

Complications of planned home births in the Czech Republic

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ABSTRACT

Objectives: This study evaluated complications that can occur during planned home births that require transfer to the hospital. These factors were assessed to improve the current status of deliveries performed outside health care facilities in the Czech Republic.

Material and methods: This prospective cohort study included data on 105 cases of complicated home births during 2017 to 2021 using an online form accessible to all hospital maternity wards in the Czech Republic.

Results: Planned home births were complicated by fetal/neonatal causes, maternal causes, and combined fetomaternal complications in 28 (26.7%), 20 (19%), and 2 (1.9%) cases, respectively. The need for transfer was most often realized after the birth of the fetus (86; 81.9%); however, it was realized during birth in 19 (18.1%) cases. The following complications were noted most often: postpartum hemorrhage (23; 21.9%); neonatal asphyxia (17; 16.2%); placental retention (14; 13.3%); birth injury (12; 11.4%); neonatal hypothermia (5; 4.8%); and placental birth (5; 4.8%). Indications for transfer during labor were as follows: labor obstruction (10; 9.5%); fetal hypoxia (5; 4.8%); bleeding during labor (2; 1.9%); preeclampsia (1; 0.9%); and fetal malformation (1; 0.9%). Perinatal death occurred in 8 (7.6%) cases. Permanent neonatal morbidity occurred in 4 (3.8%) cases.

Conclusions: Patients with home birth complications were transferred to the hospital most often after the birth of the fetus. The low proportion of transfers during childbirth is caused by the unprofessional management of planned home births, resulting in a high number of perinatal deaths and high rate of permanent neonatal morbidity.

Key words: home birth; complication; neonatal death; neonatal morbidity; maternal morbidity

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INTRODUCTION

The safety and risks of planned home births are currently undergoing discussion among the general public and experts in perinatology and fetomaternal medicine. Advocates of home births argue that women have the right to choose where they give birth; however, experts have proclaimed that home birth is associated with risks and complications because of the limited availability of professional care [1, 2].

In industrialized countries, planned home births are infrequent, ranging from 0.1% in Sweden to 20% in the Netherlands. Regarding maternal morbidity, studies have indicated lower rates of episiotomy, vaginal extraction

procedures, and Cesarean delivery for home births [3–6]. Furthermore, women have expressed high satisfaction with planned home births [7]. However, home births are unfavorable in terms of neonatal morbidity and mortality. A meta-analysis of perinatal outcomes in the United States indicated a higher risk of neonatal death, lower Apgar scores, and higher neonatal intensive care unit admission rates for home births compared with hospital deliveries. Moreover, home births are related to increased risks of complications that are often higher than the risks of complications in hospitals, despite home delivery being managed by a midwife. The risk of neonatal death is approximately three-fold, and

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the risk of an Apgar score of zero is 10-fold for home births [8]. Additionally, this risk is higher for first-time mothers and deliveries after week 41 of gestation [9, 10]. The risk of stillbirth associated with home births is twice as high as that associated with hospital births [11].

A meta-analysis that evaluated 12 studies performed in industrialized countries showed that the risk of neonatal death, excluding congenital malformations, is 2.9-times higher for home births than for hospital births [9]. Another study performed in 2013 that analyzed labor results of 14 million low-risk newborns of singleton pregnancies showed that according to the Apgar score, the relative risks of a score of zero were 10.55 for home births and 14.24 for first-time mothers; however, the relative risk of a score of zero according to the Apgar scores for hospital births was 1.0 for physician-led births and 0.55 for midwife-led births; for first births, the relative risk was 1.0 for physician-led hospital births and 0.51 for midwife-led hospital births [10]. Another study performed in 2014 that evaluated 14 million low-risk newborns from singleton pregnancies found that the relative risks of neonatal death were 3.87 for home births, 6.67 for deliveries after week 41 of gestation, and 6.74 for hospital births; this difference between home births and hospital births was statistically significant [8]. Another study published in 2015 evaluated 79,727 low-risk mothers [11]; of these, 3203 had planned home births, and 18.8% of those home births required urgent transfer to the hospital because of a sudden complication.

Furthermore, perinatal deaths occurred for 3.9 patients at home and 1.8 patients in the hospital for every 1,000 births; this difference between home births and hospital births was statistically significant. Moreover, during that study, the incidence of neonatal deaths was 1.6 patients at home and 0.6 patients in the hospital for every 1,000 births, and the incidence of stillbirths was 2.4 patients at home and 1.2 patients in the hospital for every 1,000 births [11]. Planned birth outside a hospital setting results in a two-fold to three-fold increase in the risk of death or an absolute increase in the risk of one to two deaths per 1,000 live births [12–14]. The incidences of preterm birth, neonatal death, hypoxic-ischemic encephalopathy, meconium aspiration, brachial plexus injury, and neonatal humerus fractures are also higher for home births [15, 16].

Although the data regarding the outcomes of births outside hospital maternity wards observed during foreign studies are consistent in terms of the incidence and nature of complications, data regarding the situation in the Czech Republic are minimal. According to the current data from the Institute of Health Information, 553,423 births were recorded during 2016 to 2020; of these, 4,022 (0.73%) occurred outside health facilities. The trend of the proportion of births outside the hospital increased slightly during

the period and reached 0.8% in 2020 [17]. According to the available data, 371 (26%) out-of-hospital births were planned. Of a total of 4,022 out-of-hospital deliveries, 3,044 (75.7%) patients were transferred to the hospital within one hour of delivery.

The morbidity of newborns born outside health facilities in the Czech Republic is higher, according to foreign literature sources. Hypoxic-ischemic encephalopathy occurs in 0.8% of hospital births and in 2.74% of out-of-hospital births; furthermore, it occurs in 0.11% of newborns born in the hospital and in 0.50% of newborns born outside hospital facilities because of early neonatal sepsis [18]. The proportion of births in the Czech Republic outside a hospital setting is similar to the incidence of out-of-hospital births and neonatal complications in the United States, where approximately 35,000 out-of-hospital births are recorded each year, representing approximately 2.5% of all births. Approximately 25% of out-of-hospital births in both countries are unplanned. The risk of severe neonatal morbidity with hypoxic-ischemic encephalopathy is approximately three-times higher for newborns born out of the hospital compared to newborns born in the hospital [19]. Although professional medical societies strongly discourage out-of-hospital births, they have defined non-negotiable prerequisites for home births, including the strict exclusion of women with risk factors for complications during labor, the availability of a certified midwife or specialist physician, the possibility of urgent transfer to the hospital, and the exclusion of women who have experienced a previous Cesarean delivery [20].

Data regarding complications associated with planned home births in the Czech Republic have been completely unavailable until now. Previously, medical professionals had encountered these data only in the form of sporadically published causal communications. Therefore, we performed this study to summarize original and previously unpublished data regarding complications associated with planned home births in the Czech Republic. These results are valuable to health care providers who must deal with these complications.

Objectives

The objective of this study was to evaluate the complications of planned home births that result in urgent transfer to the hospital. These complications requiring transfer were assessed to improve the current status of deliveries outside health care facilities in the Czech Republic.

MATERIAL AND METHODS

Data were prospectively collected from 92 obstetric wards in the Czech Republic from January 1, 2017 to December 31, 2021, using an online protocol based on specific access details. The inclusion criterion was a planned home

birth that required transfer to a hospital during delivery or within six weeks after delivery because of complications. The essential demographic variables (age, education, residence by population) and variables describing previous antenatal care and the course of pregnancy (gestation, parity, antenatal care) of the study cohort, circumstances leading to hospital transfer (indications for transfer, type of delivery management, indicated medical measures, current and final conditions of the mother), and variables of the newborn (birth weight, postpartum disease, necessary medical measures, and definitive status) were analyzed. The willingness to cooperate with health care providers, treatment provider in the home setting, reason for transfer to the hospital, type of delivery, patient condition, necessary treatment measures, outcome measures, and size of the residence by population were also considered. Statistical analyses were performed (SPSS Statistics 19 software: SPSS Inc., Chicago, IL, USA). This investigation was performed in accordance with the Declaration of Helsinki and ethical standards. The authors followed the principles of the Data Protection Act. Because the data were anonymized and the results were in aggregate form, informed consent was not sought from the subjects. The Ethics Committee of the Institute for Mother and Child Care in Prague approved this study (approval number: EK UPMD 012/2016).

RESULTS

This study included a total of 105 cases of complications of planned delivery outside the hospital that required transfer to a hospital obstetric department. The median age of mothers was 34 years. The median gestational age at the time of delivery was 40 weeks. The median birth weight of the newborn was 3,235 g (Tab. 1).

The cohort consisted of 105 women; 45 (42.9%) were nulliparous, 39 (37.1%) were primiparous, 13 (12.4%) were secundiparous, and 8 (7.6%) were terciiparous or more. In terms of education level, there were 10 (9.5%) women with primary school education, 11 (10.5%) women with secondary school education without a general certificate of secondary education, 39 (37.1%) women with secondary school education and a general certificate of secondary education, and 45 (42.9%) women with a college education.

Most cases of complications of planned home deliveries were recorded in large cities; 57 (54.3%) women were living in towns with more than 90,000 inhabitants. Standard antenatal care during pregnancy was performed for 67 (63.8%) women, whereas 12 (11.4%) women reported that they did not receive any specialist care during pregnancy. Based on subjective assessment of the health professionals who cared for the patients who experienced complications during home birth, 13 (14.0%) women showed no willingness to cooperate with health professionals. In terms of the accompanying person during childbirth, an emergency physician assisted the delivery for five (4.8%) women, a midwife assisted the delivery for 36 (34.3%) women, the partner of the woman giving birth assisted the delivery for 16 (15.2%) women, another nonprofessional person assisted the delivery for 22 (21.0%) women, and no accompanying person assisted the delivery for 26 (24.8%) women. There were 93 (88.6%) spontaneous vaginal deliveries at home, five (4.8%) spontaneous vaginal deliveries at the hospital, and seven (6.7%) births that required Cesarean delivery. The characteristics of women in labor and the circumstances of transfer to the hospital are shown in Table 2.

Transfer was necessary because of complications experienced by the fetus or newborn in 28 (26.7%) cases, maternal complications in 20 (19%) cases, and combined complications (when the transfer was required because of difficulties experienced by both the mother and fetus/newborn) in two (1.9%) cases. In terms of the other 55 cases (52.4%), the mothers were transferred to the hospital only to confirm the absence of any complications after birth. Table 3 provides an overview of the indications for transfer to the hospital.

Asphyxia was diagnosed in nine (8.6%) newborns, both asphyxia and hypothermia were diagnosed in five (4.8%) newborns, and isolated hypothermia was diagnosed in 10 (9.5%) newborns. A total of 75 (71.4%) newborns were physiologically evaluated and showed no signs of morbidity and required no therapeutic measures. However, six (5.7%) stillbirths occurred. Resuscitation was required for 10 (9.5%) newborns, resuscitation and controlled hypothermia were required for four (3.8%) newborns, and other intensive care was required for 10 (9.5%) newborns. Eighty-six (81.9%) newborns had good physiological outcomes; however,

Table 1. Essential characteristics of mothers and newborns

| Study population (n = 93) | Mean | Median | Minimum | Maximum | Q1 | Q2 | IQR |
|---------------------------|------|--------|---------|---------|------|------|-----|
| Age [years] | 32.9 | 34.0 | 21.0 | 42.0 | 29.0 | 36.3 | 7.0 |
| Gestational age [weeks] | 39.9 | 40.0 | 32.0 | 44.0 | 39.0 | 41.0 | 2.0 |
| Birth weight [g] | 3218 | 3235 | 1230 | 4520 | 2940 | 3600 | 668 |

IQR — interquartile range; Q — quartile

Table 2. Selected demographic characteristics of parturient women and reasons for transfer to hospital

| | n | % |
|---|----|------|
| Age [years] | | |
| ≤ 24 | 8 | 7.6 |
| 25–29 | 21 | 20 |
| 30–34 | 31 | 29.5 |
| 35–39 | 38 | 36.2 |
| ≥ 40 | 7 | 6.7 |
| Gravidity | | |
| 1 | 32 | 30.5 |
| 2 | 38 | 36.2 |
| 3 | 19 | 18.1 |
| ≥ 4 | 16 | 1 |
| Parity | | |
| 0 | 45 | 42.9 |
| 1 | 39 | 37.1 |
| 2 | 13 | 12.4 |
| ≥ 3 | 8 | 7.6 |
| Gestational age [weeks] | | |
| ≤ 37 | 10 | 9.5 |
| 38–40 | 60 | 57.1 |
| 41–42 | 30 | 28.6 |
| ≥ 43 | 5 | 4.8 |
| Education | | |
| Basic | 10 | 9.5 |
| High school (secondary school without GCSE) | 11 | 10.5 |
| Secondary school with GCSE | 39 | 37.1 |
| College | 45 | 42.9 |
| Residence | | |
| City up to 3000 inhabitants | 20 | 19 |
| City 3000–6000 inhabitants | 6 | 5.7 |
| City 6000–11,000 inhabitants | 7 | 6.7 |
| City of 11,000–25,000 inhabitants | 5 | 4.8 |
| City 25,000–47,500 inhabitants | 4 | 3.8 |
| City 47,500–90,000 inhabitants | 6 | 5.7 |
| City of over 90,000 inhabitants | 57 | 54.3 |
| Prenatal care | | |
| Standard | 67 | 63.8 |
| Nonstandard | 20 | 19 |
| Absent | 12 | 11.4 |
| Not reported | 6 | 5.7 |
| Willingness of the woman to cooperate during labor | | |
| None | 14 | 13.3 |
| Limited | 49 | 46.7 |
| Sufficient | 42 | 40 |

| Accompanying person assisting with childbirth | | |
|--|----|------|
| Physician | 5 | 4.8 |
| Midwife | 36 | 34.3 |
| Partner | 16 | 15.2 |
| Another nonmedical professional | 22 | 21 |
| None | 26 | 24.8 |
| Modality of delivery | | |
| Vaginal delivery at home | 93 | 88.6 |
| Vaginal delivery at the hospital | 5 | 4.8 |
| Cesarean delivery | 7 | 6.7 |

GCSE — general certificate of secondary education

Table 3. Complications leading to transfer to the hospital

| | n | % |
|--------------------------|----|------|
| Obstructed labor | 10 | 9.5 |
| Fetal hypoxia | 5 | 4.8 |
| Intrapartum bleeding | 2 | 1.9 |
| Preeclampsia | 1 | 0.9 |
| Fetal malpresentation | 1 | 0.9 |
| Postpartum hemorrhage | 23 | 21.9 |
| Newborn asphyxia | 17 | 16.2 |
| Retained placenta | 14 | 13.3 |
| Birth injury | 12 | 11.4 |
| Postpartum control | 11 | 10.5 |
| Newborn hypothermia | 5 | 4.8 |
| Delivery of the placenta | 4 | 3.8 |

seven (6.7%) newborns had temporary morbidity and three (3.8%) newborns had permanent morbidity. During the perinatal period, eight (7.6%) newborns died. Regarding maternal morbidity, 86 (81.9%) women had good physiological outcomes after delivery, 18 (17.1%) women developed severe postpartum hemorrhage, and one (0.95%) woman experienced another type of shock. Forty-seven (44.8%) patients did not require any specialized obstetric care. Manual removal of the placenta was required for 14 (13.3%) cases, birth injury repair was required for 12 (11.4%) cases, surgery was required for 17 (16.2%) cases, and other intensive care was required for 17 (16.2%) cases. Twenty-two (21.0%) parturient women required blood transfusion. Although the resulting maternal condition was physiological in 82 (88.2%) cases (i.e., those without signs of maternal morbidity), one case involved long-term morbidity and one parturient woman died during puerperium; however, this death was not causally related to the home birth complication (Tab. 4).

| Table 4. Hospital care and neonatal and maternal outcomes | | |
|--|----------|----------|
| | n | % |
| Status of the newborn | | |
| Asphyxia | 7 | 7.5 |
| Asphyxia and hypothermia | 5 | 4.8 |
| Physiological | 75 | 71.4 |
| Hypothermia | 10 | 9.5 |
| Intranatal death | 6 | 5.7 |
| Not reported | | |
| Care of the newborn | | |
| Resuscitation | 10 | 9.5 |
| Resuscitation and controlled hypothermia | 4 | 3.8 |
| Other intensive care | 10 | 9.5 |
| None | 81 | 77.2 |
| Final condition of the newborn | | |
| Temporary morbidity | 7 | 6.7 |
| Good | 86 | 81.9 |
| Permanent morbidity | 4 | 3.8 |
| Perinatal death | 8 | 7.6 |
| Status of the parturient during transfer | | |
| Good | 86 | 81.9 |
| Hemorrhage | 18 | 17.1 |
| Another shock | 1 | 1 |
| Care of the parturient | | |
| Manual removal of the placenta | 14 | 13.3 |
| Birth injury repair | 12 | 11.4 |
| Other intensive care | 17 | 16.2 |
| Surgical care | 15 | 14.3 |
| None | 47 | 44.8 |
| Final condition of the parturient | | |
| Temporary morbidity | 13 | 12.4 |
| Good | 90 | 85.7 |
| Long-term morbidity | 1 | 0.95 |
| Death | 1 | 0.95 |

DISCUSSION

We investigated 105 complications of planned home births requiring treatment in a hospital maternity ward in the Czech Republic between January 1, 2016 and December 31, 2021. The data obtained are consistent with those obtained through a pilot study published in 2020, which analyzed complications of planned home births from 2016 to 2017 [21]. An investigation of the factors associated with planned home birth complications showed a high proportion of transfers to hospital after delivery, most often because of peripartum hypoxia experienced by the newborn, hypothermia experienced by the newborn, or other

complications. These results are inconsistent with other studies that reported that most transfers of planned home births to the hospital occur during delivery and before the birth of the fetus (8.2–24.1% of cases).

Our study showed that 22.5% to 56.3% of nulliparous women and 4.4% to 16.1% of multiparous women attempting home birth required transfer to the hospital. The most common indications for transfer to the hospital during childbirth were prolonged childbirth (5.2–9.8% of cases) and fetal distress (1.0–3.6% of cases). Postpartum transfer to the hospital was performed for 1.7% to 7.3% of planned home births. For 1.6% to 8.9% of nulliparous women and 1.6% to 5.5% of multiparous women, the time from childbirth to transfer to the hospital ranged from 2 to 5 days. The most common indications were postpartum hemorrhage (0.2% of cases) and neonatal respiratory problems (0.3–1.4% of cases). All transfers in the current study were urgently performed; however, data from the literature indicate that only 5.5% of planned home births required urgent transfer [22, 23]. The most common indications for transfer during childbirth were the cessation of labor progression (10 cases) and fetal hypoxia during childbirth (5 cases). This is disproportionate to the number of postpartum transfers in our study: 17 transfers were performed for neonatal asphyxia, which indicates insufficient or nonexistent monitoring of fetal condition during childbirth. Although the incidence of neonatal asphyxia syndrome is 5 to 8 for every 1,000 live births [24], intervention to benefit the newborn after delivery is performed for 10% of all births. Neonatal resuscitation is necessary for one percent of cases [25]. In the analyzed group, peripartum asphyxia was reported for 16.1% of transferred cases, and hypoxic-ischemic encephalopathy or early neonatal death was reported for 11.5% of cases.

The survey results concluded that there is insufficient professional supervision throughout childbirth and inadequate or nonexistent monitoring of the condition of the fetus. The high proportion of newborns with asphyxia and hypothermia also suggested poor and unprofessional care for the newborn after birth, which is correlated with the absence of professional medical staff during childbirth. These findings are alarming and should be the basis of a social debate regarding the governance of childbirth conditions outside the medical facility.

However, the most common indications for postpartum transfer were postpartum hemorrhage, adherent placenta, and labor injuries. Postpartum hemorrhage is a symptom of four complications (atonic hemorrhage, hemorrhage caused by placental tissue retention, hemorrhage caused by birth injuries, and hemorrhage caused by hemocoagulation disorder). A detailed analysis of the causes of postpartum hemorrhage has not been performed. Postpartum hemorrhage occurs in 3% of births, and the quantitative measurement

of blood loss has been performed for up to 10% of cases [26, 27]. Furthermore, placental retention occurs in 2.7% of vaginal births [28]. However, postpartum hemorrhage treatment, birth injury treatment, and manual placenta removal cannot be practically performed outside the hospital environment. Medical professionals are against birth management outside the hospital because of the high risk of complications requiring professional care performed by hospital staff and technical equipment in the delivery room.

Contrary to expert arguments, we must accept that the demand for home birth by the minority of the public will continue to be a reality [29]. The strength of this study was the use of original data from the Czech Republic, which have not been published to this extent previously and may impact obstetric practice.

We believe that the general public should be aware of the risks of planned home births, including the complications identified by our investigation, which are specific to home births in the Czech Republic. To improve the results of planned home births, it is necessary for those who are interested in such deliveries to undergo an assessment of risk factors; furthermore, women with identified risk factors, including nulliparity, should be warned against home births. Furthermore, women without demonstrable risk factors who choose a home birth should be monitored during birth, and standard fetal monitoring should be performed as well. Proper documentation should be maintained to allow for a retrospective assessment of labor and its complications. It is also necessary to correctly record the details of planned home births so that they can be differentiated from unplanned deliveries outside health care facilities. Although most clinicians in the field of gynecology and obstetrics warn patients about the risks of complications and negative perinatal outcomes associated with planned home births, an enhanced interdisciplinary collaboration among all health professionals involved in the care of parturient women and the shared responsibilities of birth outcomes are necessary to improve the current situation. Identifying evidence of sources of conflict and the presentation of clinical situations involving complicated home births help to improve awareness of the general public and health professionals and optimize conditions to allow safe childbirth in the Czech Republic.

The current situation, which includes the planned delivery of newborns outside health care facilities in the Czech Republic, is accompanied by specific incidences of severe complications during childbirth and the postpartum period that contradict the literature. Most transfers are performed late after delivery of the fetus, resulting in severe perinatal morbidity and perinatal mortality.

This study was limited by the probable inaccuracy of data and absence of the possibility of distinguishing be-

tween planned and unplanned home births. Soon, the Institute of Health Information and Statistics of the Czech Republic plans to analyze the results of births outside hospital facilities using a perinatology registry. This will enable an accurate description of the problems associated with home births and their complications and allow for solutions to these issues.

CONCLUSIONS

In the Czech Republic, home births are subject to unprofessional birth management, insufficient or nonexistent fetal condition monitoring, the absence of selection of appropriate pregnant women who are not at high risk, the absence of valid documentation, and the lack of clarity regarding responsibilities associated with the management of labor and its outcome. Although professional hospital staff strongly disagree with delivery outside the hospital, the current situation requires fundamental changes in the care of women who have decided to give birth in a nonhospital setting.

Article informations and declarations

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Conflict of interest

All authors declare no conflict of interest.

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