J Gynecol Obstet Hum Reprod xxx (2018) xxx–xxx

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com

Original Article

Management of pregnancy based on healthcare consumption of women who delivered in France in 2015: Contribution of the national health data system (SNDS)

Clara Piffaretti [a], Vincent Looten [b,c,d], Sylvie Rey [e], Jeanne Fresson [e], Anne Fagot-Campagna [a], Philippe Tuppin [a,*]

[a] *Caisse Nationale de L'assurance Maladie Des Travailleurs Salariés, Direction de la Stratégie des Études et des Statistiques, 26–50, avenue du Professeur-André, 75986 Paris Cedex 20, France*
[b] *Hôpital Européen Georges Pompidou, Assistance Publique Hôpitaux de Paris, 75015 Paris, France*
[c] *Université Paris Descartes, Paris, France*
[d] *Inserm UMRS1138, Paris, France*
[e] *Direction de la Recherche, des Études, de L'évaluation et des Statistiques (Drees), 75015 Paris, France*

ARTICLE INFO

Article history:
Received 16 April 2018
Received in revised form 28 May 2018
Accepted 30 May 2018
Available online xxx

Keywords:
Pregnancy
Population surveillance
Prenatal care
Delivery obstetric
Administrative claims

ABSTRACT

Objective. – This study was designed to further our knowledge of the management of pregnant women based on the national health data system (SNDS).
Material and methods. – Women covered by the national health insurance general scheme or a local mutualist section, who delivered in 2015.
Results. – Among the 672,182 women included (mean age: 31 years, SD 5.3), 0.3% were under the age of 18 years, 4% lived in a French overseas department (<18 years: 21%), 17% had complementary universal health insurance coverage (<18 years: 75%), 1.2% presented a mental illness, 0.6% had a cancer, and 0.4% had cardiovascular disease. At least one outpatient visit with a gynaecologist or midwife was detected for 93% of women (first trimester (T1): 75%), specific or nonspecific pelvic ultrasound was performed in 98% (T1: 92%), blood glucose assay was performed in 78% (T1: 61%), and an oral glucose tolerance test was performed in 58%. Before delivery, 0.2% of women had at least one admission to the intensive care unit and 22% had at least one hospital stay (<18 years: 38%), for which the principal diagnoses were: false labour (4.5%), threatened preterm labour (2.5%), surveillance of high-risk pregnancy (2.6%), diabetes (2.6%), and hypertension (0.7%). The preterm delivery rate was 6.7% (<18 years: 14%, ≥40 years: 9%). Although 20% of deliveries were performed by caesarean section, 16% of vaginal deliveries required instrumental extraction.
Discussion. – SNDS data enrich the data derived from periodic national perinatal surveys, such as the poor follow-up of adolescent girls. These data can promote the elaboration and monitoring of annual indicators.

1. Introduction

The decision and evaluation of public health actions in the field of perinatal mortality require the production and regular availability of data concerning management throughout pregnancy, by taking sociodemographic characteristics, health status and risk factors into account. These data can also be used to evaluate compliance of screening, follow-up and referral practices with guidelines [1].

Five national perinatal surveys were conducted in France between 1995 and 2016 using a sample of all births (from 22 weeks of amenorrhoea (WA) or a birthweight of 500 g) in maternity units during the same week, i.e. slightly less than 15,000 live births [2–5]. Data were collected from the medical charts of maternity units and an interview with women after delivery. One of the advantages of these surveys is that they provide precise clinical, social and subjective data [2,3]. However, they cannot be used to produce annual indicators or to conduct subgroup studies.

In France, more than 99% of deliveries occur in hospital. In order to provide complementary data derived from a comprehensive national database (almost 800,000 births in 2015), the national hospitalisation

* Corresponding author.
E-mail address: philippe.tuppin@cnamts.fr (P. Tuppin).

https://doi.org/10.1016/j.jogoh.2018.05.014
2468-7847/

database has been used since the 2000s to monitor certain indicators concerning maternal age, preterm delivery, birthweight or modes of delivery [1,6–9]. An anonymous national health data system (SNDS) has also gradually been developed since the 2000s. It includes national hospital discharge database derived from the PMSI (*Programme de médicalisation des systèmes d'information*), as well as all healthcare reimbursed by French national health Insurance for almost all of the population [10]. The first studies on pregnancy and neonates based on these data have already been published [11–14]. However, little information is available concerning the follow-up of pregnant women based on their healthcare consumption, despite the publication of national guidelines [15].

The objective of this study was to further our knowledge of the management of pregnant women in France and to illustrate how the data available in the SNDS can contribute to the monitoring of management guidelines for pregnant women.

2. Material and methods

2.1. Population

This study was based on women who delivered in 2015 in France, selected according to the recommendations of the *Agence technique de l'information sur l'hospitalisation* (ATIH) [Agency for Information on Hospital Care] [9] from their hospital stay for delivery (or following a delivery outside of hospital). Among the 789,766 delivery stays in 2015, 15,979 were excluded due to an identifier problem or a lack of delivery procedure. Then delivery stays for women covered by the national health insurance general scheme or a local mutualist section (86% of French population) and with reimbursed healthcare in 2014 and 2015, apart from delivery, were selected (678,953 stays). The last delivery stay was selected for women who delivered twice in 2015 giving 678,462 delivery stays or mothers. Finally 6280 mothers were excluded for various reasons (gestational age missing, living in a foreign country or in Mayotte, medical termination of pregnancy). Overall 672,182 women were included in the present study.

2.2. Variables

The SNDS contains various sociodemographic data: age, sex, date of death, place of residence, but does not include any clinical data during visits, prescriptions or examinations [10]. However, the SNDS includes information on hospital stay diagnoses and the presence of long-term diseases (ALD: *affection de longue durée*, eligible for 100% reimbursement of healthcare), coded according to the International Classification of Diseases 10th edition (ICD-10). Identification of medications is based on their Anatomical Therapeutic Chemical code. National nomenclatures are also used for outpatient and inpatient medical procedures, laboratory tests and medical or paramedical visits.

The degree of social deprivation can be estimated by complementary universal health insurance (CMUC) coverage, which provides access to care without advance payment or extra billing. This status was identified by the presence of CMUC reimbursed healthcare at the end of 2014.

Diseases managed in 2014 were identified by means of an algorithm-based disease and expenditure mapping tool, which distributes beneficiaries into 56 non-exclusive groups of patients based on their healthcare consumption [16,17]. These algorithms were developed from ALD diagnoses, hospital diagnoses, medications and sometimes procedures that are almost disease-specific, allowances or Diagnosis-Related Groups. These data are collected with a depth of 1–4 years for hospital diagnoses compared to the year of study considered. Only categories or diseases of interest for the study population were described. A consumption of analgesic was considered in the presence of at least six refunds in 2014.

The mother's age was calculated from her birthday in 2015, either before or after delivery. According to ATIH recommendation, gestational age was recalculated from the gestational age recorded in PMSI when it was situated between 22 WA and 42 WA, otherwise from the date of the last menstrual period recorded in the PMSI when it was situated between 154 and 300 days, otherwise the recalculated gestational age was considered to be missing. Preterm delivery was defined by a gestational age strictly less than 37 WA. The date of delivery corresponded to the date of the procedure (or the date of admission to hospital for deliveries outside of hospital). The duration of pregnancy was calculated as follows: date of delivery − [gestational age (WA) * 7 + 3 − 14]. The mother's parity is only available for vaginal deliveries in hospital. Single or multiple births were determined from the associated diagnosis ICD-10 codes [9].

To assess healthcare consumption during pregnancy, mandatory ultrasound examinations for each of the three trimesters were identified by their specific codes (pregnancy and trimester). Abdominal and pelvic ultrasound examinations were also included due to lack of specific codes use. Midwife, obstetrician–gynaecologist or general practitioner visits were described separately and then combined, as French guidelines consider follow-up by these various healthcare professionals according to the level of risk of the pregnancy, data that are not available in the SNDS. For hospitalisations during pregnancy, only the principal diagnosis (health problem justifying admission to hospital) was taken into account. The hospital spontaneous stillbirth rate was estimated from ICD-10 coding of maternal hospital stays, which was also used to estimate the number of foetuses concerned.

2.3. Data analysis

Data are expressed as a percentage of the population according to maternal age-group, trimester or the entire pregnancy. For certain examinations, the median and quartiles calculated among mothers in whom this examination was performed at least once are indicated. Mean length of stay and the associated standard deviation (SD) were calculated. SAS software (version 7.11, SAS Institute Inc., Cary, NC, USA) was used for analysis. The CNAM has permanent access to the SNIIRAM database, authorised by the *Commission Nationale de l'Informatique et des Libertés* (CNIL) (French data protection authority).

3. Results

3.1. Characteristics and diseases of pregnant women

Women included in this study had a mean age of 31 years (SD 5.3): 0.3% were younger than 18 years and 5% were 40 years or older (Table 1). Women living in French overseas departments and regions (DROM) (4% of the overall study population) were younger (<18 years: 21%, 18–24 years: 7%). These women were also more frequently CMUC beneficiaries: total of 17% with 75% of women under the age of 18. Data concerning parity are only available for vaginal deliveries; 33% of women undergoing vaginal delivery were primiparous. A multiple pregnancy was reported for 1.7% of women. Maternal morbidity rates were low but increased with age except for chronic respiratory disease and mental illness, which were more prevalent among the youngest women.

3.2. Visits and follow-up of pregnancy

Seventy-five percent of women attended at least one visit with a gynaecologist or midwife during the first trimester and 98% in all

Please cite this article in press as: Piffaretti C, et al. Management of pregnancy based on healthcare consumption of women who delivered in France in 2015: Contribution of the national health data system (SNDS). J Gynecol Obstet Hum Reprod (2018), https://doi.org/10.1016/j.jogoh.2018.05.014