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Clustering of hypertension, diabetes mellitus and dyslipidemia in a Nigerian population: a cross sectional study

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Abstract

Objective: The clustering of cardiovascular risk factors and diseases has grievous implications on overall morbidity and mortality. There is however relative paucity of this information among the Nigerian population. This study was aimed at defining the prevalence of the clustering of hypertension (HT), diabetes mellitus (DM) and dyslipidemia (DYSL) in a Nigerian teaching hospital outpatient clinics population.

Subjects and Methods: A cross sectional study of patients managed at the hypertension and diabetes clinics of the Lagos State University Teaching Hospital, Nigeria between January and December 2008. The baseline demographic characteristics, blood pressures, blood sugars and fasting lipid profiles were obtained retrospectively from hospital records. Using the standard criteria for the diagnosis of HT, DM and DYSL, the prevalence of these conditions and their respective clusters were determined.

Results: A total of 506 patients were seen over this period, Male; 234(46.2%), Female; 272(53.8%) with mean age of 57.35(1.28) years. The prevalence of HT, DM and DYSL were 85%, 39.5% and 58.9% respectively. Concurrent HT and DYSL was the most prevalent cluster found in 146 patients (28.9%), followed by the clustering of the three co-morbidities of HT, DM and DYSL in 124 patients (24.5%).Other clusters were DM+HT; 49 (9.7%), DM+DYSL;13 (2.6%). 41.2% of the population had the clustering of at least two co-morbidities and about a quarter had the three conditions co- existing.

Conclusion: There is a significant burden of the cardiovascular risk factors occurring in clusters in the Nigerian population studied. This calls for purposeful measures to control these risk factors.

Keywords: Clustering, Hypertension, Diabetes, Dyslipidemia, Nigerian

Résumé

Objectif: Le regroupement des facteurs de risque cardio-vasculaires et les maladies a des implications graves sur la morbidité et la mortalité globales. Il y a cependant une pénurie relative de ces informations au sein de la population nigériane. Cette étude visait à définir la prévalence du regroupement de l'hypertension (HT), le diabète sucré (DS) et de la dyslipidémie (DYSL) dans les départements de service de consultation des centres hospitaliers universitaires nigérians.

Sujets et méthodes: Une étude transversale de patients pris en charge dans les cliniques d'hypertension et de diabète au centre hospitalier universitaires de l'Etat de Lagos au Nigeria entre Janvier et Décembre 2008. Les caractéristiques démographiques de base, la tension artérielle, la glycémie et des profils lipidiques à jeun ont été obtenues rétrospectivement à partir des dossiers hospitaliers. En utilisant les critères standards pour le diagnostic de HT, DM et DYSL, la prévalence de ces conditions et de leurs groupements respectifs ont été déterminées.

Résultats: Un total de 506 patients ont été examinés au cours de cette période, Homme : 234 (46,2%), femmes : 272 (53,8%) avec un âge moyen de 57,35 (1,28) ans. La prévalence de l'HT, DM et DYSL étaient de 85%, 39,5% et 58,9% respectivement. Parallèlement l'HT et DYSL était le regroupement le plus important parmi les 146 malades (28,9%), suivis par le regroupement des trois co-morbidités de HT, DM et DYSL chez 124 patients (24,5%). D'autres regroupements étaient DM + HT; 49 (9,7%), DM + DYSL; 13 (2,6%). 41,2% de la population avait le regroupement d'au moins deux co-morbidités et environ un quart avait les trois conditions co-existantes.

Conclusion: Il y a une charge importante des facteurs de risque cardio-vasculaires qui se produisent dans les regroupements des populations nigérianes soumise à l'étude. Cela fait à des mesures coercitives pour controler ces facteurs de risque.

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hypertension having ≥ 3 additional risk factors [12]. A further analysis of the Framingham Heart Study data reported that 72% of hypertensive men and 82% of hypertensive women had multiple cardiovascular risk factors [22]. In this study, hypertension mostly co-existed with dyslipidemia (28.9%). Johnson ML et al reported a prevalence rate of concomitant hypertension and dyslipidemia in a United States general veteran population as 30.7%. This however was a predominantly male and older population with mean age of people with the two conditions as 62.5 years [23]. In their study, the veteran population was further stratified into diabetic and non-diabetic subpopulations demonstrating a higher prevalence of concomitant hypertension and dyslipidemia of 66.3% in diabetics as against 23.8% in non- diabetics. Our present study has not examined the prevalence of concomitant cardiovascular risks in sub-populations. It will be worthwhile to look into this aspect in the nearest future. The relatively lower prevalence of isolated diabetes mellitus (2.8%) and dyslipidemia (3%) in comparison with isolated hypertension (21.9%) in the population studied suggests that diabetes mellitus and dyslipidemia are less likely to occur in isolation than hypertension in Nigerians. Of note are the 34(6.7%) patients who had none of the co-morbidities studied. These are sub population of patients referred to the specialty clinics by other practitioners with the clinical suspicion of either hypertension or diabetes mellitus but in whom these conditions were not established after evaluation following standard diagnostic criteria. This illustrates the importance and relevance of sub-specialty care in clinical practice.

Furthermore, this study revealed that 41.2% of the population studied had at least two of the comorbidities studied and about a quarter (24.5%) having the clustering of the three conditions of hypertension, diabetes mellitus and dyslipidemia. With the documentation of the occurrence of about 50% of coronary events in hypertensive subjects being associated with the presence of ≥ 2 additional risk factors [12], the degree of cardiovascular risk factors clustering demonstrated in this population might be predictive of likely occurrence of higher rates of cardiovascular events in the Nigerian hypertensive and diabetic population.

Conclusion

In conclusion, this study has demonstrated significant clustering of cardiovascular risk factors in a Nigerian population attending an urban tertiary health care outpatient clinic with established or suspected hypertension or diabetes mellitus. There is therefore a need for meticulous interventions to control these risk factors among the population studied to reduce the attendant morbidity and mortality. Furthermore, a community based nationwide survey is desirable as a means of defining a more representative prevalence of cardiovascular risks clustering among the Nigerian population.

References

- Haslam DW and James WP: Obesity. Lancet 2005;366:1197-1209
- The world health report 2006: working together for health. Geneva: World Health Organisation, 2006.
- Akinkugbe OO: Non-Communicable Diseases in Nigeria; The next Epidemic: Nigeria's preparedness. Nigerian Journal of Medical Practice 2000; 3: 904-907
- Adegoke OA, Adedoyin RA, Balogun MO et al, Adebayo RA, Bisiriyu LA, Salawu AA: Prevalence of metabolic syndrome in a rural community in Nigeria. Metab Syndr Relat Disord 2010; 1:59-62.
- Ulasi II, Ijioma CK and Onodugo OD: A community- based study of hypertension and cardio-metabolic syndrome in semi –urban and rural communities in Nigeria. BMC Health Serv Res.2010;10:71-76
- Ogbera AO: Prevalence and gender distribution of the metabolic syndrome: Diabetol Metab Syndr. 2010;2:1-5
- Oladapo OO, Salako L, Sodiq O et al, Shoyinka K, Adedapo K, Falase AO: A prevalence of cardiometabolic risk factors among a rural Yoruba south- western Nigerian population: A population based survey. Cardiovasc J Afri. 2010;1:26-31
- Siminialayi IM, Emem-Chioma PC and Odia OJ: Prevalence of Metabolic Syndrome in Urban and Suburban Rivers State, Nigeria: International Diabetes Federation and Adult Treatment Panel III Definitions. Niger Postgrad Med J.2010;2:147-153
- Ikem RT, Akinola NO, Balogun MO, Ohwovoriole AE and Akinsola A: What does the presence of hypertension portend in the Nigerian with Non Insulin Dependent Diabetes Mellitus? WAJM 2001;20:127-130
- Isezuo AS, Badung SLH and Omotoso ABO: Comparative analysis of lipid profiles among patients with type-2 diabetes, hypertension and concurrent hypertension and diabetes: a view of

Table 1: Characteristics of the studied population

Parameter	Mean (SD)
Age (years)	57.35 (12.81)
BMI(Kg/m^2)	28.23 (6.60)
SBP(mmHg)	156.59(28.75)
DBP(mmHg)	94.23(17.26)
FPG(mg/dl)	155.99(91.43)
2HPPG(mg/dl)	205.55(120.83)
Chol-T(mg/dl)	193.89(50.07)
TGR(mg/dl)	94.28(44.41)
LDL-Chol(mg/dl)	130.52(44.88)
HDL-Chol(mg/dl)	44.11(15.60)

Table Legend:

BMI=Body Mass Index, SBP=Systolic Blood Pressure, DBP=Diastolic Blood Pressure, FPG=Fasting Plasma Glucose, 2HPPG=2hours Post Pandrial Glucose, Chol-T=Total Fasting Cholesterol, TGR=Trygliceride, LDL-Chol= Low Density Lipoprotein – Cholesterol, HDL-Chol= High Density Lipoprotein – Cholesterol, disease in Nigeria and the commonest cardiovascular disease in Africans [20]. The mean fasting lipid profiles of the studied population appeared within normal limits with the exception of the High density lipoprotein –Cholesterol fraction of 44.4(15.6) mg/dl which is lower than expected for the male gender. It is unclear whether this is consistent with the reported complex relationship of the metabolic abnormalities unique to individuals of the African descent which included a relatively favorable lipid profile in the setting of increasing incidences of cardiovascular diseases [21]. This however calls for further evaluation in our population.

Isolated hypertension was found in 21.9% of the patients studied. Hypertension also coexisted with other cardiovascular risk factors of dyslipidemia in 28.9% and both diabetes mellitus and dyslipidemia in 24.5% of the population. These are consistent with



Fig.1: Relative Prevalence of Co-morbidities of Hypertension, Diabetes Mellitus and Dyslipidemia

Figure Legend:

DM+HT: Concurrent Diabetes Mellitus and Hypertension DM+DYSL: Concurrent Diabetes Mellitus and Dyslipidemia HT+DYSL: Concurrent Hypertension and Dyslipidemia HT+DM+DYSL: Concurrent Hypertension, Diabetes Mellitus and Dyslipidemia DM only: Isolated Diabetes Mellitus HT only: Isolated Hypertension DYSL only: Isolated Dyslipidemia None: Nil morbidity found.

Discussion

These results showed that hypertension is the commonest of the three conditions studied with 85% prevalence. A finding traceable to the established fact that hypertension is the leading non-communicable

earlier findings that patients with hypertension often have other major cardiovascular risk factors. The Framingham Heart Study identified only hypertension as the cardiovascular risk factor in < 20% of patients with 30% of men and 32% of women with metabolic syndrome. J Nat Med Assoc.2003;95:328-334

- Grundy S.M: Metabolic syndrome: a multiplex cardiovascular risk factor. J Clin Endocrinol Metab. 2007; 92: 399–404
- Kannel WB: Risk stratification in hypertension: new insights from the Framingham Study. Am J Hypertens 2000; 13(Suppl):3S-10S
- Staessen JA, Wang JG and Thijs L: Cardiovascualr protection and blood pressure reduction: a metaanalysis. Lancet 2001; 358:1305-1315.
- Hill D and Fisher M: Effects of intensive glyceamic control on cardiovascular outcomes. Diabetes Obes Metab.2010; 8:641-627.
- 15. Elhayany A, Lustman A, Abel R, Attal-Singer J and Vinker S: A low carbohydrate Mediterranean diet improves cardiovascular risk factors and diabetes control among overweight patients with type 2 diabetes mellitus: a 1-year prospective randomized intervention study. Diabetes Obes Metab.2010; 3:204-209.
- Mourad JJ and Le Jeune S: Blood pressure control, risk factors and cardiovascular prognosis in patients with type 2 diabetes: 30 years of progress. J Hypertens Suppl.2008;3:S7-13
- Chobanian AV, Bakris GL, Black HR and Cushman WC *et al*: The Seventh Report of the Joint National Committee of Prevention, Detection, Evaluation and Treatment of High Blood Pressure: The JNC 7 Report. JAMA 2003; 289: 2560 - 2572

- World Health Organization: Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia: a report of a WHO/IDF consultation. Geneva, Switzerland; 2006.
- Alberti KG, Eckel RH, Grundy SM et al, Zimmet PZ, Cleeman JI, Donato KA, Fruchart J, James WPT, Loria CM, Smith SC, Jr: Harmonizing the metabolic syndrome. A joint interim statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Artheroclerosis Society; and International Association for the Study of Obesity. Circulation 2009; 120: 1640-1645.
- Akinkugbe OO (ed): Non communicable diseases in Nigeria. Final report of a national survey. Lagos: Federal Ministry of Health – National expert committee on Non Communicable Diseases; 1997: 12 – 41.
- Schuster DP, Gaillard T and Osei K: The cardio metabolic syndrome in persons of the African diasporas: challenges and opportunities. J Cardiometab Syndr 2007; 2:260-266.
- 22. Kannel WB: Fifty years of Framingham study contribution to understanding hypertension. J Hum Hypertens. 2000; 14:83-90.
- Johnson ML, Pietz K, Battleman DS and Beyth RJ: Prevalence of co-morbid hypertension and dyslipidemia and associated cardiovascular diseases. AmJ Manag Care 2004; 10:926 -932.

Received: 22/9/11 Accepted: 20/3/12 peuvent prendre en charge la technique de contrôle effectif et la prévention de la résistance des vecteurs dans les communautés pauvres en ressources.

Introduction

Malaria remains a public health problem in many countries with about 40 % of the world's population affected in some way by the disease and causing over 780,000 deaths every year [1]. The integrated vector management (IVM) targeting both larvae and adult mosquitoes has been considered the future for malaria control [2,3]. The use of Indoor Residual Spraying (IRS), though standardised and wellestablished as control method for mosquitoes globally, especially in Asia, the Pacific and Latin America, has been more limited to the margins of malaria distribution in southern Africa and to epidemic-prone countries often at higher altitudes in Africa. The World Health Organization (WHO) has proposed extending the coverage in Africa [4].

As the argument to deploy IRS for use in countries in Africa continues and many governments yet to demonstrate enough commitment, optimization of the available adulticidal techniques is essential. One such technique is the flit spray of living rooms with insecticide. Though insecticide-based control measures (e.g. indoor spraying with insecticides, ITNs) are the principal ways to kill mosquitoes that bite indoors [4], judicious use of insecticides for mosquito control is crucial to limiting the development and spread of resistance [5].

The aim of the present study was to assess the use and methods of application of insecticides for control of adult mosquitoes in households in endemic community where IRS is absent, and determine the response of mosquito population to commercially available flit-spray insecticide common in Nigeria market.

Methodology

The study was carried out in Sagamu town which comprise of Makun. Ijagba, Ofin and Sabo communities in the Sagamu Local Government (SLG) area, Ogun State, Nigeria. The Local Government is located in the malaria endemic regions in Southwest Nigeria. Due to growing economic activities in the area, Makun, Ijagba, Ofin and Sabo communities are almost integrated neighbourhoods with estimated population of 255,000 inhabitants. A cross sectional evaluation of use of commercial flit-spray insecticide was conducted in the population and laboratory assessments of effectiveness on mosquitoes population were done in the Malaria Research Unit (now Communicable Diseases Research Unit, CDRU), Department of Pharmacology, Olabisi Onabanjo University, Sagamu, Nigeria. Ethical approval for the study was obtained from the joint Ethics committee of the Olabisi Onabanjo University and Olabisi Onabanjo University Teaching Hospital.

Assessment of household use of insecticides

A survey was carried out with the use of a pre-tested structured questionnaire which was developed by the study team and administered by IA and SA. A total of 401 houses were selected through systematic random sampling (houses corresponding to every 3^{rd} house). The sample size was determined on the degree of variability measured by assuming that 50% of the households use one form or another of insecticides against mosquitoes, and at precision of $\pm 5\%$ and confidence level of 95%. An incomplete information or inconsistent response rate of 5% was estimated and made up in the population.

In the pilot test to assess test-retest reliability, an identical questionnaire was provided to 20 participants 2 weeks apart. The participants were selected at random from among the households in the area of study. They completed the questionnaire with a member of the research team present, followed by discussion on the question formats including difficulties and clarity of the different questionnaire items.

Women who are mothers with children aged between 0-12 years were recruited from the selected houses following obtaining their consent to participate in the study. A woman is enrolled if she is a housewife or single mother and has lived with her family for a minimum of one year. The information collected from the participants included demographic details such as age, address, size of family and head of family, and type of apartment, formal training on how to apply insecticide to homes, insecticides they were using as at the time of the study, who was responsible per house for applying the flit-spray insecticide. The methods. for example frequency of application and time of use, adapted in homes using the flit-spray insecticides to control mosquitoes and the three most commonly used were also determined. The reading of instructions on the product labels in respect of use of the flit-spray insecticide was assessed among the participants.

Collection of mosquito larvae and pupae, and breeding of mosquitoes in the laboratory

The breeding of mosquitoes was carried out in the mosquito breeding section of the Malaria Research Unit in the Department of Pharmacology, Olabisi Onabanjo University, Sagamu, Nigeria. Mosquito larvae and pupae of Anophelines were collected from