'Awareness and attitudes towards total cardiovascular disease risk assessment in clinical practice among physicians in Southern Nigeria'

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Abstract

Introduction: *The disparity between the increasing burden of cardiovascular disease (CVD) and available resources to treat it in sub-Saharan Africa necessitates preventive strategies. Total CVD risk assessment is a cost-effective approach to guide primary preventive therapy. However, in order to utilise this approach there has to be an understanding about it among the end-users. The objective of this study was to determine the awareness, use, and attitudes regarding total CVD risk assessment in clinical practice among physicians in Port Harcourt, Nigeria.*

Methods: *a cross-sectional survey of 150 physicians in government hospitals and private practices in Port Harcourt city. The characteristics of 'users' versus 'non-users' of CVD risk assessment were compared with the Chi-Square test of significance.*

Results*: 106 physicians completed the questionnaires. 74 (69.8%) reported awareness of tools available to assess total CVD risk. Among those aware, 87.1% agreed that CVD risk assessment is useful, 81% agreed it improves patient care, 74.3% agreed it leads to better decisions about recommending preventive therapies and 60% agreed that it increased the likelihood that they would recommend risk-reducing therapies to high-risk patients. However, 62.9% of these physicians felt it was time-wasting to use and only 21 (28.4%) actually use CVD risk assessment regularly in practice. The most commonly reported barrier was unfamiliarity with how to use risk estimation tools (52.8%). Majority who use it do so to guide preventive therapy. Female sex and the use of an Internet-enabled smartphone were associated with increased odds of being a 'user' of risk estimation tools (odds ratios 4.8, CI 1.4-16.9; and 5.9, CI 1.7-20.0 respectively).*

Conclusion*: Utilisation of risk assessments in clinical practice is low. A major barrier was non-familiarity with how to use the tools. Continuous medical education and wider use of smartphone technology may represent health system approaches to tackling this issue.*

Keywords*: Risk assessment, cardiovascular disease, and primary prevention*

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Introduction

Cardiovascular disease (CVD) represents the presentation of a pathologic atherosclerotic process that begins in childhood.[1] It is a major cause of morbidity and mortality worldwide accounting for about a third of global mortality.[2] This mortality is projected to increase to 24 million deaths by 2030.[3] In sub-Saharan African countries including Nigeria there is a rising prevalence of CVD.[4] Cardiovascular disease is a multifactorial disease with genetic, and environmental influences that interact. The rapid adoption of western diets and increasing sedentariness of the population made worse by rural-urban migration in these areas contribute to the rise in CVD prevalence in low middle income countries. Although improved treatment modalities especially in developed regions of the world reduce mortality from CVD, the index presentation may be with sudden death or for those who survive an event, long-term disability. This is even worse in low and middle-income countries like Nigeria with scarce resources for the sophisticated management, which this disease often times, requires. Furthermore, majority of individuals with CVD are asymptomatic therefore, preventive measures remain mandatory.

Cardiovascular disease prevention involves two major broad strategies- population level strategies and the high-risk strategies.[5] The high-risk strategy works at the individual level to identify and treat those who on the basis of having a constellation of risk factors are at high absolute risk of developing cardiovascular events such as strokes and heart attacks.[6, 7] Treatment of individuals who are at high risk of developing CVD may have limited impact at the population level, but it greatly impacts the individual. This approach therefore necessitates the identification of such high-risk individuals. Opportunistic or systematic screening or increasing the level of public awareness such that people who have CVD risk factors can present for a risk assessment, can accomplish this.

Risk estimation requires a tool that has been validated and evaluates relevant non-modifiable and modifiable risk factors to calculate the absolute risk. There are no available risk estimation tools that are derived from the indigenous Nigerian population. However, even in developed nations with robust guidelines on risk assessment to aid CVD prevention, the uptake of total risk assessment remains suboptimal.[8,9,10] An online cross-sectional survey involving 952 physicians in the United States, demonstrated that 92% reported awareness of tools available to calculate global risk of coronary heart disease.[11] Over 80% of these agreed on the utility of risk estimation in improving patient care, and guiding better decisions about recommending preventive therapies. Even with this high level of awareness, only 41% admitted to using risk assessment in practice and the most commonly reported barrier was the time it takes to complete an assessment.

This study set out to determine the awareness, use, and attitudes regarding total CVD risk assessment in clinical practice among physicians in Port Harcourt, a metropolitan city in south-south Nigeria.

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Methods

Study design: This was a cross-sectional study that involved the distribution of questionnaires to one hundred and fifty physicians in the bustling metropolitan city of Port Harcourt Nigeria. The questionnaire was an adaptation of one utilised in a study among physicians in the United States.[11] It was pre-tested among a representative sample (10% of the sample size); questions that were unclear or not suitable in the local context were rephrased before it was finally distributed. For example a question on the original questionnaire 'Do you see patients in the office or other ambulatory care setting?' was rephrased to 'Do you see patients in the government (BMH or UPTH) or private practice setting?'.

A stratified random sampling technique was employed to select study participants. First the two specialist hospitals in the city (Braithwaite memorial specialist hospital and the university of Port Harcourt teaching hospital) were identified. Subsequently, a simple random sample was drawn from these two centres. Convenience sampling was applied to select physicians (practicing only in Port Harcourt) in private practice; physicians were randomly selected to participate during their annual general meeting held in Port Harcourt city. Physicians who work in the two government hospitals are involved in academia. Two research assistants who explained the purpose of the study delivered the questionnaires. Informed verbal consent was obtained prior to participation in this study. The questionnaires were collected from the physicians on the same day. Exclusion criteria included doctors who were non-physician specialists (i.e. surgeons, paediatricians and obstetric/gynaecologists) and non clinic-based medical doctors. Ethical approval was obtained from the Ethical Committee of the University of Port Harcourt Teaching Hospital.

Variables included in the questionnaire (appendix 1) included participants sex, year of graduation from medical school, practice setting (government or private), position in the hospital and time spent in clinic-based practice. We obtained data regarding the awareness of tools available to assess CVD risk, the frequency of utility of these tools among those aware including type of tools used, the reasons for non-utility where appropriate and factors which the physicians thought represented barriers to their use. In addition, we sought information regarding the frequency of risk communication to patients as well as the utility of risk assessment in guiding the prescription of cardioprotective medication for primary prevention.

Statistical analysis: The results are presented in tables and figures. Responses to each item were tabulated, missing responses were excluded, and differences were compared by respondent characteristics. Testing for significant differences was performed using Chi-Square for categorical outcomes. Among the physicians who were aware of risk assessment tools, responses that indicated "Strongly Agree", or Agree" were combined into a category termed "Agree", while, "Disagree" or "Strongly Disagree" were combined into a category termed "Disagree". Physicians were classified as "users" and "non-users" based on their response to the question regarding the frequency with which they assess patients' risk in practice. The former category comprised those who were aware of and, "occasionally",

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"most of the time", or "always" assessed total CVD risk and the latter comprised those who were aware but "never" or "rarely" assessed total CVD risk. Characteristics of the respondents in each category were compared with the Chi-Square test of significance. Similarly physicians who indicated that they "occasionally", "most of the time", or "always or nearly always" use the risk estimation to communicate with patients and guide treatment recommendations were categorised as "those who use risk assessment to guide cardioprotective therapy". The level of statistical significance was set at $P<0.05$. Statistical analysis was performed with Statistical Package for the Social Sciences for Mac, version 21.0 (SPSS Inc., Chicago, IL, USA).

Results

Out of the 150 physicians invited to participate, forty declined and four were excluded due to incomplete information provided in the questionnaires. The response rate was thus 71%. There were 63 (59.4%) males giving a male: female ratio of 1.5:1. Majority were employed in the government teaching hospitals (77.4%). Cardiologists made up 16% of the respondents; physicians in general internal medicine specialties were 34.9% and 49.1% were general practitioners (GP's). Only 32 (30.2%) reported using an Internet enabled smartphone when consulting patients. The only significant difference noted when sub-specialty groups were compared was that cardiologists were more likely than general internists and GP's to be employed in the government hospitals (Table 1).

Less than one-third of the physicians surveyed correctly identified the high-risk category as absolute ten-year CVD risk of more than 20%, and the proportions were not significantly different among the specialties (23.5%, 29.7% and 28.8% of the cardiologists, general internal medicine physicians and GP's respectively; p=0.797). On the other hand, 37.8% of physicians who reported being aware of risk assessment tools correctly identified the high-risk category compared to only 6.3% of those who reported not being aware (p=0.001).

Of the 106 physicians, 74 (69.8%) were aware of CVD risk assessment tools. Although more cardiologists were aware compared to the other specialist groups, this was not statistically significant (Table 1). Among those aware of risk assessment tools, 87.1% agreed/strongly agreed that CVD risk calculation is useful, 81% agreed/strongly agreed it improves patient care, 74.3% agreed/strongly agreed it leads to better decisions about recommending preventive therapies and 60% agreed/strongly agreed that it increased the likelihood that they would recommend risk-reducing therapies to high-risk patients. However, 62.9% of them felt it was time-wasting to use in daily practice (Table 2).

Furthermore, among the physicians who were aware of tools used to calculate risk, only 21 (28.4%) reported using risk assessment at least occasionally and of these, majority (63.7%) utilized a web-based application or an application installed on their phones. Seven (33%) of them utilized a paper chart; only 4.8% used a non-web based spreadsheet on a personal computer. Among the non-users, the most commonly reported barrier to

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Table 1. Characteristics of the study participants according to specialty

Variable		All (n=106)	Cardiologist (n=17)	General internal medicine physicians (n=37)	General practitioners (n=52)	P
		%	%	%	%	
Sex	M	59.4	76.5	64.9	50.0	0.110
	F	40.6	23.5	35.1	50.0	
Practice	Government	77.4	100.0	86.5	63.5	0.002
	Private	22.6	0.0	13.5	36.5	
Time spent in clinic-based care	>75%	49.1	52.9	56.8	42.3	0.083
	51-74%	23.6	5.9	24.3	28.8	
	50%	14.2	23.5	10.8	13.5	
	25-49%	10.4	5.9	5.4	15.4	
	<25%	2.8	11.8	2.7	0.0	
Use of smartphones		30.2	35.3	27.0	30.8	0.821
Aware of tools to estimate CVD risk		69.8	82.4	64.9	69.2	0.426
Time since graduation	<10 years	44.3	35.3	40.5	50.0	0.072
	10-20 years	32.1	58.8	32.5	23.1	
	>20 years	23.6	5.9	27.0	26.9	

Table 2. Percentage of the physicians who are aware of risk estimation tools that agree with the statements regarding CVD risk assessment according to user category

Regarding CVD risk assessment	Risk assessment user category		
	User	Non-user	P
	%	%	
I find it useful (n=61)	95.2	83.7	0.185
It improves patient care (n=57)	95.2	75.5	0.052
It leads to better decisions about whether or not to recommend cardio protective therapies (n=52)	85.7	69.4	0.152
It is time wasting (n=44)	38.1	73.5	0.005
It increases the likelihood that I will recommend risk-reducing therapies to high-risk patients (n=42)	71.4	55.1	0.201

CVD risk assessment was unfamiliarity with how to use risk estimation tools (52.8% - Figure 1). The proportion of non-users who agreed that risk estimation was time wasting in clinical practice was significantly higher when compared to the users (Table 2).

Among the 21 physicians who calculate CVD risk in clinical practice, majority were classified as "those who use risk assessment to guide cardioprotective therapy" as 95.2% indicated they use it to guide aspirin and BP lowering therapy, 90.5% use it to guide lipid lowering therapy and 95.2% communicate risk to their patients. Physicians who use internet-enabled smartphones when consulting patients were three times more likely to use risk assessment (57.1% vs. 42.9%; p=0.007; odds ratio 5.9 {CI 1.7-20.0}). Similarly, significantly more females compared to males used risk assessment in clinical practice (odds ratio 4.8 {CI 1.4-16.9} - Tables 3 and 4).

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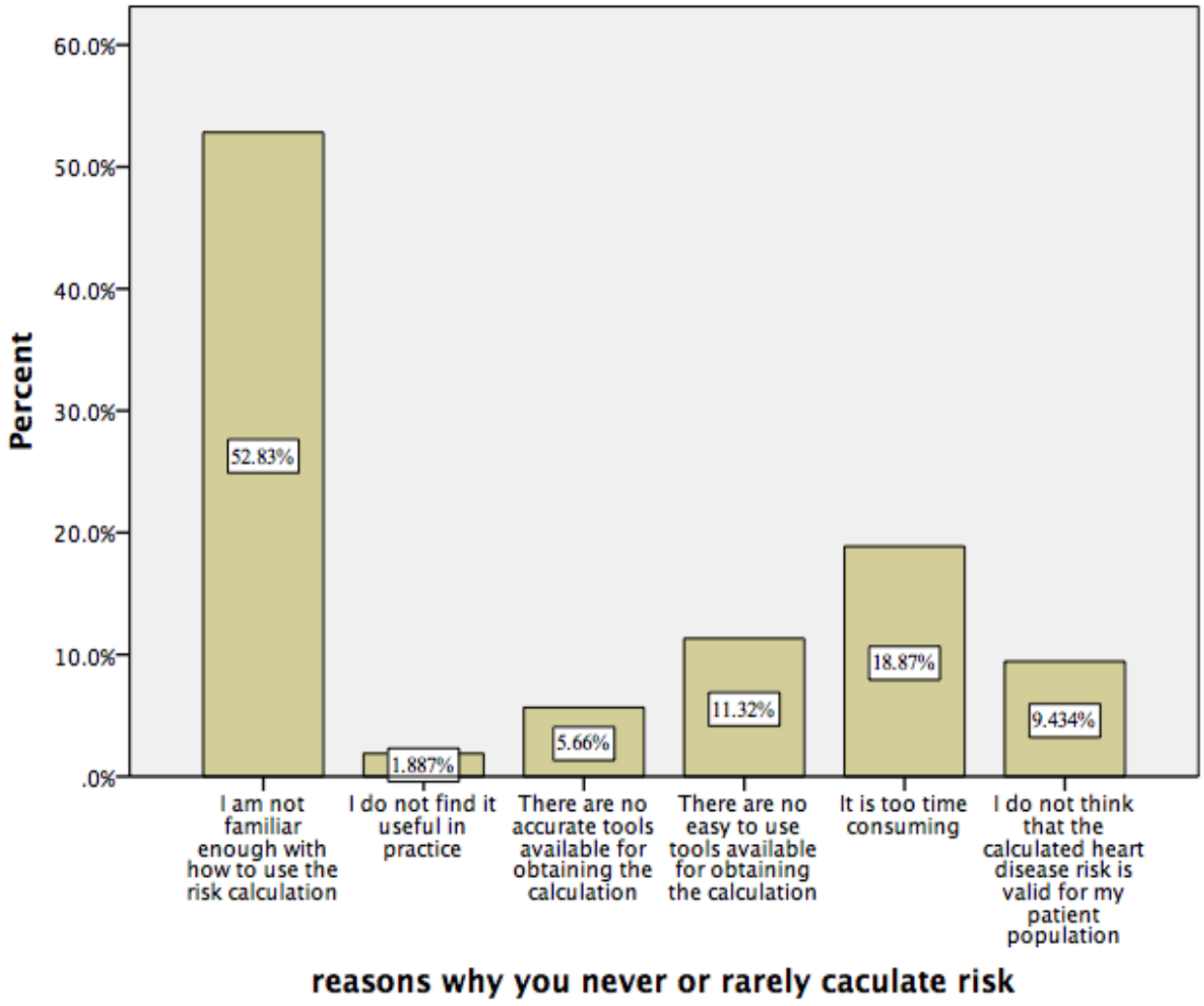

Figure 1. Reasons for never or rarely estimating patients' CVD risk

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Table 3. Comparison of the sub-group of physicians who use risk estimation in practice

	%	P
All (n=21)	**28.4**	
Sex		**0.031**
Male	42.9	
Female	57.1	
Practice setting		**0.930**
Government	85.7	
Private	14.2	
Specialty		**0.088**
Cardiology	28.6	
General internal medicine	14.3	
General practitioners	57.1	
Time spent in clinic-based care		**0.175**
>75%	61.9	
51-74%	28.6	
50%	9.5	
25-49%	0.0	
<25%	0.0	
Use of internet enabled smartphones		**0.007**
Yes	57.1	
No	42.9	
Time since graduation		**0.694**
<10 years	52.4	
10-20 years	38.1	
>20 years	9.5	

Table 4. Logistic regression of factors affecting outcome ('non-user' vs 'user')

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		B	S.E.	Wald	Sig.	Exp (B)	95% C.I. for EXP (B)	
							Lower	Upper
Step 1[a]	Sex	1.578	.637	6.134	.013	4.844	1.390	16.884
	Use of smartphone	1.771	.626	8.010	.005	5.876	1.724	20.034
	Years since graduation	-.409	.425	.927	.336	.664	.289	1.528
	Practice setting	.004	.863	.000	.996	1.004	.185	5.450
	Specialty	-.486	.408	1.416	.234	.615	.277	1.369
	Constant	-3.909	1.798	4.729	.030	.020		

Discussion

Absolute cardiovascular disease risk assessment is an integral part of cardiovascular disease prevention programs. With the current state of epidemiologic transition in many parts of sub-Saharan Africa including Nigeria, the need for CVD prevention cannot be over-emphasised. Several guidelines have been published on CVD prevention and they all recommend the calculation of an individual's short-term and even lifetime risk of CVD using different risk calculators as a means to guide preventative therapy. Several tools for estimating total cardiovascular risk are available and recommended by national and international guidelines.[1, 6, 12] They are available as paper charts or online calculators with the latter incorporating more variables.

Published data on the awareness and utility of risk assessment among physicians in Nigeria is lacking. In this study, while majority of the physicians surveyed were aware of tools to assess CVD risk, only 28.4% utilised risk assessment at least occasionally when reviewing patients in clinical settings. This is similar to what Shillinglaw et al found in their study among physicians in the United States.[11] In contrast to that study where the most common reason for not utilizing risk assessment was time constraint, in our study it was the unfamiliarity with the tools available. When this is added to the finding that only about a third of the physicians correctly identified the high-risk category, it underscores the need for more focused physician education in our setting. Female gender and the use of Internet enabled smartphones allowed for increased use of risk calculators however the wide confidence intervals may be because of the relatively small sample size. Some calculators are available as free applications that are easily downloaded on electronic devices and are user friendly. Moreover the applications provide the user with information regarding the patients risk category making it easier for the user to make clinically relevant decisions. It is

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noteworthy that only a third of the surveyed physicians use smartphones while consulting patients. This may be reflective of the lack of electronic patient records providing limited need for using these devices in practice.

An important aspect of risk estimation is that it aids the clinician to determine the need to commence preventive drug therapy. This is particularly important when the drug in question has significant side effects such as bleeding with aspirin therapy. A systematic review on the impact of risk estimation in clinical practice found that in four randomised controlled trials, the estimation of risk by a clinician did not improve patient outcomes in terms of improvement of blood pressure or diabetes control.[13] Another systematic review addressed this issue and the authors similarly found limited evidence that risk estimation positively impacted patient outcomes.[14] However, early risk factor identification and modification may delay the progression of CVD and a study done in southern Australia showed that although only 40% of the general practitioners surveyed used risk assessment in clinical practice,[15] similar to our study, they also showed that when the tools were used, they were used to guide clinical decision-making majority of the time. This suggests that increase in the uptake of risk assessment may have a significant impact on CVD prevention strategies.

There are no established guidelines regarding whom to screen and what the ideal settings to carry out such screenings are. This coupled with the lack of facilities in some centres for assaying total cholesterol may be hindering factors. However there are non-lab based algorithms that can be employed.[16] The over-riding take home point from this study is that risk assessment and CVD prevention has to be brought to the top of the healthcare agenda and updated local guidelines are long overdue.

Limitations

The non-response bias in this study may have led to over-estimation of awareness of CVD risk estimation tools as those physicians who did not respond may have differed significantly from the responders in terms of awareness of risk estimation. In addition the small sample size reduced the power of the study to find significant differences between 'users' and 'non-users' of CVD risk estimation tools.

Conclusion

Risk estimation is a pivotal element in prevention of CVD. It allows proper treatment of patients based on their risk category and helps to avoid over treating those in low risk categories. Although several tools are in existence, their utility lies in their actual use by physicians. Majority of the physicians surveyed were aware of tools to calculate global CVD risk, but only one-fifth of them utilise risk assessments in clinical practice. A major barrier was unfamiliarity with how to use the tools. Among those who utilize risk assessment however, majority of them use it to communicate with patients and to guide primary

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prevention therapy and the use of smartphones encouraged the utilisation of risk assessment. Continuous medical education and wider use of smartphone technology may represent health system approaches to tackling this important issue in CVD prevention.

Recommendations

- Larger studies are needed to document factors that hinder the uptake of risk estimation and implementation of existing guidelines on CVD prevention
- Population based cohort studies are needed in sub-Saharan Africa in order to allow the collection of data needed to create risk estimation tools tailored to the population. This will aid in the preparation of CVD prevention guidelines specific to this population.

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