

Postnatal morbidity after childbirth and severe obstetric morbidity

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Objective To identify the impact of pregnancy and childbirth, and severe obstetric morbidity on outcome 6 to 12 months postpartum.

Design Questionnaire assessment of postnatal outcome in a cohort study.

Setting South East Thames, UK.

Population All women resident in South East Thames and delivering between 1st March 1997 and 28th February 1998.

Methods Questionnaire study of a cohort of women who experienced a severe obstetric morbidity during pregnancy or labour (cases), compared with a cohort of women who did not (controls).

Main outcome measures Assessment of postnatal depression risk [Edinburgh Postnatal Depression Scale (EPDS)], general health [Short Form 36 (SF-36)], sexual activity and use of health services between 6 and 12 months postpartum.

Results There were 331 cases and 1339 controls out of 48,262 deliveries. Six to 12 months after delivery, 77 (23.3%) of cases and 272 (20.5%) of the controls were at risk of postnatal depression ($P = 0.25$; 95% CI for difference -2.2% to 7.9%), 43.1% of cases were having problems with sexual relations compared with 18.7% of controls ($P < 0.001$; 95% CI for difference 8.9% to 21.9%). There was evidence of poorer general health in cases. Some 31.5% of cases attended outpatients in the first six months and 9.4% required emergency admission to hospital compared with 17.0% ($P < 0.001$; 95% CI for difference 9.1% to 19.9%) and 3.7% ($P < 0.001$; 95% CI for difference 2.4% to 9.0%), respectively, in controls.

Conclusion Both control pregnancy and childbirth and severe obstetric morbidity are associated with significant postnatal morbidity. A severe obstetric morbid event significantly influences women's sexual health and wellbeing and increases health services utilisation. Prevention and appropriate management of severe obstetric morbid events may reduce these outcomes.

INTRODUCTION

In a population-based cohort, it has been estimated that 1.2% of women suffer from severe obstetric morbidity, two-thirds caused by massive haemorrhage and one-third by severe pre-eclampsia, sepsis and uterine rupture¹. Postnatal care² and the extent of postpartum maternal morbidity is a much neglected research area^{3,4}. Previous studies of postnatal maternal morbidity have generally involved small samples of women, from single or a small number of maternity units, and have largely consisted of postal questionnaires of the woman's perception of her health without linkage to pregnancy or labour^{3,4}. Previous work has centred

on symptoms such as headache (newly occurring in 3.6%³), backache (43% to 46%^{4,5}), stress incontinence (10.6%^{3,5}) and haemorrhoids (5.3% to 24.6%^{3,5}).

Few studies have investigated the sexual function of postnatal women, and none has related sexual function to events occurring at delivery, other than the mode of delivery^{5–8}.

Glazener⁶ examined sexual function after childbirth and found that 53% of women experienced problems in the first eight weeks postpartum and 49% in the subsequent year. The need for help with these issues was expressed by 7% to 13% of the women but only a quarter sought it.

There have been no prospective follow up studies of women who have had a severe obstetric morbidity outcome as compared with those who have not, and furthermore, women who have had a stillbirth are almost always excluded from postnatal studies^{8–10}. We report a prospective geographical, cohort study of women who experienced a severe obstetric event during their pregnancy or labour, compared with women who had control pregnancies without severe morbidity. The aim of the study was to assess whether there are differences in outcome in women who have and have not had a severe obstetric morbidity.

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METHODS

This study represents the follow up phase of a prospective study investigating the incidence and outcome of severe obstetric morbidity¹. All of the 19 maternity units of the South East Thames Region of the UK (SETR) participated. The relevant ethical approval was obtained from all units. All women resident in SETR delivering over 24 weeks of gestation were eligible wherever they delivered. Cases were defined as women who experienced a severe obstetric morbid event during their pregnancy, labour or postpartum period. The morbidities of interest were severe haemorrhage, severe pre-eclampsia (including eclampsia and haemolysis, elevated liver enzymes and low platelets [HELLP] syndrome), severe sepsis and uterine rupture. The parameters of these morbidities have been previously defined¹. Controls were women who were resident in SETR who did not have a severe morbidity during pregnancy, delivery or postnatally. Four controls were randomly selected from women delivering in the same week as the relevant case.

After identification of cases and controls from the cohort, recruitment letters were sent inviting the women to complete a postal questionnaire. A reminder letter was sent after two weeks to those who did not respond. If women agreed, a postal questionnaire was sent out to be completed six months following delivery. If a case declined to participate, either at recruitment or having received the questionnaire, her selected controls were not used. As some women replied late, either agreeing or declining to participate, some cases had more or fewer than four controls. However, the overall effect was to have four times as many controls as cases.

The general practitioners of all cases and controls were sent a questionnaire about the number of visits made by women to see a general practitioner in the first six months following delivery, and whether any 'life event' (as defined by the general practitioner) had been noted, whether the child was still alive, and whether any current 'problems' were attributable to her delivery. The general practitioners were relied upon to provide information on any infant deaths that would not be identified any other way.

Antenatal, intrapartum and birth data were collected from the maternity notes and included 117 individual items in the following domains: demography (including social class and ethnicity), past medical and obstetric details, antenatal and intrapartum care, investigations performed and obstetric morbidity¹. Social exclusion was noted when any of the following were identified in the notes: concealed pregnancy, very young age (<16 years), poor housing, low income ('on income support' written in notes), minor/child in local authority or state care (either currently or in past), in trouble with the law (currently or previously), living alone (partner abroad or 'unsupported' written in notes), unbooked, unwanted pregnancy, currently or previously in foster care, care order being considered on potential child, social worker involvement and drug or alcohol dependency.

The postnatal questionnaire comprised the Short Form 36 (SF-36)¹¹, the Edinburgh Postnatal Depression Scale (EPDS)¹², a section on sexual function⁶, questions on future fertility wishes and a section on use of health care services.

The SF-36 has been validated for postal questionnaires measuring general health and is generally accepted^{11,13,14}. It comprises 36 questions covering nine areas of health: role-limiting physical, role-limiting emotional, physical functioning, social functioning, mental health, energy and vitality, pain, general health perception and perceived change in health. The EPDS is specific for the postpartum period, is relatively short and has also been validated for postal administration^{12,15,16}. The EPDS score identifies women who are relatively happy (score of <10), those who have the blues (score of 10–12) and those who are at risk of postnatal depression (score of ≥13).

Two questions assessing the wish for more children before and after the index pregnancy were asked. Eight of the nine questions asked about the resumption of sexual relations with their partners, and whether there had been any difficulties. The questions on sexual function that were incorporated into this study have been validated². The last question was open and allowed the women to communicate any other feelings they wished.

The aim of the postal questionnaire was to combine questions that covered general health (the SF-36), specific postnatal health (EPDS), especially mood changes, the effect of a traumatic delivery on future reproductive plans and postnatal sexual functioning². Also included were questions enquiring about the woman's use of health services, and in particular, visits to her general practitioner or to the hospital.

Comparisons were made between responders and non-responders to determine any evidence of reporting bias. Process and outcome variables assessed at six months in cases and controls were compared using χ^2 tests and Mann–Whitney tests as appropriate. EPDS scores were analysed firstly as a quantitative measure, and secondly defining two categories: postnatal depression risk (EPDS ≥13) and 'blues'/no risk (EPDS <13).

Future fertility desires in cases and controls were compared at baseline (i.e. pre-index pregnancy) and at six months postpartum. The proportion of cases for whom future pregnancies were not possible was estimated. Among those cases for whom future pregnancies were possible, the proportion whose reported desire for children was reduced at follow up was compared with those in the control group. Agreement between maternal reports of the number of general practitioner visits in the six months following delivery and those reported by the general practitioner was estimated.

Power calculations were performed to estimate the number of cases and controls required to estimate differences between groups. It was calculated that 48 cases with four controls for every case would be sufficient to detect a difference in the incidence of hypertension after delivery of

Table 1. Morbidity distribution (%) for responders and non-responders among cases.

Obstetric morbidity	Responders (n = 331)	Non-responders (n = 255)
PET alone*	31	34
Eclampsia	2	2
HELLP ^a	6	2
EBL > 1500 mL ^b	31	30
Tx ≥ 4 units ^c	7	11
Hb drop > 4 g ^d	18	15
Severe sepsis	3	4
Uterine rupture	2	2
Total	100	100

^a Haemolysis, elevated liver enzymes and low platelets.

^b Estimated blood loss.

^c Transfused four or more units of blood.

^d Peripartum haemoglobin drop of over 4 g/dL.

* Severe pre-eclampsia.

20% vs 5%, with 80% power, at the 5% significance level. The estimated number of deliveries in the study region was 50,000 and, using previous estimates of incidence of severe obstetric morbidity, this would give us between 25 and 545 cases. A year's data collection was also used as this avoids seasonal variations when calculating incidence.

RESULTS

There were 586 cases and 2351 controls recruited to the study at delivery. Of these, 331 (56.5%) and 1339 (57.0%), respectively, participated in the follow up postnatal questionnaire study. There was a similar proportion of responders and non-responders in each obstetric morbidity group, except for HELLP (6% of responders vs 2% of non-responders) (Table 1).

The mean time for completion of questionnaires was 6.7 months postpartum for cases and 7.1 months for controls. There was no difference in gestation at delivery, multiple pregnancy, outcome of child or method of delivery between responders and non-responders for either cases or controls. Furthermore, with the cases there was no difference in the type of morbidity involved, admission to intensive care or high dependency units, or the presence of any severe

complications (following the initial severe obstetric morbidity). There was, however, an overall difference in age (but not in cases), marital status (not in cases), ethnic and social groups, parity and the presence of social exclusion.

There were a total of 44 infant/baby deaths in the ante-, intrapartum or neonatal periods, with 25 (1.5%) in the responders and 19 (1.5%) in the non-responders ($\chi^2 = 0.001$, $df = 1$, $P = 0.974$).

Non-responders were likely to be younger (median 28 vs 30 years for responders; Mann-Whitney $Z = 7.40$, $P < 0.001$), unsupported (7% vs 4%; $\chi^2 = 72.5$, $df = 4$, $P < 0.001$) and to be smokers (21.9% vs 12.0%; $\chi^2 = 52.0$, $df = 1$, $P < 0.001$). Responders were more likely to be Caucasian (89.2% vs 74.5%; $\chi^2 = 109.4$, $df = 2$, $P < 0.001$). Women of manual class or who were unemployed were less likely to respond (41.8% of non-responders were from non-manual class vs 71.0% for responders; $\chi^2 = 64.6$, $df = 3$, $P < 0.001$). Factors associated with social exclusion led to a reduced response rate, being present in 7.4% of non-responders and only 2.1% of responders ($\chi^2 = 46.9$, $df = 1$, $P < 0.001$). The past medical or obstetric history or mode of delivery had no effect on response rates.

Examining the questionnaires sent to general practitioners for women who did not return their questionnaires allowed further comparisons to be made. There were 1251 general practitioner questionnaires for responders and 108 for non-responders. The number of general practitioner visits was similar in both groups (19.4% of non-responders and 21.9% of responders had more than six visits; $\chi^2 = 0.35$, $df = 1$, $P = 0.36$). The difference between the proportions of cases and controls with more than six general practitioner visits was also the same for non-responders as for responders ($\chi^2 = 2.39$, $df = 1$, $P = 0.12$; tested using logistic regression with an interaction term).

EPDS scores were typically higher in the cases than in the controls (median 7 for controls, 9 for cases; Mann-Whitney $Z = 3.33$, $P = 0.001$); however, the proportions in the two groups with an EPDS score of 13 or more (at risk of postnatal depression¹⁵) were not significantly different (23.3% of cases and 20.5% of controls; 95% CI for difference -2.2% to 7.9%; $\chi^2 = 1.28$, $df = 1$, $P = 0.26$).

The women were asked if they had had any 'life event' during the postnatal follow up period. Some 37.5% of the

Table 2. SF-36 results for cases and controls (medians with interquartile range).

SF-36 category	Controls (n = 1332)	Cases (n = 326)	Mann-Whitney Z	P
Physical functioning	95 (85 to 100)	90 (80 to 100)	4.98	<0.001
Social functioning	100 (77 to 100)	88 (66 to 100)	3.80	<0.001
Role-limiting physical	100 (75 to 100)	100 (50 to 100)	4.98	<0.001
Role-limiting emotional	100 (66 to 100)	100 (33 to 100)	2.97	0.003
Mental health	76 (60 to 84)	72 (60 to 84)	2.09	0.037
Energy and vitality	50 (35 to 70)	50 (30 to 65)	1.88	0.060
Pain	88 (66 to 100)	77 (55 to 88)	5.60	<0.001
General health perception	82 (61 to 90)	72 (56 to 87)	4.25	<0.001
Change in health	50 (50 to 50)	50 (25 to 50)	5.30	<0.001

cases had experienced a life event compared with 31.6% of controls ($\chi^2 = 4.16, df = 1, P = 0.041$). Those women who had reported a life event were more likely to be at risk of postnatal depression than those who had not (32.1% vs 15.6%; $\chi^2 = 59.9, P < 0.001$).

The SF-36 general health measure results are shown in Table 2. There was evidence of differences between cases and controls on all subscales of the SF-36, with cases having poorer outcomes than controls, although this evidence was only weak in the case of mental health as well as energy and vitality.

Visits to the general practitioner were grouped as none, one to three, four to six and more than six visits. Some 13.3% (67/256) of cases visited their general practitioners more than six times compared with 6.5% (129/992) of controls ($\chi^2 = 17.3, df = 1, P < 0.001$; 95% CI for difference 3.0% to 10.8%). Some 9.4% (29/330) of cases were seen as an emergency in hospital compared with 3.7% (111/1333) of controls ($\chi^2 = 18.9, df = 1, P < 0.001$; 95% CI for difference 2.4% to 9.0%). Some 31.5% (104/330) of cases were treated as outpatients compared with 17.0% (227/1333) of controls ($\chi^2 = 34.8, df = 1, P < 0.001$; 95% CI for difference 9.1% to 19.9%). There was no significant difference in elective admission rates to hospital (4.5% vs 3.3%; $\chi^2 = 1.20, df = 1, P = 0.27$).

There was only weak agreement between the number of visits to the general practitioner reported by the subject (recorded as none, one to three, four to six, more than six visits) and the number reported by the general practitioner when grouped into the same categories (weighted kappa = 0.28), but there was still a relatively strong association between them (Goodman and Kruskal's gamma = 0.62). The lack of agreement appeared to be due to under-reporting of general practitioner visits by the subjects (7.0% of women reported visiting their general practitioner more than six times, while general practitioners themselves gave this figure as 15.7%: $\chi^2 = 71.1, df = 1, P < 0.001$ using a McNemar test).

Table 3 shows the proportions of cases and controls that reported wanting more children prior to the index pregnancy. There were significant differences between the two groups ($\chi^2 = 6.06, df = 2, P = 0.048$), with cases being more unsure than controls.

At follow up, 11 controls reported that they were no longer able to have children. Five of those women had been sterilised or their partners had undergone a vasectomy.

Table 3. Comparing the baseline (pre-index pregnancy) future fertility wishes. Values are given as n (%).

More children	Control	Case	Total
No	331 (24.9)	73 (22.2)	404 (24.3)
Yes	777 (58.4)	182 (55.3)	959 (57.8)
Unsure	223 (16.8)	74 (22.5)	297 (17.9)
Total	1331 (100)	329 (100)	1660 (100)

$\chi^2(1) = 6.06; P = 0.048$.

Table 4. Time taken to re-establish sexual relations ($n = 1330$ for controls and 329 for cases). Values are given as n (%).

Weeks after delivery	Controls	Cases
≤6	709 (56)	123 (43)
7–12	437 (35)	125 (43)
>12	118 (9)	40 (14)

$\chi^2(2) = 17.66; P < 0.001$.

Of the 29 cases who were no longer able to have children having had a hysterectomy, 11 had not wanted any more, 10 wished for more and 8 were not sure. Eighteen women (5.5% of cases) therefore had their option to have more children removed. Among cases who were still able to have children, the proportion whose desire for children was less than it had been at baseline was 39.3% (118/182), compared with 34.3% (453/1330) of controls (95% CI for difference -1.1% to 11.1%; $\chi^2 = 2.66, df = 1, P = 0.10$).

Seventy-seven (34.1%) of the cases reported having problems with sexual function, compared with 240 (18.7%) of controls (95% CI for difference 8.9% to 22.0%; $\chi^2 = 27.5, df = 1, P < 0.001$). Of those women in the EPDS score group ≥ 13 and between 10–12, 27.1% (95/351) and 28.5% (74/260), respectively, admitted to having problems with sexual function, while only 17.3% (182/1052) of those with scores below 10 reported problems ($\chi^2 = 22.9, df = 2, P < 0.001$).

Table 4 shows the time taken to re-establish sexual relations postnatally. Among those who had not re-established sexual relations, the relative number of women who listed not having a partner, lack of interest and concern that it might hurt, respectively, among their reasons were similar for cases and controls. Of those with a partner, the relative number of cases and controls who listed partner's lack of interest, partner's tiredness and partner's concern that it might hurt among their reasons were also similar. There was some evidence that controls were more likely than cases to list tiredness as a reason (75.1% of controls, 63.3% of cases; 95% CI for difference 4.4% to 23.1%; $\chi^2 = 4.52, df = 1, P = 0.034$), but the largest difference was in the proportions who listed fear of falling pregnant again among their reasons (50.0% of cases and 28.6% of controls; 95% CI for difference 9.7% to 33.2%; $\chi^2 = 13.4, df = 1, P < 0.001$).

DISCUSSION

The longer term impact of obstetric morbidity and indeed 'normal' pregnancy has been poorly investigated. This was highlighted by a United Kingdom House of Commons Select Committee Report on Maternity Services as long ago as 1992¹⁷. This report has shown that postnatal morbidity is highly prevalent and a severe obstetric event during pregnancy or labour increases the probability of a poor outcome. Our control population was not 'normal' as it included women with minor and moderate morbidity and

the study was not set up to examine these. Some caution is necessary when interpreting results from any study requiring postal questionnaires which are highly susceptible to non-responder bias. We found no significant difference between our two groups in their response/non-response profile and therefore comparisons between the two groups are valid. Any conclusions drawn from this study must be tempered with the fact that depressed women may be over- or under-represented.

When analysing data from such a survey, response bias is an important consideration. In this study, the responders were more likely to be Caucasian, married and without any social exclusion risk factors. However, analysis of the number of general practitioner visits as reported by general practitioners, in cases and controls who responded or did not respond, showed that responders and non-responders were similar and there was no evidence of a greater response bias among cases. If this generalises to other outcomes assessed from maternal reports, it suggests that differences found between cases and controls are not due to differential response bias. The overall response rates were over 50% in both groups.

There was no overall significant difference between cases and controls in terms of the risk of postnatal depression. There was, however, a greater tendency for controls to be at the lower end of the scale (i.e. <10) than the cases, while cases were more likely to be in the 'postnatal blues' category (10–12). Strikingly, over 20% of controls have an EPDS score of greater than or equal to 13, which indicates high risk of postnatal depression, even 6–12 months after delivery. Women with severe obstetric morbidity do appear to have a significantly higher EDPS score than controls and represent an at-risk group of women postnatally.

As expected, women who had an uncomplicated pregnancy and childbirth tend to do well postnatally in most of the SF-36 categories of health-related quality of life, although they score low in the energy and vitality and change in health perception categories. This may not be surprising as they are coping with a six month old baby. Cases scored worse in every category of the SF-36, although one of the smallest differences was in the mental health score component.

Women who had had a severe obstetric morbidity were more likely to visit their general practitioner or be seen as outpatients in the first 6–12 months postnatally. This is most likely to be explained in part by routine follow up after the severe morbid event. Visits to the accident and emergency department and elective admissions were similar for both groups, but cases were more likely to be admitted as an emergency. The reasons for the emergency admission were not recorded in our study but may be related to the obstetric morbidity.

Figures reflecting future fertility wishes need to be interpreted with caution as they do involve a degree of recall bias. They do however show that a negative experience in one pregnancy can prevent women from completing the family they originally wanted.

A greater proportion of cases reported having problems with intercourse. Although the difference was not great, when analysed individually, more important differences become apparent. Thirteen percent of cases had not restarted sexual relations at the time of returning their questionnaires, compared with just over 4% of controls. Highly relevant is the fact that half of the cases who had not recommenced sexual relations quoted the fear of falling pregnant again as a reason compared with just over a quarter of the controls. This is a feature that has not been reported previously and may be a direct consequence of their experience during pregnancy and childbirth.

The important feature of this study is the evidence of extensive postnatal morbidity both in women who had had control pregnancies or severe obstetric events. Women who have suffered from severe obstetric morbidity continue to have negative consequences across a range of measures. Further understanding of how to predict these adverse outcomes and how to manage them is required. Severe obstetric events have longer term sequelae that maternity services need to be able to predict and plan for. The maternity services also need to work closely with primary care to address the needs of women with minor or moderate morbidity pregnancy in the years following birth.

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