

## Control of Hypertension in Pregnant Women in Secondary Health Facilities in Nigeria: A Cross-Sectional Study

Jennifer Adaeze Chukwu<sup>1\*</sup>, Doris Atibinye Dotimi<sup>2</sup>, Jennifer Ladokun<sup>3</sup>, Esther Dogo<sup>4</sup>,  
Chinedu O. Egwu<sup>5</sup>, Chidinma Chukwu<sup>6</sup>, David Tersoo Audu<sup>7</sup>

<sup>1</sup>*Project Management Unit/Project Manager, World Health Organization, United Nations House Plot 617/618 Central Area District PMB 2861 Abuja, Nigeria*

<sup>2</sup>*Associate Professor of Public Health, Bayelsa Medical University, Nigeria*

<sup>3</sup>*Regional Manager, Society for Family Health, Lagos, Nigeria*

<sup>4</sup>*Quality Improvement Specialist, Jhpiego, 23 Ibrahim Tahir Lane Cadastral zone B05, Utako Abuja, Nigeria*

<sup>5</sup>*Medical Biochemistry Department/Lecturer, College of Medicine, Alex-Ekwueme Federal University Ndufu-Alike, P.M.B. 1010 Ebonyi State, Nigeria*

<sup>6</sup>*Deputy Manager/Clinic Lead, 370 Wilsthorpe Road, Alexandra Nursing Home, Long Eaton, Nottingham. NG10 4AA*

<sup>7</sup>*Health Officer, United Nations Children's Fund, Nigeria*

### Abstract

*Hypertension is among the non-communicable diseases that complicate pregnancies in women. Diagnosis and control of this condition are important in reducing the risk of maternal and foetal mortality. This study was aimed at determining the prevalence and control of hypertension among pregnant women visiting secondary health care facilities in four Local Government Areas in Lagos (2) and Abuja (Federal Capital Territory) (2), Nigeria. Our findings showed that there was a high prevalence of hypertension in these facilities (50%). Our finding also revealed that the overall level of control was 30.45%, which decreased with time in the course of the management. The control was highest in the first quarter and lowest in the third (last) quarter. The consistent and appropriate use of antihypertensives is important to prevent the complications associated with non-communicable diseases like hypertension during pregnancy. Healthcare providers should therefore advocate early diagnosis and management of hypertension during pregnancy.*

**Keywords:** *Control, Hypertension, Non-communicable diseases, Pregnancy, Secondary healthcare.*

### Introduction

There are so many risk factors that make pregnancy complicated. These risk factors may include but not limited to hypertension, diabetes, overweight, obesity and blood disorders. These non-communicable diseases (NCDs) have significant adverse effects on women and pregnancy outcomes. The maternal mortality ratio is estimated to be 512 per 100,000 births in Nigeria where NCDs are responsible for approximately 24%. Xie et al. reported a global

increase in hypertensive disorders in pregnancy of 10.92 % from 1990 (n=16.30 million) to 2019 (18.08 million).

Hypertension (HTN), one of the NCDs, is a physiological condition where there is a persistent rise in blood pressure, usually higher than 140/90 mmHg (SBP/DBP) [1]. Hypertension in pregnancy is gaining attention due to its increasing prevalence in this condition. Hypertension complicates 5-10% of pregnancies and represents a significant cause of maternal

Received: 09.10.2023

Accepted: 25.10.2023

Published on: 29.12.2023

\*Corresponding Author: [gennytimah@gmail.com](mailto:gennytimah@gmail.com)

and perinatal morbidity and mortality [2]. HTN ranks second just behind haemorrhage among the causes of maternal mortality in Nigeria [3].

Among the causes of maternal mortality, it ranks second only after haemorrhage. Hypertension during pregnancy could be chronic hypertension, preeclampsia-eclampsia, preeclampsia superimposed on chronic hypertension, and/or gestational [4, 5].

Hypertension during pregnancy also increases the risk of pre-term birth, placental abruption, and birth by caesarean section [6]. Reducing indirect causes of maternal death is imperative in curbing or decreasing the maternal death rate in Nigeria [7]. Because of the significance of hypertension in pregnancy, care must be taken to diagnose and manage it to reduce the risk associated with it. This study therefore aimed at evaluating the risk of hypertension and control in pregnant women visiting secondary health facilities in Nigeria during their antenatal care (ANC).

## **Materials and Methods**

### **Study Design**

This was a cross-sectional study where the data of hypertensive pregnant women visiting the facilities for ANC were collected to monitor the progress of their hypertension. The women registered and attended ANC in these facilities. They had their BP taken as a part of their vital signs. The medical charts of these women were audited monthly to ascertain the level of blood pressure control after the use of lifestyle modification and prescribed antihypertensives. The data were from the case notes of the women from January to September 2021, spanning three quarters- Quarter 1-3.

During this period, 905 folders of hypertensive pregnant women were audited. Pregnant women within the gestational age of 20-40 weeks visiting for ANC were included in the study while pregnant women with gestational age > 40 weeks, not on antihypertensives or lifestyle modification and over were excluded from the study.

## **Data Collection and Analysis**

Medical audit of case files of pregnant women was done in five (7) General and three (3) private hospitals in four Local Government areas (LGAs) in Nigeria. These LGAs were Ikorodu and Alimosho both in Lagos State and, Bwari and Abuja Municipal Area Council (AMAC), both in Federal Capital Territory/Abuja. The Hospitals studied in Lagos were Alimosho General Hospital and Mobonike (Private) Hospital, both in Alimosho LGA and, Ikorodu General Hospital and Oak (Private) Hospital, both in Ikorodu LGA. The ones studied in FCT were Bwari General Hospital, Daughter of Charity (DOC) (Private) Hospital and Kubwa General Hospital in Bwari LGA and, Nyanya General Hospital, Saffron Hospital and Wuse General Hospital in AMAC. The data retrieved was entered on a data entry template and analysed using GraphPad Prism.

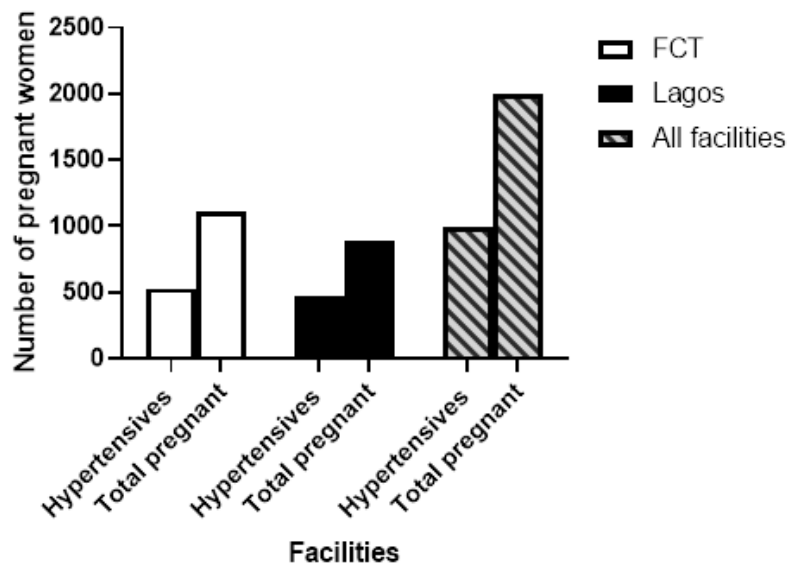
## **Results and Discussion**

In total, 1996 case files (FCT=1110 and Lagos=886) of pregnant women were audited. From the 1996 folders examined, 995 were hypertensive (FCT=529 and Lagos=466). This showed that approximately 50% of the pregnant women were hypertensive (FCT=47.66% and Lagos=52.60%) (Figure 1). This result indicates that the prevalence of hypertension is high among pregnant women in these secondary health facilities in Nigeria. HTN in pregnancy could predate the pregnancy or develop as a result of pregnancy [4]. Regardless of the order, the consequences are enormous and therefore have to be controlled using appropriate measures such as lifestyle modification, exercise and the use of antihypertensives [8].

A related study in Harare, Zimbabwe, it showed that there is an increase in the prevalence in pregnancy-induced hypertension (PIH) with a rate of 19.40% [9]. HTN increases the rate of stillbirth in women which is higher in women with PIH than in those without HTN [9]. In Nigeria, Ebeigbe, et al. reported a prevalence of 20.8% of pregnancy-induced HTN among

women attending antenatal care in a Teaching Hospital in South-South [10]. while Singh, et al. in their study showed that the prevalence ranged from 17-34.10% [11]. The prevalence for HTN in pregnancy varies across facilities and regions, accounting for the varied results from these different studies. In a cohort study in the US by Bello et al., they showed from the medical record of pregnant women who delivered singleton infants, that the prevalence of HTN in pregnancy increased from 10.3 in 2009 to 28.1% in 2014 [12].

The increasing in prevalence of HTN in pregnancy could be attributed to increasing contributing factors like obesity, smoking, reduced physical activity, drinking alcohol, first-time pregnancy, family history of pregnancy related HTN, black race, multiple babies, and/or age [13]. Because of the western lifestyle adopted by most people including pregnant women, these risk factors are more frequent during pregnancies and lead to increase in HTN.



**Figure 1.** Prevalence of Hypertension in Lagos and FCT Secondary Health Centres

Our finding showed that the overall level of control was 30.45% in all the facilities studied (Lagos =32.40% and FCT=28.73%) in nine (9) months (Table 1). The control was fairly the same across the facilities during the period of study. The target in treating HTN is to get the SBP $\leq$ 140 and DBP $\leq$ 90 mmHg which can be achieved using different approaches including medications [14]. In this study, in addition to recommended lifestyle modification, the mostly used antihypertensive was methyldopa (90%) followed by nifedipine. For mild cases, vasoprin was given. Nifedipine is considered the first line of treatment of HTN in pregnancy while methyldopa is often used as a second line in some countries; even though many still use it as first-line. Hoeltzenbein et al. reported that methyldopa reduces the risk of birth defects [15].

Studies in the past have shown the high efficacy of nifedipine in pregnancy in comparison to other drugs, which may account for the poor control seen in this study as majority were placed on methyldopa [16, 17].

Considering the monthly control, we observed 32% in January 2021 which increased significantly to 60% in March. However, after March, the control dropped consistently up until September 2021 when it was 17.12% (Figure 2). Even though methyldopa is among the recommended antihypertensives in pregnancy, its efficacy is lower than nifedipine and has since been used mainly as a second line drug [17, 18]. However, methyldopa is still used as first line drug in most countries like some health facilities in Nigeria. This may explain the loss of control seen in our study.

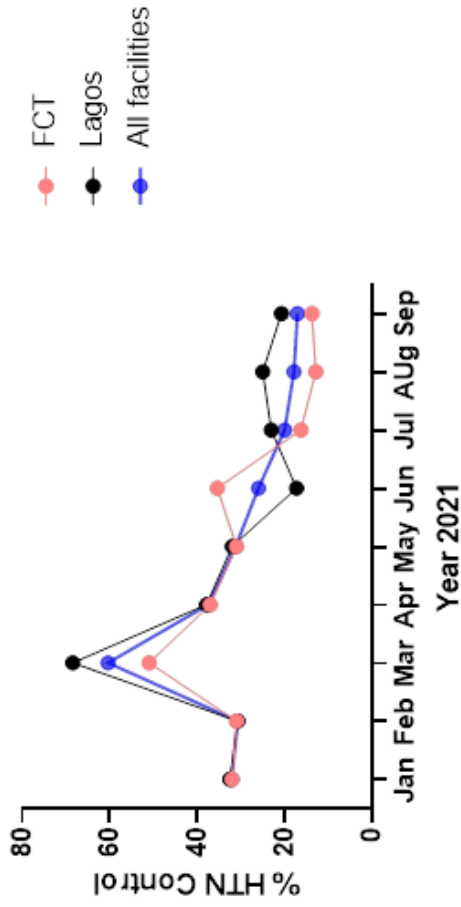


Figure 2. Percentage Control of Hypertension in the Secondary Health Facilities

Table 1. Monthly and Overall Control of Hypertension in Pregnancy

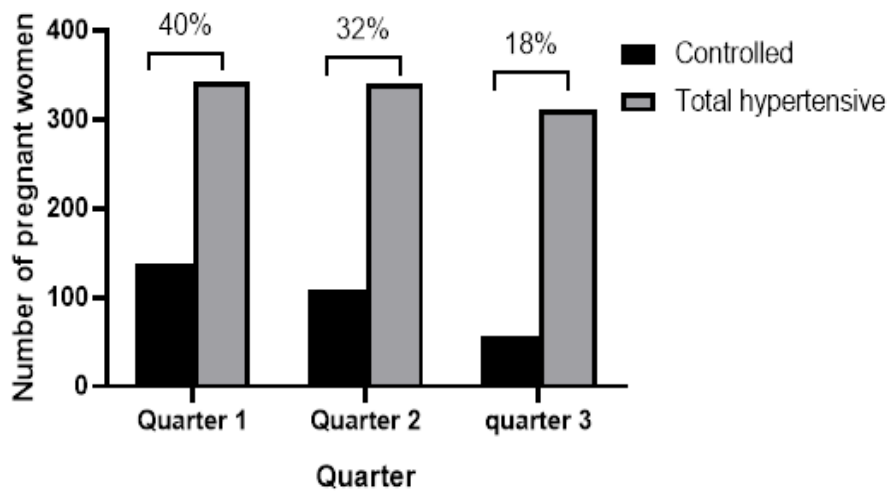
Indicator	State	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Overall
No of pregnant women with controlled HTN (<140/90)	FCT	22	24	24	23	19	17	7	8	8	-
No. of charts reviewed (known hypertensive pregnant women)	-	69	78	47	62	62	48	43	62	58	-
% Controlled	-	<b>32.88%</b>	<b>30.77%</b>	<b>51.06%</b>	<b>37.10%</b>	<b>31%</b>	<b>35.42%</b>	<b>16.28%</b>	<b>12.90%</b>	<b>13.79%</b>	<b>28.73%</b>
No of pregnant women with controlled HTN (<140/90)	Lagos	14	16	37	25	16	9	12	11	11	-
No. of charts reviewed (known hypertensive pregnant women)	-	43	52	54	66	50	52	52	44	53	-
% Controlled	-	<b>32.56%</b>	<b>30.77%</b>	<b>68.52%</b>	<b>37.88%</b>	<b>32.00%</b>	<b>17.31%</b>	<b>23.08%</b>	<b>25.00%</b>	<b>20.75%</b>	<b>32.40%</b>
No of pregnant women with controlled HTN (<140/90)	Aggregate	36	40	61	48	35	26	19	19	19	-
No. of charts reviewed (known hypertensive pregnant women)	-	112	130	101	128	112	100	95	106	111	-
% Controlled	-	<b>32.14%</b>	<b>30.77%</b>	<b>60.40%</b>	<b>37.50%</b>	<b>31.25%</b>	<b>26.00%</b>	<b>20.00%</b>	<b>17.92%</b>	<b>17.12%</b>	<b>30.45%</b>

$$\% \text{ Control} = \frac{\text{No of pregnant women with controlled HTN}}{\text{No of charts reviewed}}$$

The overall control was calculated by taking the average of the monthly control for the 9-month period from January to September 2021.

From the quarterly control results, it showed that there was a steady decline in the level of control from 40% in quarter 1 to 18% in quarter 3 (Figure 3). HTN is a chronic condition that requires the subjects to be on the medications consistently. Failure to take the antihypertensives when due can lead to loss of control. Methyldopa, the mostly used antihypertensive by the pregnant women in this

study, has been reported to show some adverse effects such as nausea, diarrhoea, headache, dry mouth and rash [19]. These adverse effects can discourage the subjects from taking their drugs consistently [20]. More so, lack of proper orientation of the subjects by healthcare providers can also lead to abandoning of the medications when initial control is achieved [21]. Put together, these factors can lead to loss of control seen in the hypertensive pregnant women recorded in this study.



**Figure 3.** Quarterly Control of Hypertension in Secondary Health Facilities

Control of hypertension alongside other non-communicable diseases during pregnancy is of great importance as this reduces the risk of maternal and neonatal complications and death in extreme cases.

## Conclusion

There is high prevalence of HTN among pregnant women going for ANC in secondary health facilities in Nigeria and the control stalls in the course of management. This could be attributed to so many factors which may include but not limited to poor awareness of the dangers of uncontrolled HTN, huge cost of management, out of pocket expenditures poor choice of antihypertensives, non-compliance to prescribed medications, exercise, and poor lifestyle

modification and lack of qualified and experienced medical personnel in some health facilities. It is therefore imperative to increase the level of awareness in the management of HTN during pregnancy in secondary healthcare facilities which have high volume of hypertensive pregnant women especially in rural/semi-urban settings.

## Conflict of Interest

The authors declare no conflict of interest.

## Acknowledgements

The authors wish to acknowledge the hospital management boards of the centres used for the study for allowing us to use their respective facilities.

## References

- [1] WHO Hypertension Available online: <https://www.who.int/news-room/fact-sheets/detail/hypertension> (accessed on 19 October 2023).
- [2] Braunthal, S.; Brateanu, A. Hypertension in Pregnancy: Pathophysiology and Treatment. *SAGE Open Med.* 2019, 7, doi:10.1177/2050312119843700.
- [3] Msughter, A.E. "Pregnancy Induced Hypertension in Kabo Local Government Area of Kano State, Nigeria." *Biomed. J. Sci. Tech. Res.* 2021, 39, doi:10.26717/BJSTR.2021.39.006321.
- [4] Mammaro, A.; Carrara, S.; Cavaliere, A.; Ermito, S.; Dinatale, A.; Pappalardo, E.M.; Militello, M.; Pedata, R.; Cacciatore, A. Hypertensive Disorders of Pregnancy. *J. Prenat. Med.* 2009, 3, 1.
- [5] Beech, A.; Mangos, G. Management of Hypertension in Pregnancy. *Aust. Prescr.* 2021, 44, 148, doi:10.18773/AUSTPRESCR.2021.039.
- [6] Kintiraki, E.; Papakatsika, S.; Kotronis, G.; Goullis, D.G.; Kotsis, V. Pregnancy-Induced Hypertension. *Hormones (Athens).* 2015, 14, 211–223, doi:10.14310/HORM.2002.1582.
- [7] Hossain, N.; Shaikh, Z.F. Maternal Deaths Due to Indirect Causes: Report from a Tertiary Care of a Developing Country. *Obstet. Med.* 2022, 15, 176, doi:10.1177/1753495X211037916.
- [8] Carey, R.M.; Muntner, P.; Bosworth, H.B.; Whelton, P.K. Prevention and Control of Hypertension: JACC Health Promotion Series. *J. Am. Coll. Cardiol.* 2018, 72, 1278, doi:10.1016/J.JACC.2018.07.008.
- [9] Muti, M.; Tshimanga, M.; Notion, G.T.; Bangure, D.; Chonzi, P. Prevalence of Pregnancy Induced Hypertension and Pregnancy Outcomes among Women Seeking Maternity Services in Harare, Zimbabwe. *BMC Cardiovasc. Disord.* 2015, 15, 1–8, doi:10.1186/S12872-015-0110-5/TABLES/3.
- [10] Ebeigbe, P.; Igberase, G.; Aziken, M. Hypertensive Disorders in Pregnancy: Experience with 442 Recent Consecutive Cases in Benin City, Nigeria. *Niger. Med. J.* 2007, 48, doi:10.4314/NMJ.V48I4.50895.
- [11] Singh, S.; Ahmed, E.B.; Egondou, S.C.; Ikechukwu, N.E. Hypertensive Disorders in Pregnancy among Pregnant Women in a Nigerian Teaching Hospital. *Niger. Med. J.* 2014, 55, 384, doi:10.4103/0300-1652.140377.
- [12] Bello, N.A.; Zhou, H.; Cheetham, T.C.; Miller, E.; Getahun, D.T.; Fassett, M.J.; Reynolds, K. Prevalence of Hypertension Among Pregnant Women When Using the 2017 American College of Cardiology/American Heart Association Blood Pressure Guidelines and Association with Maternal and Fetal Outcomes. *JAMA Netw. Open* 2021, 4, e213808–e213808, doi:10.1001/JAMANETWORKOPEN.2021.3808.
- [13] Tebeu, P.M.; Foumane, P.; Mbu, R.; Fosso, G.; Biyaga, P.T.; Fomulu, J.N. Risk Factors for Hypertensive Disorders in Pregnancy: A Report from the Maroua Regional Hospital, Cameroon. *J. Reprod. Infertil.* 2011, 12, 227.
- [14] Brown, C.M.; Garovic, V.D. Drug Treatment of Hypertension in Pregnancy. *Drugs* 2014, 74, 283, doi:10.1007/S40265-014-0187-7.
- [15] Hoeltzenbein, M.; Beck, E.; Fietz, A.K.; Wernicke, J.; Zinke, S.; Kayser, A.; Padberg, S.; Weber-Schoendorfer, C.; Meister, R.; Schaefer, C. Pregnancy Outcome after First Trimester Use of Methyldopa: A Prospective Cohort Study. *Hypertension* 2017, 70, 201–208, doi:10.1161/HYPERTENSIONAHA.117.09110.
- [16] Folic, M.M.; Jankovic, S.M.; Varjacic, M.R.; Folic, M.D. Effects of Methyldopa and Nifedipine on Uteroplacental and Fetal Hemodynamics in Gestational Hypertension. *Hypertens. pregnancy* 2012, 31, 31–39, doi:10.3109/10641955.2010.525274.
- [17] Alavifard, S.; Chase, R.; Janoudi, G.; Chaumont, A.; Lanes, A.; Walker, M.; Gaudet, L. First-Line Antihypertensive Treatment for Severe Hypertension in Pregnancy: A Systematic Review and Network Meta-Analysis. *Pregnancy Hypertens.* 2019, 18, 179–187, doi:10.1016/J.PREGHY.2019.09.019.
- [18] Podymow, T.; August, P. Antihypertensive Drugs in Pregnancy. *Semin. Nephrol.* 2011, 31, 70–85, doi:10.1016/J.SEMNEPHROL.2010.10.007.
- [19] Gupta, M.; Khalili, Y. Al Methyldopa. *xPharm Compr. Pharmacol. Ref.* 2023, 1–5, doi:10.1016/B978-008055232-3.62162-2.

[20]Cohen, J.S. Adverse Drug Effects, Compliance, and Initial Doses of Antihypertensive Drugs Recommended by the Joint National Committee vs the Physicians' Desk Reference. *Arch. Intern. Med.* 2001, 161, 880–885, doi:10.1001/ARCHINTE.161.6.880.

[21]Taibanguay, N.; Chaiamnuay, S.; Asavatanabodee, P.; Narongroeknawin, P. Effect of Patient Education on Medication Adherence of Patients with Rheumatoid Arthritis: A Randomized Controlled Trial. *Patient Prefer. Adherence* 2019, 13, 119, doi:10.2147/PPA.S192008.