Original Article

Awareness of Physicians and Clinical Pharmacists About ACC/AHA Guidelines for Dyslipidemia Management: A Cross-Sectional Study

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ABSTRACT

Introduction: Cardiovascular diseases (CVDs) are one of the leading causes of morbidity and mortality worldwide. Although genetics could contribute to the incidence of CVD, they are mostly acquired conditions. Management of precipitating factors such as hyperlipidemia can prevent CVD. Therefore, clinical guidelines have been used as a tool to improve patient outcomes and minimize practice variation. **Objective:** The objective of this study was to assess health-care providers' (physicians and clinical pharmacists) awareness about the latest edition of the American College of Cardiology/American Heart Association (ACC/AHA) guidelines of dyslipidemia management. **Materials and Methods:** To meet the study objective, a self-administered questionnaire was designed based on the recommendations of the latest edition of the ACC/AHA guidelines for dyslipidemia management. After validation, the questionnaire was distributed to physicians and clinical pharmacists in Al-Ahsa province of Saudi Arabia. **Results:** Validation of the questionnaire was carried on 10 participants (Cronbach's alpha = 0.816). Seventy-seven participants completed the questionnaire (acceptance rate = 51.33%). The majority of participants knew about the release of the ACC/AHA 2013 guidelines for dyslipidemia (77% of the physicians and 48% of the clinical pharmacist). Inadequate knowledge of the major changes in the dyslipidemia management was observed in both study groups with no significant difference between them (the median score for physicians and pharmacists was 4 out of 10 with a range of 1–9, $Z = -0.15$, $P = 0.88$). **Conclusion:** Inadequate level of knowledge about practice-changing recommendations of the recent ACC/AHA guidelines for dyslipidemia management was observed among the study participants. This level of knowledge could result in clinical malpractice and worsen management outcomes. Thus, efforts should be in place to raise awareness about the evidence-based management of dyslipidemia and monitor compliance to guidelines and their implementation outcomes.

Keywords: *American College of Cardiology/American Heart Association, atherosclerotic cardiovascular disease, cardiovascular diseases, clinical pharmacists, dyslipidemia, guidelines, physicians*

Introduction

Globally, cardiovascular diseases (CVDs) are considered among the leading causes of death and disability.[1] The World Health Organization pointed out that ischemic heart disease (IHD) and stroke remained the top two leading causes of death globally for the last 15 years. IHD and stroke accounted for the death of 15.2 million people in 2016.[2] Although CVD can result from hereditary factors, it is most commonly an acquired condition. CVD risk factors include tobacco use,

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obesity, unhealthy diet, physical inactivity, high blood pressure, diabetes, and hyperlipidemia. Modification of these risk factors can significantly reduce the incidence of CVD.[3] Management of hyperlipidemia takes a pivotal role in different practice guidelines for primary and secondary prevention of CVD.[4-6] For Saudi Arabia, CVDs caused 37% of deaths in 2016.[7] A previous study showed a high prevalence of hyperlipidemia among both genders in Saudi Arabia, with a prevalence of 54% and 40.3% for hypercholesterolemia and hypertriglyceridemia, respectively.[8] Another study estimated the prevalence of hypercholesterolemia and borderline hypercholesterolemia among Saudis to be 8.5% and 19.6%, respectively.[9]

To minimize practice variation, clinical practice guidelines serve as an appropriate tool for decision-making. The objective of the guidelines was to improve patients' outcomes by shifting clinical practice to an evidence-based one.[10] Despite that different evidence-based guidelines for dyslipidemia treatment are available, there is a substantial gap between guidelines recommendations and real-world practice.[11,12]

Using data from randomized controlled trials (RCTs), systematic reviews, and meta-analyses of RCTs, the ACC and AHA have collaborated with the National Heart, Lung, and Blood Institute, other professional organizations, and stakeholders to develop clinical practice guidelines for accurate assessment of cardiovascular risk, lifestyle modifications needed to reduce cardiovascular risk, and management of blood cholesterol, overweight, and obesity in adults. There are major differences between these guidelines and the previous ones. Those differences are identification of four major statin-benefited groups, inability to find RCT-based evidence to support continued use of specific low-density lipoprotein cholesterol (LDL-C) and/or non-high-density lipoprotein cholesterol (HDL-C) treatment targets, the usage of the new pooled cohort equations to estimate 10-year atherosclerotic cardiovascular disease (ASCVD) risk in both white and black men and women, monitoring frequency of statin medications, and provision of expert guidance on management of statin-associated adverse effects.[4]

For Saudi Arabia, no national dyslipidemia guidelines have been published till date and the use of ACC/AHA guidelines is common. According to a recently published report, an expert panel considered the ACC/AHA guidelines to be "directly applicable" in the Saudi clinical settings.[13] To the best of our knowledge, no previous studies evaluated the awareness of physicians and clinical pharmacists with the practice-changing recommendations of the 2013 ACC/AHA guideline on dyslipidemia management. Thus, this study aimed at assessing the awareness and knowledge of physicians and clinical pharmacists about this guideline and the major differences in treatment and monitoring recommendations compared to previous ones.

Materials and Methods

Ethical approval

The study was approved and supported by a grant from the Deanship of Scientific Research, King Faisal University, Kingdom of Saudi Arabia. Before data collection, necessary approvals were obtained from participants' institutions, with consent from the participants as well.

Study design and study tool

A cross-sectional study was conducted from March to June 2014. For data collection purpose, a structured questionnaire was designed (Appendix 1). After documenting demographics (gender, age) and professional characteristics (specialty, years of experience) of the participant, 10 multiple-choice questions were formulated to meet the study objectives. The questions assessed participants' knowledge about the statin-benefited groups mentioned in the guidelines of interest, the new perspective on LDL-C and/or non-HDL-C treatment goals, the definition of ASCVD, the new Global Risk Assessment equations for ASCVD primary prevention, the aim and the frequency of monitoring lipid profile during treatment, their knowledge about the different intensities of statin therapy, determination of patient groups who are candidates for high-intensity statin therapy, the groups for whom the guideline has no clear recommendation with regard to statin use, and finally the release time of the most recent ACC/AHA guidelines.

Participants

The participants were licensed internists, cardiologists, critical care physicians, and clinical pharmacists recruited from three different governmental hospitals in Al-Ahsa province, eastern region of Saudi Arabia. These hospitals are the main health services providers to patients with CVD in the province. The data collection tool was first validated with 10 participants (5 physicians and 5 clinical pharmacists) before distribution to the other participants.

Analysis of results

To check for the reliability of the study instrument, the responses of the 10 participants involved in the validation phase were coded and Cronbach's alpha was calculated to measure the internal consistency with a

predetermined accepted range of 0.5–1.[14] A score out of 10 was calculated for each participant assuming that each right answer is equivalent to one point. An overall estimation of participants' knowledge was developed by calculating the means, standard deviations, medians, and ranges of scores for the whole study sample and each group as well. Means and standard deviations were used for continuous variables whereas numbers and percentages were reported for discrete ones. Being an ordinal variable, nonparametric tests were used to analyze scores (Mann–Whitney, Kruskal–Wallis, and Spearman rank) with a predetermined level of significance of alpha = 0.05 using version 13 of the statistical package of SYSTAT.

Results

After validation of the questionnaire with 10 participants (5 physicians and 5 clinical pharmacists), Cronbach's alpha was found to be 0.816. Then the questionnaire was distributed to 150 physicians and clinical pharmacists; 77 health-care providers accepted to participate in the study (response rate = 51.33%) with a completion rate of 100%. The demographics of participants are summarized in Table 1.

Of the 48 physicians participated, 23 (47.9%) were cardiologists, 21 (43.8%) were internists, and the remaining were critical care physicians.

For the knowledge assessment part of the questionnaire, the average score for study participants (n = 77) was 4.6 ± 2.1. For physicians, the average score was 4.4 ± 1.9. For pharmacists, it was 4.6 ± 2.4. The median score for both physicians and pharmacists was 4 with a range of 1–9. The distribution of scores among different specialties is summarized in Table 2.

The median score for cardiologists (median = 5, range = 3–9) was significantly different to other specialties (internists and other specialties' median = 4, range = 1–7; adjusted H = 7.81, P = 0.02). No significant difference was found between pharmacists' and physicians' scores (Z = −0.15, P = 0.88). However, female practitioners scored significantly higher than male practitioners (median score = 5 vs. 4, Z = −2.1268, P = 0.03). No significant correlation was found between the duration of practice experience and the total score (r = 0.047, P = 0.67). The questions that had the lowest percentage of right answers were about monitoring of statins, high-intensity statin group, and estimation of 10-year risk of ASCVD (9.1%, 28.6%, 33.8%). Table 3 shows the percentages of right answers for each topic assessed through the study questionnaire.

Table 1: Demographics of study participants

	Physicians (N = 48)	Clinical pharmacists (N = 29)
Gender		
Female, *n* (%)	13 (27)	12 (41.4)
Male, *n* (%)	35 (73)	17 (58.6)
Duration of practice experience (years), mean ± SD	11.3 ± 8.1	6.2 ± 5.3

Discussion

This study provides insight about recent dyslipidemia management updates awareness of clinical pharmacists and physicians from two major specialties (cardiology and internal medicine).

In this study, poor level of knowledge and awareness about the practice-changing recommendations in lipid management guidelines was observed. This finding is in line with the findings of Reiner *et al.*[15] where only half of the participating physicians use lipid management guidelines and their level of knowledge about them was not satisfactory.[15] Similarly, Heidrich

Table 2: Participants' distribution of scores according to their specialties

Score	Clinical pharmacists	Cardiologists	Internists	Critical care physicians
	n (%)	*n* (%)	*n* (%)	*n* (%)
1–3	13 (44.8)	2 (8.7)	10 (47.6)	1 (25)
4–6	8 (27.6)	14 (60.9)	10 (47.6)	2 (50)
7–9	8 (27.6)	7 (30.4)	1 (4.8)	1 (25)

Table 3: Percentage of right answers assessed through the study questionnaire

Topic assessed	Physicians' right answers (%)	Clinical pharmacists' right answers (%)
Statin-benefited groups	50	55
New perspective on LDL-C and/or non-HDL-C treatment goals	27.1	51.7
Definition of ASCVD	72.9	75.9
The new Pooled Cohort Equations	27.1	44.8
Monitoring lipid profile	25	27.6
Different intensities of statin	40.6	39.7
Groups with no clear recommendation in the guidelines	58.3	51.7
Release time of the most recent ACC/AHA guidelines	77.1	48.3

et al.[16] reported that only 63% of internists and 32% of general practitioners reported to initiate lipid-lowering and antihypertensive treatment according to guidelines. In the same context, Vashitz *et al.*[12] stated that only 36.9% of primary care physicians were compliant to lipid monitoring guidelines. Cardiovascular risk estimation was among the major knowledge weaknesses of the study participants. Eaton *et al.*[17] reported a similar result in a previous study as only 17% of the participating family physicians reported calculating the risk estimate for coronary vascular diseases.

According to the study findings, significant difference in the level of guidelines awareness and knowledge was found between physicians from different specialties. Similarly, Mosca *et al.*[18] reported that awareness and incorporation of CVD guidelines into practice among cardiologist and primary care physicians were significantly higher compared to other specialties. On the contrary, McBride *et al.*[19] demonstrated that there was no significant difference between internists and family practice physicians for adherence to lipid management guidelines. Despite the previously reported positive impact of clinical pharmacists' practices on lipid management and compliance to guidelines,[20-22] their level of knowledge did not differ significantly from physicians' in this study.

Study results showed that female practitioners' level of knowledge was superior to their male peers. This finding is consistent with what Borgès Da Silva *et al*.[23] concluded, where female physicians were more compliant to diabetes guidelines compared to males.

Several reports investigated the reasons for the gap between evidence-based guidelines recommendation and their implementation in clinical practice. Those reasons include physicians' limited of knowledge and familiarity, lack of agreement on guidelines recommendations, lack of access to the guidelines, inability to change the previous practice, lack of expected benefits and motivation, limited patients' involvement, time, and organizational constraints.[11,12,24-26]

This study is not free of limitations. Sampling method, small sample size, and response rate limit the generalizability of the study findings. Besides, the study did not involve primary care physicians and general practitioners who frequently manage patients with dyslipidemia. Moreover, the study focused only on the participants' knowledge about the practice-changing updates of the guidelines and did not investigate the participants' beliefs about the guidelines and the possible barriers to their implementation from participants' point of view. However, the significance of the study findings and its possible impact on the quality and outcomes of care provided to patients with dyslipidemia necessitate conducting larger studies and increasing the efforts to raise practitioners' awareness about the guidelines' practice-changing updates. Besides, quality improvement projects in various clinical practice settings should emphasize on developing local protocols to ease the implementation of guidelines, educating practitioners about practice-changing updates, and monitoring the compliance to guidelines and the outcomes of their implementation.

Conclusion

The results of this study showed sizable deficits in physicians' and clinical pharmacists' awareness about the ACC/AHA lipid management guidelines practice-changing updates. Therefore, efforts should be made to increase the awareness and to monitor the implementation of the guidelines.

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Conflicts of interest

There are no conflicts of interest.

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Appendix 1: Awareness of health-care providers about new guideline of dyslipidemia

- Age: ……
- Gender:
  - o Male
  - o Female
- Job:
  - o Physician
  - o Pharmacist
  - o Nurse
  - o Others
- Specialty:oInternal medicine
  - o Cardiologist
  - o Other (specify) _____
- When was the latest guideline for the management of dyslipidemia published?
  - o 2004
  - o 2010
  - o 2013
  - o 2014
- In the new guidelines, LDL goal for CARDIOVASCULAR DISEASE (CAD) and CAD equivalent is:
  - o <100 mg/dL
  - o <130 mg/dL
  - o <70 mg/dL
  - o No LDL target
- ASCVD term used in the new guidelines represents:
  - o Acute coronary syndrome or a history of MI, stroke, or TIA.
  - o Acute coronary syndrome or a history of MI, stable or unstable angina, coronary or other arterial revascularization.
  - o Acute coronary syndromes, or a history of MI, stable or unstable angina, coronary or other arterial revascularization, stroke, TIA.
  - o Acute coronary syndromes, or a history of MI, stable or unstable angina, coronary or other arterial revascularization, stroke, TIA, or peripheral arterial disease presumed to be of atherosclerotic origin.
- The equation used to estimate 10 years' risk equivalent:
  - o Framingham risk score
  - o Pooled cohort equation
  - o APACHE II
  - o Curb 65
- The major statin benefit groups were identified for whom the ASCVD risk reduction clearly outweighs the risk of adverse events:
  - o Individuals with clinical ASCVD
  - o Primary elevations of LDL–C >190 mg/dL
  - o Diabetes aged 40 to 75 years with LDL-C 70 to 189 mg/dL and without clinical ASCVD
  - o Without clinical ASCVD or diabetes with LDL-C 70 to 189 mg/dL and estimated 10-year ASCVD risk >7.5%
  - o 1 AND 2
  - o All of the above
- According to new guidelines, patients candidate for high-intensity statin are: (choose all correct)
  - o Clinical evidence of ASCVD regardless of age
  - o Clinical evidence of ASCVD with age <75 years
  - o Adults age >21 years and primary LDL–C ≥190 mg/dL
  - o All diabetic patients
- Monitoring LDL is used to asses:
  - o Adherence
  - o Efficacy of treatment
  - o Both
- Regarding recommendations for statin monitoring
  - o An initial fasting lipid panel followed by a second lipid panel 4–12 weeks after initiation, Thereafter, assessments should be performed every 3 to 12 months as clinically indicated.
  - o An initial fasting lipid panel followed by a second lipid panel 3 months after initiation, Thereafter, assessments should be performed every 6 months as clinically indicated.
  - o An initial fasting lipid panel followed by a second lipid panel 3 months after initiation, Thereafter, assessments should be performed every year.
- The intensity of statin used in the new guidelines is based on:
  - o Percentage of LDL reduction
  - o Percentage of C reactive protein reduction
  - o Ability to achieve target LDL
- The RCTs identified in the systematic evidence review indicated a consistent reduction in ASCVD events from statins therapy in secondary and primary prevention populations, with the exception of no ASCVD event reduction in those with:
  - o New York Heart Association (NYHA) class II-IV heart failure
  - o Maintenance hemodialysis
  - o Diabetic patient
  - o 1 and 2
  - o All of the above