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Health policies for the reduction of obstetric interventions in singleton full-term births in Catalonia

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Highlights

- From 2010-14 the rate of obstetric interventions including C-sections remained stable in Catalonia
- High complexity level and low volume of births attended increased the use of C-sections
- Monetary incentives for hospitals failed in decreasing the rate of C-sections
- The non-medicalized deliveries strategy decreased the use of C-sections for a limited time

Introduction

In recent years, the rate of surgical procedures carried out in order to assist childbirth has substantially increased [1]. Data recorded in different reports and international databases [2-3] show an increase in the rate of caesareans with high variability between countries.

In the prior assessment carried out in our environment, we found that the hospital's rate of C-sections and the use of instruments for assisting birth were related to the volume of assisted births in hospitals, as well as the type of financing [4]. Moreover, this previous work made clear the limitations of the information available to assess health provision during delivery. As a result, a specific study, supported by the Ministry of Health, has been launched in order to explore the birth outcomes of healthy women and to identify the profile of the professional assisting women during the intrapartum process (MidconBirth [5]).

The maternity care model proposed by the Catalan Ministry of Health promotes assistance based on the best evidence available with appropriate technology used in a rational and sustainable way for avoiding unnecessary procedures [6]. In Catalonia, there is a separation between the public insurer, which guarantees universal coverage to all citizens, and the healthcare providers. The relationship between the public insurer and the hospitals as

providers is established based on an annual contract. The financing takes into account the case-mix index, based on the groups related to diagnosis system (AP-DRG), attended in each hospital [7]. The DRG assigned to C-sections raises the complexity of the case-mix attended and therefore raises the budget allocated to each hospital. Obstetric discharges are about 14% of all discharges. Every year until 2014, around 0.8% of every hospital's budget was linked to the achievement of 10-12 objectives. Since 2006, one of the objectives was to maintain the rate of C-section lower than 21%. In addition, in 2008, a new strategy for increasing non-medicalized deliveries (NMD) on maternity care was launched, so technical and economic support for hospitals was offered for adapting their infrastructures to natural non-medicalized deliveries, and for creating specific spaces for assisting healthy women during birth.

The aim of this study is to explore the evolution in the proportion of obstetric surgical procedures (C-section, forceps, vacuum and instrumented births without specifying instrument type) performed in singleton full-term births (SFTB) occurred during 2010-2014 in Catalonia while two strategies for reducing the rate of obstetric interventions (OI) were applied.

Material and methods

To explore the evolution in the proportion of OI performed in SFTB occurred during 2010-2014, data about all singleton births between 37 and 42 weeks of pregnancy assisted at 42 publicly financed maternity hospitals were extracted from the Minimum Basic Data Set that collects information of hospital discharges using ICD-9-MC codes. The hospitals where births were assisted were classified according to the level of complexity attended into five categories [8]: Group I (low complexity); Group IIA (medium complexity); Group IIB (medium-high complexity); Group IIIA (high complexity); Group IIIB (very high complexity).

A second grouping was defined based on the volume of annual births assisted in hospitals. This grouping considered four strata: Stratum 1 (600 births or less annually); Stratum 2 (between 601 and 1200 births annually); Stratum 3 (from 1201 to 2400 births annually), and Stratum 4 (more than 2400 births annually). In addition, hospitals were classified in

two categories according to the adoption of the NMD strategy or not.

This study was exempt from Ministry of Health of the Government of Catalonia Ethics Committee review as it used publicly available, anonymous data.

Statistical Analysis

The proportion and the confidence interval (CI 95%) was calculated for the OI that were explored (C-section, forceps, vacuum and instrumented births without specifying instrument type) in each group of hospitals and for each year studied, considering as the denominator the total number of SFTB assisted. The annual average change in the incidence was calculated based on Poisson regression models or negative binomial regression in the case of vacuum and other types as the variance was greater than the average (overdispersion) [9]. The log of total births was included as a term of exposure. Regression models were adjusted by the level of complexity, the volume of births and the adoption of the NMD strategy. All of the analyses were carried out with Stata v13.

Results

From 2010 to 2014, there were 236,163 discharges for live SFTB. Table 1 shows the distribution of the SFTB in hospitals grouped according to their characteristics. Hospitals in Group I attended around one third of all births. The number of births assisted in each level of complexity remained stable throughout all the years. Hospitals from stratum 3 cared for almost 48% of all births, and the figures were stable throughout the period. Hospitals included in the NMD strategy attended about 63% of deliveries in 2010. Since 2011, the percentage increased to 88%.

The total number of births with OI were 82,742 (35.0%). The rate of C-sections was 20.6%, forceps 8.3%, vacuum 2.8% and non-specified 3.4%. Figure 1 shows the evolution of each one of the OI in each level of complexity. OI proportions were stable throughout the period within each level of complexity. Hospitals in Groups I and IIB had the lower overall average of OI in these five years (below 34%), while group IIIA had the highest rate (38.4%). The percentage of C-sections was greater in Groups IIIA and IIIB, which correspond to hospitals of high and very high complexity, with an upward trend. The

percentage was lower and stable in Group IIB. The use of forceps was higher in Groups IIIA and IIIB with a decrease in their use. Group IIB showed the more pronounced decrease in the use of forceps from 8.5% to 5.8%. The use of vacuum increased throughout the period in all levels except in the Group IIIA with the more pronounced increase in the Group IIB, from 3.6% to 7%.

The evolution of the OI proportion was stable in each one of the volume strata (Figure 2). Stratum 2 had the lower rate of OI (below 31.4%), whilst Stratum 1 showed the highest percentages. The rate of C-sections was highest in Stratum 1 (600 or less births) and, in Stratum 4 the rate increased by 3%. The use of forceps was more frequent in Stratum 3 and 4 with a downward trend over time. The use of vacuum increased in all the strata except Stratum 3 throughout the period under study.

The rate of OI in the hospitals that adopted the NMD strategy was stable, while in the non-NMD hospitals the rate decreased from 36.1% to 31.5%. Those involved in the NMD strategy had a lower rate of C-sections since 2010 to 2013 but, since then, there was no difference between both types of hospitals (Figure 2). The use of forceps and the use of vacuum was higher in NMD hospitals, in the last case with an upward trend.

The multivariate regression analysis showed that OI remained stable throughout the period. (Table 2) The rate of OI increased with higher levels of complexity (+13%), while large volumes of births and the adoption of the NMD strategy were associated with a decreasing rate. C-sections remained steady throughout the period although, as level of complexity of cases attended increased, the C-section rate increased too (about 4% annually). The adoption of the NMD strategy decreased the use of C-section by 9%. The use of forceps decreased throughout the period by nearly 5% year on year, although their use increased as level of complexity did (+16%). The use of vacuum was stable throughout the period but the use of the NMD strategy was the main factor for its increase in some hospitals (IRR 3.71).

Discussion

This study analyses data regarding OI in SFTB in order to ascertain whether the volume of

births attended, their level of complexity, the incentives applied or the adherence to the NMD strategy had any effect over the rate of OI. Our results show a stabilisation in the rate of OI including C-sections through the period, a decrease in the use of forceps and an increase in the use of vacuum. These results are aligned with other studies [10] conducted after implementing clinical practical guidelines for decreasing unnecessary interventions, which identified a decrease in instrumented births at the expense of an increase in C-sections. In our results, the decrease in the use of forceps is at the expense of the increase in the use of vacuum.

The number of SFTB without any instrument, around of 65% of the deliveries, can be considered as normal births. These results are similar to the rates obtained in Dowell's study [11], which found that half of the women that gave birth in obstetric units in England were classified as low-risk and that the rate of normal births among these women was 60%.

Several studies show that OI, mainly C-sections, have increased in recent years, [12] especially in private healthcare services [13-15]. In our country, a preliminary study showed a significant difference in the rates of OI between public and private services [4]. Apart from financing, some hospital's characteristics could explain the variability found in the rate of OI in our study. High rates of OI could be expected in hospitals attending complex cases. However, high rates of OI, such as C-sections, are unexpected in the hospitals attending less complex cases as those in level I or IIA. The rate of OI should be stable among the different strata, but surprisingly, hospitals with less activity present a higher rate of OI and C-sections. The rate of OI including C-sections decreases when hospitals adopt the NMD strategy although the rate of vacuum increases. The rates of OI and C-sections did not change through the period in spite of the incentives employed.

These results open a debate on the effect that the organisation of the services may have in our context. All the public maternity units considered in our study are obstetric units highly technically oriented, that can attend high risk as well as low risk pregnancies and births. That raises the question about the dubious benefits of giving birth in these mixed environments, as recently studies have shown positive health results when healthy women are treated in specific units that are separated from the conventional obstetric units [16-19].

The result also challenges the public policy-makers' strategy applied in our country based in economic incentives for reducing C-sections. The strategy has failed as the rate of caesareans has remained over 24% without achieving a downward trend. The observed stabilization in the last five years is similar to that observed in the rest of Spain [3] although our population is restricted to live SFTB. It seems plausible to assume that, needing to fulfil as many as ten to twelve goals in order to receive the incentives almost certainly decreased the value of each one of these incentives. Moreover, the value of the incentives might not offset the value of the budget increase due to the complexity in the case-mix, in which C-sections play a role. Besides, some hospitals passed on the incentives to the obstetricians themselves, while others did not. On the contrary, it seems that the adherence to the NMD strategy could be an incentive for reducing the rate of C-sections. This makes sense since its adoption implies, not only the revision of the infrastructures, but also a cultural change. However, as our results show, the NMD strategy does not work for reducing the rate of all OI.

The administrative origin of the data is the main limitation of this study. First, the lack of some clinical factors do not allow identifying low-risk pregnancies tributaries of non-medicalized deliveries [20-21]. Second, the recorded data in the hospital discharge reports are not exhaustive in some procedures so this study has not explored other frequent OI such as induction of labour or use of epidural analgesia [4].

To reduce OI, mainly C-sections, the public insurer should adopt different strategies. First the general adoption of the NMD strategy, the implementation of evidence-based care for intrapartum routine [22], and the organization of specific units to cater for low-risk pregnancies mainly in the hospitals with less activity. Second, considering for payment the tariff of C-sections as the same as vaginal deliveries, although they are in different DRG groups, in order to align the incentives and the DRG-based payment. In this case, it might be advisable to keep in mind that about 15% of Caesarean sections are the recommended percentage. Third, increasing the monetary value of the incentives and passing on the incentives to the professionals. Finally, encouraging the already incipient cultural and social change that promotes the participation of women in decision-making demanding a more natural birth [23]

Conclusions

In Catalonia, the proportion of caesareans remained stable through 2010 to 2014, while the use of forceps fell. OI increased with the increase in complexity of births attended and it also increased with low volumes of births. The adoption of the NMD strategy decreased the rate of C-sections and increased the use of vacuum. The public health insurer should develop new strategies for achieving a lower rate of OI and C-sections as monetary incentives have proved to be non-effective.

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Figures

Figure 1. C-section rate and instrumental births rate evolution for 2010-2014 by hospital level of complexity. Singleton full-term births

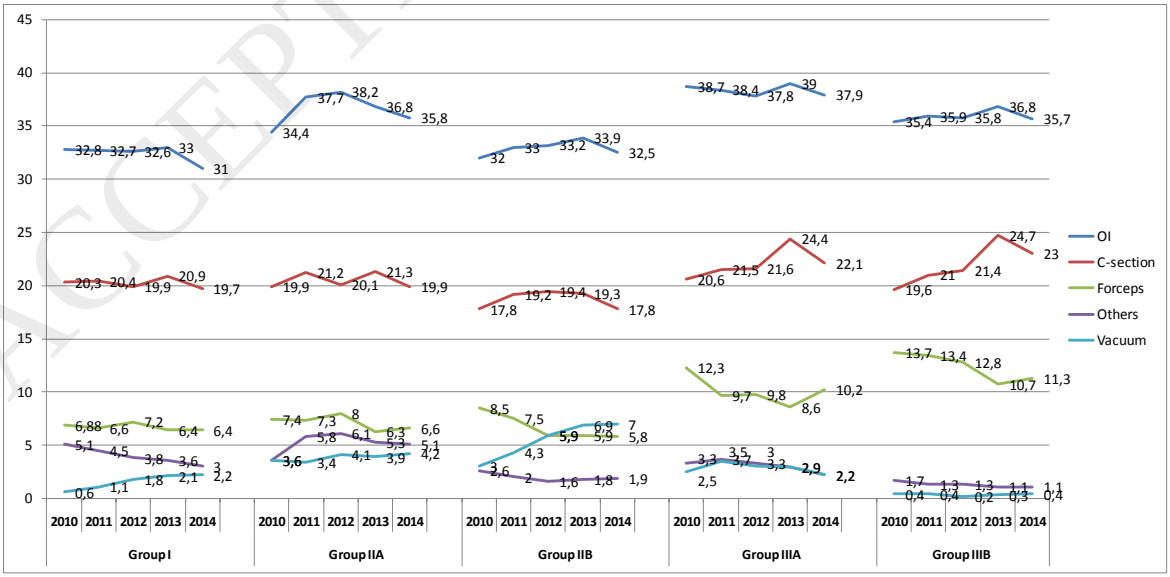

Figure 2. C-section rate and instrumental births rate evolution for 2010-2014 by volume of births attended and the adoption of the NMD strategy. Singleton full-term births

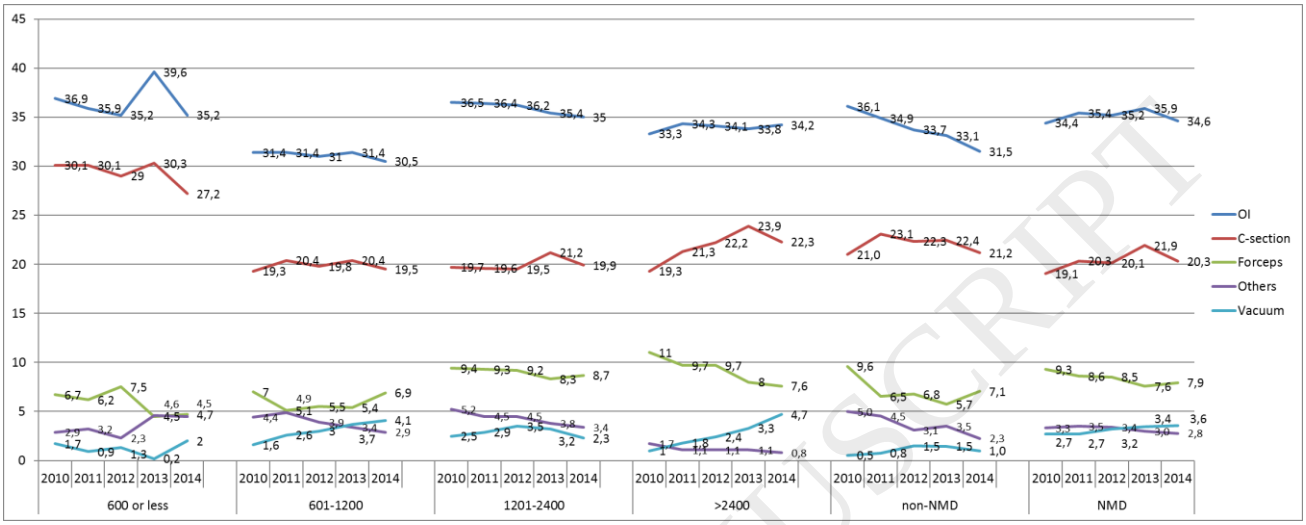

Figure 3. Annual average change (incidence rate ratio and 95% CI) for obstetric interventions adjusted by level of complexity, volume of deliveries and the adoption of the NMD strategy. Singleton full-term births 2010-2014

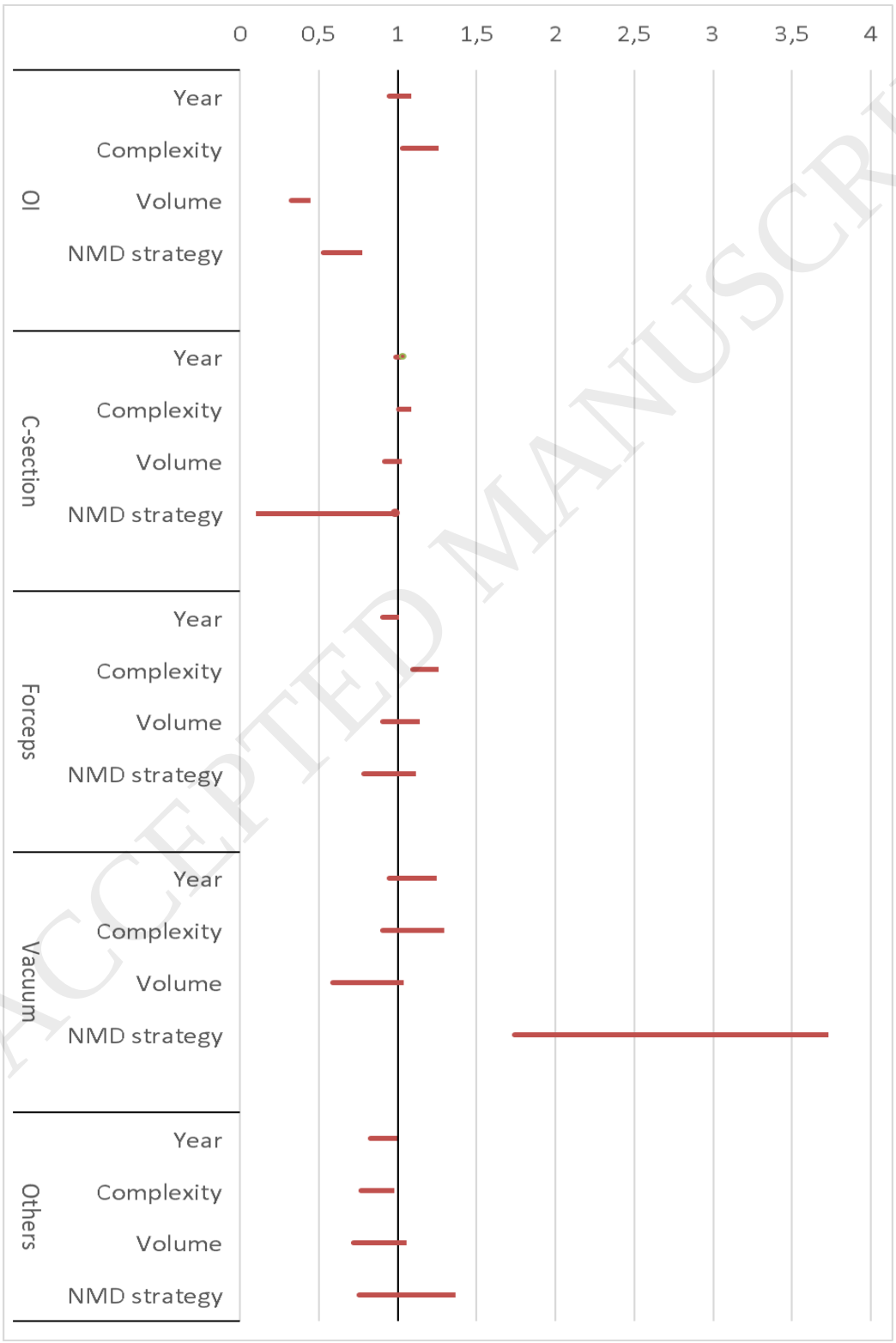

Figure 3. Annual average change (incidence rate ratio and 95% CI) for obstetric interventions adjusted by level of complexity, volume of deliveries and the adoption of the Non-medicalized delivery (NMD) strategy. Singleton full-term births 2010-2014