The effect of income pooling within a call group on rates of obstetric intervention

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Abstract

Background: On July 1, 1997, the call group at a tertiary referral hospital in Ottawa changed its remuneration. The authors tested the hypothesis that change in an obstetric call group's remuneration from individual fee-for-service billing to equal sharing of the pooled group income would result in reduced rates of obstetric intervention.

Methods: Intervention rates were compared for the 12 months before (1678 births) and the 12 months after (1934 births) the change. Data were collected on onset of labour, indication for induction of labour, mode of delivery and neonatal outcome. Statistical analysis was performed with Wilcoxon's signed-rank test.

Results: The mean rate of elective induction of labour was 38.6% in the year before the change and 33.3% in the year after the change ($p = 0.01$). There were small but statistically significant increases in the mean duration of labour and mean length of the second stage ($p = 0.03$).

Interpretation: Billing policy may affect clinical decisions. Our findings add weight to the literature showing increased intervention rates with fee-for-service remuneration.

Rates of obstetric intervention, particularly induction of labour and operative delivery, are a source of concern, as increasing intervention is not necessarily associated with improved outcome. Differing rates of intervention cannot purely be explained by clinical need or population differences[1] and may be affected by many factors, including obstetricians' individual practice style,[2] hospital policies,[3] day of the week[4] and time of day.[5]

Several studies have shown that private payment for obstetric care and fee-for-service payments are associated with increased rates of caesarean section and induction of labour.[4,6,7] However, these studies have been limited by the need to study different hospitals or clinics with different populations and physicians.

On July 1, 1997, obstetricians at a tertiary referral hospital in Ottawa changed their practice such that financial remuneration that had previously been based on individual case billing was changed to an equal distribution of the pooled income among the call group, thus removing any direct financial incentive for an individual physician to perform more procedures or deliveries while on call. This provided an opportunity to examine the practice of a single group of physicians working with the same population in the 2 different situations. We performed a study to test the hypothesis that the change in remuneration would result in reduced rates of induction of labour and operative delivery.

Methods

We collected data from the hospital's obstetric database for deliveries during the periods July 1, 1996 – June 30, 1997 (period 1), and July 1, 1997 – June 30, 1998 (period 2), these being the years immediately before and after the change in remuneration. All deliveries by the 8 physicians in the call group over the 2 periods were studied. Most high-risk deliveries were

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excluded as they were managed by a separate maternal–fetal medicine service. Data were collected on induction of labour, indication for induction, mode of delivery, length of labour and neonatal outcome.

We used deliveries performed by physicians unaffected by the change in remuneration at a similar tertiary referral hospital in the same city over the same period as a "comparison group" to determine whether other, "global" factors may have influenced intervention rates.

We calculated rates of elective induction, elective and emergency (nonelective) caesarean section and operative vaginal delivery for each individual physician for the 2 periods. Patients were categorized by attending physician (antenatal care provider) for elective induction of labour or elective caesarean section and by physician present at delivery for interventions in labour, as these were judged to be the primary decision-makers in each case. Elective induction excluded the indication of prelabour rupture of membranes at term, as a hospital policy of induction of labour was in effect.

We compared demographic data for the 2 periods using the χ^2 test and Student's *t*-test. Changes in intervention rates were compared with Wilcoxon's signed-rank test. A p value less than 0.05 was considered statistically significant.

Results

A total of 1591 women were attended in period 1 and 2000 women in period 2. A total of 1678 women gave birth in period 1, and 1934 women gave birth in period 2. The larger number of women in period 2 was mainly due to the exclusion from period 1 of the patients of a physician who left the country during the study period. The groups in period 1 and period 2 were similar in maternal age, parity, infant birth weight and neonatal outcomes for both the attending physicians and the delivering physicians.

The mean rate of elective induction of labour was significantly lower after the change (33.3%) than before the change (38.6%) ($p = 0.01$) (Table 1). The rate was lower after the change for each of the physicians (Table 2). There was a strong correlation between the physicians' induction rate for period 1 and the proportion by which their induction rate decreased ($r = 0.70$, $p = 0.05$).

The mean rates of elective and emergency caesarean section, operative vaginal delivery and total operative deliveries were also lower after the change than before the change, although the differences were not statistically significant (Table 1). The total operative delivery rate for each physician is shown in Table 2.

There were small but statistically significant increases in the mean duration of labour and mean length of the second stage in period 2 (Table 1) ($p = 0.03$).

In the comparison group there was no significant difference between period 1 and period 2 in the rate of induction of labour (32.6% v. 31.2%) ($p = 0.31$) or the caesarean section rate (19.0% v. 17.9%) ($p = 0.27$).

Table 1: Rates of obstetric interventions and outcomes for 8 physicians before (period 1) and after (period 2) change in remuneration from fee for service to income pooling

Intervention or outcome	Mean (and range) Period 1	Period 2	*p* value
Elective induction of labour, % of deliveries	38.6 (34.8–41.5)	33.3 (28.9–35.7)	0.01
Gestational age in cases of elective induction, d	274.6 (272–277)	275.5 (273–278)	0.02
Elective caesarean section, % of deliveries	8.4 (6.7–10.6)	7.8 (5.0–10.4)	0.48
Emergency caesarean section, % of deliveries	10.0 (8.2–13.2)	9.2 (5.4–11.5)	0.29
Operative vaginal delivery, % of deliveries	17.2 (11.7–22.3)	14.9 (9.1–20.9)	0.21
Total operative deliveries, % of deliveries	27.3 (20.2–31.6)	24.1 (16.9–29.8)	0.16
Length of labour, min	479 (438–516)	512 (492–540)	0.03
Length of second stage, min	50.9 (45–60)	57.4 (46–67)	0.03

Table 2: Rates of induction of labour and total operative delivery for the 8 physicians for the 2 periods

Physician no.	Intervention; no. (and %) of deliveries: Induction of labour Period 1	Period 2	% change	Operative delivery Period 1	Period 2	% change
1	92/236 (41.5)	74/256 (28.9)	–12.6	94/303 (31.0)	58/233 (24.9)	–6.1
2	98/282 (34.8)	105/328 (32.0)	–2.7	61/225 (27.1)	70/261 (26.8)	–0.3
3	78/201 (38.8)	67/227 (29.5)	–9.2	56/184 (30.4)	73/249 (29.3)	–1.1
4	58/165 (35.2)	71/207 (34.3)	–0.9	55/174 (31.6)	47/219 (21.5)	–10.1
5	47/123 (38.2)	54/154 (35.1)	–3.1	56/210 (26.7)	41/242 (16.9)	–9.7
6	74/179 (41.3)	74/210 (35.2)	–6.1	49/205 (23.9)	72/242 (29.8)	5.8
7	68/180 (37.8)	85/238 (35.7)	–2.1	43/213 (20.2)	56/261 (21.5)	1.3
8	93/225 (41.3)	134/380 (35.3)	–6.0	45/164 (27.4)	50/227 (22.0)	–5.4

Interpretation

We found a reduction in rates of elective induction of labour in the year following the change in remuneration from fee for service to income pooling, the largest reduction being for the physicians who had the highest induction rates before the change. Other markers of reduced intervention were increased gestational age at delivery in cases of elective induction and longer duration of both labour and second stage; however, it is difficult to determine whether these findings represent a tendency to intervene earlier in the year before the change or a tendency to defer delivery in the year after the change.

One of the limitations of a retrospective study such as ours is that we cannot assume that these associations necessarily imply causation. There may be a number of other confounders, such as changes in communication or culture within the call group. It would be very difficult to replicate this natural experiment with a randomized control group. We are not aware of the introduction of any local or national practice guidelines that might have influenced rates of induction or operative delivery during the study period. To provide a surrogate control group for such factors, we examined the practice of a physician call group at a neighbouring hospital. Their intervention rates were similar and showed no change. One other change, which occurred at the same time as the change in remuneration, was a decrease in the frequency of on-call duty, from an average of 1 in 5 nights to 1 in 9 nights. It has been suggested that physician fatigue may increase cesarean section rates.[8] Although such factors may affect physicians' practice on the delivery unit, we would not expect a decrease in duty hours to have such a marked effect on the decision to induce labour made in the office during normal working hours.

Our results demonstrate that management and organizational issues, such as billing policy, may affect clinical decisions. They add weight to the literature showing increased intervention rates with fee-for-service remuneration.

Competing interests: None declared.

Contributors: The project was conceived and designed by Drs. Bland and Oppenheimer. Drs. Bland and Holmes collected the data. All of the authors participated in analyzing and interpreting the data. The manuscript was prepared by Drs. Bland, Oppenheimer and Holmes and revised by Drs. Oppenheimer and Shi Wu Wen.

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