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FAMILY SIZE AND CARDIOVASCULAR RISKS IN PEOPLE LIVING IN AWKA, NIGERIA

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ABSTRACT

Background: There are many risks to cardiovascular disease among Nigerians and the **c**orrelation between family size and cardiovascular risk is recently being studied. We assessed specific cardiovascular risks in relation to family size in a city in Eastern Nigeria. **Methods and Material:** A cross-sectional survey of a representative population was studied and the following variables were obtained and correlated with family size; Cigarette smoking, tobacco snuff use, alcohol consumption, thickened arterial wall and hypertension. Means and standard deviations for continuous variables were calculated. Chi square was used to compare categorical variables. The distribution and characterization of the variables with family size were analyzed using cross tabulation **Results:** The association between smoking and family size was not significant, p=0.104. The prevalence of tobacco snuff use significantly peaked among those with family size 5 – 9 (50.0%), and declined with family size <5 (37.5%) and those with family size >9 (12.5%) p=0.029. The prevalence of alcohol use significantly declined as family size increased, p=0.021. The prevalence of thickened arterial wall significantly increased as family size declined, p<0., 001. The prevalence of hypertension significantly increased as family size increased, p=0.007. **Conclusions:** Hypertension was the biggest risk occurring more among those with smaller family size. While artherosclerosis increased with family size. The use of cigarettes and tobacco snuff was low, but alcohol use declined with increased family size.

KEYWORDS: Family size, cardiovascular risks, disease, Hypertension, smoking.

INTRODUCTION

Cardiovascular disease and its associated morbidity and mortality are a growing public health concern in most developing countries and Nigeria is not an exception. Over the years, Nigeria has developed industrially, with a wide variety of nutritional alternatives including those with artificial preservatives making non-communicable diseases (NCD) to become even more prevalent with cardiovascular and cerebrovascular diseases, recording the highest rise in mortality levels in individuals below the age of 50years.[1] WHO further observed that deaths from non-communicable diseases accounted for 26% (570,000 deaths) of all-cause mortality in Nigeria in 2015 and estimated that the risk of premature death from target NCD was 21%.[2] It is thought that the high burden of diseases in developing countries is worsened by increasing urbanization and other high risk factors such as diabetes mellitus, obesity, hypertension and associated lifestyle changes.[2,3] Other risks associated with increasing risk of cardiovascular disease (CVD) among Nigerians include smoking, sedentary lifestyle, dyslipidemia, alcohol consumption and a high salt diet.[3,4] Smoking is a growing concern among Nigerians and in 1998, it was responsible for 4.5 million cardiovascular deaths; a consequence of increasing risk of dying from coronary heart disease (CHD).[5] It is thought that smoking cessation is the most cost effective intervention for patients with cardiovascular and cerebrovascular diseases.

Cardiovascular disease has been observed to be commoner amongst men in parts of Nigeria with hypertension being the prevalent cause.[6] While significant risks for cardiovascular disease exist in both rural and urban centers in Nigeria, there seemed to be no difference in the prevalence of the risks in relation to income level or education, but it did affect access to cardiovascular screening.[7] Differences in CVD risks were different among the sexes, with women being more obese and the men having a higher proportion of pre-diabetes, diabetes, hypertension and elevated cholesterol.[7]

Also, women with sub-fertility longer than 5years were more at risk of developing CVD events compared to others even on exclusion of other CVD risks and adverse

pregnancy outcomes.[8] The number of children is also significantly related to development of coronary heart disease among both sexes. A "J" shaped association between number of children and CHD has been described, with the prevalence lowest among those with 2 children and increasing linearly with each additional child beyond 2 in the UK.[9,10] For those with at least 2 children, each additional child increased the age-adjusted odds of CHD by 30% for women and by 12% for men.[9] Magnus MC et al observed in UK, that the associations between number of offspring and CVD risk were similar in both sexes, with the nadir of risk among those with no children.[10] Women with 2–3 live births, but not women with four or more live births, had a reduced risk of disease of the arteries, arterioles, and capillaries.[10] Peters SAE et al similarly observed in China, that compared with childless women, women with children had an increased risk of CHD, but not of stroke in both sexes and, suggested that factors associated with parenthood and childrearing are more likely to affect the risk of CVD outcomes than factors associated with childbearing.[11] However, in the Finnish study, mortality from haemorrhagic stroke was fourfold higher among the women with 10 births or more compared with women who had 2-4 children, but no differences exists in cerebral infarction prevalence.[12]

Jaffe DH et al observed a non-linear association between parity and CVD mortality among men and women; with an excess CVD mortality risks among middle-aged women with no children and among middle-aged women and men with 8 or more children compared to those with two children.[13]

In this study, we examined the association between family size and cardiovascular risk among a population in a city in South East Nigeria.

MATERIALS AND METHOD

This was a cross-sectional study, conducted from October to December 2016. Two hundred and ninety-four (294) subjects were recruited for this study. They were mainly traders, artisans, hawkers around the urban city of Awka, Nigeria.

Sample size determination

The minimum sample size was determined based on the prevalence of cardiovascular risk factors in general out-patient clinics of 21.5% using the present of 3 out of 6 selected factors in Nigeria.[14] The formula, below, was used.[15]

$$N = \frac{Z^2(P)(1-P)}{D^2}$$

N = minimum sample size

P = Prevalence of cardiovascular risks factors in general out-patient clinics in Nigeria (21.5%)

Z = Degree of probability at 95% confidence interval (1.96)

D = Absolute precision i.e. value required (in percentage points which in actual terms describes the maximum difference between the population rate and sample rate that can be tolerated (0.05)

$N = 1.96^2 \times 0.215 \times 0.785/0.05^2 = 259$

However, 10% of this number was added to allow for normal attrition N = 259 + 10% of 259

And upgraded to 294. N = 294

The local area masters approved the exercise and gave their cooperation. Every participant in this study gave informed oral consent. Clear explanation for this study was given to each of the participants. With the aid of a questionnaire, data were collected from them. These included biodata, cigarette smoking, alcohol use, tobacco snuff use, number of children/dependants, prior hypertension status.

Anthropometric and demographic data were collected. Arterial wall thickness was checked for using the brachial and radial arteries.

The variables were graded into groups as follows
Family size (Number of dependants):
A. <5, B. 5 – 9, C.>9

Smoking: 1. Those that were smokers
2. Those that were non-smokers

Tobacco snuff use: 1. Those that used tobacco snuff
2. Those that did not

Alcohol: 1. Those that have positive alcohol history
2. Those that have not

Arterial wall: 1. Those that have thickened arterial wall
2. Those with normal arterial wall

Hypertension: 1. Those that knew they were hypertensive prior to the study
2. Those whose hypertensive status was not known prior to the study

Data Analyses

Data analysis was done using the Statistical Package for Social Sciences (SPSS Inc, Chicago, IL) version 17.0 statistical software.

The influence of the variables on family size was compared between the groups for each variable. The mean values and standard deviations for continuous variables were calculated. The non-parametric tests Chi square was used to compare categorical variables. The distribution and characterization of the variables with

family size were analyzed using cross tabulation. All tests were two-tailed with P <0.05 taken as statistically significant.

Definition of terms

Family size was defined as the number of children or dependants the subject has.

The subjects who were found to have cardiovascular risks were counseled and advised to see clinicians in the hospitals.

RESULTS

The number of the subjects studied was 294. They were dominantly (98.9%) Igbo. Their mean age was 43±15 years and range 20 – 90 years. Females made up 72.1% and males 27.9%. Their age distribution is displayed on (Table 1).

The distribution of family size showed that majority (62.6%) of the subjects have family size <5 whereas those with family size >9constituted the least (33.4%). The distribution of the risks is shown in table 2.

The association between smoking and family size was not significant, Chi square=4.532, df=2, p=0.104 (Table 3).

Significant association was observed between tobacco snuff use and family size, df=2, p=0.029 (Table 3). Among 16 of the subjects who responded yes to tobacco snuff use, the prevalence of tobacco snuff use peaked among those with family size 5 – 9 (50.0%), and declined with family size <5 (37.5%) and those with family size >9 (12.5%) (Table 3).

There was a significant association between alcohol use and family size, df=2, p=0.021. Among the 124 subjects who responded positively to alcohol use, the prevalence of alcohol use was highest (56.5%) among those whose family size was <5, followed by 37.1% among those with family size 5 – 9, and trailed by 6.5% among those with family size >9 children/dependants. This showed that the prevalence of alcohol use significantly declined as family size increased (Table 3, Figure 1).

Out of 10 subjects whose family size was >9, 6(60.0%) have thickened arterial wall. Among the 100 subjects with family size 5 – 9, 38(38.0%) have thickened arterial wall. Furthermore, 36(19.6%) of the 184 subjects with family size <5 were observed to have thickened arterial wall. This demonstrated that the prevalence of thickened arterial wall significantly increased as family size increased, p<0.001 (Table 3).

Among the 62 respondents whose hypertension status was known to be positive, 54.8% have family size <5, 35.5% with family size 5–9, whereas 9.7% have family size >9. This showed that the prevalence of overt hypertension significantly increased as family size decreased, p=0.007 (Table 3, Figure 2).

Table 1: Age distribution of study subjects n=294.

Age Distribution	Study Subjects (n/%)
20 – 29 years	68 (23.1%)
30 – 39 years	72 (24.5%)
40 – 49 years	44 (15.0%)
50 – 59 years	62 (21.1%)
60 – 69 years	34 (11.6%)
70 – 79 years	12 (4.1)
80 - 89 years	-0-
90 – 99 years	2 (7.0%)

Table 2: Frequency of variables that responded.

Variables	Yes N (%)	No N (%)
Smoking	16 (5.4%)	278 (94.6%)
Tobacco use	16 (5.4%)	278 (94.6%)
Alcohol use	124 (42.2%)	170 (57.8%)
Thickened arterial wall	80 (27.2%)	214 (72.8%)
Hypertension status	62 (21.1%)	232 (78.8%)

Table 3: Distribution and characterization of potential cardiovascular risk factors at different levels of family size in the study subjects (n=294).

Variables	Family Size (Number of children/dependants) n (%)			χ^2	LHR	P- value
	<5	5 – 9	>9			
Smoking Yes	10 (62.5%)	4 (25.0%)	2 (12.5%)	4.563		0.104
No	174 (62.6%)	98 (34.5%)	8 (2.9%)			
Tobacco snuff Yes	6 (37.5%)	8 (50.0%)	2 (12.5%)	7.091	2	0.029
No	178 (64.5%)	92 (33.1%)	10 (3.4%)			
Alcohol use Yes	70 (56.5%)	46 (37.1%)	8 (6.5%)	7.754	2	0.021
No	114 (67.1%)	54 (31.8%)	2 (1.2%)			
Thickened arterial wall.Yes	36 (19.6%)	38 (38.0%)	6 (60.0%)	16.730	2	<0.001
No	148 (80.4%)	62 (62.0%)	4 (40.0%)			
Hypertension status Yes	34 (54.8%)	22 (35.5%)	6 (9.7%)	9.902	2	0.007
No	150 (64.7%)	78 (33.6%)	4 (1.7%)			

χ^2=Chi square, LHR=Likelihood ratio.

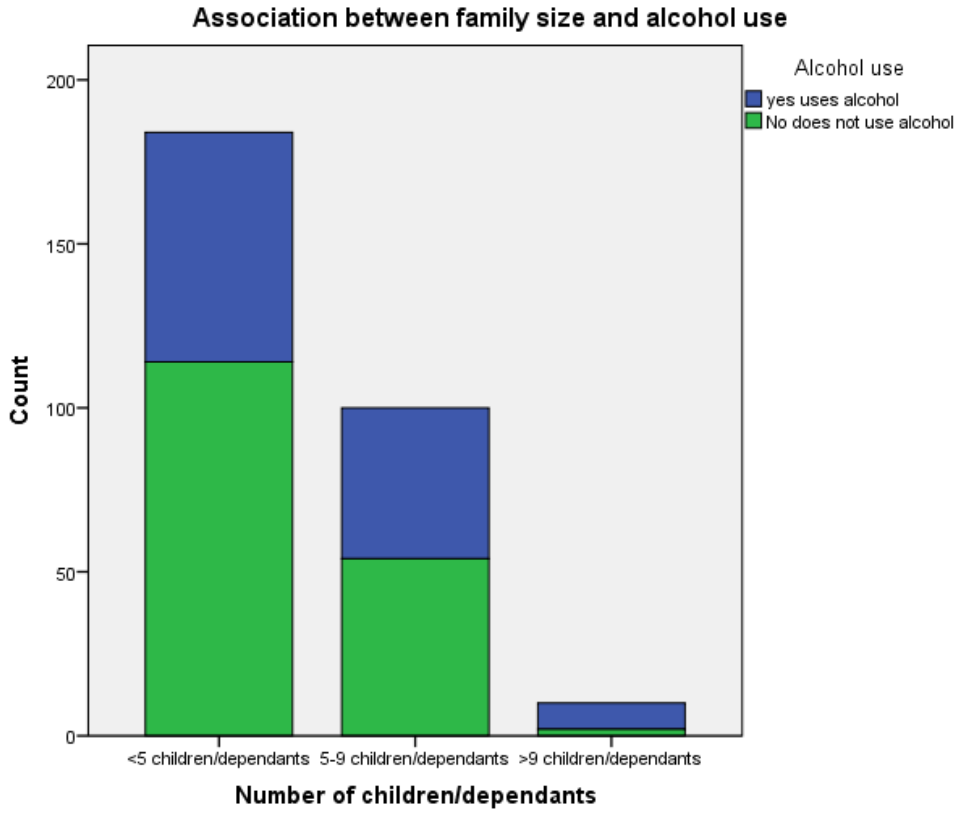

Figure 1: Association between family size and alcohol use.

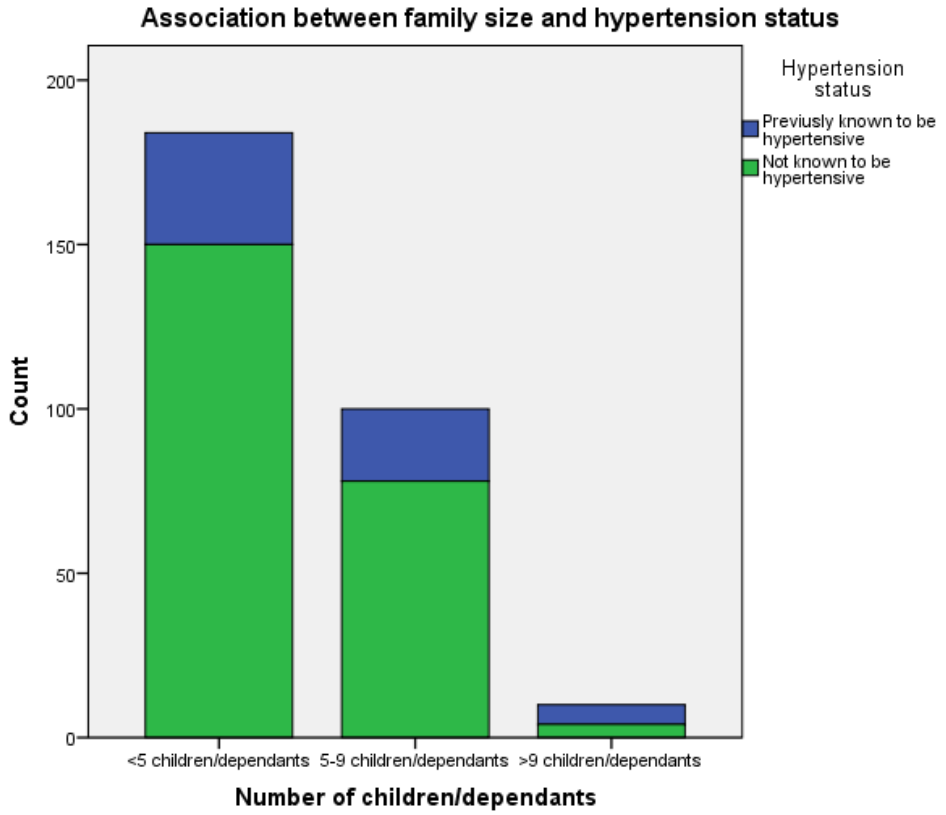

Figure 2: Association between family size and hypertension status.

DISCUSSION

Among Nigerians are recognized many risks associated with cardiovascular disease responsible for a rising mortality rate due to this non-communicable disease. However, the relationship between family size and risk of cardiovascular disease is being studied only recently.

An identified risk of cigarette smoking was low among the respondents and not significantly different among the different age groups. Oluyombo R et al, observed even a lower prevalence of cigarette smoking in an earlier study in 2015,[4] suggesting that, this risk though small in proportion, may likely pose a public health challenge in the coming years. The use of snuffed tobacco also was observed to have a similar proportion in our study with tobacco snuff use peaking among those with 5-9 family members. Cigarette smoking, and by extrapolation use of tobacco snuff, is associated with poorer education among the population about the effect of smoking on health.[16]

Alcohol consumption was observed to decline as the family size increased. Alcohol consumption is considered a luxury only after the essential needs of feeding, clothing and housing have been fulfilled among Nigerians. Omideyi observed that large family sizes is associated with lower levels of household income, little savings, and increased poverty from a net reduced productivity among rural Nigerian households.[17] Also, a greater number of children reduces disposable income resulting in lifestyle changes considered unfavourable to maintaining good cardiovascular health: with those already economically less advantaged or already practicing poorer lifestyle and dietary choices, being simultaneously more likely to have larger families.[18]

The observed risk of thickened arterial wall which increased as family size increased has since been recognized. A U-shaped relationship between family size and artherosclerosis was described by Sanghavi M et al, with number of live births associated with subclinical coronary and aortic atherosclerosis among women.[19] It is assumed by some authors to be a result of the permanent changes that occur within a woman's body during pregnancy, and compounded by multiple pregnancies.[18] This risk is also seen among men, as there was a similar correlation between number of children and future development of cardiovascular complications.[18] However childless fathers, just like women, had a greater risk of future cardiovascular events compared to fathers with two children.[13,16,20]

Hypertension was the greatest risk associated with cardiovascular disease. Our observed prevalence of 54.8% among those with family size <5 was higher than the observation of 39% in Northern Nigeria by Mukadas et al, and 47% in Western Nigeria by Oluyombo et al.

CONCLUSION

There is strong positive correlation known to the medical community between number of children and risk of developing cardiovascular disease. Hypertension remains the biggest risk occurring more among those with smaller family size. While artherosclerosis increased with family size. The use of cigarettes and tobacco snuff was low, but alcohol use declined with increased family size.

LIMITATIONS

The study population was not structured. It was a cross-sectional study, in which many eligible subjects were missed out. The study population was small. A larger study size would have been more representative of the population.

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