JOURNAL OF BEHAVIORAL HEALTH, 2019
VOL 8, NO. 2, PAGE 35–40
10.5455/jbh.20180925070610

ORIGINAL RESEARCH

Open Access

Awareness of the atherosclerotic cardiovascular disease risk estimator among primary care physicians in a Medicare advantage plan

Scarlett Sossamon[1], Tara Esse[2], Omar Serna[2], Aisha Vadhariya[3], Sanika Rege[3], Marc Fleming[3], Susan Abughosh[3], Jeannie Choi[4]

[1]522 W 27th Street, Houston, TX

[2]Cigna-HealthSpring, Houston, TX

[3]College of Pharmacy, University of Houston, Houston, TX

[4]Sanofi, 55 Corporate Dr, Bridgewater, NJ

ABSTRACT

Background: The American College of Cardiology/American Heart Association (ACC/AHA) atherosclerotic cardiovascular disease (ASCVD) risk estimator, an online calculator tool for primary prevention, can aid providers in assessing the 10 year and lifetime risks for ASCVD. Primary care physician (PCP) awareness of the ACC/AHA ASCVD Risk Estimator has not been adequately examined.

Objective: To assess PCP awareness of the ACC/AHA ASCVD Risk Estimator.

Methods: A survey was administered to PCPs during the health plan provider network meetings in July 2016. The survey included questions regarding PCP awareness of the ACC/AHA ASCVD Risk Estimator as well as location and predominant socioeconomic status of the patient population. Demographic and practice variables, such as gender, race, ethnicity, age, years in practice, and specialty, were collected. Risk Estimator awareness was determined overall, and group differences by PCP and practice characteristics were examined using chi-square tests for categorical variables, and *t*-tests for continuous variables.

Results: A total of 214 out of 215 physicians from the health plan's Southwest and Southeast Texas regions completed the survey. Among those surveyed, 57% indicated awareness of the ASCVD Risk Estimator. PCP awareness was significantly associated with the patients' socioeconomic status, where physicians treating mostly the indigent patient population were more aware of the Risk Estimator compared to those treating mostly middle- and upper-class populations.

Conclusions: Over 40% of those surveyed were unaware of the ASCVD Risk Estimator, indicating a need for education among PCPs as it pertains to improving patient care in high-risk CVD patients.

ARTICLE HISTORY

Received September 25, 2018
Accepted March 20, 2019
Published April 20, 2019

KEYWORDS

ACC/AHA; ASCVD; guidelines; cardiovascular disease; risk estimator; primary care; awareness

Introduction

Cardiovascular disease (CVD) is the leading cause of death among Americans. One study estimates that, by 2030, over 40% of the US population will have some type of CVD. It has also been projected that total direct medical costs for CVD will escalate from $272.5 to $818.1 billion by 2030. Of total direct medical costs, the elderly population (65–79 years of age) account for nearly half of this estimate. With the increasing prevalence of CVD and mounting medical costs, efforts focusing on the prevention of this disease state are critically needed [1–4].

As a result of the high risk of atherosclerotic CVD (ASCVD), the American College of Cardiology (ACC) and the American Heart Association (AHA) created the Atherosclerotic CVD (ASCVD) Risk Estimator, an online calculator tool that inputs certain factors to estimate 10 year and lifetime risk of developing a primary ASCVD event (i.e., stroke, myocardial infarction, or death from coronary disease or stroke). Factors assessed in the ASCVD Risk

Contact Scarlett Sossamon snajera2323@gmail.com 522 W 27th Street, Houston, TX.

Estimator include gender, race, age, cholesterol levels, social history, past medical history, and blood pressure. The tool is based on the information from multiple community-based populations which can be used to estimate 10-year ASCVD risk, including populations such as African-Americans and non-Hispanic white men and women between the ages of 40 and 70 years. Furthermore, based on the calculated percentage risk, the ACC/AHA guidelines provide recommendations on statin therapy. For instance, a ≥7.5% 10-year ASCVD risk score is an indication to begin statin therapy in those aged 40–75 years. Assessing risk for ASCVD can help drive treatment decisions and can impact clinical outcomes [5–9].

The ASCVD Risk Estimator can assist healthcare providers in assessing a patient's 10 year and lifetime risk for primary ASCVD and aiding in the management of high-risk patients [10,11]. It can also assist the provider in facilitating a discussion focused on lifestyle recommendations, statin benefits, and education regarding CVD.

A survey of internal and family medicine physicians, cardiologists, and endocrinologists, conducted by Virani et al. focused on providers' understanding of the updated 2013 ACC/AHA cholesterol guidelines. The survey generated a strong response rate of 72.1% (543 of 725); however, only about 43% of providers in training and 48% of those in practice indicated they had actually read the guideline. The study also found that about 50% of physicians were unable to identify the four statin benefit groups, with a large proportion indicating they were unaware of the updated low-density lipoprotein treatment thresholds. In addition, most were unaware of the four outcomes assessed by the 10-year ASCVD risk equation [12].

Overall, variation in awareness of the ASCVD Risk Estimator by primary care physicians (PCPs) and practice characteristics has not been adequately examined. Therefore, the aim of this study was to investigate overall awareness of the ASCVD Risk Estimator among PCPs contracted within a Texas-based Medicare Advantage Plan (MAP). Group differences in awareness were also examined by physician gender, age, years of practice, race, location, ethnicity, specialty, and patient socioeconomic status. In addition, this study also aimed to examine differences in awareness of the risk estimator tool based on PCP and practice characteristics.

Methods

Study design and survey administration

A self-administered paper-based survey instrument was provided to PCPs contracted within a Texas-based MAP, who attended a mandatory quarterly meeting in their respective geographic locations during 2016. A cross-sectional analysis was performed using the collected data. For a higher response rate, the survey instrument was distributed on-site, and PCPs were requested to complete and return it before leaving the meeting. The survey instrument was distributed to PCPs practicing in the greater Houston (Southeast Texas) and Rio Grande Valley (Southwest Texas) regions; PCPs who did not either attend the meetings or fully fill out the survey were excluded from analysis. After the exclusions, a total of 214 surveys were included in the analysis.

Survey instrument

The survey instrument was developed as part of a larger study conducted by pharmacy outcomes researchers at the University of Houston College of Pharmacy and MAP clinical pharmacists. The study questions were based on the awareness-to-adherence model theoretical framework (Look for a ref for this framework). A group composed of MAP medical directors was assembled to evaluate content and face validity of the survey instrument prior to administration. The larger project intended to understand and improve physician awareness of the 2013 ACC/AHA cholesterol management guidelines. The survey instrument contained a total of 16 items with the following sections: patient socioeconomic status, PCP knowledge of the 2013 ACC/AHA guidelines, PCP perceptions of their clinical use of statins, and PCP awareness of the ACC Guideline Clinical phone application (app) and ASCVD Risk Estimator. For the purposes of this study, the primary focus was the section regarding awareness of the ASCVD Risk Estimator as shown in Figure 1. The results from the full study will be published elsewhere and further information will be provided upon request. The University of Houston Institutional Review Board approved the study prior to conducting the research.

The majority of the survey questions, included in the analysis, were designed on a 1–5 scale, where 1 indicated "Strongly Disagree" and 5 indicated "Strongly Agree [13]." One question captured the socioeconomic status of patients mostly seen by the

1. In your perception, which financial category best describes the majority of your [*MAP name*] patients?

☐ Upper Middle Class ☐ Middle Class ☐ Indigent (Medicaid, low income subsidy)

2. Please indicate your level of agreement with the statement below.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am aware of the online ACC/AHA ASCVD Risk Estimator	☐	☐	☐	☐	☐

Figure 1. Survey questions used in the analysis.

responding provider, and the patients were categorized into four groups: upper middle class, middle class, indigent, and other (Fig. 1). The indigent population was defined as having Medicaid or low-income subsidy.

Data extraction

After collecting the data, all the information from the filled-out surveys was extracted into a dataset. A search was initiated on the MAP's database and/or the Texas Medical board database to obtain other pertinent prescriber information. Prescriber demographic and practice characteristics were collected and recorded, including gender, race, ethnicity, age, years in practice, and specialty. The data were de-identified and analyzed by researchers at the University of Houston College of Pharmacy.

Statistical analysis

Physician's level of agreement with their awareness was dichotomized as "aware" *versus* "not aware," with a score ≤3 being classified as "not aware." A score of >3 was categorized as "aware." Descriptive statistics were used to describe physician demographic and practice characteristics. Chi-square tests were used to examine differences across the "aware" and "not aware" physician groups among categorical variables, such as sex, race, location, ethnicity, physician specialty, and patient socioeconomic status. A *t*-test was used to evaluate differences among continuous variables, such as age and years of practice. All data were first coded with Microsoft Excel prior to being analyzed using SAS 9.3 software (SAS Institute, Carey, NC).

Results

A total of 215 surveys were distributed, of which 214 (99.5%) were completed. One survey was excluded from analysis due to having been returned incomplete. Demographic and practice characteristics among PCPs surveyed are summarized in Table 1. The majority of physicians surveyed were non-Hispanic (62.6%) and male (71.5%), with an average age of 53 years [standard deviation (SD)= ±10.9]. PCPs who responded were mostly in the Southeast Texas region and had a background in family practice.

Of the 214 physicians that completed the survey, 124 (57.7%) were aware and 91 (42.3%) were not aware of the ASCVD Risk Estimator. Group differences in awareness by PCP demographic and practice characteristics are summarized Table 2. The socioeconomic status of the patients the physician mostly treated was significantly associated with awareness of the Risk Estimator (p <0.0012). The majority of PCPs (86.0%) treated the middle-class and indigent patient populations. After

Table 1. Demographic characteristics of surveyed primary care physicians.

Variable	*N* = 214
Gender, *n* (%)	
Male	153 (71.5)
Female	54 (25.2)
Mean age (±SD)	534 (±10.9)
Years of practice (±SD)	21 (±10.6)
Race, *n* (%)	
White	133 (62.1)
Black	15 (7.0)
Asian	39 (18.2)
Other	28 (13.1)
Location, *n* (%)	
Southwest Texas	66 (30.8)
Southeast Texas	149 (69.6)
Ethnicity, *n* (%)	
Non-Hispanic	134 (62.6)
Hispanic	81 (37.9)
Physician specialty, *n* (%)	
Internal medicine	65 (30.4)
Family practice	133 (62.1)
Financial category which best describes the majority of physician's patients, *n* (%)	
Other	23 (10.7)
Upper Class	2 (0.9)
Middle Class	83 (38.8)
Indigent	102 (47.7)

SD: standard deviation.

Table 2. Descriptive statistics among surveyed PCPs by awareness.

Variable	Aware (*N* = 124)	Not Aware (*N* = 91)	*p*-value
Gender, *n* (%)			
Male	89 (72.0)	64 (76.0)	0.54
Female	34 (28.0)	20 (24.0)	
Age, mean (±SD)	53.8 (±10.9)	53.8 (±10.8)	0.97
Years of practice, mean (±SD)	21.24 (±11.0)	21.49 (±10.2)	0.87
Race, *n* (%)			
White	72 (58.1)	61 (67.0)	0.30
Black	11 (8.9)	4 (4.4)	
Asian	26 (21.0)	13 (14.3)	
Other	15 (12.1)	13 (14.3)	
Location, *n* (%)			
Southwest Texas	38 (30.7)	28 (30.8)	0.98
Southeast Texas	86 (69.3)	63 (69.2)	
Ethnicity, *n* (%)			
Non-Hispanic	81 (60.5)	53 (39.6)	0.29
Hispanic	43 (53.1)	38 (46.9)	
Physician specialty, *n* (%)			
Internal Medicine	38 (32.8)	27 (32.9)	0.98
Family Practice	78 (67.2)	55 (67.1)	
Financial category which best describes the majority of physician's patients, *n* (%)			
Other	12 (9.9)	11(12.4)	
Upper Class	0 (0.0)	2(2.3)	
Middle Class	37 (30.6)	46 (51.7)	0.0012*
Indigent	72 (59.5)	30 (33.7)	<0.0001* (Fisher)

*Significant difference $p < 0.05$.
PCP = primary care physician; SD = standard deviation.

further analysis using the Fisher test, it was found that PCPs treating mostly indigent patients were more aware of the ASCVD Risk Estimator than those treating mainly upper middle class, middle class, and other. There were 102 (47.7%) physicians treating mostly an indigent patient population; of those, 72 (59.5%) were aware of the ASCVD Risk Estimator. Conversely, 83 (38.8%) PCPs documented that they primarily treat the middle-class population, with only 37 (30.6%) stating that they are aware of the ASCVD Risk Estimator. Only two physicians stated that they primarily treat the upper-class population, and neither PCP (0%) stated that they were aware of the Risk Estimator. Last, 23 (10.7%) PCPs were categorized as treating the "other" patient population, with 12 (9.9%) stating that they were aware of the ASCVD Risk Estimator.

Discussion

Our study analyzed the overall awareness of the ACC/AHA ASCVD Risk Estimator among PCPs and examined the differences in awareness based on PCP and practice characteristics. Nearly half of the physicians surveyed (42.3%) stated that they were aware of the Risk Estimator. The literature suggests that the estimation of cardiovascular risk by US physicians, particularly in the elderly patients, may be suboptimal [14]. One study reports that by using the 2013 ACC/AHA guidelines, which encompasses the ASCVD Risk Estimator, 32.4% statin-eligible patients who were not currently receiving statin therapy were identified [15]. The ACC/AHA ASCVD Risk Estimator, if used appropriately, can aid providers in managing and estimating the risk of patients developing ASCVD, especially in elderly individuals who deal with multiple comorbidities

[16]. Efforts to increase the awareness of this tool among practicing physicians may be beneficial in improving patient care in this high-risk population.

With the growing prevalence of CVD and the increasing complexity of patient cases, there is a need for additional resources to aid providers in caring for these patients. As new online resources and tools are developed, educational training can aid physicians in explaining how to use the tool, highlighting its benefits and limitations [10,17]. Educational training can include anything from handouts that explain in-detail about the tool to webinars that go over a disease state and how the tool can aid providers in their practice, using case examples to help visualize the tool application.

This study showed that the majority of PCPs who were aware of the ACC/AHA ASCVD Risk Estimator mainly treat the indigent population. In comparison, among physicians treating mainly upper-middle-class and middle-class populations, the majority of physicians were unaware of the Risk Estimator. One study suggested that people in lower socioeconomic status groups had the most significant burden of illness and, as their cases may be more complex, physicians may be looking for ways to better manage their high-risk patients, which may be linked to greater awareness of the Risk Estimator [18–20]. Further research is needed to ascertain the reasons for this discrepancy and to ensure that all physicians are aware of this tool regardless of their patient socioeconomic status. No other differences in awareness with physician or practice characteristics were documented in this study, including sex, age, years of practice, location, ethnicity, and specialty.

The ASCVD Risk Estimator is a valuable online tool that can improve patient care and potentially lead to better health outcomes. Efforts to raise awareness, as well as increase the use of the online tool, are greatly needed.

Further research is needed in order to understand how to increase the overall awareness and use of clinical decision-making tools like the ASCVD Risk Estimator among PCPs, as well as to promote the ways in which such tools can improve patient outcomes.

In addition, while our study did not focus on provider perceptions of the guidelines, a study by Jamé et al. published in 2015 found that many PCPs were aware of the ACC/AHA guidelines, but a considerable proportion were not implementing them into their clinical practice. The researchers concluded that understanding PCP perceptions and wishes is important when developing strategies centered on ACC/AHA guideline integration [21]. Another study also noted that physicians were reluctant in embracing the new ACC/AHA guidelines [22]. Keeping this in mind, PCP views of the guidelines must be taken into consideration when developing educational materials regarding the adoption of tools like the ASCVD Risk Estimator.

Limitations

This study contains some limitations. First, the study was limited to PCPs in the Southeast and Southwest Texas areas participating in the health plan MAP network. This limits its generalizability to different regions and populations. Second, only a select number of PCPs were able to take the survey, as some physicians could not attend the meeting to complete it. Finally, the survey only assessed awareness of the ASCVD Risk Estimator but did not evaluate the actual use of it. Also, PCP perception of the ACC/AHA guidelines was not assessed, which could play a role in their adherence to guideline recommendations and can certainly impact the use of tools such as the ASCVD Risk Estimator.

Conclusion

This study is believed to be one of the first studies of its kind to investigate the overall awareness of the ASCVD Risk Estimator by PCPs, as well as to examine whether awareness was influenced by PCP and patient characteristics. Overall, the study had several important findings. First, of the PCPs surveyed, nearly half (42.3%) were found to be unaware of the ACC/AHA ASCVD Risk Estimator, indicating a need for education among physicians. In addition, PCPs treating indigent CVD patients may be more aware of the Risk Estimator because they may be treating more high-risk patients and are looking for tools to aid them in their management. Further research is needed to increase the overall awareness and use of clinical decision-making tools like the ASCVD Risk Estimator among PCPs, as well as to promote the ways in which such tools can improve patient outcomes.

Funding Source

Support for this project was provided by Sanofi and Regeneron Pharmaceuticals Inc.

Author Disclosure Statement

Dr. Sossamon was a pharmacy resident at Cigna HealthSpring. Dr. Esse and Dr. Serna were employees

of Cigna HealthSpring and are currently employees of CareAllies. Ms. Vadhariya and Ms. Rege are graduate students at the University of Houston. Dr. Fleming was a professor at the University of Houston, and is currently a professor at the University of North Texas System College of Pharmacy. Dr. Abughosh is a professor at the University of Houston. Dr. Choi is an employee and has stock options of Sanofi.

Authors' contribution

Susan Abughosh, Tara Esse, Mark Fleming, Omar Serna, and Scarlett Sossamon contributed to the study design. Scarlett Sossamon collected the data. Susan Abughosh, Aisha Vadhariya, Sanika Rege, and Scarlett Sossamon performed the data interpretation. Scarlett Sossamon wrote the manuscript along with Tara Esse, and all authors contributed to the revision of the manuscript. Support for this project was provided by Sanofi and Regeneron Pharmaceuticals Inc.

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