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Inserm U 953

Presentation of a protocol of severe maternal morbidity surveillance using hospital discharge data in Europe : a feasibility study

EURO-Peristat II - January 2012

Euro-Peristat objectives

➔ One objective on the Euro-Peristat II Project is:

Objective 3

Point 2: Analyse data from selected countries on: generating maternal morbidity indicators from hospital discharge data and quality criteria (registration criteria, missing data and data linkage)

➔ Work package number 5

Point 3: Develop protocoles for analysis of data from selected countries on: 1/ generating maternal morbidity indicators using hospital discharge data and 2/ quality criteria (registration criteria, missing data and data linkage)

Introduction

➔ Maternal mortality is a major indicator of health system performance

But this indicator presents several limitations due to:

- The diminution of maternal death incidence in developped countries since 30 years
- The scarcity of maternal deaths in Europe
- The poor quality of data (20-30% of underreporting)

(Deneux-Tharaux et al. Obstet Gynecol 05)

- More of 50% of cases are juged avoidable in countries with enhanced systems for maternal deaths surveillance

(CEMACH 04, French National Deaths Inquiry 06-10)

➔ To improve knowledge and improve maternal health, it is necessary to focus on severe maternal morbidity

Introduction

➔ Lack of knowledge on SMM in Europe (routine data)

Country / coverage	Number of women	Rates per 1000 women							
		Eclampsia	ICU admission	Blood transfusion				Hyster-ectomy	Embolisa-tion
				3 units or more	5 units or more	other amount	no units specified		
Belgium									
Flanders	59 956	NA	NA	NA	NA	NA	11.5	NA	NA
Czech Republic	96 771	0.2	NA	NA	NA	NA	NA	0.8	NA
Denmark	63 781	0.3	NA	0.2	0.1	5.9	5.1	0.3	0.0
Germany *†	636 844	3.9	2.8	NA	NA	10.7	NA	0.9	0.0
Estonia	13 879	0.6	NA	NA	NA	NA	NA	0.9	NA
Ireland									
Greece									
Spain									
Valencia	38 389	0.3	NA	NA	NA	NA	6.5	0.3	NA
France	774 870	1.0	0.5	NA	NA	NA	2.1	0.3	0.3
Italy	534 568	1.6	NA	NA	NA	NA	4.6	0.9	0.0
Cyprus									
Latvia	20 256	0.4	NA	NA	NA	NA	NA	0.8	NA
Lithuania									
Luxembourg									
Hungary	93 913	0.5	NA	NA	NA	NA	NA	1.0	0.0
Malta	3 838	1.3	NA	1.8	0.5	3.4	0.0	0.5	NA
Netherlands	187 910	0.7	2.2	NA	2.0	4.4	NA	0.3	0.3
Austria									
Poland	213 190	0.2	NA	NA	NA	NA	NA	NA	NA
Portugal									
Slovenia	17 629	1.1	NA	NA	NA	NA	10.6	0.6	NA
Slovak Republic									
Finland*	56 878	0.2	NA	NA	NA	NA	0.1	0.2	0.2
Sweden									
United Kingdom									
Wales	29 569	0.8	NA	NA	NA	NA	NA	0.0	NA
Scotland	53 342	0.6	NA	NA	NA	NA	NA	0.2	NA
Norway									

Introduction

➔ **There is a lack of knowledge on severe maternal morbidity in Europe (routine data)**

Identified causes :

- Recent interest on maternal health, since the beginning of 1990s
  Before, focus was on fetuses, new borns and infants health
- No international or european consensual definition of SMM
  Heterogeneous definitions are used in studies
- Rare incidence
  Close to 1% in the litterature according to studies with differents definitions

➔ **Data on SMM are scarce and their quality is not evaluated**

Introduction

However, data sources exist for severe maternal morbidity:

- SMM events are hospital events

  (Women always meet hospital system)
- Hospital discharge data are collected in routine for all patients
- Hospital discharge data are available in most European countries
- Hospital discharge data coding is standardized with ICD codes

➔ **Hospital discharge data constitute a potential source of information for monitoring SMM in Europe**

A pilot study conducted in France on hospital discharge data quality demonstrated their possible use for some indicators of SMM.

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Journal of Clinical Epidemiology 64 (2011) 1014–1022

Journal of Clinical Epidemiology

Hospital discharge data can be used for monitoring procedures and intensive care related to severe maternal morbidity

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Accepted 24 November 2010

Aim, materials & methods

• **Aim** : To estimate the accuracy and the reliability of the reporting of diagnoses and procedures related to SAMM in French hospital discharge data (PMSI)

• **Materials & methods**

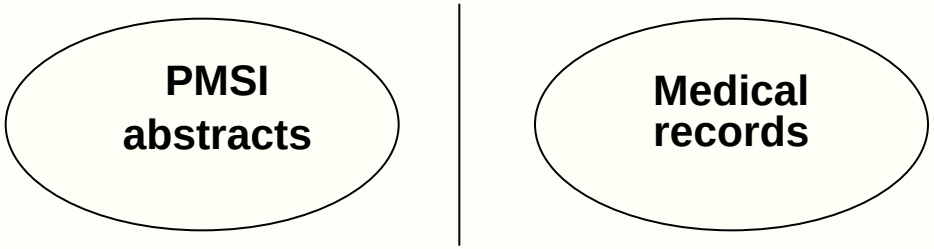
- Study group from 4 tertiary teaching hospitals :
 INSERM researchers + Clinicians + medical information specialists

Algorithm for the sampling :

- Women between 14 and 53 years old who delivered in the facilities
- Date of discharge between 01/01/2006 and 12/31/2007
- Principal or associated diagnosis with the code O or Z35/ Z37/Z39
- Abstracts including at least one of the codes of the following events :

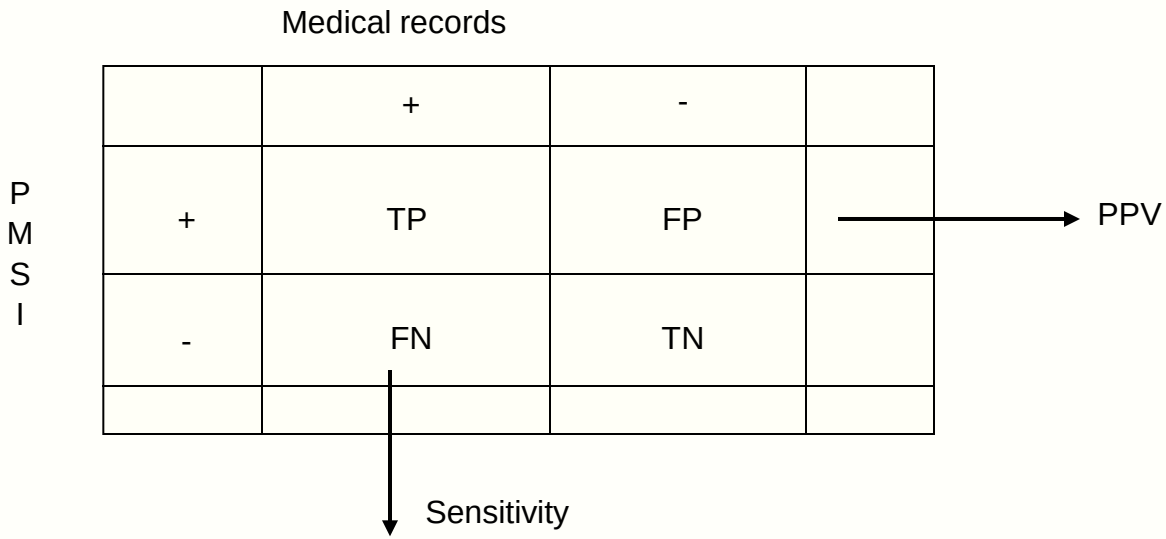
  – **Eclampsia** (O15)
  – **Pulmonary embolism** (O88)
  – **Embolization** of uterine arteries (EDSF011)
  – **Hemostatis hysterectomy** (JNFA001)
  – **Ligation** of hypogastric artery (EDSA002)
  – **Ligation** of uterine vascular pedicle (ELSA002)
  – **Intensive care** (SUPREA - SUPSI)

- Method



  - Gold standard = medical record
  - Using computerized medical records to study the false negatives

- Analysis



Data comparison

Tables 1 & 2: PMSI Validation referring to medical records
N deliveries = 30 607

	SMME in PMSI	SMME in medical records	False-positives	False-negatives
	n	n	n	n
Total	396	399	82	85
Eclampsia	84	20	67	3
Pulmonary embolism	31	24	11	4
Uterine artery e	72	128	0	56
Hysterectomy	23	31	0	8
Uterine artery a	34	44	1	11
Intensive care	152	152	3	3

* out of 30,607 deliveries, medical record as reference.

	Sensitivity	PVV	Kappa
Eclampsia	85%	**20%**	**0,33**
Pulmonary embolism	83%	65%	0,73
Embolizations	**56%**	100%	0,72
Hysterectomies	74%	100%	0,85
Ligations	75%	98%	0,84
Resuscitation / Intensive care	98%	98%	0,99
Centre 1	97%	97%	
Centre 2	84%	94%	
Centre 3	**51%**	89%	
Centre 4	75%	**57%**	

All Specificities and NPV >99%

PMSI Validation

Table 3: Validity of the PMSI data for SMME: sensitivity, posit
predictive value (PPV)*.

	Sensitivity % [95% CI]	PPV % [95% CI]
Eclampsia	85,0 [69,3-100,0]	20,2 [11,6-28,8]
Pulmonary embolism	83,3 [68,4-98,2]	64,5 [47,6-81,3]
Embolization	56,2 [47,6-64,5]	100,0 -
*revised results **	*95,3* *[91,6-98,9]*	*100,0* -
Hysterectomy	74,2 [58,8-89,6]	100,0 -
*revised results **	*100,0* -	*100,0* -
Ligation	75,0 [62,2-87,8]	97,6 [92,4-100,0]
*revised results **	*95,5* *[89,4-100,0]*	*97,7* *[93,2-100,0]*
Intensive care	98,0 [95,8-100,0]	98,0 [95,8-100,0]

** 4 centers, 2006-2007, out of 30,607 deliveries, medical record as reference.*

*** : revised results after correction of procedure codes not specific to the obstetrical cc*

All Specificities and NPV > 99%

Discussion

- Diagnoses :
  - Over-estimation in hospital discharge data
  - Wide panel of actors: Heterogeneity of abilities and coding accuracy *(Dussaucy,Lombrail, Klemmensen, Smulian)*
  - Tarification system = incentive for coding in excess

- Procedures :
  - Better but problems remain
  - Excessive precision of classification codes *(Lombrail, RESP 91/ Lloyd, JAMA 85)*
  - Coding is time consuming

- ICU admission
  - Good quality of coding in hospital discharge data

In obstetrics in France: Procedures and intensive care can be used for monitoring SMM. Diagnoses could not.

- Advices for using hospital discharge data:
  - Take account of inter-centres variations
  - Distinguish procedures, diagnoses and admission unit criteria

Additional qualitative results

- Complementary qualitative approach:
  - Characteristics of the medical information systems which can explain the discrepancies of results between centers
  - 2 steps in the process of medical information registration have been identified as key steps to obtain high quality hospital dicharge data
    - The source of medical information
      - Paper medical records
      - Computerized medical records
    - The validation of the information
      - Number and abilities of the persons involved in the review
      - Completeness of the medical records review

Chantry et al. RESP 2012 (in press)

Proposition of a protocol of SMM surveillance using hospital discharge data in Europe

EURO-Peristat II – January 2012

Justification

- SMM needs to be evaluated in Europe
- Euro-Peristat protocol is not designed to monitor SMM
- Hospital discharge data exist in most of european MS
- Hospital data are regularly used by the WHO, OECD, Eurostat, ECHI, but:
    - They do not collect SMM items
    - Data quality has not been assessed
    - Their results are based on aggregated-data
    - They do not permit additional quality assessment analyses

➔ **To study SMM in Europe, we have to imagine a new study based on individual records**

Objectives of the study

➔ Target: monitoring SMM in Europe

Objective 1:

To study the feasibility of collecting a set of hospital-based data in some MS to evaluate SMM

meaning collecting discharge abstracts based on individual information

Objective 2:

To assess the quality of the collected hospital discharge databases

Objective 3:

To estimate incidences of overall SMM, and for each complication in the participating MS, and make comparisons between them.

Objective 1

➔ To study the feasibility of SMM surveillance using hospital discharge data collected from some MS

Step 1: Identification of the participating MS

Step 2: Inventory of available hospital discharge databases in each MS

Step 3: Identification of a contact person able to do the linkage between the project leader from each MS and the governemental and non-governemental organizations

Material: Regulatory frameworks of each MS, European regulations, literature

Methods:
- review of literature
- questionnaire for the concat person about:
  - . the classifications used in data for procedures and diagnoses,
  - . the ways of coding procedures and diagnoses
  - . the system organization

Step 4: To obtain the authorization to collect data

Step 5: Cost of obtaining a dataset

Objective 2

➔ To assess the quality of each hospital discharge database

Material: Hospital discharge data and published results from population-based studies in the participating MS.

Methods:

- Internal validation: assessment of the dataset by crossing diagnoses with procedures, qualitative assessment with results from the questionnaire about the way of coding and the organization of the information system

- External validation: assessment of the dataset using the results from population-based studies as reference

Step 1: Identification of qualitative quality criteria

Step 2: Identification of studies for comparisons in the MS

Step 3: Qualitative and statistical analyses

Objective 3

➔ **To estimate the frequency of overall SMM and to make comparisons between MS**

Material: Hospital discharge datasets from participating MS

Methods: Statistical analyses
- frequency analyses
- comparison analyses between diseases and MS

Step 1: To ensure of the availability of the dataset

Step 2: Selection of SMM items to analyse in the collected datasets

Step 3: Statistical analyses

Organization

➔ Priority steps

1/ Selection of the participating MS

2/ Identification of a contact person

3/ Conception of the questionnaire

4/ Study of legislation and costs for collecting hospital discharge dataset in MS

➔ Schedule

February - April: Conception of the questionnaire, inventory of regulatory frameworks to obtain the authorization to collect a dataset.

May - September: Achievement of authorizations, circulation of the questionnaire, collection of the dataset

October - December: Qualitative and quantitative analyses

Discussion