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Rationale of a Cross Sectional Analytic Study on Determinants of Recurrent Preeclampsia at University Clinics of Kinshasa (Democratic Republic of Congo) and at Victor Dupouy Hospital Center (France)

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Abstract

Research Background: Pre-eclampsia is one of main causes of materno-foetal mortality and morbidity worldwide, with a prevalence of 3% - 7%. Although considered a primiparous condition, it can nevertheless recur. Several factors appear to be associated with risk of recurrence of pre-eclampsia, such as the term of delivery of previous pregnancy, severity of disease, the existence of co-morbidities and the inter-genital space. **Purpose:** The aim of our study will be to analyse and identify in a population of pregnant women with a history of preeclampsia risk factors associated with occurrence of recurrent preeclampsia at University clinics of Kinshasa (Democratic Republic of Congo) and at Victor Dupouy Hospital Center (France). **Methods:** In this study, pregnant women with an history of preeclampsia who will give birth between November 2018 and October 2024 at University Clinics of Kinshasa (UCK) and Victor Dupouy Hospital Center (VDHC) will be included. This will be a cross-sectional analytical study, data from previous and subsequent pregnancies will be studied. **Expected Result:** The prevalence of recurrent preeclampsia in the study population will be determined. And we will highlight the factors that will determine the recurrence of preeclampsia by analysing the risk factors. **Conclusion:** Knowledge of the factors associated with recurrent preeclampsia could be an excellent tool for predicting and preventing the disease.

Keywords

Recurrent Pre-Eclampsia, Risk Factor, Determinants

1. Introduction

Hypertension in pregnancy is defined as systolic blood pressure greater than or equal to 140 mmHg or diastolic blood pressure greater than or equal to 90 mmHg [1].

Preeclampsia is defined as gestational hypertension accompanied by one or more of following: Proteinuria, other maternal organ dysfunctions (eclampsia, PAO, HELP syndrome, etc.), utero-placental dysfunction (HRP, IUGR, umbilical doppler anomaly, IUD) [2].

Preeclampsia remains one of main causes of maternal-fetal mortality and morbidity worldwide [3]. Prevalence of preeclampsia worldwide is between 3% and 7% [4]. In France, around 5% of pregnancies are accompanied by preeclampsia [5]. In Canada, Canadian Institute for Health Information estimates the incidence of preeclampsia at 11.5% [6].

A retrospective study of 740 cases of hypertension and pregnancy at Souissi maternity hospital in Rabat between January and December 2013 found an incidence of 4.3% of cases of hypertension associated or not with proteinuria [7]. Incidence of preeclampsia in Senegal has been estimated at 1.4% [8]. In Democratic Republic of Congo (DRC), prevalence of hypertensive disorders during pregnancy is 6.6% [9].

To date, pathophysiology of preeclampsia is poorly understood, although it has been established that it originates in placenta [10] [11] [12]. Pre-eclampsia can progress rapidly, leading to serious complications in 10% of cases and threatening short-term survival of both mother and fetus [5].

The only treatment for preeclampsia is for woman to give birth, but risk of early delivery must be weighed against gestational age [1].

Although preeclampsia is considered to be a primiparous condition, it can nevertheless recur. Cathelain-Soland *et al.* in a study on the incidence and risk factors of vascular complications in pregnancy following an history of preeclampsia found a rate of 27.5% [13]. Lemonnier *et al.* in a study on the obstetrical future after a first pregnancy complicated by severe preeclampsia with delivery before 34 weeks found that 34% of subsequent pregnancies were complicated by a vascular pathology [14]. Mahande in his study of recurrence of pre-eclampsia in Tanzania found a rate of 25% recurrence [15]. Hernandez-Diaz in her study of the risks of pre-eclampsia in first and subsequent pregnancies found a recurrence rate of 15% [16].

Women with a history of preeclampsia have a high risk of recurrence in subsequent pregnancies. And several factors seem to be associated with risk of recurrence of preeclampsia, such as term of delivery of previous pregnancy, severity of

disease, the existence of co-morbidities and the inter-gynaecological space [17].

A study carried out at Grenoble University Hospital found that rate of recurrence of pre-eclampsia was 12.5%. There was a statistically significant difference between patients with and without recurrence in the early onset of pre-eclampsia in association with low birth weight and presence of thrombophilia [18].

An outcome study found that recurrent women, compared with those without recurrence, had a clinical profile at their first preeclampsia characterised by a high rate of severe preeclampsia, eclampsia and adverse criteria [19].

Mostello in a study of determinants of recurrence of pre-eclampsia found a 14.7% recurrence rate in women with a history of pre-eclampsia. Recurrence rate being inversely proportional to the term of delivery of first pregnancy. Obese and overweight women had a high risk of recurrence [20].

In DRC, a few studies have been carried out on preeclampsia, but they have only focused on risk factors such as seasonal variations [21], mineral trace elements and obstetric accidents [22], and neonatal outcome of induced prematurity [23], Epidemiological and clinical profile of severe preeclampsia in the UCK and obstetrical Doppler and neonatal outcome [24]. However, there is no study on recurrence of preeclampsia and associated factors. This is why we proposed present study.

To date, few studies have examined determinants of recurrence of preeclampsia. However, describing various factors associated with recurrence of preeclampsia could help in predicting and thus preventing its occurrence in a subsequent pregnancy [25] [26] [27].

2. Objective

This present study will analyse and identify factors associated with recurrent preeclampsia at UCK and VDHC (France).

2.1. Study Rationale

To answer to the question of the existence of determinants of recurrent preeclampsia, our study will take place from novembre 2018 at UCK and at VDHC. Our choice is justified by our visit to these facilities as a part of our training course. Our study population will consist of pregnant women with a history of preeclampsia.

2.2. Study Method

2.2.1. Sample Size

This will be a cross-sectional analytical study of pregnant women with a history of preeclampsia in subsequent pregnancies.

The minimum sample size will be calculated according to following formula:

$$n \geq Z_{\alpha}^{2} \frac{p(1-p)}{d^{2}}$$

In this formula, n represents minimum sample size, Z_{α} equals confidence

interval (1.96), p is the assumed proportion prevalence of problem in population equal 6.6% [9], and d is degree of precision set at 0.05.

After incorporating these elements into formula, minimum sample will be 100 providers. This study is designed and will be financed from our own funds.

2.2.2. Provider Selection

1) Inclusion critéria

To be included in this study, you must be a pregnant woman with a history of preeclampsia.

2) Non-inclusion criteria

Pregnant woman without a history of preeclampsia.

2.2.3. Study Variables

1) Demographic data: Age, BMI.

2) Medical data: History of arterial hypertension, diabetes.

3) Obstetrical data: Parity, gestational age, pregnancy characteristics, preeclampsia characteristics, term and route of delivery, inter-genes space.

4) Fetal data: status of the child, birth weight, Apgar score.

2.3. Data Collection Procedures

Once we will have obtained authorization for survey from department and faculty, we will contact the authorities of chosen health facilities to obtain their agreement to study and the access to the obstetric records of pregnant women.

2.4. Expected Results of Study

At the end of present study, various factors associated with recurrence of preeclampsia will be identified.

The prevalence of recurrent preeclampsia in the study population will be determined. And we will highlight the factors that will determine the recurrence of preeclampsia by analysing the risk factors.

2.5. Statistical Considerations

Data will be entered using Microsoft Excel 2016 and then exported to a database in Statistical package for social Sciences (SPSS) version 22.0 for analysis.

Continuous variables were summarised as mean and standard deviation and categorical variables were summarised as proportion.

Proportions and means were compared using Chi-square and Student's T-tests, respectively.

Odd Ratio will be used to identify variables associated with recurrence of preeclampsia.

Test will be considered statistically significant for a value of $p < 0.05$.

2.6. Ethical Consideration

This project was presented and approved by staff of Department of Obstetrics

and Gynaecology of UCK and by Obstetrics and Gynaecology service of VDHC. And data in the files will be anonymised and kept in complete confidentiality.

3. Discussion

Knowledge of risk factors for recurrence of preeclampsia is important for prevention and early management of recurrent preeclampsia. Several factors have been studied and appear to be associated with an increased risk of recurrence.

A study carried out at maternity unit of Caen Hospital in 2011 found that 34% of patient had a recurrence of preeclampsia.

The only risk factor for recurrence of a placental vascular complication in a subsequent pregnancy was a longer interval between two pregnancies [14].

A meta-analysis of recurrences of hypertensive disorders in pregnancy found a recurrence rate of 18.1% and 20.7% in 22. Delivery of a small-for-gestational-age child was a determining factor in recurrent preeclampsia. HELLP syndrome increased risk of recurrence. Recurrence increased with decreasing gestational age at delivery in previous pregnancy [28].

In a study of risk of recurrence of hypertensive disorders in pregnancy, after early-onset preeclampsia, risk increased 97-fold [29].

In Tanzania, one study find that preeclampsia is not only a serious complication of a particular pregnancy, but also a strong predictor for preeclampsia and other adverse outcomes in future pregnancies. Women with preeclampsia in a previous pregnancy had a 9-fold increased risk of preeclampsia. The absolute recurrence risk was as high as 25%. A history of preeclampsia was associated not only with future risk of preeclampsia but also with adverse outcomes for future babies such as preterm birth, perinatal death and low birth weight [18].

Strengths of Study

Our study will be the first to identify risk factors for recurrent preeclampsia in Kinshasa. It will therefore serve as a reference for futures studies.

Study Limits

The information gathered on the basis of the current pregnancy follow-up file will not give us enough information about the course of the previous pregnancy complicated by preeclampsia [30].

4. Conclusion

Knowledge of factors associated with recurrent preeclampsia could provide an excellent tool for predicting and preventing that disease.

Author's Contributions

SMAD, MMA and AMC are the principal investigators. SMAD generated and designed the study. MMA and AMC participated in study design and will be actively involved in data collection. SMAD, MMA, AMC, KGSC, MNF, LBJ and NOC contributed to drafting and improvement of manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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