Rarity of Heart Failure in a Traditional African Population; A Rural Community Based Study

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Introduction
Heart failure (HF) is a common finding in the western society, especially among the elderly [1]. In sub-Saharan Africa however, it affects younger people with a mean in the middle ages [2]. Its prevalence increases with age. Most data available are hospital-based and cannot be correctly applied to the larger population. Such data pool subjects from hospital facilities and miss those in the population unable to present in hospital for various reasons. Population statistics of HF for sub-Saharan Africa are hardly available. This was to assess the population prevalence of HF in a rural sub-Saharan African community and get a truer picture of HF morbidity.

Methods
In 2008, BNO led a team to Mangu Local Government Area of Plateau State, Nigeria to study cardiovascular disease (CVD) risk factors. The study has been published elsewhere [6]. Briefly, all subjects 15 years and above were studied for CVD risk factors after ethical clearance was obtained from the Research and Ethics Committee of Jos University Teaching Hospital. Following permission granted equally by all strata of local governance, the population was mobilized. On each field study day, the subjects

Results:
Of the 840 subjects, 231 were men; 8 (0.95%) of whom were in HF (2M, 6F); and aged between 50 to 90 years. All the men were above 65 years while 2 of the women were less than 65 years. Four were hypertensive, 3 had hypertension and diabetes; while 1 the oldest had neither. They all denied tobacco and alcohol use. Most of the affected women were multiparous.

Conclusion: HF is infrequent in rural Nigeria with a prevalence of 0.95%. Hypertension was a prominent risk factor, with co-morbid diabetes. The absence of tobacco/alcohol history, anaemia and low rate of kidney disease confirms that a constellation of risk factors is required for HF among hypertensives. The earlier presentation and greater involvement of women (in the background of multiparity) supports the notion that repeated pregnancy and child-birth place higher disease burden of hearts of women

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were arranged as they arrived and registered. Biodata and the following socio-demographic data were got from them: age, ethnicity, religion, civil status, educational attainment, parity (where applicable), occupation, tobacco and alcohol use. Blood pressure, weight and height (used to determine Body Mass Index – BMI as quotient of weight in kilograms and square of height in metres), as well as waist/hip ratio were measured in standard fashion. Finally the first out of every 3 subjects were sequentially chosen in the order of arrival and registration for phlebotomy and urine collection. Blood was analysed for total and HDL-Cholesterol (from which atherogenic index was determined as quotient of total cholesterol and HDL-Cholesterol), sugar, uric acid, creatinine, packed cell volume in the base laboratory; and urine was checked on the spot with protein and glucose strips for proteinuria and glycosuria.

Additional history got from the subjects included individual history of hypertension, diabetes mellitus, HF; stroke and sudden cardiac death. For individual blood pressure estimation, the last 2 of 3 readings taken at least 5 minutes apart were averaged for use.

Data were analysed at the computer Centre of University of Jos with SPSS Version 17. Subjects with self reported HF were extracted in this sub-analysis into frequency tables for each item of interest.

**Results**

A total of 840 subjects (231 M/609 F)) were studied out of whom 8 (2 M/6 F) were in HF. The male to female ratio of the population (1: 2.6) was similar to that of HF subjects (1: 3). The HF subjects form the thrust of this report.

Their ages ranged from 50 to 90 years. The males were all elderly (greater than 65 years), while 2 of the 6 females were less than 65 years (50 and 53 years). Four of them (50%) gave a history of hypertension, while 2 of the 6 females were less than 65 years (50 and 53 years). Four of them (50%) gave a history of hypertension, diabetes mellitus in 3. This highlights the pre-eminence of hypertension especially in HF in Africans. As shown in the study of Levy et al [10], hypertension is the commonest risk factor of HF; contributing to a large proportion of HF in a population sample.

Our study recorded more females than males with HF. This is also the pattern in hospital based HF statistics in our environment [11]. Interestingly the reverse is the case in Europe [12]. Our women in Africa go through childbirth more than in the west. Repeated pregnancy and childbirth can take its toll on the function on the heart [13], and may be one explanation for the pattern in our environment. Obesity was not a common feature. None of them was obese, though one was overweight. This patient had the highest atherogenic index (due to low HDL-Cholesterol; result not shown), and the only one with elevated serum creatinine. Higher BMI and lower HDL-Cholesterol are independent predictors of HF among blacks [14]. These subjects did not have a large constellation of risk factors as shown in the table. This may be why the HF prevalence is low in the sub-Saharan rural population. A similar explanation was given for the low rate of proteinuria in hypertensives evident in the same population [15]. Much earlier Falase et al had shown that in our hypertensives, many other factors beside high blood pressure contribute to precipitating HF in hypertensives namely low packed cell volume, low serum albumin and alcohol abuse [16].

One of the reasons for more HF with ageing is atrial tachyarrhythmias [17]. This cardiac arrhythmia occurs in the background of several CVDs though occasionally there may be no obvious cause; what is called the lone atrial fibrillation. Even when there is no CVD encompassing the heart, atrial fibrillation

<table>
<thead>
<tr>
<th>S/No</th>
<th>Sex</th>
<th>Age (y)</th>
<th>HBP only</th>
<th>DM only</th>
<th>HBP/DM</th>
<th>Parity</th>
<th>BMI(kg/m²)</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>M</td>
<td>72</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>N/Ap</td>
<td>27.2</td>
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<td>2.</td>
<td>F</td>
<td>70</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>12</td>
<td>20.5</td>
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<tr>
<td>3.</td>
<td>M</td>
<td>87</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>N/Ap</td>
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<tr>
<td>4.</td>
<td>F</td>
<td>80</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>25.1</td>
</tr>
<tr>
<td>5.</td>
<td>F</td>
<td>53</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>N/Av</td>
<td>19.3</td>
</tr>
<tr>
<td>6.</td>
<td>F</td>
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<td>-</td>
<td>-</td>
<td>Yes</td>
<td>10</td>
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<td>7.</td>
<td>F</td>
<td>70</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>22.5</td>
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<tr>
<td>8.</td>
<td>F</td>
<td>90</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>11</td>
<td>20</td>
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</tbody>
</table>

**Discussions**

This study shows that HF is infrequent in this rural population; standing at a point prevalence of 0.95% (8/840). Prevalence rates of HF in different populations have given different values because cardiac function evaluation hardly employs same tools and definition; which is usually difficult in practice [7]. Reported population prevalence rates have varied from 1% to 3% [4]. When self report was used (as in this study) a few years ago in the United States, a prevalence of 2% was recorded [8]. In Europe, it was 1% to 2% [1]. Here, with the same self report, it was less than 1%.

Hypertension in Africans starts earlier, is more severe and contributes highly to morbi-mortality of CVD [9]. Here it was present in all but one of the subjects; co-existing with diabetes mellitus in 3. This highlights the pre-eminence of hypertension especially in HF in Africans. As shown in the study of Levy et al [10], hypertension is the commonest risk factor of HF; contributing to a large proportion of HF in a population sample.

<table>
<thead>
<tr>
<th>S/No</th>
<th>AI</th>
<th>Cr (micromol/l)</th>
<th>PCV(%)</th>
<th>Proteinuria</th>
</tr>
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<tr>
<td>1.</td>
<td>7.6</td>
<td>212</td>
<td>45</td>
<td>-ve</td>
</tr>
<tr>
<td>2.</td>
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<td>N/Av</td>
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<td>N/Av</td>
<td>N/Av</td>
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<tr>
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<td>88</td>
<td>41</td>
<td>-ve</td>
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<td>2.4</td>
<td>106</td>
<td>42</td>
<td>-ve</td>
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<td>N/Av</td>
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<td>3.1</td>
<td>90</td>
<td>41</td>
<td>-ve</td>
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</table>

| Cr: Creatinine, PCV: Packed Cell Volume |

**References**


is known to trigger diastolic heart failure common in the elderly [18]. The pulse rates here (result not shown) ranged from 72 to 100/minute; and none was reported as irregular. Atrial fibrillation is not common in African populations, either native on the continent or in the America [19]. There must be a genetic angle to it as African Americans are less encumbered than white Americans [20]. The low prevalence of established risks already alluded to here may be why African rural populations [21] have a strikingly low rate of atrial fibrillation than urban African and western populations.

In conclusion, population rates of HF in sub-Saharan Africa still lag behind those of the advanced countries; largely because of low constellation of CVD risk factors. All efforts to prevent or check the on-going epidemiological transition [6] should be put in place. For the women, reproductive health measures to discourage grand multiparity are equally desirable, as repeated pregnancies impact negatively on the cardiovascular system [22]. This study is however limited by its reliance of self report rather than objective assessment of heart function like echocardiography.

**Declarations of Interest**

The authors declare no conflicts of interest.

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**References**