https://dx.doi.org/10.4314/jpb.v17i2.4
Vol. 17 no. 2, pp. 105-111 (September 2020)
http://ajol.info/index.php/jpb

Journal of
PHARMACY AND
BIORESOURCES

Cardiovascular risk assessment in Community Pharmacies in Warri, Nigeria

David U. ADJE[1*], Azuka C. OPARAH[2] and Timothy MEGBOLU[1]

[1]*Department of Clinical Pharmacy and Pharmacy administration, Delta State University, Abraka. Nigeria.*
[2]*Department of Clinical Pharmacy, University of Benin, Benin City. Nigeria.*

Received 7th February 2020; Accepted 9th August 2020

Abstract
Many apparently healthy persons have multiple risk factors for cardiovascular disease without being aware. Assessing cardiovascular risks and initiating appropriate interventions and referrals at the community pharmacy level could be lifesaving. The objective of this study was to explore cardiovascular risk assessment on community pharmacy clientele and to determine the proportion of patients with high cardiovascular risk factors. Subjects (140) were recruited from 5 community pharmacies in Warri Metropolis. Cardiovascular risks assessment was done among subjects that met the inclusion criteria. Blood pressure, total cholesterol levels, Diabetes status, age and gender were documented in a data collection form. Risk stratification was done using World Health Organization/ International Society of Hypertension WHO/ISH risk assessment chart. Data were analyzed using SPSS version 20. Subjects (116) who met the inclusion criteria were screened. About half (50.9%) were moderate users of alcohol. Majority (81.9%) of patients were physically active. Few subjects (2.6%) were tobacco users. Total cholesterol values and fasting blood sugar levels were abnormal for 12.9% and 4.3% of subjects respectively. The proportion of subjects with high cardiovascular risk was 6%. Cardiovascular risk assessment is feasible in community pharmacy setting. Only 6% of subjects were at high cardiovascular risk.

Keywords: Cardiovascular risk assessment, Community pharmacy, WHO/ISH charts

INTRODUCTION

Cardiovascular disease (CVD) are a leading cause of morbidity and mortality and is responsible for one-in-three deaths globally [1,12]. The modifiable risk factors for cardiovascular disease include hypertension, diabetes, smoking, high blood lipids or physical inactivity [2]. CVD events, mainly heart attacks and strokes, are preventable if prompt action is taken to reduce risk factors. Global risk assessment is the preferred option if risk factor reduction is to have a significant impact [3]. Global risk assessment takes into consideration all possible factors that could potentially influence development of cardiovascular disease to calculate a risk score that is more useful than addressing individual elevated risk factors [3]. Various tools can be used to facilitate global risk assessment and target interventions towards patients who will get the most benefit from them [4,6-9]. The American Heart Association recommends that adults 40 to 79 years of age should have their cardiovascular risk assessed every four to six

* Correspondence. *E-mail*: a_udave77@yahoo.com *Tel*: +234-8023241125. ISSN 0189-8442

years [5]. The World Health Organization/ International Society of Hypertension (WHO/ISH) risk assessment tool consists of 28 different charts specific for each of the 14 WHO epidemiological sub-regions [10,11]. This tool is well suited for use in resource limited environments because of its simplicity. The input variables are age, gender, systolic blood pressure, and diabetes and tobacco use status and total cholesterol level. Colour codes are used to determine the 10-year risk of combined myocardial infarction and stroke (fatal and non-fatal) [10]. Use of the WHO/ISH risk assessment tool involves selecting the appropriate chart depending on the study region, gender, age, diabetes and smoking status of the patient. The color region that corresponds to the point of intersection of the systolic blood pressure and total cholesterol level defines the risk category of the patient. Color codes range from green (very low < 10%); Yellow (low 10% - <20%), Orange (moderate 20% - <30%); Red (high 30% - <40%), deep red (Very high ≥ 40%).

Even though the charts may underestimate CVD risk in certain persons, they provide reliable guide to cardiovascular risk [11]. The main objective of this study was to explore cardiovascular risks among community pharmacy clientele using the WHO/ISH risk chart. Specific objectives were to determine the number of patients with systolic and diastolic blood pressures above 140/90mmHg, determine proportion of patients with cholesterol level above 5 mmol/l, determine the number of patients with high fasting and random blood sugar levels to determine proportion of patients in the high-risk categories and to explore association between clinical characteristics and risk category.

METHOD

Setting. Risk assessment was carried out in selected community pharmacies located in Warri, Nigeria. Warri is a cosmopolitan city with an estimated population of 700,000 people. The city's economic activities revolve around oil exploration. A government general hospital and many private hospitals, /clinics and traditional healing homes undertake health delivery in the city. About eighty registered pharmaceutical premises and more than 500 medicine vendors who operate in the area. Five pharmacy premises were purposively selected for this study based on customer turnover and willingness of resident pharmacists to facilitate the study.

Patients/ population inclusion and exclusion criteria. All patients visiting the pharmacy who met the inclusion criteria were evaluated. Patients must be between age 40 and 80 years. Patients below 40 years with very high blood pressure or cholesterol levels and those who were willing to participate in the study by signing a consent form. Patients who did not meet the inclusion criteria were excluded from the study.

Outcome measures. The primary outcome measure was the proportion of clients with high cardiovascular risk. Secondary outcome measures were: proportion of clients who use tobacco, proportion of clients who were physically active (30 minutes of moderate activity at least 3 times a week), and proportion of clients who were moderate to high consumers of alcohol. Proportion of clients with high systolic and diastolic blood pressure levels, proportion of clients with high blood glucose levels and proportion of clients with total cholesterol levels above 5 mmoles/liter.

Data collection procedures. Patient's specific data were collected on the first visit and entered into a data collection form. Consenting patients were evaluated after signing an informed consent form. Data collected include patient demographic and clinical characteristics such as blood pressure, blood cholesterol level, blood glucose level. Blood pressure was measured using an automated BP apparatus (Omron 1A1B). The

subject was asked to be seated with arm supported so that the cuff was at heart level. After resting for about 5 minutes, the cuff was inflated to desired level. The subject was asked not to talk during measurement. Two measurements were taken and average recorded. Total cholesterol was measured using Multi-care cholesterol meter (Biomedical Systems International, Italy). A finger-prick sample was obtained with an automatic lancing device following strict aseptic procedure. An Acuchek Active $^{(R)}$ glucose meter was used for obtaining blood glucose measurement. The procedure is similar to that followed in obtaining cholesterol measurement.

Data analysis. Data analysis was done using IBM SPSS Version 20 statistical package. [12] .Socio demographic and clinical characteristics were expressed as frequencies and percentages. Chi Square test was used to explore association between clinical characteristics and risk category based on gender and age. Logistic regression analysis was done to identify predictors of risk category. A *P* value of less than 0.05 is considered significant.

Ethical approval. Ethical approval for the study was obtained from the Health Research Ethics Committee, Delta State University Teaching Hospital, Oghara, and Delta State, Nigeria. Ethical approval No.: DELSUTH/HREC/2015/038

RESULTS

Subjects (140) from five community pharmacies were recruited for the study. Of these, 24 were excluded since they did not meet the inclusion criteria. There were more males, 65 (56%) than females, 51 (44%). Nearly half of the subjects, 52 (44.8%) were in the 40-50 age group, only few, 3(2.7%) were smokers. Majority of subjects 95 (81.9%) claimed to be physically active. There were more subjects with abnormal cholesterol levels 15(12.9%) than glucose 5 (4.3%), (tables 1 and 2). Majority were in the low-risk category. Only 7 (6%) of subjects were in the high/very high category, Figure 1. Age stratification showed a significant association between age and systolic and diastolic blood pressures, (X^2 =7.488, 3, P =0.058; X^2 =14.750, df 3, P =0.000) respectively. There was no significant association between age and other clinical characteristics Table 3.

A Chi Squared test was done to evaluate association between clinical characteristics and risk category based on gender and age. Systolic blood pressure and cholesterol level were significantly associated with high-risk category in males, (X^2= 21.202, P=0.031); X^2=18.493, 5df.P=0.002 respectively. For the females, only systolic and diastolic blood pressures were significantly associated with high-risk category, X^2=48.06, df 16, P=0.001; X^2 =25.06, df=10, P=0.005.

Age, gender, smoking status, systolic blood pressure, diastolic blood pressure, total cholesterol, and random blood sugar were used in a logistic regression analysis to predict risk category. The prediction model was statistically significant. F=8.138, df 9, P<0.001 and accounted for 49.7%. R^2=0.497. Adjusted R^2=0.436. The raw and standardized coefficients of the prediction model and correlation with involvement are shown in table 4. Systolic blood pressure, total cholesterol level, and random blood sugar were the highest predictors of cardiovascular disease in this population.

DISCUSSION

The purpose of this study was to explore at risk patients and assess the feasibility of carrying out cardiovascular risk assessment in the community pharmacy setting. The fact that more males than females showed willingness to participate in this study is not surprising since men are generally at greater risk of heart disease than pre-menopausal women. However, risk levels in post- menopausal women are similar to that of

men [13,14]. The proportion of smokers in this study was quite small which may be a reflection of increased public awareness of the dangers associated with smoking and the benefits of quitting [15-16]. Smoking is estimated to cause nearly 10% of all cardiovascular diseases [17].

Table 1: Socio-Demographics of Subjects

Variable		N (%)
Sex	*Male*	65(56.0)
	Female	51(44.0)
Age	<40	2(1.7)
	40-50	52(44.8)
	51-60	33(28.4)
	61-70	21(18.1)
	>70	8(6.9)
Tobacco use	*Yes*	3(2.6)
	No	113(97.4)
Smoking habit	Occasional	1(0.0)
	Moderate	1(0.9)
	Heavy	1(0.9)
	Non-smokers	113(98.2)
Alcohol use	Moderate	59(50.9)
	Heavy	1(0.9)
	Don't Drink	56(48.3)
Physical activity/week	0 time	2(1.7)
	Once	3(2.6)
	Twice	16(13.8)
	Thrice	64(55.2)
	Everyday	31(26.7)
Activity category	Physically active	95(81.9)
	Physically inactive	21(18.1)
Chronic illness	Diabetes mellitus	13(11.2)
	Hypertension	26(22.4)
	Angina	3(2.6)
	Diabetes / Hypertension	4(3.4)
	None	70(60.3)

Table 2: Clinical Characteristics of subjects

Variable		N(%) n=116
*Blood pres*sure (systolic)	Normal (90-119)	11(9.5)
	Pre hypertension (120-139)	68(58.6)
	Stage One(140-159)	31(26.7)
	Stage Two(≥160)	6(5.2)
*Blood pres*sure (diastolic)	Normal (60-79)	37(31.9)
	Pre hypertension (80-89)	48(41.4)
	Stage One(90-99)	15(12.9)
	Stage Two(≥ 100)	16(13.8)
	ISH	13(11.2)*
Blood glucose (fasting)	<7mm/L	12(10.3)
	≥ 7mm/L	5(4.3)
Blood glucose (random)	<11mm/L	87(75.0)
	≥11mm/L	12(10.3)
Total cholesterol	≥ 5mmol/L	15(12.9)
	<5mmol/L	101(87.1)

*Already captured as part of high systolic blood pressure, does not contribute to totals

Table 3: Clinical Characteristics stratified by age

Age group (yr.)	SBP ≥140mmHg n (%)	DBP ≥90mmHg n (%)	FBS ≥7mm/L n (%)	RBS ≥11mm/L n (%)	CHOL ≥5mm/L n (%)	HRS ≥20
40-50	16(39.0)	16(50.0)	1(20.0)	3(25.0)	7(46.7)	2(33.3)
51-60	12(29.3)	10(31.3)	3(60.0)	6(50.0)	2(13.3)	2(33.3)
61-70	9(22.0)	3(9.4)	1(20.0)	3(25.0)	4(26.7)	1(16.7)
>70	4(9.8)	3(9.4)	0(0.0)	0(0.0)	2(13.3)	1(16.7)
X^2	7.488	14.750	1.600	1.500	4.467	0.667
Df	3	3	2	2	3	3
P-value	0.058	0.002	0.449	0.472	0.215	0.881

SBP = Systolic Blood Pressure. DBP = Diastolic Blood Pressure. CHOL = Cholesterol. HRS = Risk Score. X^2 is significant at P <0.05

Table 4: Logistic regression of independent variables against risk category

Model	B	SE b	Beta	Pearson's r	T	P	Sr^2
Constant	-1.461	0.363			4.025	0.00	
Sex	-.0.033	0.074	-0.039	0.067	0.441	0.660	0.004
Age	0.050	0.043	0.107	0.219	1.171	0.245	0.048
Smoking status	0.528	0.224	0.102	0.180	1.154	0.252	0.324
Alcohol intake	-0.120	0.085	0.128	0.064	0.160	0.160	0.016
Systolic B P	0.017	0.004	0.580	0.618	4.596	0.000	0.381
Diastolic BP	-0.02	0.005	-0.040	0.407	-0.393	0.696	0.165
Total cholesterol level	0.084	- 0.033	0.216	0.238	-2.540	0.013	0.057
Random blood sugar	0.001	0.001	0.231	0.224	-2.194	0.031	0.050

Dependent variable = risk category SEb = standard error of mean; B= unstandardized beta coefficient, β = |Standardized beta coefficient, Sr^2= Semi partial correlation coefficient

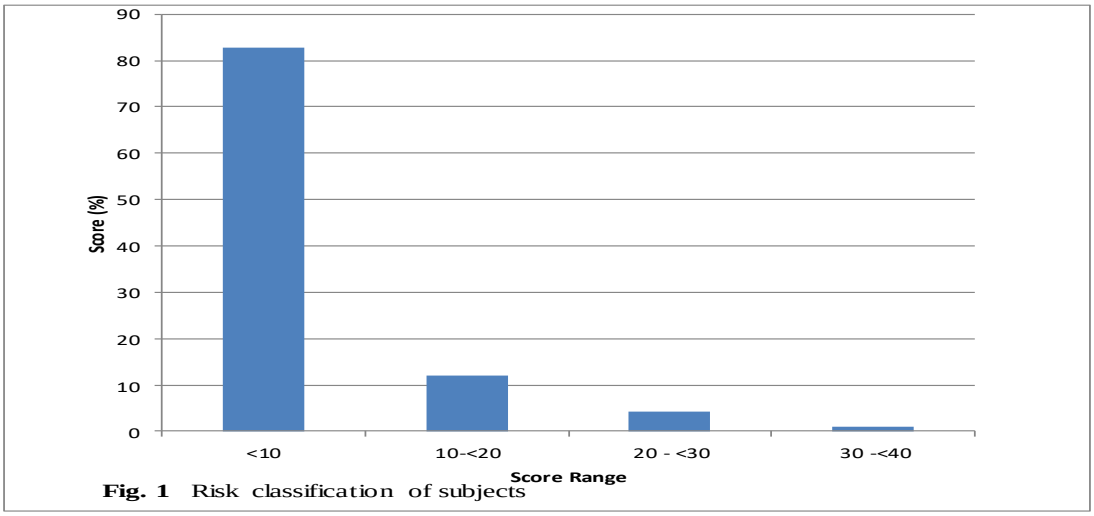

Fig. 1 Risk classification of subjects

Quitting smoking can result in rapid reversals of risk status within a short time. For instance, health improvements can be observed within two years of quitting and CVD risk level returns to normal within 15 years [18]. Smoking cessation is a proven strategy to reduce cardiovascular risk and should be encouraged at all times. More than 50% of subjects were moderate drinkers of alcohol. The question of whether alcohol consumption reduces cardiovascular risk has been a subject of debate. Many studies have shown a U- or J shaped association between mortality and alcohol consumption. People who drink moderate amounts have a lower death rate than non-drinkers, while those who drink large

amounts have a higher death rate [19, 20]. This is not to encourage the promotion of alcohol consumption as preventive therapy for cardiovascular disease as the deleterious effects of heavy alcohol consumption are well established [19].

Most of the subjects claimed to be physically active. This is justifiable because most persons in the study environment are farmers, fishermen and engage in rigorous activity associated with oil exploration. The cardiovascular benefits of regular moderate physical activity have been well demonstrated and should be encouraged across population groups [21-23]. Systolic blood pressure was significantly associated with high-risk category in both males and females. Elevated systolic blood pressure has been shown to increase the risk of cardiovascular events independent of diastolic blood pressure levels in the general population [24, 25] and in the elderly [26]. Logistic regression of independent predictor variables against risk category yielded systolic blood pressure, total cholesterol levels and comorbidities as greatest predictors of high-risk categories. This finding is also consistent with known risk factors for cardiovascular disease [24-27]. The proportion of subjects in the high-risk category was 6 %. This result is comparable to that of other workers. For example, in Mongolia, prevalence rate of high cardiovascular risk was (6%), Malaysia (2.3%) and in Cambodia (1.3%) [11].

In order to maximize the benefits of cardiovascular risk assessment, risk profiles should be properly communicated to the patient. Therefore, efforts should be made by primary care providers and other professionals involved in risk assessment to communicate risk to the patient in a simple, clear, culturally sensitive manner that would motivate the patient to make the changes required to reduce his risk [7].

Conclusion. Cardiovascular risk assessment is feasible in community pharmacy setting and community pharmacy is a suitable site for performing cardiovascular risks assessment. Cardiovascular risks assessment should be included in the curriculum of undergraduate pharmacy students as well as mandatory continuing education program for pharmacists in order to increase pharmacists' competence in cardiovascular risk assessment.

REFERENCES

1. Center for Disease Control and Prevention (CDC) - Heart Disease Facts and Statistics 2011, Available at *http://www.cdc.gov/heartdisease/statistics.htm*.Accessed 14/6/13.

2. World Health Organization (WHO) Cardiovascular disease fact sheet. Available from http://www.who.int/mediacenter/factsheets/fs317/en/index.html 2011. Accessed 15/1/15.

3. Grundy, S.M., Pasternak, R., Greenland, P., Smith, S. and Furster, V. - Assessment of Cardiovascular risk by use of multiple risk factor equation: A statement for healthcare professionals from the American Heart Association and the American College of Cardiology. *Circulation,* 1999, 100:1481-1492.

4. Sheridan S. Pignone M, Mulrow C. Framingham-based tools to calculate the global risk of Coronary Heart Disease: a systematic review of tools for clinicians. J. Gen Intern Med 2003; 18: 1039-52.

5. De Backer G *et al.* Third Joint Task force of European and other societies on cardiovascular disease prevention in clinical practice. European guidelines on cardiovascular disease prevention in clinical practice. *Eu. Heart J. 2003; 24(17); 1601-1610.*

6. D'Agostino RB, Grundy S, Sullivan LM, et al. Validation of the Framingham Coronary Heart Disease Prediction Scores. *JAMA* 2001; 286:180-7.

7. Grover, A.S., Lowensteyn, I. - The challenges and benefits of cardiovascular risk assessment in clinical practice. *Canadian Journal of Cardiology*, 2011, 27:481-487. doi 10.1016/j.cjca. 04.008.

8. PL Detail-Document - Common Cardiovascular Risk Calculators Pharmacist's Letter/ Prescriber's Letter, Jan 2014. Available at *www.Prescribers Letter.com*.

9. Lloyd-Jones, D., Adams, R., Camethon, M., DeSimone, G., Ferguson, T.B., Flegal, K. and Hong, Y. - Heart disease and stroke statistics – 2009 update; a report from the American Heart Association Statistics Committee and Stroke Statistics Sub-Committee. *Circulation, 2009,* 119(3) e 21-e 181.

10. World Health Organization (WHO) - Prevention of Cardiovascular disease – guidelines for assessment and management of cardiovascular risk. WHO Geneva 2007 ISBN 9789241547178.

11. Otgontuya, D., Oum, S., Buckley, B.S. and Bonita, R., - Assessment of total cardiovascular risk using WHO/ISH risk prediction charts in three low- and middle-income countries in Asia. *Biomed Central Public Health*, 2013, 13:539. Available at http//www. biomedcentral.com/1471-2458/13/539.

12. IBM Corp. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.

13. Zhang, Y. - Cardiovascular diseases in American women. Nutrition, Metabolism and Cardiovascular Diseases. (MMCD) 2010, 20(6): 386-393.

14. Mosca, L., Mochari, H., Christian, A., Berra, K., Jaubert, K., Mills, T. and Simpson, S.L. - Preventive action and barriers to cardiovascular health. *Circulation*, 2006, 113(4), 525-534.

15. Terwase, M.J. and Asuzu, C.C. - The impact of tobacco smoking on health and cessation among a cohort of smokers in Ibadan. *International Journal of prevention and treatment, 2014*, 3(1):11-16

16. Salaudeen, A.G., Akande, T.M. and Musa, O.I. - Cigarette smoking-prevalence and awareness of health problems of tobacco use among students of college of education in North Central state of Nigeria. *Nigeria medical practitioner 2009*; 55(6).

17. Godtfredsen N S, Holst C, Prescott E, Vestbo J, Osler M – Smoking reduction, smoking cessation and mortality: a 16 year follow up of 19732 men and women from the Copenhagen Center for Prospective population Studies. *American Journal of Epidemiology*, 2002, 156(11):994-1001.

18. Centers for Disease Control and Prevention - 2014 Surgeon General Report: 50 years of progress.2014 Available at *http//www.cdc.gov/tobacco/data_statistics/sgr/50th anniversary/ Accessed* 20/2/15.

19. Marmot, M and Brunner E. - Alcohol and cardiovascular disease; the status of the U shape curve. British Medical Journal (BMJ), 1991, 303 (6802):565-568.

20. Marmot M. G. Alcohol and coronary heart disease. *International Journal of Epidemiology, 2001*, 30(4):724-729.

21. Abbot, R. D., Rodiguez, B. L., Burchfiel, C. M. and Curb, J.D. -Physical activity in older middle-aged men and reduced risk of stroke - the Honolulu Heart Program. *American Journal of Epidemiology, 1994, 139*(9):881-893.

22. Wannamerthee, G and Shaper, A.G. - Physical activity in the prevention of cardiovascular disease: an epidemiological perspective. *Sports Medicine* 2001, 31(2):101-114.

23. American Heart Association (AHA)-Physical Activity guideline. 2011 Available at *http//www.heart.org/HEARTORG.GettingHealthy/PhysicalActivity/Start-Walking/AmericanheartAssociationGuidelines_ucm_3079716_Article.jsp#/orgPSW9SQYK*. Accessed 15/3/13.

24. Rodriguez, C.J., Swett, K., Agarwal, S.K., Folsom, A.R., Fox, E.R., Loehr, N.H., Rosamond, W.D. and Chang, P.P. – Systolic blood pressure among adults with hypertension and incident cardiovascular events: The Atherosclerosis Risk in Communities Study *Journal of American Medical Association (JAMA) Intern. Med, 2014, 174*(8):1252-1261.

25. Aronow, W. S. - Systolic blood pressure levels associated with cardiovascular events and all-cause mortality: Results of the REGARDS STUDY. *Cardiovascular Pharmacology 2014*, 3:e126.doi 10,4172/2329-6607.1000e.126.

26. Butler, J., Kalogeropoulos, A. P., Georgeiopoulou, V. V., Bibbins-Domingo, K, Najjar, S.S. ,Sutton-Tyrrel , K.C. and Harris, T. B. - Systolic blood pressure and incident heart failure in the elderly . The Cardiovascular Health Study and the Health, Aging, and Body composition Study, *Heart*, 2011, Aug 97(16):1304-1311.

27. Lewington, S. and Clarke, R. - Combined effect of systolic BP and total cholesterol on cardiovascular disease risk. *Circulation 2005*, 112: 3373-3374.