practices ($P < 0.001$). As practices in the aspirin arm were reminded of the code for "buying aspirin over the counter" but those in the hormone replacement arm were not, we ignored these codings when measuring the outcome. In the written records that we examined, three (4.6%) patients with ischaemic heart disease bought their aspirin over the counter.

Comment

Feedback of prescribing practice can increase the proportion of patients with ischaemic heart disease receiving prescribed daily aspirin by 9%. Some of the apparent increase may be due to improved coding, but only 2% of patients with ischaemic heart disease had only a written record (no computer record) of aspirin use, and less than 5% were buying their aspirin over the counter.

About a million patients have ischaemic heart disease in the United Kingdom.[4] If aspirin use in 86 high risk patients prevents one death in two years[3] then a 9% increase in prescribing daily aspirin would reduce mortality from ischaemic heart disease by 1134 deaths every two years. In practices similar to those studied, feedback to 20 general practitioners (number of doctors needed to treat) or 6.4 practices (number of practices needed to treat) would be needed to prevent one death from ischaemic heart disease in two years.

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1 King R, Denne J. Audit suggests that use of aspirin in coronary heart disease is rising. *BMJ* 1995;311:1504.
2 Aspirin to prevent heart attack or stroke. *Drug Ther Bull* 1994;32:1-3.
3 NHS Centre for Reviews and Dissemination. Aspirin and myocardial infarction. *Effectiveness Matters* 1995;1(1).
4 McCormick A, Fleming D, Charlton J. *Morbidity statistics from general practice: fourth national study 1991-2*. London: HMSO, 1995. (Series MB5, No 3.)

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Any questions

How long is it safe to take tamoxifen?

Breast cancer was diagnosed five years ago in a woman aged 52. She had a lumpectomy followed by radiotherapy and was given tamoxifen as part of a trial. She was told that the trial had ended and that it was her choice whether to continue; apparently no guidance was given. Should she continue to take tamoxifen and if so for how long?

The benefit from adjuvant treatment with tamoxifen for breast cancer in terms of reduced incidence of relapse and mortality is overwhelming,[1] although the optimal duration of treatment remains to be determined. Because of this beneficial effect and the reduced risk of myocardial infarction[2] and osteoporosis,[3] lifelong treatment with tamoxifen has been suggested as the ideal hormone replacement therapy for women with breast cancer. Evidence indicates that five years of treatment with tamoxifen is a reasonable standard for adjuvant treatment. A recent announcement from the United States National Cancer Institute, based on the preliminary results of two trials comparing adjuvant treatment of five and 10 years' duration, makes it unlikely that continuation of treatment beyond five years would produce clinical benefit.[4] There are potential side effects, which may increase with prolonged use. There is a threefold increase in the risk of uterine cancer, but the risk remains well below 1% in those using tamoxifen for up to five years. Morbidity related to benign endometrial changes should not be disregarded as the accumulated dose may be important.[5] There is no evidence for human hepatocarcinogenicity, but possible harmful thromboembolic effects have been reported with tamoxifen.[2]

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1 Goldhirsch A, Wood WC, Senn HJ, Glick JH, Gelber RD. Meeting highlights: International consensus panel on the treatment of primary breast cancer. *J Natl Cancer Inst* 1995;87:1441-5.
2 McDonald CC, Alexander FE, Whyte BW, Forrest AP, Stewart HJ. Cardiac and vascular morbidity in women receiving adjuvant tamoxifen for breast cancer in a randomised trial. *BMJ* 1995;311:977-80.
3 Kristensen B, Ejlertsen B, Dalgaard P, Larsen L, Holmegaard SN, Transbol I, et al. Tamoxifen and bone metabolism in postmenopausal low-risk breast cancer patients: a randomised study. *J Clin Oncol* 1994;12:992-7.
4 Frankel DH. US cancer institute halts tamoxifen study. *Lancet* 1995;346:1554.
5 Neven P, De Muylder X, Van Belle Y, Campo R, Vanderick G. Tamoxifen and the uterus. Women given this drug need careful assessment. *BMJ* 1994;309:1313-4.