

African Journal of Pharmacy and Pharmacology

Volume 11 Number 36, 29 September, 2017
ISSN 1996-0816



ABOUT AJPP

The **African Journal of Pharmacy and Pharmacology (AJPP)** is published weekly (one volume per year) by Academic Journals.

African Journal of Pharmacy and Pharmacology (AJPP) is an open access journal that provides rapid publication (weekly) of articles in all areas of Pharmaceutical Science such as Pharmaceutical Microbiology, Pharmaceutical Raw Material Science, Formulations, Molecular modeling, Health sector Reforms, Drug Delivery, Pharmacokinetics and Pharmacodynamics, Pharmacognosy, Social and Administrative Pharmacy, Pharmaceutics and Pharmaceutical Microbiology, Herbal Medicines research, Pharmaceutical Raw Materials development/utilization, Novel drug delivery systems, Polymer/Cosmetic Science, Food/Drug Interaction, Herbal drugs evaluation, Physical Pharmaceutics, Medication management, Cosmetic Science, pharmaceuticals, pharmacology, pharmaceutical research etc. The Journal welcomes the submission of manuscripts that meet the general criteria of significance and scientific excellence. Papers will be published shortly after acceptance. All articles published in AJPP are peer-reviewed.

Contact Us

Editorial Office: ajpp@academicjournals.org

Help Desk: helpdesk@academicjournals.org

Website: <http://www.academicjournals.org/journal/AJPP>

Submit manuscript online <http://ms.academicjournals.me/>

Editors

Himanshu Gupta

*Department of Pharmacy Practice
University of Toledo
Toledo, OH
USA.*

Prof. Zhe-Sheng Chen

*College of Pharmacy and Health Sciences
St. John's University
New York,
USA.*

Dr. Huma Ikram

*Neurochemistry and Biochemical
Neuropharmacology Research Unit,
Department of Biochemistry,
University of Karachi
Karachi-75270
Pakistan*

Dr. Shreesh Kumar Ojha

*Molecular Cardiovascular Research Program
College of Medicine
Arizona Health Sciences Center
University of Arizona
Arizona,
USA.*

Dr. Vitor Engracia Valenti

*Departamento de Fonoaudiologia
Faculdade de Filosofia e Ciências,
UNESP
Brazil.*

Dr. Caroline Wagner

*Universidade Federal do Pampa
Avenida Pedro Anunciação
Brazil.*

Dr. Ravi Shankar Shukla

*Macromolecule and Vaccine Stabilization Center
Department of Pharmaceutical Chemistry
University of Kansas
USA.*

Associate Editors

Dr. B. Ravishankar

*SDM Centre for Ayurveda and Allied Sciences,
SDM College of Ayurveda Campus,
Karnataka
India.*

Dr. Natchimuthu Karmegam

*Department of Botany,
Government Arts College,
Tamil Nadu,
India.*

Dr. Manal Moustafa Zaki

*Department of Veterinary Hygiene and
Management
Faculty of Veterinary Medicine,
Cairo University
Giza,
Egypt.*

Prof. George G. Nomikos

*Takeda Global Research & Development Center
USA.*

Prof. Mahmoud Mohamed El-Mas

*Department of Pharmacology,
Faculty of Pharmacy
University of Alexandria,
Alexandria,
Egypt.*

Dr. Kiran K. Akula

*Electrophysiology & Neuropharmacology Research
Unit
Department of Biology & Biochemistry
University of Houston
Houston, TX
USA.*

Editorial Board

Prof. Fen Jicai

School of life science, Xinjiang University, China.

Dr. Ana Laura Nicoletti Carvalho

Av. Dr. Arnaldo, 455, São Paulo, SP. Brazil.

Dr. Ming-hui Zhao

*Professor of Medicine
Director of Renal Division, Department of Medicine
Peking University First Hospital
Beijing 100034
PR. China.*

Prof. Ji Junjun

Guangdong Cardiovascular Institute, Guangdong General Hospital, Guangdong Academy of Medical Sciences, China.

Prof. Yan Zhang

*Faculty of Engineering and Applied Science,
Memorial University of Newfoundland,
Canada.*

Dr. Naoufel Madani

*Medical Intensive Care Unit
University hospital Ibn Sina, Univesity Mohamed V
Souissi, Rabat,
Morocco.*

Dr. Dong Hui

Department of Gynaecology and Obstetrics, the 1st hospital, NanFang University, China.

Prof. Ma Hui

School of Medicine, Lanzhou University, China.

Prof. Gu HuiJun

School of Medicine, Taizhou university, China.

Dr. Chan Kim Wei

*Research Officer
Laboratory of Molecular Biomedicine,
Institute of Bioscience, Universiti Putra,
Malaysia.*

Dr. Fen Cun

Professor, Department of Pharmacology, Xinjiang University, China.

Dr. Sirajunnisa Razack

Department of Chemical Engineering, Annamalai University, Annamalai Nagar, Tamilnadu, India.

Prof. Ehab S. EL Desoky

Professor of pharmacology, Faculty of Medicine Assiut University, Assiut, Egypt.

Dr. Yakisich, J. Sebastian

*Assistant Professor, Department of Clinical Neuroscience R54
Karolinska University Hospital, Huddinge
141 86 Stockholm ,
Sweden.*

Prof. Dr. Andrei N. Tchernitchin

*Head, Laboratory of Experimental Endocrinology and Environmental Pathology LEEPA
University of Chile Medical School,
Chile.*

Dr. Sirajunnisa Razack

*Department of Chemical Engineering,
Annamalai University, Annamalai Nagar, Tamilnadu, India.*

Dr. Yasar Tatar

*Marmara University,
Turkey.*

Dr Nafisa Hassan Ali

*Assistant Professor, Dow institute of medical technology
Dow University of Health Sciences, Chand bbi Road, Karachi,
Pakistan.*

Dr. Krishnan Namboori P. K.

*Computational Chemistry Group, Computational Engineering and Networking,
Amrita Vishwa Vidyapeetham, Amritanagar, Coimbatore-641 112
India.*

Prof. Osman Ghani

*University of Sargodha,
Pakistan.*

Dr. Liu Xiaoji

*School of Medicine, Shihezi University,
China.*

ARTICLES

- Knowledge, attitude and practice of community pharmacists in relation to cholesterol screening in Delta State, Nigeria** 451
Adje, U. D., Arute, E. J. and Adarighofua, M. I.

Full Length Research Paper

Knowledge, attitude and practice of community pharmacists in relation to cholesterol screening in Delta State, Nigeria

Adje, U. D.^{*}, Arute, E. J. and Adarighofua, M. I.

Department of Clinical Pharmacy and Pharmacy Administration, Delta State University, Abraka, Nigeria.

Received 7 August, 2017; Accepted 21 August, 2017

Elevated level of cholesterol is a risk factor for the development of cardiovascular disease. Community pharmacies are considered as ideal settings to provide screening services for chronic medical conditions. An adequate knowledge and a positive attitude towards cholesterol screening would increase pharmacist's involvement in cholesterol lowering interventions and referrals. The objective of this study was to assess community pharmacists' knowledge, attitude and resource availability in relation to cholesterol screening in Delta State, Nigeria. A 33 item pre tested self-administered questionnaire with a Cronbach's alpha value of 0.628 was distributed to all 160 community pharmacists in Delta State. The questionnaire items assessed knowledge, attitude and available resources in relation to cholesterol screening. Categorical data was expressed as frequency and percentages. Chi-square test was performed to explore relationship between demographic variables and pharmacist's knowledge. A p-value of less than 0.05 was considered statistically significant. More than half (64.7%) of community pharmacist were knowledgeable in relation to cholesterol and its influence on cardiovascular diseases. Cholesterol screening services were provided by only 11.3% community pharmacies in Delta State. Majority (82%) were willing to be trained in the use of cholesterol meter. Nearly half, 42.9% had a negative attitude towards cholesterol screening. Pharmacist's knowledge about cholesterol and its influence in cardiovascular diseases was satisfactory. However, attitude towards cholesterol screening was largely negative and provision of such services was very low.

Key words: Cholesterol screening, community pharmacies, knowledge, Nigeria.

INTRODUCTION

Cardiovascular diseases (CVD) have continued to exact a heavy toll on people in developing and developed countries of the world with devastating impact on quality

of life (Go et al., 2014; WHO, 2014; Mozaffarian et al., 2015). Risk factors for development of CVD include high blood pressure, diabetes mellitus, smoking, and elevated

^{*}Corresponding author. E-mail: a_udave77@yahoo.com.

serum cholesterol which is considered an independent risk factor for CVD (Wadhera et al., 2016; WHO, 2015; Keys et al., 1984). A positive relationship exists between total serum cholesterol levels, triglyceride levels, other atherogenic particles and the development of CVD especially coronary heart disease (Stamler et al., 1986; Toth, 2005; Assmann et al., 1998; Austin et al., 1998).

Though the benefits of lowering cholesterol levels on the prevention of future heart attack, stroke, and death, have been well established both in those at risk and in persons with established CVD (Almuti et al., 2005; MRC/BHF, 2002; Anderson et al., 2013), there is still a huge treatment gap leaving out many persons who would have benefited from lipid lowering therapy (Hoerger et al., 1998; Bolli, 2014; Ahn et al., 2015). Also, for many persons on treatment, adherence to therapy is often compromised by perceived adverse effects of medication, resulting in discontinuation (Bitton et al., 2013; Roebuck et al., 2011). Community pharmacists are in an ideal position to support management of dyslipidemia and reduce risks associated with CVD, because they are highly accessible and are often the first point of entry into the health care system (Joyce et al., 2007). Pharmacists could assist by engaging in screening for dyslipidemia, promoting awareness and lifestyle interventions, and increasing adherence through assessment and resolution of drug therapy problems associated with use of lipid lowering medications.

A good knowledge of cholesterol and its influence on cardiovascular diseases, as well as a positive attitude towards cholesterol screening could increase impact of community pharmacists in reducing cardiovascular disease burden through cholesterol lowering interventions. The objectives of this study were to assess the knowledge of community pharmacists in relation to cholesterol and its influence on cardiovascular diseases, evaluate attitude of community pharmacists towards cholesterol screening and to determine resources available in community pharmacies for cholesterol screening.

MATERIALS AND METHODS

Study design

A cross sectional survey design was used for this study. A pretested 33 item questionnaire with Cronbach's alpha value of 0.628 was distributed to the resident pharmacists at the various community pharmacies in Delta State.

Setting

This research was carried out in registered community pharmacies located in Delta State, Nigeria. Delta State is an oil rich state situated in the Niger Delta region of the country. A teaching hospital, several general hospitals and a host of private medical facilities offer health care services in the state. Laboratory services

are provided by public and private laboratory facilities in the state.

Population/sample size

The population consisted of all community pharmacies in the state. The total number of registered community pharmacists in the state was 160. In view of the small population size, a census of all community pharmacies in the state was done.

Data collection and presentation

A pretested self-completion questionnaire was distributed to the pharmacists in charge of all community pharmacies in the state. The questionnaire was pretested in a sample of 25 community pharmacists in Asaba, the state capital city. The questionnaire consisted of 33 questions divided into four sections. Section A addressed pharmacist demographics. Section B contained questions assessing pharmacist's knowledge, while Section C addressed pharmacist's attitude towards cholesterol screening. Section D consisted of questions relating to resource availability for cholesterol screening in community pharmacies. Institutional permit was obtained for the study.

Data analysis

Data collected were entered into Microsoft Excel spread sheet and crosschecked for errors and missing data. Then, they were finally exported into the Statistical Package for Social Sciences (SPSS) software. Responses to the 20 knowledge questions were expressed as frequency and percentages. Pharmacists attitude was measured on a 5 point Likert scale ranging from 1 (strongly agree to 5 (strongly disagree) with an assumed midpoint of 3. Rated scores were treated as interval data suitable for quantitative analysis. Chi-square test was performed to explore relationship between demographic variables and pharmacist's knowledge. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Demographic characteristics of pharmacists

A total of 160 questionnaires were distributed but 150 were retrieved thus giving a response rate of 93.75%. Cronbach's alpha value for the questionnaire showed modest level of internal consistency (0.628). There were more females (84, 56%) than males (66, 44%). The predominant age group was 31 to 40 years. Nearly half of the pharmacists have been in the practice for 5 to 10 years (42%) and most of them had no additional qualifications (60%) (Table 1).

Knowledge of cardiovascular disease

Knowledge about cholesterol and its influence in cardiovascular diseases was satisfactory as more than half (64.7%) of the respondents answered all knowledge questions correctly. However, scores were very low on questionnaire items relating to treatment targets for

Table 1. Socio-demographic characteristics of respondents N=150.

Item	N (%)
Gender	
Male	66 (44)
Female	84 (56)
Age	
25-30	41 (27.3)
31-40	52 (34.7)
41-50	36 (24.0)
Above 50	21 (14.0)
Number of years in practice	
<5years	52 (34.7)
5-10years	63 (42.0)
>10years	35 (23.3)
Number of years in place of employment	
<5 years	58 (38.6)
5-10 years	73 (48.7)
>10 years	19 (12.7)
Additional qualification	
None	90 (60.0)
Pharm D	30 (20.0)
M.Pharm	19 (12.7)
Ph.D.	2 (1.3)
FPC Pharm	7 (4.7)
Others	2 (1.3)

arthrogenic lipid fractions and side effects of statins (Table 2).

Proportion of pharmacists that answered knowledge questions correctly

Age, practice experience and additional qualifications were significantly associated with pharmacist’s knowledge of cholesterol (Table 3).

Attitude to cholesterol screening

The overall percentage positive response to questions reflecting a negative attitude to cholesterol screening was 42.9% indicating that nearly half of pharmacists had a negative attitude towards cholesterol screening. Affordability of the cholesterol screening equipment was not a major factor influencing this negative attitude as only 5.3% strongly agreed or agreed with the statement that they could not afford cholesterol meters. More than

half; 63.3% strongly agreed or agreed that cholesterol screening was not feasible in the pharmacy and that it should be left to laboratory scientists (63.9%). Details of pharmacist attitude with respect to cholesterol screening are shown in Table 4.

Resources for cholesterol screening

More than half of pharmacists surveyed (62%) were involved in blood pressure screening. Only 17 (11.3%) had cholesterol meters in the pharmacy and cholesterol screening was done by a very small percentage of pharmacists (9.3%). Majority (82%) of the pharmacists expressed a willingness to be trained in the use of cholesterol metre (Table 5).

DISCUSSION

The study population represented a wide variety of pharmacists’ cutting-across different age, gender, and

Table 2. Pharmacists knowledge of cholesterol as a risk factor for CVD; N= 150.

Knowledge questions	N (%)*
What is the major source of high level of cholesterol in humans	146 (84.0)
Which of the forms of cholesterol is most implicated in development of heart diseases in humans?	131 (87.3)
Cholesterol level can only be measured in the laboratory	96 (64.0)
The mainstay of drug therapy for high blood cholesterol is?	124 (82.7)
Dietary approach to reducing high cholesterol is not effective?	148 (98.7)
A high fiber diet is not helpful in lowering high cholesterol	148 (98.7)
The treatment benchmark for low density lipoprotein cholesterol (LDL) is?	46 (30.7)
For CV risk assessment only fasting serum cholesterol can be used	57 (38.0)
Conversion factor from mg/dl to mmol/L for total blood cholesterol level is?	76 (50.7)
The most common side effect of statins is?	22 (14.2)
Stanol esters/plant sterols can lower cholesterol levels	143 (95.3)
The highest level of cholesterol can be found in egg-white.	96 (64.0)
Which of the following type of cholesterol is cardio protective?	148 (98.7)
The treatment goal for total blood cholesterol level is?	52 (34.7)
The treatment goal for low density lipoprotein cholesterol (LDL) is?	45 (30.0)

Table 3. Pharmacist's knowledge scores stratified by age, gender, years of practice and additional qualifications.

Item	N (%)*	χ^2	Df	P value
Gender				
Male	66 (44)	2.620	4	0.623
Female	84 (56)			
Age				
25-30	41 (27.3)	85.023	12	0.000
31-40	52 (34.7)			
41-50	36 (24.0)			
Above 50	21 (14.0)			
Number of years in practice				
<5 years	58 (38.7)	44.126	8	0.000
5-10 years	73 (48.7)			
>10 years	35 (23.3)			
Additional qualification				
None	90 (60)	85.023	12	0.000
Pharm D	30 (20.0)			
M.Pharm	19 (12.7)			
Ph.D.	2 (1.3)			
FPC Pharm	7 (4.7)			
Others	2 (1.3)			

*Proportion of pharmacists that answered knowledge questions correctly.

experience in community pharmacy practice. There was predominance of females in the study population. This is in line with a similar study carried out in Great Britain in 2005 where it was observed that over 54.7% of practicing

pharmacists were of the female gender (Hassell and Eden, 2006).

More than half of community pharmacists were knowledgeable in relation to cholesterol and its influence

Table 4. Pharmacists’ attitude towards cholesterol screening.

Variable	Response [n (%)]					Positive (%)	M (Standard deviation)
	SA	A	U	D	SD		
High blood pressure should be more importantly considered than high blood cholesterol in heart disease	17 (11.3)	43 (28.7)	0 (0.0)	50 (33.3)	40 (26.7)	40.0	3.18 (1.626)
Cholesterol measurements are not feasible in community pharmacy setting	51 (34.0)	44 (29.3)	44 (29.3)	7 (4.7)	4 (2.7)	63.3	2.85 (1.340)
Measuring cholesterol in community pharmacy is very expensive	3 (2.0)	51 (34.0)	41 (27.3)	50 (33.3)	5 (3.3)	35.0	2.70 (1.330)
Measuring cholesterol in community pharmacy is time consuming	1 (0.7)	15 (10.0)	41 (27.3)	53 (35.3)	40 (26.7)	10.7	3.68 (1.172)
I would rather send my patients to the laboratory for cholesterol measurement	43 (28.7)	51 (34.0)	6 (4.0)	42 (28.0)	8 (5.3)	62.7	2.42 (1.347)
Measurement of cholesterol should be left to the physicians and laboratory scientists	46 (30.6)	50 (33.3)	0 (0.0)	14 (9.3)	40 (26.6)	63.9	2.71 (1.842)
I have better things to do than to measure blood cholesterol level	28 (18.6)	65 (43.3)	2 (1.3)	35 (23.3)	20 (13.3)	61.9	3.00 (1.566)
I cannot afford to acquire a meter for cholesterol measurement	3 (2.0)	5 (3.3)	3 (2.0)	76 (50.7)	63 (42.0)	5.3	4.26 (0.870)
Total % positive (M ± Standard deviation)	-	-	-	-	-	42.9	3.10 (±1.386)

Strongly agree (SA)=1; Agree (A)=2; 3=undecided (U)=3; disagree (D)=4; strongly disagree (SD)=5. Scale is 1-5; midpoint =3. Positive (%)=strongly agree plus agree.

on cardiovascular diseases. Pharmacists’ knowledge regarding the sources of cholesterol, forms of cholesterol, diet, cholesterol lowering therapies was quite impressive, with majority of the pharmacists selecting a statin as the first line agent for lowering high blood cholesterol line with the National Cholesterol Education Program guidelines (NCEP, 2002). However, pharmacists exhibited knowledge deficits in the following areas; treatment benchmark for LDL, treatment goal for total cholesterol, and treatment goal for LDL. This finding is similar to that of an Australian study (Lee et al., 2013). Also, knowledge of most common side effects associated with the use of statins was poor as more than half of the pharmacists chose gastric distress as a major side effect of statin therapy. Improved knowledge in these areas may facilitate improved case detection rates in the community through opportunistically testing selected patients presenting for a statin prescription. These findings might indicate a need for additional training and enlightenment of community pharmacists in Delta

State.

Nearly half of the community pharmacists had a negative attitude towards cholesterol screening. This finding is in contrast to results of a similar study involving 200 pharmacists in Iran which showed that majority (70.4%) of practicing pharmacists had an overall positive attitude to providing cholesterol screening services (Jahangard-Rafsanjani et al., 2014). This may be due to the poor resource availability profile of pharmacists surveyed in this study. Other barriers to cholesterol screening services observed from the Iranian study include a lack of regulatory policy and compensation mechanism, limited physical space in pharmacy, and time limitation. Even though there was a low level of involvement of community pharmacists in cholesterol screening in Delta State, practice experience and additional qualifications were significantly associated with higher knowledge and increased involvement in cholesterol screening. This finding is in contrast to other studies that show an inverse relationship between pharmacists practice experience and

knowledge (Ibrahim and Hussein, 2017; Khan and Azha, 2017).

The significant association between additional qualification and knowledge agrees with the findings of an Indian study that showed that pharmacists with additional qualifications were significantly more knowledgeable than those with basic pharmacy degree (Ahmad et al., 2013). The most common service rendered was blood pressure assessment. The frequency of blood glucose, weight assessment and cholesterol screening performed in the various pharmacy outlets were also very low. The aforementioned Iranian study showed that although two-third of the participants believed that well-trained pharmacists can effectively deliver such services in community pharmacies, cholesterol screening services were rarely provided in Iranian community pharmacies. In contrast to these findings, pharmacists in developed countries have been involved in cholesterol screening and cardiovascular risk assessment for decades (Blenkinsopp et al., 2003; Bluml et al., 2000). That

Table 5. Resource availability for cholesterol screening in pharmacies (N=150).

Variable	Response	n (%)
Please indicate which of the following test you perform in your pharmacy?	Blood pressure monitoring	93 (62.9)
	Glucose test	24 (16.0)
	Cholesterol test	14 (9.3)
	Body Mass Index	19 (12.7)
Do you have cholesterol metre in your pharmacy?	Yes	17 (11.3)
	No	133 (88.7)
Do you do cholesterol test/screening in your pharmacy?	Yes	17 (11.3)
	No	133 (88.7)
If No, how willing are you to acquire a cholesterol metre	Very willing	75 (50.0)
	Willing	49 (32.7)
	Not willing	26 (17.3)
Will you be willing to be trained in the use of cholesterol meter in your pharmacy	Yes	123 (82.0)
	No	27 (18.0)

majority of community pharmacists surveyed expressed willingness to be trained in the use of cholesterol meter is a clarion call to national pharmacy organizations to evolve, initiate and implement point of care training programs for pharmacists.

Conclusion

Pharmacist's knowledge about cholesterol and its influence in cardiovascular diseases was satisfactory. Pharmacists' attitude towards providing cholesterol screening services in community pharmacies in Delta State was largely negative and resource availability was poor. However, majority of the pharmacists surveyed expressed willingness to be trained in the use of cholesterol meter.

RECOMMENDATION

Community pharmacy-based cholesterol screening training model should be developed in order to improve participation, output and impact of pharmacists in disease screening activities and to increase opportunistic high cholesterol detection rates in the general population.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Ahmad A, Patel I, Balkrishnan R, Mohanta GP, Manna PK (2013). An evaluation of knowledge, attitude and practice of Indian pharmacists

- towards adverse drug reaction reporting: A pilot study. *Perspect. Clin. Res.* 4(4):204-210.
- Ahn E, Shin DW, Yang H, Yun JM, Chun SH, Suh B, Cho B (2015). Treatment Gap in the National Health-screening Program in Korea: Claim-based Follow-up of Statin Use for Sustained Hypercholesterolemia. *J. Korean Med. Sci.* 30(9):1266-1272.
- Almuti K, Rimawi R, Spevack D, Ostfeld RJ (2005) Effects of statins beyond lipid lowering: Potential for clinical benefits. *Int. J. Cardiol.* 109(1):7-15.
- Anderson TJ, Gregoire J, Hegele RA, Concutre P, John Mancini GB, McPherson R, Francis GA, Poirier P, Lau DC, Grover S, Genest J (2013) 2012 update of the Canadian Cardiovascular Society guidelines for the diagnosis and treatment of dyslipidemia for the prevention of cardiovascular disease in the adult. *Can. J. Cardiol.* 29(2):151-167.
- Assmann G, Schulte H, Funke H, von Eckardstein A (1998).The emergence of triglycerides as a significant independent risk factor in coronary artery disease. *Eur. Heart J.* 19(suppl M):M8-M14.
- Austin MA, Hokanson JE, Edwards KL (1998). Hypertriglyceridemia as a cardiovascular risk factor. *Am. J. Cardiol.* 81:7B-12B.
- Bitton A, Choudhry NK, Matlin OS, Swanton K, Shrank WH (2013). The impact of medication adherence on coronary artery disease costs and outcomes: a systematic review. *Am. J. Med.* 126(4):357-e7
- Blenkinsopp A, Anderson C, Armstrong M. (2003). Systematic review of the effectiveness of community pharmacy-based interventions to reduce risk factors for coronary heart disease. *J. Public Health Med.* 25:144-153.
- Bluml BM, McKenney JM, Cziraky MJ (2000). Pharmaceutical care services and result in Project Impact: Hyperlipidemia. *J. Am. Pharm. Assoc.*40:157-65.
- Bolli P (2014) Treatment of dyslipidemia- the problem of reaching the goal. *Atherosclerosis* 236(1):142-143
- Go AS, Mozaffarian D, Roger VL, Benjamin EJ, Berry JD, Blaha MJ, Dai S, Ford ES, Fox CS, Franco S, Fullerton HJ (2014) Heart disease and stroke statistics—2014 update: a report from the American Heart Association. *Circulation* 129(3):e28.
- Hassell K, Eden M (2006). Workforce update – joiners, leavers and practicing and non-practicing pharmacists on the 2005 Register. *Pharm. J. Vol.* 276.
- Hoerger T, Bala M, Bray JW, Wilcosky TC, LaRosa J (1998) Treatment patterns and distribution of low-density lipoprotein cholesterol levels in treatment-eligible United States adults. *Am. J. Cardiol.* 82(1):61-65.
- Ibrahim OM, Hussein1 RN (2017) Knowledge of pharmacists on proper use of oral contraceptive pills and missed dose instructions in United Arab Emirates Trop. *J. Pharm. Res.* 16(4):947-954

- Jahangard-Rafsanjani Z, Sarayani A, Javadi MR., Hadjibabaie M, Rashidian A, Gholami K (2014). Pharmacist's Attitudes and Perceived Barriers about Community Pharmacy-Based Cardiovascular Risk Screening Services. *J. Pharm. Care* 2(4):142-148.
- Joyce AW, Sunderland VB, Burrows S, McManus A, Howat P, Maycock B (2007). Community pharmacy's role in promoting healthy behaviors. *J. Pharmacy Pract. Res.* 37(1):42-44.
- Keys A, Menotti A, Aravanis C, Blackburn H, Djordjevic BS, Buzina R, Dontas AS, Fidanza F, Karvonen MJ, Kimura N, Mohacek I, Nedeljkovic S, Puddu V, Punsar S, Taylor HL, Conti S, Kromhout D, Toshima H (1984). The Seven Countries Study: 2,289 deaths in 15 years. *Prev. Med.* 13(2):141-54.
- Khan TM, Azhar S (2013). A study investigating the community pharmacist knowledge about the appropriate use of inhaler, Eastern Region AlAhsa, Saudi Arabia. *Saudi Pharm. J.* 21(2):153-157.
- Lee J, Matthew H, Damon B, Ines K, Gerald FW (2013). An audit of pharmacists' knowledge of familial hypercholesterolemia: Implications for community healthcare. *Australian Pharm.* 32(7):73-75.
- Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, Das SR, de Ferranti S, Després JP, Fullerton HJ, Howard VJ (2015a) – Heart Disease and Stroke Statistics – 2015 Update – A report from the American Heart Association. *Circulation* 2015, 131(4):e29-322. Available at: <https://uic.pure.elsevier.com/en/publications/heart-disease-and-stroke-statistics-2015-update-a-report-from-the>
- Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, Das SR, de Ferranti S, Després JP, Fullerton HJ (2015b). Erratum for Heart Disease and Stroke Statistics—2015 Update A Report From the American Heart Association. 2015 Jun 16; 131(24):e535. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26078378>
- MRC/BHF (2002) Heart Protection Study of cholesterol lowering with simvastatin in 20 536 high-risk individuals: a randomized placebo controlled trial. *Lancet.* 360(9326):7-22.
- NCEP (2002). Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Final Report *Circulation.* 106:3143, Available at: <https://www.ncbi.nlm.nih.gov/pubmed/12485966>
- Roebuck MC, Liberman JN, Gemmill-Toyama M, Brennan TA (2011) Medication adherence leads to lower health care use and costs despite increased drug spending. *Health Aff. (Millwood).* 30(1):91-99.
- Stamler J, Wentworth D, Neaton JD (1986). Is relationship between serum cholesterol and risk of premature death from coronary heart disease continuous and graded? Findings in 356 222 primary screenees of the Multiple Risk Factor Intervention Trial (MRFIT). *JAMA;* 256(20):2823-2828.
- Toth PP (2005). The 'good cholesterol': high-density lipoprotein. *Circulation,* 111(5):e89-e91.
- Wadhera RK, Steen DL, Irfan K, Giugliano RP, Foody JM. (2016) A review of low-density lipoprotein cholesterol, treatment strategies, and its impact on cardiovascular disease morbidity and mortality. *J. Clin. Lipidol.* 10(3):472-489
- World Health Organization (WHO) (2015). Fact sheet heart disease risk factors. Available at <http://www.who.int/mediacentre/factsheets/fs317/en>
- World Health Organization (WHO) (2014). The top 10 causes of death. Web site. <http://www.who.int/mediacentre/factsheets/fs310/en/>. Updated May 2014.
- SPSS, S. (2010). 19.0. 0 for Windows Software. SPSS Inc., IBM Company, USA.

African Journal of Pharmacy and Pharmacology

Related Journals Published by Academic Journals

- *Journal of Medicinal Plant Research*
- *African Journal of Pharmacy and Pharmacology*
- *Journal of Dentistry and Oral Hygiene*
- *International Journal of Nursing and Midwifery*
- *Journal of Parasitology and Vector Biology*
- *Journal of Pharmacognosy and Phytotherapy*
- *Journal of Toxicology and Environmental Health Sciences*

academicJournals