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Planned homebirth in Catalonia (Spain): A descriptive study

L. Alcaraz-Vidal[a,b,c,d,1,*], R. Escuriet[e,f], I. Sàrries Zgonc[d,g], G. Robleda[h,i]

[a] PhD candidate, Biomedicine Programme, Department of Experimental and Health Sciences, University Pompeu Fabra. Barcelona, Spain
[b] Midwife Coordinator Birth Centre Project, Germans Trias i Pujol Hospital, Carretera del Canyet S/N 08, Badalona, Spain
[c] Sexual and Reproductive Health Research Group, (GRASSIR), Catalan Health Institute Barcelona, Spain
[d] Catalan Association of Homebirth Midwives, Spain
[e] Faculty of Health Sciences, Universitat Ramon Llull. Global Health Gender and Society (GHenderS) Research Group. Barcelona, Spain
[f] Catalan Health Service. Government of Catalonia, Spain
[g] Independent RM, Spain
[h] Campus Docent Fundació Privada Sant Joan de Déu, School of Nursing, University of Barcelona. Spain
[i] Iberoamerican Cochrane Centre. Barcelona, Spain

Introduction

Place has a great impact on women's experience during childbirth (Henshall et al., 2016, 2018; Jenkinson et al., 2013; Murray-Davis et al., 2014). Choosing where to give birth is a right recognised by the World Health Organization (World Health Organization, 1997), the European Court of Human Rights) (European Court of Human Rights, 2014), the International Confederation of Midwives (ICM) (International Confederation of Midwives. Prague Council Meeting, 2014), and the International Federation of Gynaecology and Obstetrics (Committee for the Study of Ethical Aspects of Human Reproduction and Women's Health. et al., 2015).

Research into the place where births are attended has considered various aspects, including safety (Bolten et al., 2016; Davies-Tuck et al., 2018; de Jonge et al., 2009; Hutton et al., 2016; van der Kooy et al., 2017), women's experiences (Fleming et al., 2016; Handelzalts et al., 2016; Jouhki et al., 2017; Downe et al., 2018), and financial costs (Schroeder et al., 2012; Janssen et al., 2015; Scarf et al., 2016; Hitzert et al., 2017). The term "planned home birth" is used to describe births where the woman decides to give birth at home accompanied by a qualified professional during labour, regardless of whether the birth actually takes place in her home (Vedam et al., 2012; Hutton et al., 2016).

In countries where home births are included in the health system, midwives are the health professionals who attend the births, and there are explicit government policies regarding the practice, such as institutional information for the general public and for health professionals, training for midwives, and coordination amongst the different levels of healthcare involved in the birth (Brocklehurst et al., 2011; de Jonge et al., 2017; Hollowell et al., 2011; Hutton et al., 2016)

Planned home births are associated with higher rates of eutocic births and lower rates of instrumental births, casarean sections, severe perineal trauma, and severe postpartum bleeding (Scarf et al., 2018). Women who have planned home births report better experiences, regardless of whether they have been transferred to hospital during the birth (Geerts et al., 2014; Coxon et al., 2017; Geerts et al., 2017); amongst other aspects, this experiencie is related with the continuity of care (Hauck et al., 2020) and participation in decision making (Zielinski et al., 2015). Babies born at home are more likely to be breastfed after birth (Brocklehurst et al., 2011; Scarf et al., 2018) and to continue breastfeeding to the age of 6 months (Quigley, 2016).

The debate about the safety of home births centres largely on neonatal morbidity and mortality. Many studies have found that home births are associated with lower rates of instrumental and caesarean births, but also with higher perinatal mortality (Wax et al., 2010; Evers et al., 2010; Snowden et al., 2015; van der Kooy et al., 2017). Hollowell et al. (2011) also found a lower rate of interventions; however, these authors concluded that the incidence of adverse events in planned home births in low-risk pregnancies was low, although higher in nulliparous women. Nevertheless, the NICE guidelines for intrapartum care recommend home birth for all women with low-risk pregnancies, because the absolute risk is very low (National Institute for Health and Care Excellence NICE 2014).

In 2012, a Cochrane review concluded that, in low-risk pregnancies, although solid evidence from randomised studies was lacking, the evidence from observational studies indicated that planned hospital births were not safer than planned home births attended by an experienced midwife in collaboration with a medical team. (Olsen and Clausen, 2012).

Two strong studies underline the safety of home births in low-risk pregnancies attended by midwives in areas where this option is integrated into the health system. Hutton et al. (2019) found no differences in perinatal or neonatal mortality in matched cohorts of 11,493 home births vs. 11,493 hospital births in Ontario, Canada, and a meta-analysis by Reitsma et al. (2020) concluded that the evidence on maternal outcomes consistently supported planned home births in these conditions.

In general, for women with low-risk pregnancies, planned home birth initiated spontaneously and attended by trained professionals in coor-

* Corresponding autor.
E-mail address: lalcaraz.germanstrias@gencat.cat (L. Alcaraz-Vidal).
[1] L.Alcaraz-Vidal lalcaraz.germanstrias@gencat.cat

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dination with the health system has proven as safe as hospital birth (Brocklehurst et al., 2011; Olsen and Clausen, 2012; Hutton et al., 2014; Cheyney et al., 2014; De Jonge et al., 2015, 2016; Scarf et al., 2018; Hutton et al., 2019; Reitsma et al., 2020).

In Spain, official records show that 0.63% of births take place at home (Spanish Statistical Office, 2018), but these records do not state the proportion of planned and unplanned home births (Ortega et al., 2017). For this reason, official records do not enable the analysis of maternal and neonatal outcomes according to the place of birth; thus, the rate of adverse advents with respect to planned place of birth remains to be determined. Catalonia is the region with the largest number of home births, and thanks to the data collected by CAHBM midwives, we know that most home births in Catalonia were planned.

In Spain, home birth is not covered by the public health system. Women who opt for home birth must contract a private service, usually from midwives practicing independently of the health system. These professionals, although not integrated into the public health system, can nevertheless count on support from the system, because all women have the right to use the available public health resources, such as prenatal tests, postpartum care, and access to emergency care in both primary care centres and hospitals. The Catalan Association of Homebirth Midwives (CAHBM), created in 2015, comprises 60 midwives working in Catalonia who work alone or in teams through a caseload model of care and collect data about their work through a shared database. In Spain, midwives must complete a two-year residency programme after earning an undergraduate degree in nursing. Midwife training programmes in Spain do not specifically cover home births; training in home birthing is imparted by associations of midwives and includes accompanying midwives experienced in home birthing in their work. The government requires no specific qualifications for midwives who attend home births.

In our context, scant evidence about outcomes of home births is available. Ruiz-Callado et al. (2012) analysed neonatal mortality in "normal" pregnancies (a single foetus in the cephalic presentation, with the onset of labour between week 37 and week 42) between 1995 and 2009 in Spain; despite the limitations of the study, the authors concluded there were no significant differences between home births attended by healthcare professionals and hospital births.

Given the lack of official data about planned home births in Spain, it is difficult to compare the rates of perinatal morbidity and mortality between these births and similar births in hospitals. Thus, we aimed to determine the incidence of maternal and perinatal adverse events in planned home births attended by CAHBM midwives.

Methods

Study design, setting, and population

This observational, descriptive, cross-sectional study analysed a cohort of women who underwent planned home births with CAHBM professionals in Catalonia (Spain) in the period comprising January 2016 through December 2018. We included women with low-risk single-foetus pregnancies who entered labour spontaneously or after nonpharmacological stimulation (acupuncture, membrane sweeping, or castor oil), with the foetus in the cephalic position between week 37+0 and week 42+0 of gestation. We excluded women with a history of complications or caesarean sections in prior pregnancies, those who were referred to the hospital for risk during the current pregnancy, and those whose membranes had ruptured > 72 h before birth.

The current analysis is a substudy of a larger study (ISRCTN94453122); it was carried out in accordance with the ResQu Index (Vedam et al., 2017) guidelines for research about place of birth and reported following the STROBE guidelines for reporting observational studies (von Elm et al., 2008)

Data collection

After contacting the midwife or team of midwives, subjects were informed of the conditions for planned home birth and signed a private contract and informed consent to allow some of their personal data to be collected and stored in anonymised format in the CAHBM database. The data for the current retrospective study were extracted from this database with the CAHBM's permission.

Data were collected after the birth. Each midwife used alphanumeric codes to record data about the mother and the newborn, as well as outcomes related to the birth, in a computerised database.

Variables and definitions

We recorded variables related to (a) mothers' sociodemographics and clinical history (age, country of origin, level of education, parity, duration of the gestation); (b) characteristics of the newborn (sex, birthweight, Apgar score, feeding and start of feeding, umbilical cord clamping); (c) obstetric history of the current pregnancy (gestational age, type of birth, duration of birth (in hours), time from rupture of membranes to birth, water birth, maternal position during birth; (d) measures to increase comfort; (e) perineal trauma, and (f) transfers (emergency or non-urgent) for maternal or perinatal complications.

The main outcome variable was birth safety, defined as one or more adverse maternal or perinatal event within 24 h after birth. Table 1 provides detailed definitions of maternal and perinatal adverse events. Maternal and perinatal morbidity were assessed by calculating the incidence of all the adverse events defined in Table 1.

Statistical methods

We used descriptive statistics to summarise the results, expressing dichotomous variables as frequencies and percentages, ordinal variables as medians and ranges, and continuous variables as means and standard deviations. In the bivariate analyses, we used chi-square tests or Fisher's exact test for dichotomous variables. The rates of adverse events are presented together with their 95% confidence intervals (CI).

We used IBM SPSS for Windows v 22.0 (IBM; Armonk, NY, USA) for all analyses.

Ethical considerations

The clinical research ethics review board at a local university hospital approved the study (study registration number 2018/8120/I). All midwives affiliated with CAHBM were provided with written and oral information about the study. All women provided written informed consent for their data to be registered in the CAHBM database, and the CAHBM approved the use of these data for the current study in an assembly on December 15, 2017. No data is available about the number of women who did not consent to their data being registered; however, to our knowledge, all women attended by CAHBM midwives during the study period signed the consent form.

Funding sources

The Federation of Spanish Associations of Midwives awarded the research protocol for this study with the Mustela Research Prize in 2018.

Results/findings

Fig. 1 is a flow diagram showing how the sample of 750 women included in the study was derived from the total population of 937 women with planned home births attended by CAHBM midwives in 2016, 2017, and 2018.

Characteristics of mothers and newborns

Table 2 reports the sociodemographic and clinical characteristics of the women [mean age, 34 ± 4.17 (range 20–47); 418 (56.1%) multiparous; 609 (82.2%) Spanish nationality] and newborns [392 (52.3%)

Table 1
Definitions of adverse events.

Maternal variables	
Severe postpartum bleeding	Estimated blood loss >1000 mL and/or clinical signs of maternal collapse (WHO 2012)
Severe perineal lesion	Third-degree tears (subtypes a, b, and c, depending on the degree of involvement of the external and internal anal sphincters) and fourth-degree tears (perineal lesions affecting both sphincters and the anal mucosa) (National Institute for Health and Care Excellence. 2014)
Admission to an intensive care unit	Admission during or in the 7 days following birth.
Fever	Axillary body temperature ≥38 °C during birth or ≥38 °C within 24 h after birth if it required hospitalization
Death due to obstetric causes	Death during pregnancy, birth, or within 42 days after birth, regardless of the length of the pregnancy and the birth place, that is related to or aggravated by the pregnancy itself or by pregnancy-related care; deaths due to accidental or incidental causes are excluded (Spanish Ministry of Health, Consumer Affairs and Social Welfare. 2009)
Perinatal variables	
Apgar score 5 min after birth ≤ 7	
Shoulder dystocia	Time between the appearance of the head and trunk ≥ 60″ and/or the need for auxiliary obstetric manoeuvres (Spong et al. 1995)
Low birthweight	Weight < 2500 g within the first 24 h of life
Erb's palsy	Damage to the brachial plexus due to obstetric manoeuvres
admission to neonatal intensive care unit	admission within 24 h after birth
foetal death during birth	absence of foetal heartbeat confirmed by sonography
Early neonatal death	Death within 7 days after birth (Spanish Ministry of Health, Consumer Affairs and Social Welfare. 2009)

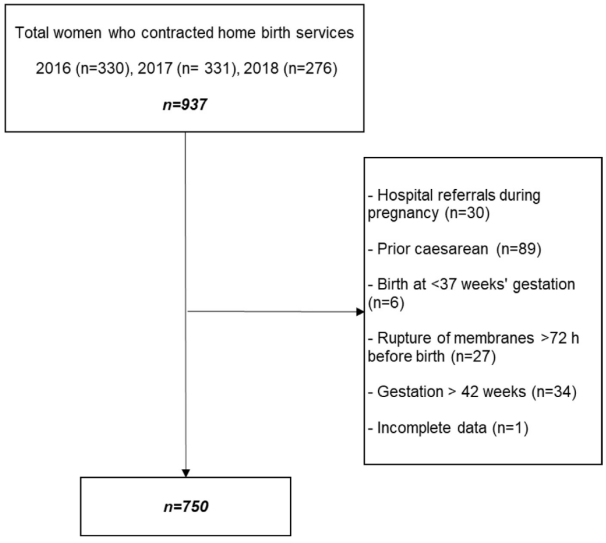

Fig. 1. Flowchart showing inclusion of women with planned home births.

girls and 358 (47.7%) boys; mean birthweight, 3424 ± 425.8 g (range 2160–5040); > 90% had Apgar >7 and started feeding <2 h after birth].

Obstetric results

Table 3 reports the obstetric variables. A total of 642 (85.6%) women had spontaneous births at home; of these, 19 (2.5%) gave birth before the midwife arrived.

A total of 695 (92.7%) of births were non-instrumental vaginal births; instruments were used in 25 (3.3% of all births). Caesarean sections were conducted in 30 (4%). Of the 634 women who gave birth at home, 171 (27%) gave birth in water and 523 (82.5%) gave birth in non-recumbent positions.

In the 636 women who gave birth at home, the birth took <12 h in 571 (89.8%). Data about the expulsion of the placenta were available for 621 births; in these births, the expulsion of the placenta took ≤60 min in 501 (80.7%)

Table 4 summarises the measures taken to increase comfort and alleviate pain, the most common of which were position changes, massage, local application of heat, and immersion in hot water.

A total of 108 (14.4%) of the women were transferred to the hospital during the birth; transfer was more common in nulliparous women [97 (89.8%) vs. 11 (10.1%) in multiparous women, p <0.0001]. The most common reason for transfer during birthing was prolonged labour, which accounted for 49 (45.3%) transfers. After the birth, 17 (2.3%) women were transferred to the hospital for suspected or confirmed postpartum complications, and 9 (1.2%) of the babies were transferred for complications after birth. Table 5 summarises the reasons for transfers.

Table 2
Sociodemographic and clinical characteristics of the pregnant women and newborns.

Characteristics of the women	2016(n = 271) n (%)	2017(n = 273) n (%)	2018(n = 206) n (%)	TOTAL(n = 750) n (%)
Country of origin				
Spanish	221 (81.5)	217 (82.2)	171 (83)	609 (82.2)
Other European	34 (12.5)	29 (11)	20 (9.7)	83 (11.2)
Non-European	16 (5.9)	18 (6.8)	15 (7.3)	49 (6.6)
Age				
0–29 years	35 (13)	43 (15.8)	36 (17.5)	114 (15.2)
30–39 years	214 (79.3)	204 (74.7)	142 (68.9)	560 (74.8)
≥40 years	21 (7.8)	26 (9.5)	28 (13.6)	75 (10)
Education				
Primary	11 (4.1)	11 (4)	6 (2.9)	28 (3.7)
Secondary	60 (22.1)	56 (20.5)	59 (28.6)	175 (23.3)
Post-secondary	200 (73.8)	206 (75.5)	141 (68.4)	547 (72.9)
Parity				
Nulliparous	120 (44.4)	121 (44.5)	86 (42.4)	327 (43.9)
Non-nulliparous	150 (55.6)	151 (55.5)	117 (57.6)	418 (56.1)
Duration of gestation				
37+0 – 40+0	126 (46.5)	118 (43.4)	100 (48.5)	344 (45.9)
40+1 – 41+0	89 (32.8)	103 (37.9)	75 (36.4)	267 (35.6)
41+1 – 42+0	56 (20.7)	51 (18.8)	31 (15)	138 (18.4)
Beta-haemolytic streptococcus				
Unknown	35 (12.9)	23 (8.4)	36 (17.5)	94 (12.5)
Negative	201 (74.2)	229 (83.9)	147 (71.4)	577 (76.9)
Positive	35 (12.9)	21 (7.7)	23 (11.2)	79 (10.5)
Characteristics of the newborns				
Sex				
Female	147 (54.2)	135 (49.5)	110 (53.4)	392 (52.3)
Male	124 (45.8)	138 (50.5)	96 (46.6)	358 (47.7)
Weight (n = 749)[a]				
< 2500 g	0 (0)	2 (0.7)	3 (1.5)	5 (0.7)
2501 g – 4000 g	240 (88.6)	252 (92.3)	189 (92.2)	681 (90.9)
4001 g – 4500 g	27 (10)	16 (5.9)	13 (6.3)	56 (7.5)
> 4500 g	4 (1.5)	3 (1.1)	0 (0)	7 (0.9)
Feeding(n = 745)[b]				
Initially bottle	2 (0.7)	2 (0.7)	0 (0)	4 (0.5)
Initially breastfeeding	268 (98.9)	268 (99.3)	203 (99.5)	739 (99.2)
Initially mixed	1 (0.4)	0 (0)	1 (0.5)	2 (0.3)
Time to first breastfeeding (n = 703)[c]				
< 2 h after birth	232 (85.6)	241 (94.5)	171 (87.2)	644 (91.6)
2 h – 4 h	13 (5.2)	7 (2.7)	7 (3.6)	27 (3.8)
4 h – 6 h	3 (1.2)	1 (0.4)	2 (1)	6 (0.9)
> 6 h	4 (1.6)	7 (2.5)	16 (8.2)	26 (3.7)
Apgar at 5′(n = 744)[d]				
≤ 7	2 (0.8)	1 (0.4)	2 (1.5)	6 (0.8)
> 7	263 (99.2)	272 (99.6)	203 (98.5)	738 (99.2)
Umbilical cord clamping (n = 637) [e,1]				
≤ 3 min	1 (0.4)	0(0)	1 (0.6)	2 (0.3)
> 3 min	234 (99.6)	229 (100)	172 (99.4)	635 (99.7)

Data from the Catalan Association of Homebirth Midwives (CAHBM), **2016–2018**.
[a] 1 missing value for the variable weight.
[b] 5 missing values for the variable feeding.
[c] 47 missing values for the variable time to first breastfeeding.
[d] 6 missing values for the variable Apgar at 5′, and.
[e] 5 missing values for the variable cord clamping.
[1] Data only for home births and home births before the arrival of the midwife.

Maternal and perinatal adverse events (Tables 6.1 and 6.2)

The annual incidence of maternal adverse events ranged from 1.5% to 2.6%. The most common adverse event was severe postpartum bleeding, which occurred in 7 of the 642 women who gave birth at home [incidence, 1.1% 95% CI: 0.3%–1.8%] (Table 6).

The annual incidence of perinatal adverse events ranged from 6.3% to 8.3%. The most common perinatal adverse event was shoulder dystocia, which occurred in 34 births [incidence, 4.5% (95% CI: 3%–6%)]. No cases of Erb's palsy or fractures of the humerus or clavicle were reported. Midwives resolved all cases of dystocia in the family home. Shoulder dystocia was associated with birthweight >4 kg (p<0.0001).

No significant associations were found between maternal or perinatal adverse events and parity.

Discussion

To our knowledge, this is the first study to collect data from independent midwives and women who decide to give birth outside the health system in Spain. The results show that both the characteristics of the women who choose to give birth at home in Catalonia and the maternal and neonatal outcomes of planned home births in this region are in line with those reported in similar studies. Thus, the outcomes of planned home births in our region are comparable with those in other countries, despite differences in the contexts of these births between Spain and other countries.

In other environments, similar retrospective cohorts were reported by Cheyney et al. (2014) in the USA, Hutton et al. (2016) in Canada, and van der Kooy et al. (2017) in the Netherlands. Like our study, all these studies used databases compiled by midwives; moreover, Cheyney

Table 3
Characteristics of the birth.

	2016 (*n* = 271) n (%)	2017 (*n* = 273) n (%)	2018 (*n* = 206) n (%)	TOTAL (*n* = 750) n (%)
Type of birth				
Caesarean	8 (3.0)	14 (5.1)	8 (3.9)	30 (4.0)
Non-instrumental vaginal	256 (94.5)	247 (90.5)	192 (93.2)	695 (92.7)
Instrumental vaginal	7 (2.6)	12 (4.4)	6 (2.9)	25 (3.3)
Place of birth				
At home	234 (86.3)	223 (81.7)	166 (80.6)	623 (83.1)
At home before midwife's arrival	3 (1.1)	8 (2.9)	8 (3.9)	19 (2.5)
Hospital	34 (12.5)	42 (15.4)	32 (15.5)	108 (14.4)
BIRTH AT HOME				
Spontaneous labour (n=394) [1,2,a]				
No	–	12 (6.4)	13 (6.3)	25 (6.3)
Yes	–	176 (93.6)	193 (93.7)	369 (93.7)
Water birth, (*n* = 634) [2–b]				
No	183(79.2)	168 (73.4)	112(64.4)	463 (73)
Yes	48 (20.8)	61 (26.6)	62 (35.6)	171 (27)
Mother's position during birth, (*n* = 634) [2,c]				
Supine	10(4.3)	17 (7.4)	5 (2.9)	32 (5.0)
Lateral decubitus	25 (10.8)	31 (13.5)	23 (13.2)	79 (12.5)
Vertical	100 (43.3)	94 (410.)	80 (46.0)	274 (43.2)
Kneeling on hands and knees	60 (26.0)	45 (19.7)	41 (23.6)	146 (23.0)
Kneeling upright	33(14.3)	40 (17.5)	21 (12.0)	94 (14.9)
Lap squatting	3 (1.3)	2 (0.9)	4 (2.3)	9 (1.4)
Duration of birth (*n* = 636) [2, d]				
< 12 h	206 (87.3)	207 (90.8)	158 (91.9)	571 (89.8)
12 h–24 h	22 (9.3)	16 (7.0)	11 (6.4)	49 (7.7)
> 24 h	8 (3.4)	5(2.2)	3 (1.7)	16 (2.5)
Duration of expulsion of the placenta (*n* = 621) [2,e]				
< 30 min	85 (36.6)	93 (41.2)	83 (50.9)	261 (42.0)
30–60 min	89 (38.4)	92 (40.7)	59 (36.2)	240 (38.6)
> 60 min	58 (25.0)	41 (18.1)	21 (12.9)	120 (19.3)
Time from membrane rupture to birth (*n* = 631) [2,f]				
< 24 h	207 (87.3)	209 (91.3)	149 (90.3)	565 (89.5)
24 h–72 h	11 (4.6)	11 (4.8)	11 (6.7)	33 (5.2)
No rupture	19 (8.0)	9 83.9)	5 (3.0)	33 (5.2)

[1] Data from 2017 to 2018.
[2] Data only from births at home and at home before the arrival of the midwife.
[a] 85 missing data about whether labour was spontaneous.
[b] 94 missing data about whether the birth took place in water.
[c] 93 missing data about the mother's position during birthing.
[d] 6 missing data about the duration of the birth.
[e] 21 missing data about the during of the expulsion of the placenta.
[f] 11 missing data about the time from rupture of membranes.

et al.'s study was also similar to ours in that the data were collected by the Midwife Alliance of North America, an organization that also works in the private sector without being coordinated by the health system. Unlike our study, some of these included high-risk pregnancies; for instance, Cheyney et al. (2014) included twin pregnancies and fetuses in the breech position, van der Kooy et al. (2017) included those with intrauterine growth restriction and congenital anomalies, and Li et al. (2015) and Hutton et al. (2016) included women with previous caesareans. Nevertheless, because the results are stratified, we can compare our results with theirs.

More than 70% of the women in this study had completed postsecondary education, and more than half of these had experience with at least one prior pregnancy. Thus, the women who planned home births had experience in previous pregnancies (most with hospital births) and had enough schooling to enable them to seek information about giving birth outside the hospital, even though the health system does not provide this information. Other studies have reported similar findings (Cheyney et al., 2014; Goyal et al., 2020; Zielinski et al., 2015). No differences in perinatal outcomes were observed in relation to mother's educational level.

Beta-haemolytic streptococcus was detected in 10% of the women. In Spain, all pregnant women are screened for beta-group streptococci (BGS), although official protocols do not consider positive results a risk factor. BGS-positive women who plan home births are informed of the risks and the postpartum surveillance of their babies is more rigorous (since antibiotics are not administered in the home). Our study found no differences in morbidity or mortality between babies born to BGS-positive and BGS-negative mothers (data not shown).

The women and babies in our study had a low rate of adverse events and required few interventions. Nearly all (92.7%) the women, including those who were transferred to the hospital during the birthing, had uncomplicated, spontaneous births. This result is similar to that reported by Cheyney et al. (2014) (93.6%), Hutton et al. (2016) (90.9%), and van der Kooy et al. (2017) (89.1%) as well as in the Birthplace Study (92.8%) (Brocklehurst et al., 2011). This percentage is considerably higher than that reported for hospital births in Catalonia in 2018 (62.1%), and even more considering that this report included spatula-assisted[1] births in the rate of vaginal births (Catalan Public Health Agency, 2020).

The rates of instrumental births and caesarean sections in our study is in line with those reported in reference studies that compared the

[1] Spatulas are instruments composed of two independent spoons that are introduced into the vagina to widen the birth canal and grasp the head of the fetus; they are used to shorten the second stage of birth. (Simon-Toulza and Parant, 2008)

Table 4
Comfort measures during home birth.

	2016* (*n* = 265)	2017* (*n* = 269)	2018 (*n* = 206)	TOTAL (*n* = 740)
Repositioning, n (%)	236 (89.06)	252 (93.7)	197 (95.63)	685 (92.57)
Massages, n (%)	203 (76.6)	201 (74.7)	158 (76.7)	562 (75.95)
Local heat, n (%)	202 (76.2)	209 (77.7)	128 (62.1)	539 (72.8)
Birth pool, n (%)	96 (36.2)	114 (42.4)	94 (45.6)	304 (41.1)
Shower, n (%)	63 (23.8)	52 (19.3)	75 (36.4)	190 (25.7)
bathtub, n (%)	57 (21.5)	49 (18.2)	37 (18.0)	143 (19.3)
homoeopathy, n (%)	56 (21.1)	49 (18.2)	36 (17.5)	141 (19.1)
Aromatherapy, n (%)	25 (9.4)	31 (11.5)	21 (10.2)	77 (10.4)
Bach flowers, n (%)	26 (9.8)	20 (7.4)	14 (6.8)	60 (8.1)
Reflexology, n (%)	11 (4.2)	15 (5.6)	13 (6.3)	39 (5.3)
Acupuncture, n (%)	6 (2.3)	19 (7.1)	4 (1.9)	29 (3.9)
Shiatsu, n (%)	1 (0.4)	5 (1.9)	0	6 (0.8)
TENS, n (%)	1 (0.4)	1 (0.4)	3 (1.5)	5 (0.7)
Hypnobirthing, n (%)	3 (1.1)	0	1 (0.5)	4 (0.5)

* Missing values: 6 women in 2016 and 4 in 2017.

Table 5
Transfers to hospital in planned home births in Catalonia, 2016 – 2018.

	2016 *n* = 271 n (%)	2017 (*n* = 273) n (%)	2018 (*n* = 206) n (%)	TOTAL (*n* = 750) n (%)
Transfer during labour, n (%)				
No	237 (87.5)	231 (84.6)	174 (84.5)	642 (85.6)
Yes	34 (12.5)	42 (15.4)	32 (15.5)	108 (14.4)
Transfer after birth, n (%)				
For maternal problems	9 (3.3)	7 (2.6)	1 (0.5)	17 (2.3)
For neonatal problems	3 (1.1)	3 (1.1)	3 (1.5)	9 (1.2)
Reason for transfer during labour, (*n* = 108)				
Mother's wishes	8 (24.2)	5 (12.2)	5 (15.6)	18 (17.0)
Need for epidural analgesia	8 (24.2)	3 (7.3)	6 (18.8)	17 (16.0)
Prolonged labour	14 (42.4)	23 (56.1)	12 (37.5)	49 (45.3)
Suspected foetal distress	2 (6.1)	8 (19.5)	7 (21.9)	17 (16.0)
Suspected uterine rupture	1 (3.0)	0	0	1 (0.9)
Intrapartum fever	0	1 (2.4)	0	1 (0.9)
Intrapartum haemorrhage	0	1 (2.4)	1 (3.1)	2 (1.9)
Hypertension	0	0	1 (3.1)	1 (0.9)
Reason for maternal transfer after birth, (*n* = 17) (%)				
Mother's wishes	1 (11.1)	2 (28.6)	0	3 (17.6)
Postpartum haemorrhage	1 (11.1)	0	0	1 (5.9)
Third-degree tear	2 (22.2)	0	0	2 (11.8)
Fourth-degree tear	1 (11.1)	0	0	1 (5.9)
Postpartum bleeding with retained placenta	1 (11.1)	4 (57.1)	1 (100.0)	6 (35.3)
Retained placenta	3 (33.3)	1 (14.3)	0	4 (23.5)
Reason for neonatal transfer after birth, (*n* = 9) (%)				
Distress	3 (33.3)	1 (33.3)	2 (66.7)	5 (55.6)
Malformation	3 (33.3)	1 (33.3)	0	1 (11.1)
Suspected sepsis	3 (33.3)	1 (33.3)	0	1 (11.1)
Cardiopulmonary resuscitation	0	0	1 (33.3)	2 (22.2)

Data from the Catalan Association of Homebirth Midwives (CAHBM), **2016–2018**.

type of birth according to the place where it took place (Hutton et al., 2016; van der Kooy et al., 2017; Scarf et al., 2018). All these studies found lower rates of instrumental and caesarean births amongst planned home births than amongst hospital births. The rates of caesareans (4%) and instrumental births (3.3%) in women who planned home births in our study were much lower than in hospital births in our region (27.1% caesareans and 10.2% instrumental; data from 2018) (Catalan Public Health Agency 2020). However, no published data are available about the rate of vaginal, instrumental, and caesarean births in healthy women with single pregnancies at full term in Spain or data stratified by risk during pregnancy.

Only 7.3% of the women transferred had complications that were treated in the hospital. Despite the high percentage of nulliparous women in our study (42.4%), the incidence of transfers during birthing was lower than that reported in similar studies. However, our results are in line with those reported in Blix et al. (2014) systematic review, where the range of transfers during birthing in planned home births ranged from 8.2% to 24.1%, although the rates were higher in nulliparous women. In countries where home birthing is incorporated into the health system, the incidence of transfers during birthing is higher than in our study (Hollowell et al., 2011; Hutton et al., 2016; Bolten et al., 2016). By contrast, studies done in countries like ours where home care during birth is not integrated into the public health system found rates of transfers similar to ours (Cheyney et al., 2014; Stauffer-Obrecht, 2020). This finding might indicate a reluctance to transfer women to hospital during birthing, which might arise from resistance from the highly motivated women who choose to give birth at home outside the system as well as from the lack of coordination with hospitals (no protocols for transfer have been agreed upon and the continuity of care by the same midwife is not ensured). The women discussed the possibility of transfer

Table 6.1
Maternal and perinatal adverse events.

	2016 (*n* = 271) n (%)	95%CI	2017 (*n* = 273) n (%)	95%CI	2018 (*n* = 206) n (%)	95%CI	TOTAL (*n* = 750) n (%)	95%CI
Maternal								
Severe postpartum haemorrhage (*n* = 642)[1]								
No	235 (99.2)	(98 - 100.2)	227 (98.3)	(96.7 - 99.8)	173 (99.4)	(98.3 - 100.4)	635 (98.9)	(98.1 - 99.6)
Yes	2 (0.8)	(–0.2 - 1.9)	4 (1.7)	(0.1 - 3.2)	1 (0.6)	(–0.4 - 1.6)	7 (1.1)	(0.3 - 1.8)
Perineal trauma (*n* = 641)[1,a]								
None	49 (20.7)	(15.8 - 25.4)	58 (25.1)	(20.2 - 30.6)	55 (31.8)	(25.6 - 38.3)	162 (25.3)	(22.3 - 28.5)
First-degree	128 (54.0)	(48 - 59.9)	113 (48.9)	(43.6 - 55.4)	77 (44.5)	(37.9 - 51.5)	318 (49.6)	(46.3 - 53.4)
Second-degree	55 (23.2)	(18.1 - 28.2)	57 (24.7)	(19.8 - 30.1)	40 (23.1)	(17.4 - 29)	152 (23.7)	(20.8 - 26.9)
Third- or fourth-degree	5 (2.1)	(0.3 - 3.8)	0	–	0	–	5 (0.8)	(0.1 - 1.4)
Episiotomy	0	–	3 (1.3)	(0 - 2.6)	1 (0.6)	(–0.4 - 1.6)	4 (0.6)	(0 - 1.1)
Maternal ICU admission[2]								
No	–	–	–	–	205 (99.5)	(98.5 - 100.4)	205 (99.5)	(98.9 - 100)
Yes	–	–	–	–	1 (0.5)	(–0.4 - 1.4)	1 (0.5)	(–0.004 - 1.004)
Maternal fever								
No	271 (100.0)	–	272 (99.6)	(98.9 - 100.3)	205 (99.5)	(98.5 - 100.4)	748 (99.7)	(99.3 - 100.1)
Yes	0	–	1 (0.4)	(–0.3 - 1)	1 (0.5)	(–0.4 - 1.4)	2 (0.3)	(–0.1 - 0.6)
Perinatal								
Apgar at 5′(*n* = 744)[b]								
≤ 7	2 (0.8)	(–0.2 - 1.7)	1 (0.4)	(–0.3 - 1)	3 (1.5)	(–0.1 - 3)	6 (0.8)	(0.1 - 1.4)
> 7	263 (99.2)	(98.2 - 100.2)	272 (99.6)	(98.9 - 100.3)	203 (98.5)	(96.9 - 100.1)	738 (99.2)	(98.5 - 99.8)
Weight(*n* = 749)[c]								
≤ 2500 g	0	–	2 (0.7)	(–0.2 - 1.7)	3 (1.5)	(–0.1 - 3.1)	5 (0.7)	(0 - 1.2)
2501 g – 4000 g	240 (88.6)	(84.7 - 92.3)	252 (92.3)	(89.1 - 95.4)	189 (92.2)	(88.5 - 95.8)	681 (90.9)	(88.8 - 92.9)
> 4000 g	31 (11.4)	(7.6 - 15.2)	19 (7.0)	(3.9 - 9.9)	13 (6.3)	(3 - 9.6)	63 (8.4)	(6.4 - 10.3)
Shoulder dystocia (*n* = 642)[1]								
No	223 (94.1)	(91.2 - 96.8)	218 (94.4)	(91.6 - 97.1)	167 (96.0)	(93.2 - 98.6)	608 (94.7)	(93.1 - 96.3)
Yes	14 (5.9)	(3.1 - 8.7)	13 (5.6)	(2.8 - 8.3)	7 (4.0)	(1.3 - 6.7)	34 (4.5)	(3 - 6)
Admission to NICU								
No	270 (99.6)	(98.9 - 100.3)	270 (98.9)	(97.6 - 100.1)	202 (98.1)	(96.1 - 99.9)	742 (98.9)	(98.1 - 99.6)
Yes	1 (0.4)	(–0.3 - 1)	3 (1.1)	(–0.1 - 2.3)	4 (1.9)	(0 - 3.8)	8 (1.1)	(0.3 - 1.8)
Perinatal death								
No	271 (100.0)	–	273 (100.0)	–	205 (99.5)	(98.5 - 100.4)	750 (99.9)	(99.6 - 100.1)
Yes	0	–	0	–	1 (0.5)	(–0.4 - 1.4)	1 (0.1)	(–0.1 - 0.3)

[a] Data about perineal trauma missing for 1 woman;.
[b] Data about Apgar at 5′ missing for 6 newborns.
[c] Data about weight missing for 1 newborn.
[1] These data refer only to home births and home births before the midwife's arrival, because the hospital does not share the information about planned home births that were transferred to the hospital.[2]Data for 2018.

Table 6.2
Composite outcomes.

	2016 (*n* = 271)		2017 (*n* = 273)		2018 (*n* = 206)		TOTAL (*n* = 750)	
	n (%)	95%CI	n (%)	95%CI	n (%)	95%CI	n (%)	95%CI
Maternal adverse effects[1]								
No	264(97.4)	(95.5–99.3)	268 (98.2)	(96.5–99.7)	203 (98.5)	(97.1–99.9)	735 (98.0)	(96.3–99.6)
Yes	7 (2.6)	(0.6–4.4)	5 (1.8)	(0.2–3.4)	3 (1.5)	(0–2.8)	15 (2.0)	(0.3–3.6)
Perinatal adverse effects								
No	254(93.7)	(90.8–96.6)	256 (93.8)	(90.8–96.6)	189 (91.7)	(88.4–95)	699 (93.2)	(90.2–96.1)
Yes	17 (6.3)	(3.3–9.1)	17 (6.2)	(3.3–9.1)	17 (8.3)	(4.9–11.5)	51 (6.8)	(3.8–9.7)
Rate of perinatal adverse effects								
0	254(93.7)	(90.8–96.6)	256 (93.8)	(90.8–96.6)	189 (91.7)	(88.4–95)	699 (93.2)	(90.2–96.1)
1	17 (6.3)	(3.3–9.1)	15 (5.5)	(2.7–8.2)	16 (7.8)	(4.5–10.9)	48 (6.4)	(3.4–9.3)
2	0	–	2 (0.7)	(–0.2–1.7)	1 (0.5)	(–0.3–1.3)	3 (0.4)	(–0.3–1.1)
Total maternal[1] and perinatal adverse effects	(*n* = 542)		(*n* = 546)		(*n* = 412)		(*n* = 1500)	
No	518(95.6)	(93.1–98)	524 (96.0)	(93.6–98.3)	392 (95.1)	(92.5–97.7)	1434 (95.6)	(93.1–98)
Yes	24 (4.4)	(1.9–6.8)	22 (4.0)	(1.6–6.3)	20 (4.9)	(2.2–7.4)	66 (4.4)	(1.9–6.8)

[1] Missing severe postpartum bleeding and severe perineal lesions for hospital births.

to hospital with their midwives and prepared contingency plans specifying their choice of hospital and the means of transport, amongst other aspects. Many women who plan home births in Spain and many midwives who attend home births do not speak openly with other healthcare professionals about planned home births for fear of being judged and pressured into giving birth in hospital. Prejudice and ignorance about planned home births often result in fear and frustration after transfer to hospital. It is important to point out that in Spain most women who plan home births receive information about this process from other women or associations of women rather than through the public health system.

The incidence of severe postpartum bleeding in our study [1.1%, 95%CI: 0.3%–1.8%] is lower than in other studies (Cheyney et al., 2014; Hutton et al., 2016; Rossi and Prefumo, 2018); the 7 women with severe postpartum bleeding were all transferred to the hospital, but none of them required admission to the ICU for this reason. However, we have no information about the percentage of cases of bleeding that required transfer. Because the diagnosis of postpartum haemorrhage in home births was visual and this method is especially difficult in water births (Lertbunnaphong et al., 2016; Diaz et al., 2018; Burns et al., 2019), some transfers may have been done as a precaution.

Another aspect that merits mention is the physiologic management of the expulsion of the placenta, which, although not usually recorded in databases, is the approach normally used in home births according to the CAHBM clinical guidelines (Alcaraz Vidal et al., 2018). In a Cochrane review about the management of the third stage of labour, Begley et al. (2019) conclude that although active management can reduce the risk of severe postpartum bleeding and maternal anaemia, the evidence supporting active management in low-risk mothers is not so clear. Similarly, other studies have concluded that active management of placenta expulsion might be inappropriate for low-risk women whose birthing process is managed physiologically (Raams et al., 2018), (Erickson et al., 2019) y (Kearney et al., 2019). It is also interesting to point out that although most births in our study took place with the women in a non-recumbent position, which might increase the risk of postpartum bleeding (World Health Organization, 2018), we observed no associations between non-recumbency and postpartum bleeding (data not shown). Moreover, we found no association between neonatal weight >4000 g and postpartum bleeding.

The incidence of severe perineal lesions in our study [(n = 641) 0.8%, 95%CI: 0.1–1.4) was also low compared to other studies (Hollowell et al., 2011; Cheyney et al., 2014; Hutton et al., 2016; Bolten et al., 2016); furthermore, it was lower than in hospital births in Spain (Ministry of Health, Social Affairs and Equality, 2012). The incidence decreased along the three years included in the study (5 cases in 2016 and none in 2017 or 2018), probably due to midwives' continuing training in preventing lesions of the anal sphincter and in applying warm perineal compresses (World Health Organization, 2018), a technique that is often used in home births.

Data about maternal admission to ICUs was collected from 2018, when only one woman was admitted. Although this variable was not collected in 2016 or 2017, secondary sources (records of midwives who participated in data collection in 2016 and 2017) suggest that no women in the earlier cohorts required ICU admission.

The percentage of home births with shoulder dystocia (4.5%) is in line with that reported in other studies, which ranges from 0.6% to 1.4% (in babies weighing 2500 g – 4000 g) (Athukorala et al., 2006) to 5% (in babies weighing 4000 g – 4500 g) (Menticoglou, 2018). In our study, 8.4% of the babies weighing > 4000 g had dystocia.

The perinatal mortality rate in our study was 1.3 in 1000; this rate is lower than that occurring in hospitals in Catalonia in 2017 (4.91/1000 in all live births) (Servei de Gestió i Anàlisi de la Informació per a la Planificació Estratègica, 2019). Perinatal mortality in studies similar to ours ranged from 0.85 in 1000 (Cheyney et al., 2014) to 1.5 in 1000 (van der Kooy et al., 2017), with Hutton et al. (2016) reporting 1.0 in 1000. Perinatal mortality is one of the most important issues in the debate about planned home births in Spain, which involves the opinions of the professional societies of neonatology (Sánchez-Redondo et al., 2020) and obstetrics.

The incidence of neonatal adverse events in our study (6.8%) was slightly higher than the 4.3% in the Birthplace Study (Brocklehurst et al., 2011), but the adverse events considered in the two studies were considerably different. Unlike in the Birthplace Study (Brocklehurst et al., 2011), the rate of neonatal adverse events in our study was not higher in nulliparous women, although the only newborn to die in our study was born to a nulliparous woman.

The practice of immersion in warm water to relieve pain deserves comment. Most women in our study used an inflatable birthing pool or the bathtubs in their homes to alleviate pain. These baths and water births were conducted in accordance with the Waterbirth International Guidelines, which recommend water temperatures $\leq$ 37.7 °C (Kay, 2017). Attending water births does not form part of the standard training for midwives in Spain. Epidural analgesia is used in more than 70% of births in Spain (Ministry of Health, Social Affairs and Equality, 2012), and only a few hospitals have bathtubs for labour. The percentage of water births increased during the study period (from 20% in 2016 to 35% in 2018). This increase could be related to two factors: midwives receiving training in water births and the incorporation into CAHBM of midwives trained in countries where water births form part of the standard training and care protocols. As suggested in other studies, the percentage of water births could also be related with a lower incidence of perineal tears (Burns et al., 2012; Edqvist et al., 2016; Maimburg, 2018).

Strengths and limitations

The present study has both strengths and limitations. First, data were collected during labour and up to 24 h after the birth. Thus, we have no information about prenatal or postnatal care, and these factors as well as long-term care have important repercussions in the health of the women and babies. Nevertheless, the data analysed enabled us to reach some conclusions about care during birthing in a model in which continual midwife care is not integrated into the public health system.

Second, since vaginal examination does not form part of the routine diagnosis of labour in home births (Alcaraz Vidal et al., 2018), the duration of the birth was estimated subjectively by the midwives and mothers from the onset of regular, intense uterine contractions rather than from a determinate measurement of cervical dilation. Vaginal examination forms part of most hospital protocols, but this practice is not supported by scientific evidence and vaginal examination is not the only way to evaluate the onset and evolution of labour (Downe et al., 2013). Consequently, although our approach could introduce an information bias, it enables the evaluation of the duration of the birth from a perspective centred on the mother's experience and the midwife's active observation.

Third, transfers were not classified according to the degree of emergency involved and the time elapsed during the transfer was not recorded. There was an information bias in relation to the data for women transferred to hospitals. In most cases, midwives were not allowed to accompany the women during the birth after transfer to the hospital, and the data collected in the hospital were not included in the discharge report. For this reason, data about issues such as estimated blood loss, episiotomy, perineal lesions, and positioning during birth could only be analysed in the cases where the birth took place in the home. However, it was possible to include these cases in the analysis of some important variables such as the Apgar score, birthweight, and maternal and neonatal admission to the ICU.

Finally, because this study is based on data from the CAHBM, we cannot extrapolate our data to reach conclusions about the safety of home birth in Spain. Despite these limitations, one strength of our study is that the 750 cases included represent 66.1% of the 1134 registered attended planned and unplanned home births in Catalonia Spanish Statistical Office INE, 2018.

Conclusions

This study provides a detailed description of the outcomes of planned home births by low-risk mothers attended by midwives in Catalonia.

The rates of maternal and neonatal morbidity show a high degree of safety during birthing and reflect the work of independent midwives in Catalonia. The variety of positions during the birth and the low percentages of high-grade perineal tears and episiotomies, as well as the high percentage of women who used water during birth and of babies who started feeding within an hour of birth, demonstrate that the care provided by the midwives in these planned home births in Catalonia is based on the scientific evidence and on a respect for physiology.

Implications for practice

This study contributes to the knowledge about planned home births in Spain and focuses attention on the women with low-risk pregnancies who choose this option as well as on the midwives who work in this field. Both these aspects are directly related to women's right to choose where to give birth in our country and the midwives' right to work in safety. For this reason, it is essential to establish an official registry of planned home births, a well-defined system of coordination with the health system, and indicators that allow the evaluation and comparison of maternal and neonatal outcomes according to where women choose to give birth. Our data make it possible to begin a multidisciplinary debate about planned home births in Spain. In this line, the CAHBM's digital database about home births has proven a useful and innovative tool for researching home births. In Spain, similar registers are lacking, so it would be desirable to extend the use of these registers to other regions.

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Declaration of Competing Interest

The authors declare that they have no competing interests.

CRediT authorship contribution statement

L. Alcaraz-Vidal: Conceptualization, Data curation, Investigation, Project administration, Resources, Writing - original draft, Writing - review & editing. **R. Escuriet:** Conceptualization, Software, Supervision, Validation, Visualization, Writing - review & editing. **I. Sàrries Zgonc:** Data curation, Investigation, Writing - review & editing. **G. Robleda:** Conceptualization, Methodology, Writing - review & editing, Formal analysis, Supervision, Validation, Visualization.

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Supplementary materials

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