

ORIGINAL ARTICLES

Accidental home deliveries in southern São Paulo, Brazil

Márcia Furquim de Almeida<sup>1</sup>, Gizelton Pereira Alencar<sup>2</sup>, Maria Hillegonda Dutilh Novaes<sup>1,3</sup>, Ivan Franca Jr<sup>1,3,4</sup>, Arnaldo Augusto Siqueira<sup>1,3</sup>, Daniela Schoeps<sup>5</sup>, Oona Campbell<sup>6</sup>, Laura Rodrigues<sup>1,7</sup>

<sup>1</sup>Departamento de Epidemiologia, Faculdade de Saúde Pública, Universidade de São Paulo (USP), São Paulo, SP, Brasil  
<sup>2</sup>Departamento de Medicina Preventiva, Faculdade de Medicina, USP, São Paulo, SP, Brasil  
<sup>3</sup>Departamento de Saúde Materno Infantil, Faculdade de Saúde Pública, USP, São Paulo, SP, Brasil  
<sup>4</sup>Department of Epidemiology, London School of Hygiene and Tropical Medicine, London, Inglaterra

Correspondence

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ABSTRACT

**OBJECTIVE:** To identify the frequency, risks of fetal and early neonatal mortality and the determinants of accidental home deliveries.  
**METHODS:** A population-based case control study of fetal and early neonatal deaths was carried out in the southern area of São Paulo, Brazil. Data were collected through home interviews and hospital record reviews. The reasons reported by the mothers were obtained from interviews and risk factors for home delivery were obtained comparing home to hospital deliveries. Data were analyzed separately for fetal and early neonatal deaths and survivors. Odds ratios, 95% confidence intervals and Fisher's exact test were used in estimating risk factors and mortality risk.  
**RESULTS:** The 0.2% frequency of home deliveries was underestimated in the live births information system. After adjustment, it reached 0.4%, comparable to other urban areas in Europe. All home deliveries identified were and were associated to an increased fetal and early neonatal mortality. Mothers' social conditions and pregnancy characteristics were associated to accidental home deliveries and these factors are different outcomes studied (fetal losses, early neonatal deaths and survivors). In 30%, mothers reported lack of available transportation to the hospital as a reason for home delivery. Failure of health services in identifying labor women and non-availability of emergency services are contributed to accidental home deliveries.  
**CONCLUSIONS:** Though rare events in urban areas, accidental home deliveries should be of special concern to health services because they seem to be avoidable and imply in increased risk of death.

**Keywords:** Accidental home deliveries. Fetal mortality. Neonatal mortality. Socio-economic factors. Health service access.

INTRODUCTION

For a few decades already, births in Brazil have been occurring predominantly in hospitals, as part of the processes of urbanization, expansion of medical care, and change in social values and behaviors. Thus home deliveries are becoming progressively rarer, and are concentrated nowadays in the rural areas of the North and Northeast Regions.<sup>1</sup> Notwithstanding, it was only after the implementation of the Live-Birth Information System (*Sistema de Informação sobre Nascidos Vivos* – SINASC) in the early 1990s that it became possible to produce population-wide information on the place of delivery of live births, through the 'place of birth' field (zone or others), included in the live birth declaration. This information could formerly be obtained only for stillbirths, since it was available in death certificates only.

Deliveries taken place outside healthcare services (hospitals and other healthcare facilities) show a decreasing trend. This type of births were accounted for 1.6% of all live births in 1994 and for 1.4% in 2000. Home deliveries account for roughly 90% of non-institutional births in Brazil.<sup>1,2</sup> However, these figures may be underestimated, since the coverage of SIM and SINASC is still an issue in the rural areas of the North and Northeast Regions, exactly where home births are more frequent. In urban areas such as the Municipality of São Paulo the proportion of non-institutional deliveries was lower, representing 0.7% of live births in 1994 and 0.3% in 2000.<sup>1,2</sup> The under-reporting of home deliveries is acknowledged in developed countries as well. In the United Kingdom, 14% of women with planned hospital deliveries but who accidentally gave birth at home were registered as hospital deliveries.<sup>3</sup>

Analyses of the literature assume that care must be taken when identifying the classifications adopted, since the term 'home delivery' includes two distinct groups, namely planned and unplanned – or accidental – home births. Certain countries have programs for planned home delivery. The distinction between planned and unplanned delivery is important, since during planned deliveries the home temporarily becomes an extension of the healthcare facility.<sup>3,5,11,13</sup>

Recently, the importance of home deliveries classified as 'accidental' or 'unplanned' to public health, as well as the need to study such deliveries separately from planned ones, are being acknowledged. Unplanned relate to populations with distinct epidemiological and healthcare-related characteristics, associated with a much higher risk of adverse outcomes for both mother and child.<sup>7,8,14</sup>

In countries such as Brazil, which lack programs for home delivery, it is essential to establish the proportion of births that took place at home accidentally. There are no prior studies indicating whether home deliveries were planned or accidental. In fact, due to the small proportion of such births in the existing information systems, home deliveries are frequently excluded from studies of perinatal mortality.<sup>6</sup> Little is known about the risk and conditions associated with delivery outside healthcare facilities and about the characteristics of the women that give birth in these conditions.

Recent studies show frequencies of accidental home deliveries in urban areas of 0.6% in Scotland,<sup>8</sup> 0.6% in England,<sup>7</sup> and 0.1% in Finland.<sup>14</sup> It is a consensus in the literature that the risk of perinatal death is increased in accidental home deliveries.<sup>7,8,9,14</sup>

Factors identified as associated with accidental home delivery include risk situations such as single mothers<sup>14</sup> and low maternal schooling,<sup>9</sup> high parity,<sup>8,9</sup> and absence of antenatal care.<sup>8,14</sup> Greater prevalence of low birthweight and preterm delivery was also found in accidental home births when compared to hospital births.<sup>8,14</sup>

The aim of the present study was to estimate the risks associated with perinatal death among home births and to identify the reasons for this type of delivery and the main characteristics of the women who gave birth at home.

METHODS

The initial data were obtained from the State System for Data Analysis Foundation (*Fundação Sistema Estadual de Análise de Dados* – Seade), and refer to the live birth (LBO) and death (DD) declarations. We performed a linkage of the two data bases. The birth cohort comprises babies born to mothers living in the southern area of the Municipality of São Paulo between 1 January 2000 and 31 January 2001. This cohort comprised 23,717 births, including 335 stillbirths, 205 early neonatal deaths, and 23,177 survivors. The present study is part of a research project<sup>15</sup> approved by the Research Ethics Committee of Faculdade de Saúde Pública of the Universidade de São Paulo. After tracking events, conducting household interviews, and collecting hospital data, we included in the study 172 stillbirths (51.3%), 146 neonatal deaths (71.2%), 313 random controls representative of the survivals in the cohort, and 24 controls paired by birthweight to the early neonatal deaths.

We considered as accidental home deliveries all births occurred at home and/or in cars, taxis, and ambulances, i.e., all births taken place outside a healthcare facility environment. We considered as hospital/institutional deliveries all births occurred in healthcare facilities, whether taking place in hospitals or in any other type of facility, such as emergency wards and antenatal care centers. Interviews with mothers were identified 21 home births. All mothers received medical care after delivery, and home births were confirmed by hospital records. Information regarding the reasons for and conditions in which the home births occurred were recorded in specific forms during the interview. Interviewers had no prior knowledge of the place of birth registered in the LBO and DD.

We excluded from the study legal interruptions of pregnancies, which resulted in four neonatal deaths, and one stillbirth resulting from an abortion identified as having been initiated by the mother.

Thus, the studied sample included 726 events, of which 705 (97.1%) were hospital deliveries and 21 (2.9%) were home births.

The expansion of the number and proportion of home births, correcting for underenumeration, was performed by applying the proportion of home births found among stillbirths, neonatal deaths, and unmatched controls to the corresponding groups (stillbirths, neonatal deaths, and survivals) from the SIM and SINASC.

For descriptive analysis we used the unmatched controls, which reflect the characteristics of the survivor population. In the analysis of risk factors for home or hospital delivery we used birthweight-matched controls due to the higher frequency of accidental home births among these events.

Exposure variables were obtained through household interviews, which included a general questionnaire used for all deliveries and a second questionnaire specific for home births. Hospital records charts were the preferential source for birthweight and gestation of pregnancy, due to their expected greater accuracy. These information were complemented by home interviews. Nonetheless, we were not able to obtain birthweight for two home births resulting in stillbirths.

Due to the small number of events, exposure variables were dichotomized. We described the reason why delivery took place outside the hospital or on the way to the hospital, whereas the household interviews identified 21 deliveries taken place outside healthcare facilities. After expanding the value found considering the cohort that originated the sample, the frequency of home births was 0.4%, whereas according to the information systems, this proportion was 0.2%. The underenumeration of home events was more frequent among stillbirths, followed by early neonatal deaths, controls (survivors) matched by birthweight, and finally by random controls.

Home births showed a statistically significant association with the perinatal death (OR=3.2; 1.1-11.1). This association is stronger with stillbirths, (OR=4.4; 1.4-16.0), but no association was found with early neonatal death (OR=1.7; 0.3-8.1).

Table 2 shows the reasons reported by mothers for delivering outside healthcare facilities. None of the mothers had chosen to give birth at home. The reasons indicated by mothers were difficulty obtaining transportation to the healthcare facility (33.3%) and the delivery having occurred too far from the mother to reach the healthcare facility (28.6%). Four women (19.1%) had sought healthcare facilities for delivery but had been sent back home. Two of these four women had recently been admitted to the hospital, and delivery took place soon after their discharge. Some mothers (14.3%) reported not having realized that delivery was imminent.

At the moment of delivery, most of the women (57.1%) had the help of family or neighbors. Six women (28.5%) gave birth alone, and four of these deliveries resulted in stillbirths. The police aided in the delivery of two women, one of which resulted in death of the baby soon after delivery. Rescue or healthcare emergency teams performed only one delivery, in which the baby survived (Table 2).

The means of transportation most frequently used by these women to reach the hospital, where they received post-delivery care were the cars of relatives or neighbors (42.9%). Rescue teams were responsible for transporting 33.3% of mothers to healthcare facilities after delivery. There was also a participation of police cars (14.3%) in transporting these women (Table 2).

Labor lasted less than 30 minutes for six women (which is coherent with the reason indicated above and mentioned by six women for the home birth, namely that labor was too fast for them to reach the healthcare facility). Labor lasted between 30 and 60 minutes for four women and over two hours for five women; six women were not able to recall the duration of labor. Of these six deliveries, five were stillbirths (Table 2).

Table 3 presents the characteristics of the women who gave birth at home and in the hospital. Considering that these deliveries have different outcomes, we also analyzed births resulting in perinatal deaths and survivals in separate. We included the unmatched controls that had been selected as birthweight-matched controls in the sample mentioned above (74), since accidental home births were more frequent in this group (4) than among random controls (1). As a whole, mothers who gave birth at home showed less favorable sociodemographic characteristics than those who gave birth in hospitals. The proportion of mothers with up to three years of schooling was 23.8% among home births and 15.5% among hospital births; the frequency of adolescent mothers was 33.3% among home births and 24.2% among hospital births; and the percentage of mothers without partner was 47.6% among home births and 28.1% among hospital births.

Variables associated with the occurrence of home births were: mother reporting poor or regular health status prior to delivery, negative or indifferent reaction to the pregnancy by the father, and absence of antenatal care, the latter two showing odds ratios higher than four. However, negative reactions to the pregnancy by the mother or family also showed odds ratios close to two, but without reaching statistical significance.

The biological characteristics of the fetus, including low birthweight and preterm delivery were more frequent among home births, but this difference was not significant.

When analyzing perinatal deaths and survivals in separate, poor or regular maternal health status prior to delivery was associated with home births, as were the absence of antenatal care and negative reactions to the pregnancy by the father, even though with lower odds ratios. No statistically significant results were obtained for survivors. Among the home-birth mothers whose deliveries resulted in perinatal deaths 28.6% had not attended antenatal care, which contributed to the occurrence of home births, whereas all home-birth mothers who gave birth to survivors attended antenatal care.

Variables associated with the occurrence of home births resulting in stillbirths were poor or regular health prior to pregnancy and absence of antenatal care (Table 4). The odds ratios for these two conditions were much higher than those obtained for all neonatal deaths (Table 3). The number of home deliveries resulting in early neonatal deaths was small (4), and consequently no statistically significant odds ratios could be obtained. All home deliveries resulting in early neonatal deaths were of low birthweight and preterm babies (Table 3). Similar results were obtained for negative reaction to pregnancy by the family.

Table 4 - Number of stillbirths and odds ratio, according to place of delivery and risk factors. Southern area of the Municipality of São Paulo, Brazil, 2000/2001.

Variables	Home Births		OR	95% CI
	Home	Hospital		
Mother's schooling				
Up to 3 years	4	31	2.27	0.47-9.11
4 years or more	8	141		
Mother's age				
<20	5	30	3.38	0.78-13.24
20+	7	142		
Marital status				
Single	6	55	2.13	0.55-8.32
Married	6	117		
Parity				
Nulliparous	4	62	0.89	0.19-3.48
Multiparous	8	110		
Mother's health status				
Regular/good	6	28	5.14	1.34-19.78
Excellent/good	6	144		
Abortion				
Considered/ried	1	26	0.51	0.01-3.81
No	11	146		
Mother's reaction				
Indifferent/unhappy/does not know	4	59	0.96	0.20-3.76
Glad	8	113		
Father's reaction				
Indifferent/unhappy/does not know	6	50	2.44	0.62-9.56
Glad	6	122		
Family's reaction				
Indifferent/unhappy/does not know	7	70	2.04	0.53-8.47
Glad	5	102		
Antenatal care				
No	5	10	11.57	2.38-50.63
Yes	7	162		
Duration of pregnancy				
<37 weeks	9	120	1.30	0.34-5.02
≥37 weeks	3	52		
Birthweight				
<2,500 g	9	129	3.00	0.39-134.50
≥2,500 g	1	43		

Table 5 - Number of early neonatal deaths and odds ratio, according to place of delivery and risk factors. Southern area of the Municipality of São Paulo, Brazil, 2000/2001.

Variables	Early neonatal deaths		OR	95% CI
	Home	Hospital		
Mother's schooling				
Up to 3 years	0	18	0	
4 years or more	4	128		
Mother's age				
<20	1	43	0.80	0.02-10.28
20+	3	103		
Marital status				
Single	2	34	3.29	0.23-46.57
Married	2	112		
Parity				
Nulliparous	2	53	1.75	0.12-24.76
Multiparous	2	93		
Mother's health status				
Regular/good	2	28	4.21	0.52-59.69
Excellent/good	2	118		
Abortion				
Considered/ried	1	18	2.07	0.04-27.32
No	3	112		
Mother's reaction				
Indifferent/unhappy/does not know	3	51	5.59	0.46-296.37
Glad	1	95		
Father's reaction				
Indifferent/unhappy/does not know	3	37	8.84	0.67-468.06
Glad	1	109		
Family's reaction				
Indifferent/unhappy/does not know	4	64	0	
Glad	0	82		
Antenatal care				
No	1	21	1.98	0.04-25.94
Yes	3	125		
Duration of gestation				
<37 weeks	4	116	0	
≥37 weeks	0	90		
Birthweight				
<2,500 g	4	119	0	
≥2,500 g	0	27		