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## **Projection of the severe preeclampsia in 2030 at the university clinics of Kinshasa**

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### **Abstract**

**Background and aim:** Severe pre-eclampsia (SEP) is an obstetric emergency requiring hospitalization of patients in structures allowing maternal and fetal care. The epidemic-like complications of PES in sub-Saharan Africa that are not or poorly monitored are well known in mother-child couples. The objective of this study was to determine the secular trend from 2006 to 2015 and the projection from 2006 to 2030 of the incidence of severe preeclampsia.

**Methods:** Evaluative and descriptive study carried out over 10 years (2006-2015) and in the Department of Gynecology and Obstetrics of CUK. The exhaustive sampling inclusion criterion was to consider all medical records of pregnant women during the time period and setting of the present study.

**Results:** Out of 8772 deliveries recorded during the study period, PE represented 565 cases, or a frequency of 6.44%. From this frequency, the PES came back to 46.9%. Relative to the total number of deliveries, the frequency of SEP was 3.02%. In 2030, the frequency of SEP in Kinshasa is estimated at 50% (projection according to the Modeler series with follow-up). The projection assumptions adopted for the EP lead to predict, between 2016 and 2030, an increase in this rate in the Congolese population.

**Conclusion:** This study shows the trend of SEP in Kinshasa is increasing growth could be estimated at 50% in 2030 that there is no regular screening. It will therefore be necessary to monitor this pathology to prevent it from happening.

**Keywords:** severe preeclampsia, projection in 2030, DRC

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### **Introduction**

Pregnancy is a very important event in a woman's life, but unfortunately it is not always without complications. Indeed, it is relatively common for the health of the mother and / or the fetus to be compromised during pregnancy. Preeclampsia (PE) is a pathology of pregnancy, that is, it can occur only during pregnancy [1, 3].

Pre-eclampsia is a multisystem condition in pregnant women, characterized by maternal placental and vascular dysfunction [4, 7]. Pre-eclampsia is defined by the occurrence of arterial hypertension (hypertension) from the twentieth week of pregnancy, associated with renal impairment with proteinuria greater than 0.3g / 24h, it is thus distinguished from hypertension chronic and transient hypertension of pregnancy, as defined by the report of the "National High Blood Pressure Education Program Working Group On High Blood Pressure In Pregnancy" [8, 11].

Severe pre-eclampsia (SEP) is an obstetric emergency requiring hospitalization of patients in structures allowing maternal and fetal care. The incidence between 8.5% and 13% and the epidemic-like complications of PES in sub-Saharan Africa not or

poorly monitored are well known in mother-child pairs [12].

In France, the epidemiology of preeclampsia is not well understood and occurs in 0.5 to 7% of pregnancies depending on the risk factors presented by the patient [13, 14]. Preeclampsia is responsible for nearly 20% of maternal mortality linked to pregnancy in the United States [15, 16] and 15% in Europe. The severity of this syndrome lies in the possibility of severe maternal complications in cases of malignant hypertension or eclamptic [16] and fetal status.

Preeclampsia still remains a public health problem because of its perinatal consequences on both the fetus and the mother [17]. Indeed, it is responsible for a significant part of induced prematurity. The prevalence of preeclampsia is significantly higher in Africa where it averages 4% in the general population but can reach up to 18% in some ethnicities. It is estimated that preeclampsia is responsible for 50,000 to 70,000 maternal deaths worldwide and 35,000 attacks of eclampsia per year [18].

Preeclampsia is on the rise. This is why we conducted an analytical study aimed at determining the secular trend from 2006 to 2015 and the projection from 2006 to 2030 of the incidence of SEP.

## Methods

This is a cross-sectional and descriptive study that took place at the Department of Gynecology and Obstetrics of the University Clinics of Kinshasa on the records of childbirths followed for severe preeclampsia during the period from January 2006 to December 2015, i.e. 10 years.

Our sample was exhaustive, consisting of medical records of deliveries followed for PES during our study period. Included in this study were all records of deliveries with SEP containing the variables of interest. All the non-exploitable files as well as those containing less than 50% of the variables studied, the cases of HTAG, mild PE, moderate PE, and the cases of SEP followed in intensive care were not included in the study.

A documentary review was carried out in the archives services of the University Clinics of Kinshasa. In this regard, provided with a previously established data collection sheet, we had collected specific information from the medical records of the newborns related to the variables in this study. The following variables were studied: socio-demographic variables: age, profession, level of education; gynecological and obstetric history: parity, gestity, PE, cesarean section. Clinical and biological variables (Maternal: height, weight, headache, vertigo, epigastralgia bar, BP, proteinuria, hypertension impact assessment and complications; Fetal: APGAR, birth weight), Variables related to Childbirth: gestational age at childbirth and mode of delivery. Pharmacological classes used.

## Operational Definitions

PES was defined as SBP  $\geq$  160 mmHg and / or DBP  $\geq$  110 mmHg with massive proteinuria from the 20th WA onwards.

Parity was defined as the number of previous pregnancies that reached at least 28 weeks and regardless of the outcome. According to the number of these pregnancies, the nulliparous was the woman who had not yet had one, the primipara was the one who had had one, the paucipara between 2 and 3, the multipara between 4 and 5 and the great multipara au- beyond 5. Pregnancy was defined as the number of intrauterine and ectopic pregnancies the woman had. According to the number of these pregnancies, the primigeste was the one who had had one, the paucigeste between 2 and 3, the multigeste between 4 and 5, great multigeste beyond 5.

## Data analysis

The data were entered using Microsoft Office Excel® 2013

software. After quality control and consistency check, the data were exported to SPSS 21.0 software for analyzes.

Continuous variables were presented as means  $\pm$  standard deviation and discrete variables as absolute and relative frequencies.

## Ethical considerations

All the rules of confidentiality and ethics were respected. The protocols for all the studies were approved by the National Health Ethics Committee in No. 240 / CNES / BN / PMMF / 2021. Studies in health institutions will review the prior approval of the competent authorities. All the subjects examined had previously consented orally or in writing to participate in the various studies.

## Results

Socio-demographic characteristics of the women born in the study the socio-demographic characteristics of pregnant women with PES are summarized in Table 1.

**Table 1:** Socio-demographic characteristics of childbirth followed for severe preeclampsia

Variable	Effectif (n=265)	%	Mean $\pm$ SD
Age group (years)			
$\leq$ 19	4	1.5	
20 - 34	167	63	31.8 $\pm$ 5.8
$\geq$ 35	94	35.5	
Educational Level			
None	1	0.4	
Primary	53	20	
Secondary	96	36.2	
Superior	97	36.6	
Unspecified	18	6.8	
Profession			
Official	53	20	
Informal	9	3.4	
No occupation	203	76.6	

It can be seen from Table I that the 20 to 34 age group was the most affected. Children under 20 were the least represented. The average age was 31.8  $\pm$  5.8 years. Most of the births had secondary or higher education and the majority of our births were unemployed.

## Clinical Characteristics of the Births in the Study

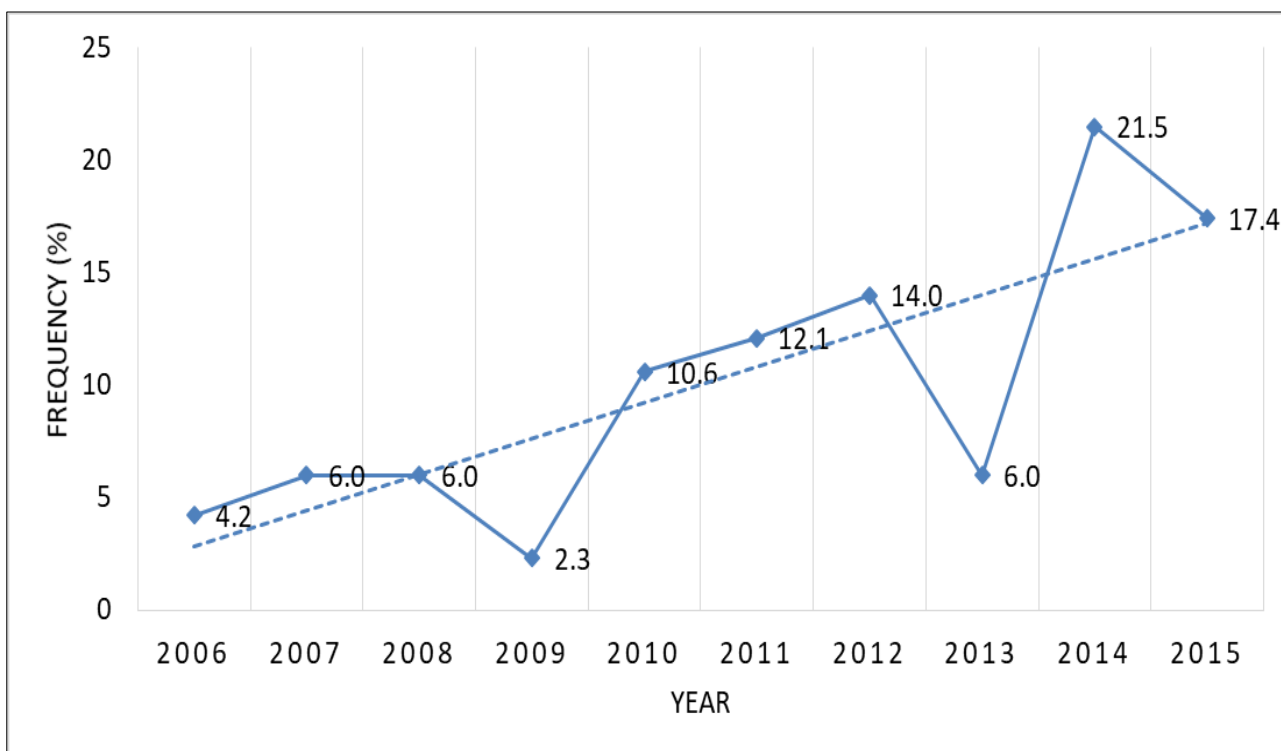
**Table 2:** Distribution of women giving birth and fetuses according to their clinical characteristics

Variable	Effectif (n=265)	%	Mean $\pm$ SD
Gesture			
Primigest	81	30.6	
Paucigeste	81	30.6	
Multigest	67	25.2	
Large multigest	36	13.6	
Parity			
Nulliparous	1	0.4	
Primiparous	106	40	
Pauciparous	86	32.5	
Multiparous	51	19.2	
Large multipare	21	7.9	
Reason for consultation			

Headache	84	31.7	
Dizziness	58	21.9	
Epigastric bar	37	14.0	
Blurred vision	54	20.4	
Weight (Kg)			
<90	213	80.4	78.5 ± 13.9
≥ 90	52	19.6	
BMI (Kg / m2)			
Normal	43	16.2	
Overweight	118	44.5	28.8 ± 3.9
Obesity	104	39.2	
PA (mmHg)			
NOT	265	100	174.3 ± 19.1
PAD	265	100	114.9 ± 10.5
Admission pregnancy age (weeks)			
28 - 27	7	2.6	
28 - 34	96	36.2	34.9 ± 3.7
> 34	162	61.1	
Obstetric history			
Preeclampsia	64	24.2	
Cesarean	38	14.3	

From this table, the average pregnancy rate in our newborns was 3.1 ± 2.2; the primigeste and the paucigeste were the most represented; the parity mean among our newborns was 2.6 ± 1.8; the primipara was more represented than the others. Headaches were the major complaints. Regarding weight, 80.4% had a weight <90 kg and 44.5% of the women born were overweight; the mean BP was 174.3 ± 19.1 for SBP and 114.9 ± 10.5 for DBP; in 61.1% of cases the gestational age was greater

than 34 weeks; 24.2% of the deliveries had a history of preeclampsia and in 69% of the cases the BCF was not disturbed. Frequency of PE according to years Out of 8772 deliveries recorded during the study period, PE accounted for 565 cases, or a frequency of 6.44%. From this frequency, the PES came back to 46.9%. Relative to the total number of deliveries, the frequency of PES was 3.02%.



Prevision frequency in 2030

Fig 1: Frequency of PES during the study period by year without projection.

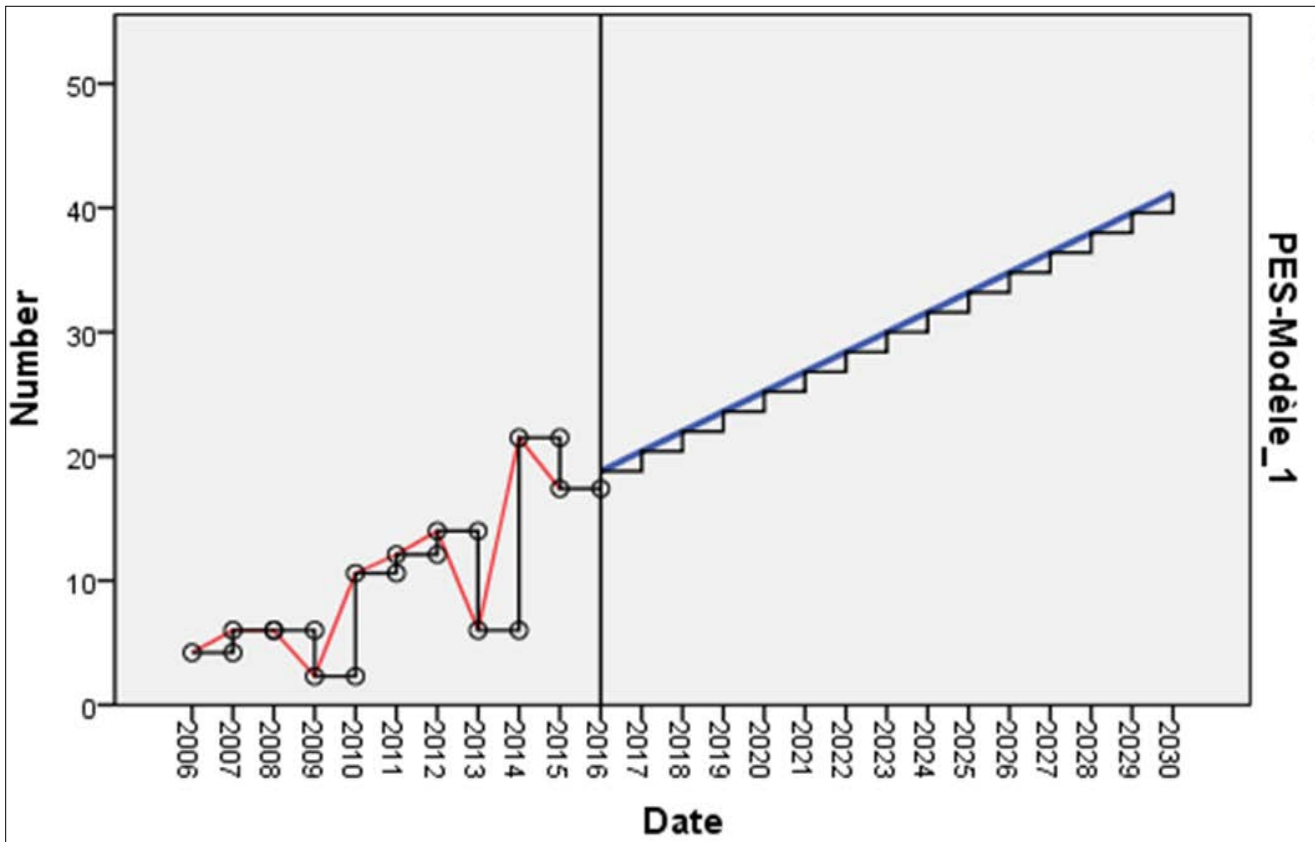


Fig 2: Frequency of PES during the study period by year with the projection according to the Modeler series.

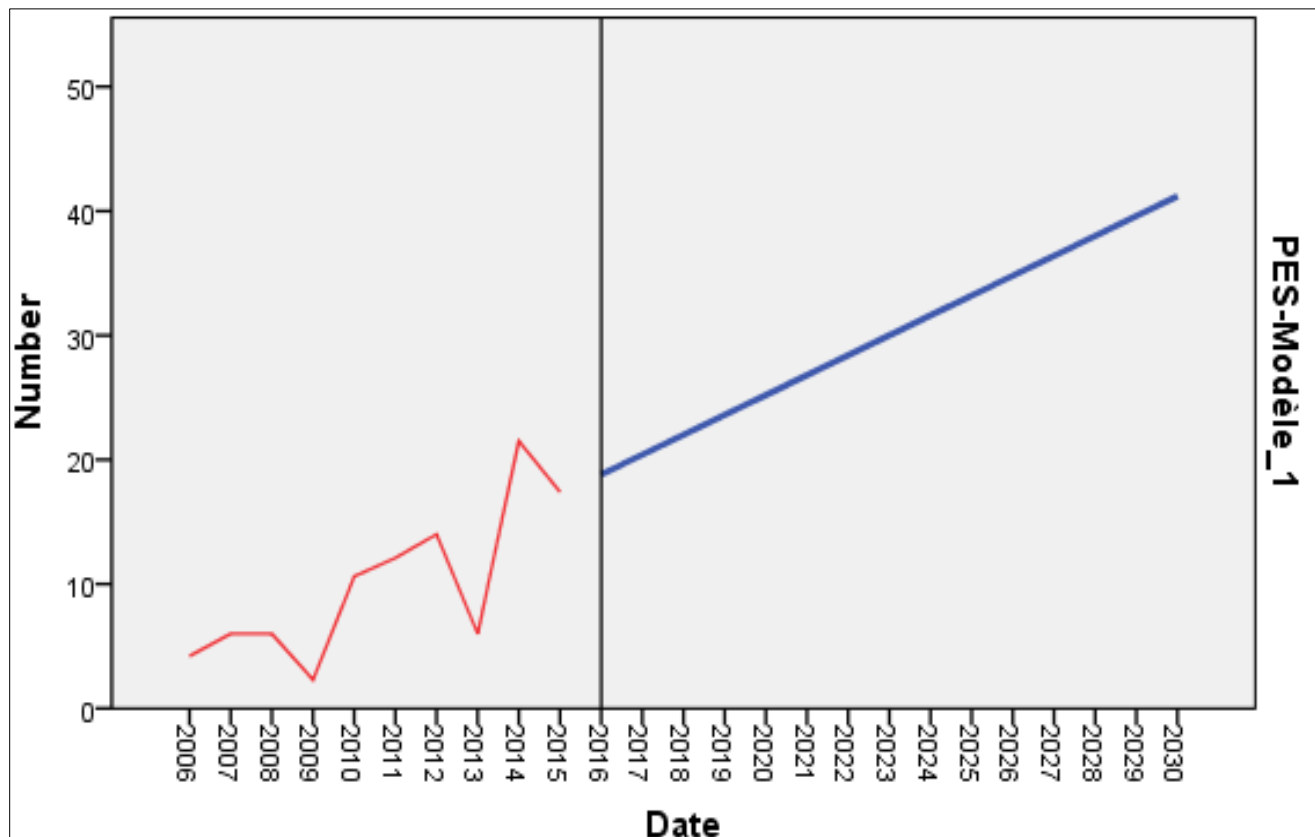


Fig 3: Frequency of PES during the study period by year with the projection according to the Simple Form Modeler series.

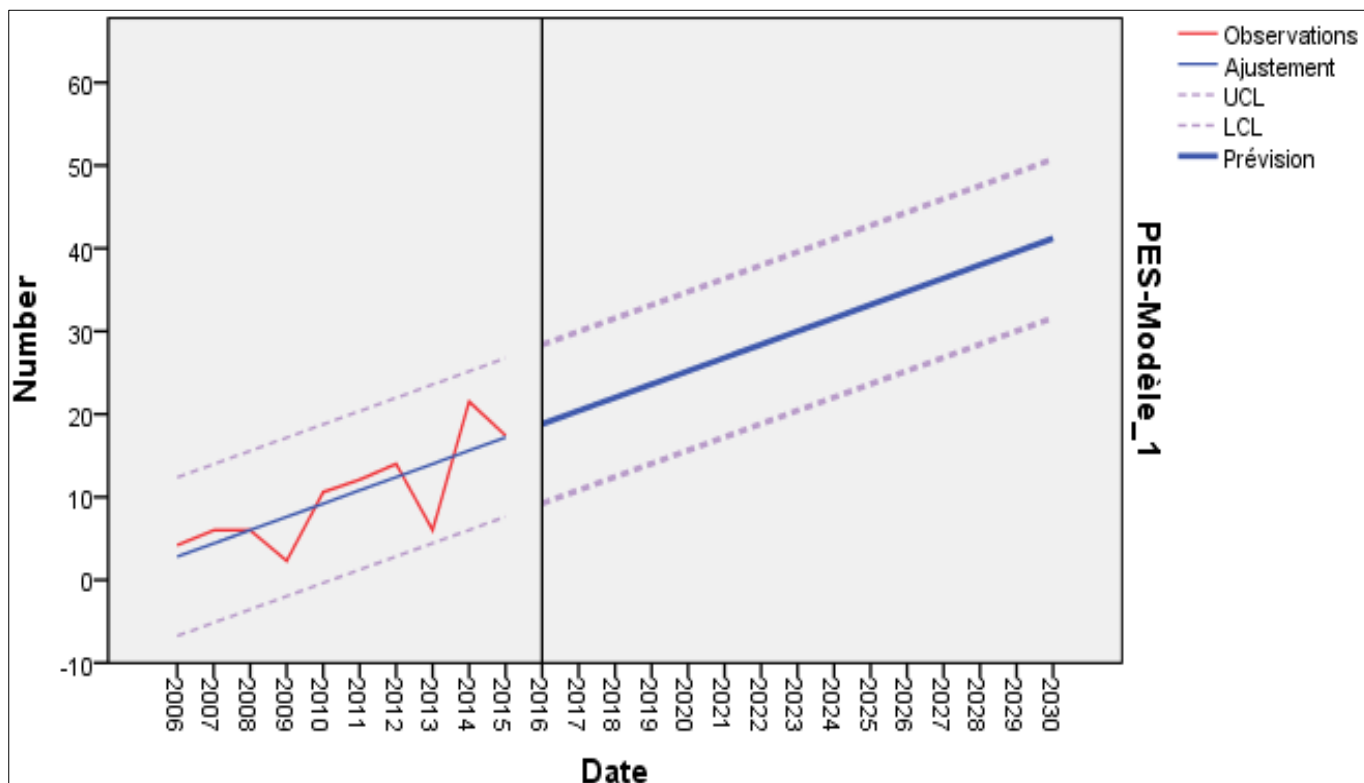


Fig 4: Frequency of PES during the study period by year with the projection according to the Modeler series with tracking.

## Discussion

### Frequency of preeclampsia

During our study period, the frequency of severe preeclampsia was 3.02%. It is higher than those noted by Hladunewich *et al* (19) in the United States with 1.4%, Hédon *et al* (20) in France 2%, Harioly *et al* (21) in Madagascar 1.3%, Minani (22) in Burundi 1.8. It is similar to that reported by Aboussouf (23) in Morocco 2.4%. This difference noted compared to the other authors could be justified in the fact that the type of the methodology used in these countries which was multicentric and community. While ours was hospitable.

### PE frequency projection

In 2030, the frequency of PE in Kinshasa is estimated at 50% (projection according to the Modeler series with follow-up). The projection assumptions adopted for the EP lead to predict, between 2016 and 2030, an increase in this rate in the Congolese population. Taking into account demographic changes (increase with a high frequency of nulliparas and first-time mothers and aging of the population (4, 12, 24), this is reflected in an increase in the number of new cases of preeclampsia and a stabilization of the number of PE (24).

For the projections of the incidence in 2030, the assumption of an extension of the recent trend (Modeler Series with monitoring) between 2016 and 2030, was used to estimate this frequency. Indeed, it is not possible to project the frequency of PE, with a sufficient degree of certainty that the strong growth of the incidence observed in DRC 2016 will continue until 2030. The evolution of the frequency, closely linked to that of the practice of screening, is difficult to predict. Contrary to the recommendations of the African Society of Gynecology and Obstetrics, fairly recent data (25) indicate that the albuminuria

dosage in pregnant women in Africa corresponds to mass screening (25), even though the benefit in terms of reduction in incidence has not been established (25). According to Congolese studies (4, 12, 24), the frequency of preeclampsia varies according to the environment and the populations, suggesting the combined effect of socio-demographic and genetic factors linked to lifestyle such as the consumption of salt in excess, alcohol, tobacco and obesity, and environmental (24). For this reason, as socio-demographic factors are attributable to this increase, it must nevertheless appeal to the population to be screened more specifically for first-time mothers and nulliparas.

Finally, for the EP projections, the hypothesis of an extension of the recent trend (Modeler series with monitoring) was systematically used for its estimation. In fact, the observed data, available from a tertiary hospital center, ensure good stability of the estimates. In addition, sudden changes in trends in PE are rare, as these are the result of fluctuations in frequency.

The limits will have to be feared because the data comes from a single center in Kinshasa, not allowing this trend to be generalized for the entire country of the DRC. However, along the same lines, a national study is expected to estimate this frequency in future years.

## Conclusion

This study shows the trend of PES in Kinshasa is increasing growth could be estimated at 50% in 2030 that there is no regular screening. It will therefore be necessary to monitor this pathology to prevent it from happening.

## Conflict of Interest

The authors declare no conflict of interest

## Acknowledgments

We thank all who participated in the study.

## Author's Contributions

RVV and ANN designed and analyzed the statistical data for the study. MTC, VND, TVA, MNB, and MFS contributed to the data collection. RRT, MMJM, ME and LMB supervised the study. All authors have read and approved the final and revised version of the manuscript.

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