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Research paper

## Newborn follow-up after discharge from the maternity unit: Compliance with national guidelines

J. Roisé<sup>a</sup>, M. Delattre<sup>b</sup>, S. Rousseau<sup>c</sup>, A. Bourlet<sup>a</sup>, M.-L. Charkaluk<sup>a,d,\*</sup>

<sup>a</sup> Service de néonatalogie, hôpital Saint-Vincent-de-Paul, groupement des hôpitaux de l'institut catholique lillois/faculté de médecine et maïeutique, 59000 Lille, France

<sup>b</sup> Service de néonatalogie, centre hospitalier de Tourcoing, 155, rue du Président-Coty, 59200 Tourcoing, France

<sup>c</sup> Service de néonatalogie, centre hospitalier de Roubaix, rue de Charleroi, 59100 Roubaix, France

<sup>d</sup> UCLille, faculté de médecine et maïeutique, 59000 Lille, France

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### ABSTRACT

**Background:** In the context of shorter hospital stays in maternity units, in 2014 the French health authorities issued guidelines for newborn follow-up after discharge from maternity units. A medical visit is recommended between the 6th and 10th day of life, as are home visits from midwives. This study was designed to evaluate compliance with these guidelines.

**Methods:** The study was observational, prospective, multicenter, and was conducted in March and April 2015 in three maternity units in northern France that participate in the Baby Friendly Hospital Initiative (BFHI). Follow-up practices (medical visit between the 6th and 10th day, home visits from a midwife) and demographic, social, and medical data were recorded during the stay in the maternity unit, and through a phone interview 1 month later, in singleton term-born infants.

**Results:** The study population included 108 mother–infant pairs. The recommended medical visit was effectively performed by a physician between the 6th and 10th day of life for 20 newborns (19%) (95% CI: [11; 26]). During the 1st month, at least one home visit from a midwife was recorded for 96 mother–infant pairs (89%). The only factor positively correlated with a medical visit between the 6th and 10th day was the mother's choice, made early during the hospital stay and independently of the real length of stay, for early discharge from the maternity unit.

**Conclusion:** Compliance with national guidelines was poor for the recommended medical visit between the 6th and 10th day of life. Information needs to be improved.

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### 1. Introduction

Newborns discharged from the maternity unit constitute a vulnerable population because of the complex adaptation to extrauterine life and the possible revelation of pathological conditions. Careful medical follow-up is therefore necessary, ideally as part of a well-established care pathway. In Europe, infant care schedules have been revisited concomitantly with the trend for shorter hospital stays after delivery. For instance in France in the 1980s, 50% of mothers stayed in the maternity unit 7–9 days after delivery, while in 2010, the mean length of stay (LOS) was 4.4 days after delivery (4.0 days for vaginal birth and 5.6 days for cesarean birth) [1]. This context led the French

Health Authority (*Haute Autorité de Santé* [HAS]) to issue guidelines in 2014 defining the conditions necessary for discharge from the maternity unit, for both mothers and newborns [2]. These national guidelines recommended post-discharge follow-up care with a home visit from a midwife and a “new medical examination to be performed between the 6th and 10th day of life by a pediatrician or a general practitioner (GP) with newborn care training.” The pertinence of these guidelines is unquestionable, but there is no certainty they are effectively applied.

The purpose of this study was to describe care practices during the 1st month of life for term infants discharged from three maternity units in northern France. The primary outcome was the medical examination performed between the 6th and 10th day of life by a physician as recommended by the national guidelines. We hypothesized that current follow-up practices are optimal for newborns discharged from these maternity units, including compliance with the national follow-up guidelines.

\* Corresponding author. service de néonatalogie, hôpital Saint-Vincent-de-Paul, 59000 Lille, France.

E-mail address: M.-L.Charkaluk<sup>ad</sup>:charkaluk.marie-laure@ghicl.net (M.-L. Charkaluk).

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## 2. Patients and methods

### 2.1. Study population

The study population was selected among mother–infant pairs discharged from three maternity units – one level IIA unit and two level IIB units – in the Lille metropolitan area in northern France. These three units participate in the Baby Friendly Hospital Initiative (BFHI) and delivered 6480 babies in 2015, i.e., 30.3% of births in the Lille perinatal care network. They meet the 12 UNICEF recommendations concerning management practices for newborn delivery and care [3], including the care network guidelines described in recommendation no. 10. Mother–infant pairs discharged from these three maternity units in March and April 2015 were eligible for inclusion in the study. Inclusion criteria were mother's age  $\geq 18$  years, singleton term delivery, discharge to home, and ability to communicate by telephone in French. Inclusion days were selected randomly between the three units and all eligible mother–infant pairs present in the selected maternity unit this day were asked to participate in the study.

### 2.2. Study protocol

Mothers who agreed to participate in the study were interviewed during their hospital stay and asked to give information about the family context and the birth. Any missing data were collected from the patient's chart. Since the primary outcome was the follow-up medical examination between the 6th and 10th day of life, only mother–infant pairs whose post-delivery LOS was less than 6 days were considered.

One month after discharge, mothers were contacted for a telephone interview. They were invited to use information recorded in their health diary, if needed to answer the questions. Follow-up care (consultations with healthcare professionals, dates of visits, and any other information related to compliance with the follow-up guidelines), as well as demographic, social, and medical data were collected. If the first attempt for a telephone interview was unsuccessful, two other attempts were made within the limit of 2 months after discharge.

### 2.3. Factors studied

We searched for associations between compliance with the follow-up guidelines and the following factors: center, mother's characteristics, newborn's characteristics, and mode of delivery. Maternal characteristics were: age; nationality; residence defined as urban (town of residence  $> 20,000$  inhabitants according to the 2013 census), rural ( $< 2000$  inhabitants), or semi-urban (2000–20,000 inhabitants); parity defined as primiparity or not; educational level defined as middle school or less, high school, beyond high school; and occupational activity. Mothers were also asked to indicate whether or not they had attended prenatal classes and whether or not they had expressed their desire for early discharge at the beginning of the hospital stay. Mode of delivery (vaginal [spontaneous or instrumental] or cesarean), and type of discharge (early or not) were recorded. According to the national guidelines, early discharge was defined as a LOS less than 72 h after vaginal delivery or 96 h after cesarean. The infant characteristics studied were: sex, gestational age, birth weight, and feeding during hospital stay classified as breastfeeding (exclusive or not) or formula feeding.

### 2.4. Statistical analysis

Data from mothers who responded to the 1-month telephone interview (study population) were first compared with data from the mothers who did not respond to the telephone interview

(drop-out population). The infant's age at the first follow-up medical visit was used to establish two groups, with and without the recommended medical visit between the 6th and 10th day of life. The number and dates of midwife visits was also determined as was the proportion of infants seen by a physician or a midwife between the 6th and 10th day of life. Comparisons were then made to search for factors associated with having a medical visit between the 6th and 10th day of life. Qualitative data were expressed as proportion and 95% confidence interval (95% CI) and quantitative data as mean and 95% CI. Comparisons were made with the chi-square test, the Fisher exact test, or the Student *t*-test as appropriate.  $P < 0.05$  was considered statistically significant.

Considering the lack of precise data on newborn follow-up practices, we relied on the clinical experience of the study center's pediatricians. This enabled us to hypothesize that the follow-up guidelines could be appropriately followed for 75% of discharged infants. Thus, the sample size needed to achieve 10% precision was 72 analyzable questionnaires. We therefore decided to include 150 mother–infant pairs for the study, anticipating a 50% drop-out rate.

### 2.5. Ethics

Eligible mothers provided their informed consent to participate in this study. This study was approved by the institutional review board (*Comité interne d'éthique de la recherche* - [CIER]) of the Lille Catholic University Hospitals (*Groupement des hôpitaux de l'institut catholique de Lille* [GHICL]). The CCTIRS (*Comité consultatif sur le traitement de l'information dans le domaine de la recherche en santé*) gave a favorable opinion. The database was recorded with the CNIL (*Commission nationale informatique et liberté*) (no. 915567).

## 3. Results

### 3.1. Study population

The study flow chart is presented in Fig. 1. The comparison between the study population, i.e., mothers whose LOS was less than 6 days and who responded to the 1-month telephone interview ( $n = 108$ ) and the drop-out population ( $n = 32$ ) is presented in Table 1. Compared with the study population, mothers in the drop-out population had a lower educational level and fewer had an occupational activity. Spontaneous vaginal delivery and breastfeeding were found in fewer of the mother–infant pairs in the drop-out population. No other difference was noted considering neonatal characteristics.

For the 108 mother–infant pairs comprising the study population, the mean LOS was  $94 \pm 18$  h for vaginal delivery and  $114 \pm 14$  h for cesarean delivery. Based on the HAS definitions, early discharge was not observed after cesarean delivery. Early discharge was noted after vaginal delivery for 15% of the mother–infant pairs.

### 3.2. Newborn follow-up

The first medical visit occurred at various times during the 1st month (Fig. 2). During their 1st month of life, 89 (82%) infants had a medical examination, performed by a GP for 56 infants (52%) and by a pediatrician for 33 infants (31%). Ninety-six (89%) mother–infant pairs had a midwife home visit: one visit for 39 (36%), two for 41 (38%), and three or four for 16 (15%). Two infants did not have a midwife or a physician visit during the 1st month of life, but they had attended a maternal and child protection center (*Protection maternelle et infantile* [PMI]), where they were seen and weighed by a pediatric nurse.

In this study population, a medical examination by a GP or a pediatrician was performed between the 6th and 10th day of life

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