Prevalence and correlates of noncommunicable disease risk factors in a peri-urban community of Oyo State, South West, Nigeria

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ABSTRACT

Background: The world is currently witnessing an epidemic of noncommunicable diseases (NCD). Four main diseases account for most morbidities and mortalities associated with NCD and they have four main risk factors in common. The objectives of the study were to estimate the prevalence and assess the factors influencing NCD-risk factors co-occurrence among adults in Ogbomoso, South West Nigeria.

Materials and Methods: A cross-sectional study design was employed among 195 residents of Papa-Areago, a suburb of Ogbomoso town. Study participants were recruited using cluster sampling technique and interviewed using an instrument adapted from the WHO STEPS-questionnaire. Chi-square test was utilized to compare categorical variables and Logistic regression conducted to assess factors associated with coexistence of NCD risk factors.

Results: Mean age of the respondents was 49.6 ± 1.4. Not <81% of the respondents were physically inactive, 7.7% were current smokers, 2.6% engaged in harmful alcohol use, 46.7% did not consume adequate servings of fruits and vegetables, 41.5% had raised blood pressures whereas 35.9% were overweight. Only 4.6% of the respondents had no risk factors whereas 31.7% of them had at least two risk factors coexisting. The odds of coexistence of risk factors was significantly lower among those in the 21–40 age category when compared to those who were at least 60 years of age (OR: 0.34, CI: 0.12–0.94).

Conclusion: The burden of NCD risk factors is high in Nigeria. There is an urgent need for the design of implementable programs targeting the control of these risk factors among Nigerian adults.

Keywords: Adults, co-occurrence, noncommunicable diseases, risk factors

Introduction

The burden of noncommunicable diseases (NCDs) has continued to rise globally. Almost two-third (37 million) of the 57 million deaths recorded globally in 2008 was due NCDs (1). NCDs are now the leading cause of premature deaths (deaths below 60 years) in most countries (1). However, available data had revealed that impact of NCDs is highest in low- and middle-income countries which are responsible for 80% of global NCD deaths.[]] Nigeria like most developing countries currently suffer from double burden of diseases characterized by high prevalence of communicable diseases superimposed with increasing burden of NCDs. In Nigeria, NCD account for not <24% of

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all deaths that were recorded for 2014 with cardiovascular diseases (CVDs) accounting for 7% of all NCD deaths.\(^2\)

Four diseases have been responsible for not <80% of NCD-related morbidity and mortality worldwide. These diseases include CVD, cancers, diabetes, and chronic lung diseases.\(^1\) These NCDs have four main lifestyle-related risk factors in common. The factors include cigarette smoking, harmful alcohol use, unhealthy diets, and physical inactivity.\(^3\)

Most NCD cases can be effectively averted by controlling the four main risk factors. Specific frameworks and strategies have thus been developed to address each of these factors. For instance, a 2008–2013 action plan was developed by the WHO,\(^4\) to help in translating the Global Strategy for the prevention and control of NCDs into implementable action plans in respective countries. Furthermore, the WHO STEPWISE approach has been put in place as a practical strategy of generating data that could be useful for monitoring NCD burden and assess impact of control programs.\(^5\) In spite of these efforts, NCD surveillance system is still weak and rudimentary in Nigeria with a paucity of comprehensive information on the major NCDs and their risk factors. Furthermore, most of the studies on NCDs in Nigeria had been hospital-based, focusing on single diseases and risk factors. This study thus aimed at providing baseline information for monitoring the trend of NCDs risk factor occurrence in Nigeria. The specific objectives were to estimate the prevalence of individual risk factors of NCDs and assess factors that could significantly predict co-occurrence of NCD-risk factors among Nigerian adults.

Materials and Methods

Study area

The study was conducted in Papa-Areago, a suburb of Ogbomoso town, the administrative headquarters of Ogbomoso North Local Government Area of Oyo State. Ogbomoso has a total population of 645,000 according to the 2006 population census.\(^6\) The inhabitants of the town are mostly of Yoruba ethnic group although other tribes including Hausa and Igbo are also resident in the town. The predominant religions of the people of Ogbomoso are Christianity, Islam, and traditional religions.

Study design

A cross-sectional study design was employed for this study.

Inclusion criteria

Men and women who had been residing in the community for at least 6 months before the survey and who gave informed consents were recruited to participate in the study.

Exclusion criteria

People who were too sick to give valid answers to questions were excluded from the study.

Sample size calculation

This was estimated using the Leslie Kish formula for estimating single proportion. Based on the report of a study conducted in Ibadan, Nigeria, 13% of our respondents were assumed to have at least two risk factors of NCDs coexisting.\(^7\) Using a nonresponse rate of 10% and a precision of 5%, the minimum sample size was estimated to be 193. However, a total of 195 respondents participated in the study.

Sampling technique

A one-staged cluster sampling technique was utilized to recruit the study participants. Papa-Areago community was purposively selected as the study cluster being the primary beneficiary of the Bowen University Primary Health Centre, a newly established Primary Healthcare Centre. All households in the community with eligible respondents were visited. One respondent was selected using simple random technique (Balloting method) from households having more than one eligible respondent.

Data collection

Data were collected using facilitated, semi-structured questionnaire adapted from the WHO-STEP Survey (5). STEP 1 involved data collection on respondents’ socioeconomic characteristics. In STEP 2, information on risk factors of NCDs was collected. STEP 3 involved physical measurements such as weight, height, and blood pressure measurements. STEP 4 involved blood sugar measurement. However, the current study focuses on NCD risk factors. The questionnaire was written in simple English, translated to Yoruba, the prevalent language in the study area, and translated back to English to preserve the original meaning of the questions asked.

Five research assistants were trained and helped in data collection. These included two nurses, a nurse assistant, a community health officer, and a community health extension Worker.

Data analysis

Data collected were field edited daily and entered into IBM SPSS statistics for windows, version 21.0. Armonk, NY: IBM Corp for analysis. Data were presented using tables and charts and were summarized using mean and percentages.
Chi-square test was used to assess relationships between categorical variables while stepwise logistic regression analysis was conducted at the multivariate level. Variables in the model were selected based on whether they were significant at the bivariate level or whether they had been reported as significant predictors of coexistence of NCD risk factors. The level of statistical significance was set at $P < 0.05$ and 95% confidence intervals were obtained to assess the determinants of coexistence of risk factors of NCDs among the respondents.

**Measures**

**Weight and height measurement**

Weights were measured using Omron personal scale (Omron health care company, Ltd.); measurements were recorded to the nearest kilograms with respondents standing barefooted and with light clothing on. Heights were measured using stadiometer and recorded to the nearest 0.5 cm. Participants were told to stand upright while the reading was being taken. Body mass index (BMI) was calculated using the formula; weight of respondents (kg) divided by height (m)$^2$.

**Overweight and obesity**

These were defined as BMI $\geq 25$ kg/m$^2$ and $\geq 30$ kg/m$^2$, respectively.$^9$

**Poor dietary pattern**

Poor dietary pattern was defined as consumption of $<5$ servings of fruits and vegetables per day (one cup of raw leafy vegetables or half cup of other vegetables [cooked] was considered one serving). One medium-sized piece of fruit or half cup of chopped fruit was measured as one serving.$^9$

**Physical inactivity**

Physical inactivity was defined as $<150$ min of moderate intensity or $75$ min of vigorous-intensity physical activities per week.$^9$

**Raised blood pressure (hypertension)**

It was defined as systolic blood pressure $\geq 140$ mmHg and/or diastolic pressure $\geq 90$ mmHg, or diagnosed cases taking antihypertensive drugs.$^{10}$ Blood pressures were measured using mercury sphygmomanometer. Participants were seated comfortably with legs uncrossed and feet resting on firm surface. Two readings (at least 5 min interval) were obtained using appropriate cuffs and the average result recorded to the nearest mmHg. The first and fourth Korotkoff sounds were recorded as systolic and diastolic blood pressures, respectively.

**Coexistence of risk factors**

This was defined as the presence of at least two risk factors in a respondent.

**Respondents’ socioeconomic class**

Using Oyedeji classification of Social Class,$^{11}$ respondents’ socioeconomic status was classified into three; low, middle, and high. This classification used a composite score of respondents’ educational levels and occupational types; each was given a score ranging from 1 to 5. Total score was ten; respondents who had aggregate score of $<5$ were classified into low socioeconomic class, those who scored $5–7$ points were categorized into middle socioeconomic class whereas those who scored $8–10$ points were in high socioeconomic class.

**Ethical consideration**

Approval to conduct the study was obtained from the Ethical Review Committee of Bowen University Teaching Hospital, Ogbomoso. Written consents were obtained from each respondent before the interview. Respondents were assured that the information received during the survey will be kept confidential. Codes rather names were used as personal identifiers. Participation was entirely voluntary and data were saved in a computer that was only accessible to the principal investigator.

**Results**

Two hundred and twenty questionnaires were administered but 195 of them were satisfactorily completed, this gave a response rate of 89.0%. As shown in Table 1, the mean age of the respondents was $49.6 \pm 1.43$ with 42.6% of them in the 41–60-year age group. More than half (56.9%) of our respondents belonged to the middle socioeconomic class and almost three-quarter (74.4%) earned $<20,000$ Naira monthly.

In Table 2, 7.7% of the respondents were current cigarette smokers; the proportion was significantly higher among men compared to women respondents (14.3% vs. 2.7%, $P = 0.003$). Only 2.6% of the respondents met the criteria for harmful alcohol use whereas 81.0% of them were physically inactive. Almost half of the respondents did not consume sufficient servings of fruits and vegetables daily; more men compared to women had poor dietary patterns (56.0% vs. 39.6%, $P = 0.024$). High blood pressures were recorded in 41.5% of the respondents, but the
excess alcohol consumption and intoxication are not part of the norm and is often treated with great negative criticism, but this lifestyle could be culturally acceptable in some communities as revealed by Brisibe et al.

Just 19% of the respondents satisfied the WHO Physical Activity recommendations. This figure agrees with the report of Akinwale et al.,[14] meanwhile, our result conflicts with findings of some previous Nigerian studies. For instance, Adewale et al. reported that 68.5% of adults in Maiduguri, a city in Northern Nigeria, were physically active.[14] The discrepancy might have been due to disparity in age distributions of the study participants in the two studies. Most participants in the current study belonged to 41–60-year age category while most participants in the Maiduguri study belonged to the 20–34 age range. Younger people are generally expected to be more physically active than the older ones and this account for the disparity observed.

Almost half of the respondents (46.7%) had low daily intake of fruits and vegetables. A similar study conducted in South Africa revealed even greater percentage (88.6%) as the proportion of respondents with low fruits and vegetable consumption pattern.[16] Due to urbanization of most developing countries, there is currently a dietary transition from high-fiber diets to fat-laden diets.

Raised blood pressure was recorded in 41.5% of the respondents; the prevalence rate was significantly higher among male respondents. This compares with the report (34.8%) of the 2014 WHO country profile on NCDs for Nigeria[17] and findings from the study conducted by Akinwale et al.[14]

Overall, 76.0% of the respondents had two or more risk factors coexisting. Mostafa et al. reported same figure (76%) as the proportion of Bangladeshi adults with at least two risk factors of NCDs coexisting.[18] Moreover, Phaswana-Mafuya et al. reported a figure of 68.9% among South African Adults.[19] In the current study, respondents who were aged 41–60 years had significantly lesser odds compared to the elderly respondents. This is in consonance with findings from the study of Mostafa et al. among Bangladeshi adults. Co-occurrence of risk factors has been documented to increase the probability of NCD development in individuals.[20]

**Conclusion**

The high prevalence of multiple risk factors among our respondents is capable of increasing the burden of NCDs in Nigeria. As such, a well-coordinated and comprehensive NCD-risk factor control program is urgently needed particularly among older people in various communities. Moreover, there is a need for governments at all levels to work together in sensitizing the populace on the increasing burden and dangers associated with the adoption of unhealthy lifestyles. This could be done in partnership with media house and key stakeholders in the respective communities. The WHO action plan on NCD prevention and control should be appropriately implemented in Nigeria. Furthermore, the WHO guidelines such as the one on

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**Table 3: Predictors of coexistence of risk factors among respondents**

| Variables                | B     | P     | OR (95% CI) |
|-------------------------|-------|-------|-------------|
| Age group (years)       |       |       |             |
| ≤20                     | 0.095 | 0.94  | 1.10 (0.10-12.79) |
| 21-40                   | −1.085| 0.04* | 0.34 (0.12-0.94)  |
| 41-60                   | −0.610| 0.16  | 0.54 (0.23-1.28)  |
| >60REF                  |       |       | 1            |
| Sex                     |       |       |             |
| Female                  | 0.204 | 0.60  | 1.23 (0.57-2.62)  |
| MaleREF                 |       |       | 1            |
| Religion                |       |       |             |
| Islam                   | 0.330 | 0.56  | 1.39 (0.46-4.19)  |
| ChristianityREF         |       |       | 1            |
| Family type             |       |       |             |
| Polygamy                | 0.262 | 0.56  | 1.30 (0.54-3.14)  |
| MonogamyREF             |       |       | 1            |
| Social class            |       |       |             |
| Low                     | −0.214| 0.78  | 0.81 (0.18-3.62)  |
| Middle                  | −0.328| 0.55  | 0.72 (0.24-2.15)  |
| UpperREF                |       |       | 1            |
| Average income (≤20,000)| 0.290 | 0.47  | 1.34 (0.61-2.92)  |

*P<0.05, predictive value - 72.8%, B - Coefficient of logistic regression, OR - Odds ratio, CI - Confidence interval, REF - reference category

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**Figure 1: Coexistence of noncommunicable diseases risk factors in the respondents**
proportion of respondents with raised blood pressure was significantly higher in males compared to female respondents (50.0 vs. 35.1%, \( P = 0.0037 \)).

In Figure 1, only 19.8% versus 26.7% of the female and male respondents had one risk factor; 33.3% of male versus 30.5% of female respondents had two risk factors whereas 25.9% versus 29.5% of them had three risk factors.

In Table 3, respondents in the 21–40 years age range had significantly lesser odds (34%) of coexistence of the risk factors when compared to those who were at least 60 years of age.

**Discussion**

The current study revealed that 7.7% of the respondents were current cigarette smokers with males having significantly higher percentage (14.3% vs. 2.7%) of those who smoke cigarette. This is in consonance with findings from previous studies.\[12,13\] Our finding was, however, higher than 1.7% reported by Oladapo et al.\[7\] in Ibadan. The difference could have been due to study population used in the two studies. Whereas the current study was conducted among peri-urban dwellers, the Ibadan study took place in rural communities which are often characterized by strong moral values preventing adoption of what they view as antisocial behavior such as cigarette smoking.

Only 5 (2.6%) of our respondents met the criteria for harmful alcohol use. This result is in agreement with findings from a similar study conducted in Lagos by Akinwale et al.\[14\] However, our result is much lower than 33% reported by Brisibe and Ordinioha among rural Ijaw dwellers in Bayelsa state.\[15\] In most communities in South Western Nigeria,
Physical activity and diet should be implemented wholly without further delay. There is a need to integrate NCD prevention and control strategies into the educational curriculum of Nigerian schools. Moreover, governmental and nongovernmental agencies need to support and mobilize resources for NCD surveillance in Nigeria.

This study was conducted in a peri-urban community with slightly different socioeconomic characteristics when compared to most rural and urban communities in Nigeria; generalizability of the study may have been affected. However, the fact that the research was community-based would have enhanced its external validity.

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Conflicts of interest
There are no conflicts of interest.

References
1. World Health Organization. Global Status Report on Non Communicable Diseases; 2010. Available from: http://www.who.int/nmh/publications/ncd_report2010/en/. [Last accessed on 2017 Apr 22].
2. World Health Organization. Non Communicable Diseases Country Profile; 2014. Available from: http://www.who.int/nmh/publication/ncd-profile-2014/en
3. Ezzati M, Riboli E. Behavioral and dietary risk factors for noncommunicable diseases. N Engl J Med 2013;369:954-64.
4. World Health Organization. 2008-2013 Action Plan for the Global Strategy for the Prevention and Control of Non Communicable Diseases. Available from: http://www.who.int/nmh/publication/ncd-action-plan/en
5. World Health Organization. The WHO Stepwise Approach to Chronic Disease Risk Factor Surveillance (STEPS). Available from: http://www.who.int/chp/steps. [Last accessed on 2017 Apr 23].
6. Oyo State Ministry of Local Government Chieftaincy Matters. Detail Information of the 33 Local Governments in Brief. Available from: http://www.oyostate.gov.ng/ministries-departments-and-agencies/ local-government-and-chieftaincy-matters/detailed-information-of-the-33-local-governments-in-brief/. [Last accessed on 2017 Apr 23].
7. Oladapo OO, Salako L, Sodiq O, 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 Afr 2010;21:26-31.
8. Obesity: Preventing and managing the global epidemic. Report of a WHO consultation. World Health Organ Tech Rep Ser 2000;894:i-xii, 1-253.
9. World Health Organization. Global Strategy on Diet, Physical Activity and Health. World Health Organization; 2017.
10. Falase AO, Akinkugbe O. A Compendium of Clinical Medicine. 2nd ed. Ibadan: Spectrum Books Limited; 2000. p. 795.
11. Oyediji G. Socio-economic and cultural background of hospitalized children in Ilesha. Nige Med Prat 1985;12:111-7.
12. Fawibe AE, Shittu AO Prevalence and characteristics of cigarette smokers among undergraduates of the University of Ilorin, Nigeria. Niger J Clin Pract 2011;14:201-5.
13. WHO. Report on the Global Tobacco Epidemics. World Health Organization; 2015.
14. Olaoluwa PA, Adeniyi KA, John OO, Pius EA, Zaidat AM Kolawole SO, et al. Behavioral risk factors for Non-Communicable diseases in three most populous Nigerian urban slums. J Public Health Dev Ctries 2017;3:327-38.
15. Brisibe S, Ordinioha B. Socio-demographic characteristics of alcohol abusers in a rural Ijaw community in Bayelsa State, South-South Nigeria. Ann Afr Med 2011;10:97-102.
16. Mainela E, Alberts M, Modjadji SE, Choma SS, Dikotope SA, Ntuli TS, et al. The prevalence and determinants of chronic non-communicable disease risk factors amongst adults in the dikgale health demographic and surveillance system (HDSS) site, Limpopo province of South Africa. PLoS One 2016;11:e0147926.
17. World Health Organization. NCD Country Profile for Nigeria. World Health Organization; 2014.
18. Zaman MM, Bhuiyan MR, Karim MN, Moniruzzaman, Rahman MM, Akanda AW, et al. Clustering of non-communicable diseases risk factors in Bangladeshi adults: An analysis of STEPS survey 2013. BMC Public Health 2015;15:659.
19. Phaswana-Mafuya N, Peltzer K, Chirinda W, Musekiwa A, Kose Z, et al. Socio-demographic predictors of multiple non-communicable disease risk factors among older adults in South Africa. Glob Health Action 2013;6:20680.
20. Schlecht NF, Franco EL, Pintos J, Negassa A, Kowalski LP, Oliveira BV, et al. Interaction between tobacco and alcohol consumption and the risk of cancers of the upper aero-digestive tract in Brazil. Am J Epidemiol 1999;150:1129-37.