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Family history impact on arterial hypertension dynamics at the Korhogo Regional Hospital from 2016 to 2021: Epidemiological and genetic approach

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Abstract

Background: The prevalence of arterial hypertension (AH) in Côte d'Ivoire was recently estimated at 38%. A recent study showed that hypertension was the second most frequent cause of consultation at the Korhogo Regional Hospital (KRH) in northern Côte d'Ivoire. This retrospective study, conducted at the KRH from 2016 to 2021, investigated the dynamics of cases of arterial hypertension (AH) in patients with a family history.

Methodology: We collected series of clinical and anthropomorphic data from 2375 patients diagnosed with arterial hypertension, of whom 103 patients (4,53%) had a history of hypertension. The data were subjected to computational statistical analysis using R software.

Results: In contrast to the general hypertensive population (hypertensives without a family history), in this subgroup (hypertensives with a family history), changes in prevalence were not significantly correlated with time or age (p>0,05). These results suggest a distinct profile, potentially influenced by genetic mechanisms or environmental and family habits.

Conclusion: Systematic identification of family history thus appears to be an essential lever for targeted prevention of certain cases of arterial hypertension.

Keywords: Arterial Hypertension; Family History; Genetics; Korfhage; Côte d'Ivoire

1. Introduction

Arterial hypertension (AH) is a major public health problem and remains the main preventable risk factor for premature death and disability, as well as the leading cause of morbidity and mortality worldwide [1]. It affects around 1 billion people and is responsible for 9,4 million deaths worldwide each year [2,3]. The medical treatment prescribed for this condition is aimed at normalizing blood pressure levels in order to prevent complications. It sometimes involves combination therapy combined with lifestyle modifications (adaptation of lifestyle habits, weight reduction, regular exercise). While several risk factors have been identified (age, diet, sedentary lifestyle), the role of family history is still

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underestimated in clinical practice. However, studies have shown that the genetic component of hypertension can influence both the age of onset and the severity of the disease [4; 5]. Like several other African countries, Côte d'Ivoire is facing an exponential rise in this asymptomatic disease [6], the causes of which remain unknown in more than 90% of diagnosed cases [7; 8]. In addition, the FLASH survey requested by French Hypertension Committee and carried out in 2007 with 4500 subjects aged over 35, maintains that hypertension is not just an individual problem, but also a family affair [9]. Previous analyses have suggested that hypertension is one of the recurrent pathologies diagnosed in Korhogo [7; 8; 10]. However, few studies have specifically examined the profiles of hypertensive patients with a family history. This study aims to fill this gap by analyzing the dynamics of cases and associated parameters in this subgroup.

2. Material and methods

This is a retrospective study conducted in the cardiology department of the Korhogo Regional Hospital (KRH) in northern Côte d'Ivoire between 2016 and 2021. The study included 103 hypertensive patients with a declared family history out of a total of 2375 hypertensive patients identified over the study period. The data collected covered both qualitative variables (gender, sedentary lifestyle, self-medication and family history) and quantitative variables (age, Glycemia, cholesterol Mia).

The data collected were structured using Excel spreadsheets, while the descriptive and analytical statistical analyses were carried out using R statistical software. These analyses included, Pearson and Spearman correlation tests; Student's t test (comparison of two paired samples) and Analysis of variance tests.

For reasons of data representation, we performed a logarithmic transformation of the data [11]. The significance threshold was set at $p < 0,05$.

3. Results

3.1. Descriptive analysis of the hypertensive population with a family history

The population of hypertensive patients with a family history is made up of 103 patients, 41 of whom are female and 62 males. On average, 17 hypertensive patients with a family history visited the Korhogo Regional Hospital (KRH) each year between 2019 and 2021. In 2019, 34 cases of hypertension with a family history were recorded. In 2020, 7 new cases of hypertensive patients with a family history were recorded. In 2021, at least 13 cases of hypertension with a family history were recorded. The student's t test revealed a non- significant difference between the means of female and male hypertensive patients with a family history for the period 2019 to 2021 ($p=0.08$). In addition, the proportion of hypertensive patients with a family history represented 4,53% of the hypertensive population registered at the KRH from 2016 to 2021.

3.2. Assessment of the impact of age on the growth dynamic of hypertension cases with a family history

Inter-annual variation does not significantly influence the growth momentum of hypertension cases associated with family history ($p=0,16$). The Pearson correlation test suggested a very low correlation coefficient ($R=0,11$) between age and the frequency of hypertensive patients with a family history over the period 2019 to 2021 ($p=0,8$). Based on our previous results, the population of hypertensive patients with a family history was split into 4 groups, including the young and/or elderly population groups and the female and/or male population groups. Analysis of the difference in variance suggests a non-significant difference in variance between the young and elderly hypertensive populations with a family history ($p=0,12$) (Figure 1) in contrast to the hypertensive populations without a family history (Figures 2). A multiple comparison analysis was then performed on the frequencies of hypertensive patients with a family history based on age and the interannual factor. This analysis showed no difference in variance between the different groups of patients generated over the period 2019-2021 ($p>0,05$).

In other words, the potential for growth in the frequency of hypertensive patients with a family history is not correlated with the parameters (i) interannual factor and (ii) age.

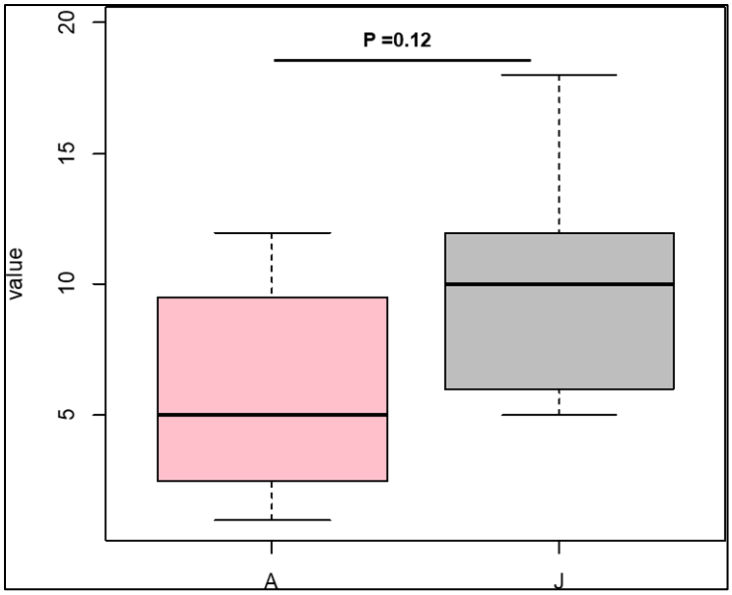
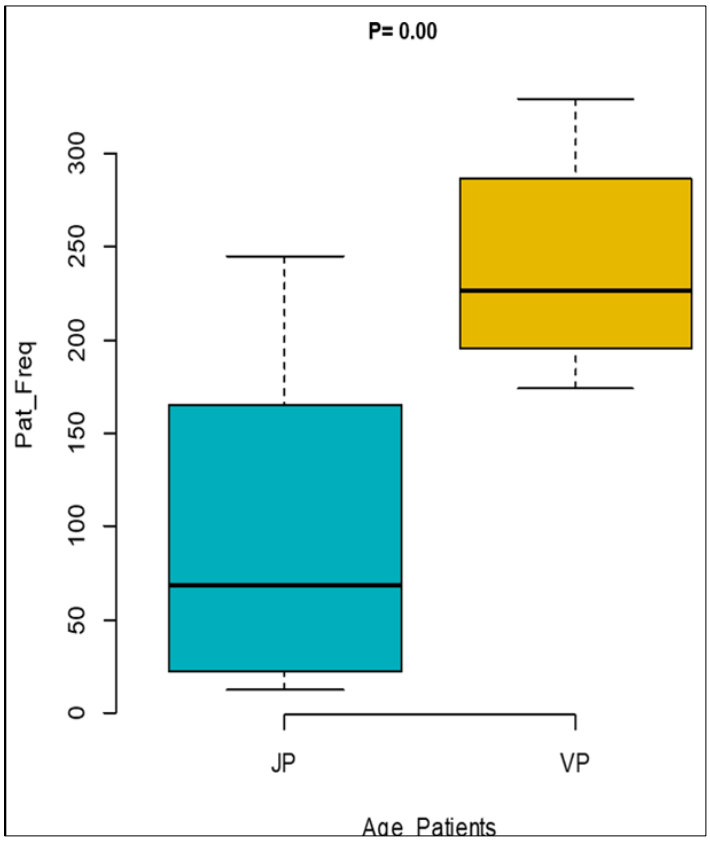


Figure 1 Analysis of the difference in variance between the young and elderly hypertensive populations with a family history. A = elderly patients with a family history. J = young patients with a family history. The ordinate axis shows the absolute frequency (standardized values) of hypertensive patients with a family history



VP = elderly hypertensive patients with a family history. JP = young hypertensive patients with a family history. On the ordinate axis we have the absolute frequency of hypertensive patients with a family history.

Figure 2 Analysis of the difference in variance between the young and elderly hypertensive populations without family history

3.3. Estimation of the correlation between the age of hypertensive patients with a family history and blood glucose and cholesterol levels.

A total of 46 hypertensive patients were included in this analysis: 26 males and 20 females. Mean glycemia and cholesterol Mia levels were estimated at 1,00 g/l and 2,03 g/l respectively (Table I). The analysis revealed 8 hyperglycemic patients with a maximum estimated glycemia value of 2,16 g/l, compared with 1 hypoglycemic patient with a

minimum estimated glycemia value of 0,55 g/l. Correlation analysis based on ranks (Spearman correlation) revealed a very low coefficient and therefore a non-significant correlation between the age of hypertensive patients with a family history and the parameters (i) glycemia (Rho= -0,1, p=0,52) and (ii) cholesterol Mia levels (Rho=0,02, p=0,88). Furthermore, analysis of the correlation revealed no significant difference between the young and elderly hypertensive populations with a family history (p>0,05), unlike the hypertensive populations without a family history. Analysis of variance showed a non-significant difference in variance between the population of hypertensive patients with a family history and those without a family history for the glycemia parameter (p>0,05). However, stimulation of the data with a view to inter-annual standardization of the parameters examined between the two populations suggested a significant difference in variance between the hypertensive populations with and without a family history (p=0,05).

Table 1 Descriptive statistics of glycemia and cholesterol Mia levels in the hypertensive population with a family history identified at the KRH from 2016 to 2021

	Glycemia	**Cholesterol Mia**
Minimum	0.55	1.06
Maximum	2.1	4.12
Average	1.00	2.03
Median	0.9	1.95
Standard deviation	0.51	0.56

4. Discussion

The proportion of hypertensive patients with a family history recorded at the Korhogo Regionam Hospital (KHR) from 2016 to 2021 represented 4,53% of the total hypertensive population analyzed. The risk of becoming hypertensive is the result of a combination of non-modifiable factors such as genetics, age and disease, and modifiable factors such as diet, weight and physical activity, all of which contribute to the rise in blood pressure. But overall, the mechanisms behind high blood pressure are still poorly understood. Nevertheless, interactions between genetic inheritance and the environment are gradually coming to light [12].

Our results therefore show that the dynamic growth in the frequency of hypertensive patients with a family history over the period 2016-2021 is not correlated with the inter-annual factor and the age of the patients. In other words, the onset of hypertension in this category of hypertensive patients could be the result of genetic and/or environmental factors [12- 14]. The family history of hypertension could be explained by dietary habits established in childhood and by the sensitivity of the renin-angiotensin-aldosterone system [15]. The genetic origin of arterial hypertension may be explained by mutation of the gene encoding angiotensinogen, ACE, and angiotensin II. This means that people with a family history of hypertension are at greater risk. Closer monitoring of these people is necessary, as the existence of a family history of hypertension should be an important factor to look for when diagnosing hypertension, as this factor is very often overlooked. In addition, our analysis showed that glycemia and cholesterolemia levels did not affect the growth rate of inter-annual frequencies of cases of hypertension with a family history (p>0,05). Furthermore, there was no significant correlation between cholesterolemia levels and the age of all hypertensive patients with and/or without a family history. However, glycemia did appear to be significantly correlated with age in hypertensive patients without a family history, which means that glycemia could be a good predictor of age in this category of hypertensive patients, unlike hypertensive patients with a family history. This result is in line with those of Nwankwo et al, (2008) and Tazi et al, (2002) who in their studies showed that the risk of developing hypertension and diabetes increases with age, which

although not a modifiable factor in the development of arterial hypertension, is far from being a genetic susceptibility factor for the development of hypertensive disorders [16,17].

5. Conclusion

Our study has shown that in hypertensive patients with a family history, the course of the disease does not really depend on age, time or the usual biological parameters. This could mean that other causes, such as genetic factors or family lifestyle, play an important role

in these cases. Also, the low number of patients reporting a family history may be explained either by under-reporting or by a lack of questioning on the part of healthcare staff. This represents a limitation in the follow-up of hypertensive patients.

It would therefore be important for family history to be better taken into account from the outset in the diagnosis of hypertension. Future research could also investigate the genetic aspect of hypertension to better understand the disease and improve management of patients at risk.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors have not declared any conflict of interests.

Statement of ethical approval

The study was conducted in accordance with the Declaration of Helsinki and approval was received from the National Ethics and Research Committee (CNER) of the Côte d'Ivoire Ministry of Health, Public Hygiene and Universal Health Coverage.

Statement of informed consent

After appropriate information and explanations, the patients whose records were used for the study gave their written consent before sampling and data processing.

References

[1] Danaei G., Lu Y., Singh G. (2014). Cardiovascular disease, chronic kidney disease, and diabetes mortality burden of cardiometabolic risk factors between 1980 and 2010: comparative risk assessment. The Lancet Diabetes & Endocrinology, Volume 2, Issue 8, 634 - 647. doi: 10.1016/S2213-8587(14)70102-0

[2] Lim S.S., Vos T., Flaxman A.D., Danaei G., Shibuya K., Adair R. H. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010 a systematic analysis for the Global Burden of Disease Study 2010. The Lancet, Volume 380, Issue 9859, 2224 - 2260. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)61766-8/abstract

[3] Poulter N.R., Prabhakaran D. (2015). Caulfield M. Hypertension. Lancet. 386(9995).801-12. https://doi.org/10.1016/S0140-6736(14)61468-9

[4] Zappa M, Golino M, Verdecchia P, Angeli F. Genetics of Hypertension: From Monogenic Analysis to GETomics. J Cardiovasc Dev Dis. 2024 May 18; 11 (5):154. doi: 10.3390/jcdd11050154

[5] Suvila K, Langén V, Cheng S, Niiranen TJ. Age of Hypertension Onset: Overview of Research and How to Apply in Practice. Curr Hypertens Rep. 2020 Aug 27; 22 (9):68. doi: 10.1007/s11906-020-01071-z

[6] Noel DD, Nafan D, Hermann-Désiré L, Souleymane S, Tuo Y,Inza JF, Edouard KNG, Florent AK, Adama C. Performance Assessment of the Recurrence of Cardiovascular Pathologies Symptoms in a Hypertensive Population. Journal of Health Science. 2017; 7 (1), 9-19 DOI: 10.5923/j.health.20170701.03.

[7] Dago N., Diarrassouba N., Touré A., Lallié H.D., N'Goran K.E., Ouattara H., Kouadio J., Coulibaly A. (2017). Whole screening analysis discerning recurrently diagnosed diseases in a Northern locality of Cote d'Ivoire. International Journal of Development Research.7 (11). 16598-16604.

[8] Dago N. D., Olefongo D., Lazare, T., Wagniman S., Koffi N. G., Joel K.K., Florent K.A., Eboulé A.E.R., Guehi Z. E., Yangni-Angaté, K.H. (2022). Assessment of recurrently diagnosed diseases dynamism at Korhogo General Hospital in Northern Côte d'Ivoire from 2014 to 2018. International Journal of Medicine and Medical Sciences, 14(1), 1-19. https://doi.org/10.5897/IJMMS2021.1469.

[9] TNS Healthcare (2007). L'hypertension pour vous et votre conjoint, Enquête FLASH 2007. France; p. French.

[10] Dago D.N., Daramcoum W.MP., Dagnogo O., Kouadio K.J., Kimou A.F. (2022) Age in Impacting the Occurrence of Chronic Diseases: Case of Recurrently Diagnosed Diseases at Korhogo Regional Hospital in Northern of Cote d'Ivoire, Computational Biology and Bioinformatics. 10(2), pp. 68-79. doi: 10.11648/j.cbb.20221002.13

[11] Dago D.N. Kablan GAJ, Alui KA, Lallié HD, Dagnogo D, Diarrassouba N and Giovanni M. (2021) Normality Assessment of Several Quantitative Data Transformation Procedures. Biostatistics and Biometrics pen Access Journal, 10, 53-67. https://doi.org/10.19080/bboaj.2021.10.555786.

[12] Olefongo D., Noel D.D., Korotoum Y.T., Angélo K.K.B., David C.N., Joseph A.D. (2025). Polymorphism of the rs12255372 Allele of the TCF7L2 Gene Associated with Predisposition to Type 2 Diabetes Using SNP Markers in a Population in the North of the Cote d'Ivoire. Int J Genet Genomics. 13(1): 10-19. doi: 10.11648/j.ijgg.20251301.12.

[13] Zhang LN, Ji LD, Fei LJ, Yuan F, Zhang YM, Xu J. (2013). Association between polymorphisms of alpha-adducin gene and essential hypertension in Chinese population. BioMed Res Int ;2013:451094.

[14] Wang L, Chen S, Zhao Q, Hixson JE, Rao DC, Jaquish CE, Huang J, Lu X, Chen J, Cao J, Li J, Li H, He J, Liu DP, Gu D; GenSalt Collaborative Research Group. Association between genetic variants of the ADD1 and GNB3 genes and blood pressure response to the cold pressor test in a Chinese Han population: the GenSalt Study. Hypertens Res. 2012;35(8):805-810.

[15] Anoman S.V. (2014). Suivi biologique de l'hypertension artérielle des Patients traitites a l'hopital militaire d'abidjan.72p Abidjan, 96. https://beep.ird.fr/collect/pha/index/assoc/1687-14/1687-14.pdf

[16] Nwankwo E.A, Ene A.C., (2008). Prevalence of prehypertension, hypertension and high body mass index in newly presenting diabetics in sub-Saharan Africa. The internet journal of Tropical medicine; 2008, 5:1. https://ispub.com/IJTM/5/1/9950

[17] Tazi M.Z., Bono W., Maamar M. (2002). High blood pressure in the diabetic patient. Cahiers du medécin, May. 5(52).22-24