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Shared decision making and patient reported outcomes among adults with atherosclerotic cardiovascular disease, medical expenditure panel survey 2006–2015



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A B S T R A C T

Importance: Shared decision-making (SDM), one of the pillars of patient centered care is strongly encouraged and has been incorporated into the management of atherosclerotic cardiovascular disease (ASCVD) but the expansion of its use has been limited

Objective: To determine the association of SDM on patient-reported health status, measures of quality of care, healthcare resource utilization, and healthcare spending among US adults with ASCVD

Method: This is a retrospective cohort study in an ambulatory setting, utilizing the Medical Expenditure Panel Survey (MEPS) 2006–2015. Analysis completed in December 2020. Participants included were adults 18 years and over with a diagnosis of ASCVD. We used the average weighted response to self-administered questionnaire evaluating shared-decision-making process as the exposure variable in the regression model. Outcome measures included inpatient hospitalizations, Emergency Department (ED) visits, statin and aspirin use, self-perception of health, and healthcare expenditure

Results: When compared with individuals reporting poor SDM, those with optimal SDM were more likely to report statin and aspirin use [statin use, Odds Ratio (OR) 1.26 (95% CI, 1.09–1.46)], [aspirin use, 1.25 (1.07–1.45)], more likely to have a positive perception of their health and healthcare related quality of life, and were less likely to visit the ED [OR for ≥ 2 ED visits: 0.81 (0.67–0.99)]. There was no difference between groups in annual total or out of pocket healthcare expenditure

Conclusion: This study suggests that effective SDM is associated with better utilization of healthcare resources and patient reported health outcomes. We hope these results could provide useful evidence for expanding the use of SDM in patient-centered care among individuals with ASCVD

1. Introduction

Shared decision-making (SDM), one of the pillars of patient centered care is strongly encouraged and has been incorporated into the management of atherosclerotic cardiovascular disease (ASCVD). [Boston Scientific [1]net] 2020, [2] SDM and patient-clinician risk communication, previously encouraged for the purpose of preserving patient autonomy, [3] is now also thought to have a positive relationship with medication adherence and other patient related health outcomes. [4] This is particularly important among individuals with chronic diseases like ASCVD where there is a high risk of readmissions, increased health care spending, morbidity and mortality. However, adoption of SDM tools into

routine clinical practice remains inconsistent and guidance on the practical application of these tools is limited. [5] Furthermore, paucity of evidence on the association of SDM with behavioral, economic, and psychosocial outcomes, particularly among cardiovascular disease patients may be contributing to the sluggish adoption of these SDM tools into cardiovascular practice. In this study, we determined the association of SDM on patient-reported health status, measures of quality of care, healthcare resource utilization, and healthcare spending among a nationally representative sample of adults with established ASCVD in the United States. We hypothesized that these results could provide useful evidence for expanding the use of SDM in patient-centered care among individuals with ASCVD.

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2. Methods

Data from the 2006–2015 Medical Expenditure Panel Survey (MEPS), a nationally representative US sample were used. Adults ≥ 18 years with a diagnosis of ASCVD (coronary heart disease, peripheral arterial disease, or cerebrovascular disease), ascertained by International Classification of Diseases, Ninth Revision, Clinical Modification codes, or by self-report, were included. The MEPS contains various files with unique information peculiar to each individual included in the dataset. Using personal identifiers, we merged the full year consolidated file with the medical conditions and prescribed medicine file to obtain detailed information on individuals included in the study. Given that this study was conducted using a publicly available de-identified dataset (sponsored by the Agency for Healthcare Research & Quality, AHRQ), it did not require IRB approval. To account for survey non-response in the total survey population, the AHRQ researchers assigned person weights and variance estimation stratum to each respondent. Details of this process have been described elsewhere. [6]

To assess the decision-making process between patient and their clinicians, we summed the responses to the 4 SDM related questions which were assigned a numerical score and subsequently developed an average weighted response labeled as: 1- indicating poor SDM, 2- indicating an average SDM, and 3 indicating optimal SDM (see footnote of Table 2). [7]

Two-part econometric model and regression models, when appropriate, were used to compare the extent of SDM among individuals with ASCVD on outcome measures including inpatient hospitalizations, Emergency Department (ED) visits, statin and aspirin use, self-perception of health, healthcare related quality of life and healthcare expenditure (Table 2).

3. Results

The study sample consisted of 16,218 MEPS participants (47% women), translating into 14.8 million US adults with ASCVD (Table 1). As shown in Table 1, 9.2% of non Hispanic whites reported poor SDM. A higher percentage of Blacks (11.5%), Asians (13.5%) and Hispanics (12.8%) reported poor SDM. While 8% of high income earning individuals reported poor SDM, over 13% of those earning very low income endorsed poor SDM between them and their clinicians (Table 1).

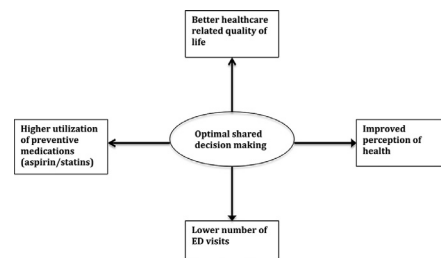
When compared with individuals reporting poor SDM, those with optimal SDM were more likely to report statin and aspirin use [statin use, Odds Ratio (OR) 1.26 (95% CI, 1.09–1.46)], [aspirin use, 1.25 (1.07–1.45)], more likely to have a positive perception of their health and healthcare related quality of life, and were less likely to visit the ED [OR for ≥ 2 ED visits: 0.81 (0.67–0.99)]. There was no difference between groups in annual total or out of pocket healthcare expenditure (Table 2).

The results were also similar on further stratification by sex and race/ethnicity. There was no interaction between sex or race/ethnicity and shared decision making on the outcomes analyzed in this study.

4. Discussion

Among individuals with ASCVD, compared with poor SDM, optimal SDM was associated with increased utilization of guideline therapy for secondary prevention of ASCVD, lower frequency of ED visits, improved perception of health and healthcare related quality of life, without any significant influence on healthcare expenditure (central illustration). These results further support the implementation SDM as a quality improvement intervention, especially among high-risk patients such as those with ASCVD.

An intricate patient-clinician relationship, patient education on self management and patient engagement in clinical decision making, complement each other and are thought to potentially improve health outcomes among individuals with chronic diseases. [2] This improves an



individual's risk perception and gives patients the opportunity to express their personal views about different treatment modalities, make informed decisions in a collaborative manner about chosen clinical therapies that most align with their beliefs and personal preferences. [2]

The American Heart Association and the American College of Cardiology emphasize SDM in the clinical guidelines for lipid management, choice of intervention for valvular heart disease, therapies for atrial fibrillation, and management for stable coronary artery disease. Nonetheless, some of the barriers to the global adoption of SDM include time constraints during routine clinical visits, limited availability of standardized decision aid tools that could be integrated into routine workflow, and balancing the trade off between potential clinical benefit and a patient's preferences, especially with complex cardiovascular disease patients. [8]

Promoting mobile health technology and improving patient access to these technological advancement in healthcare is thought to be one of the ways to improve patient education and engagement, patient-clinician communication, to ultimately promote adherence, quality of life, perception of health and provide cost effective healthcare services among high risk individuals like those with ASCVD. [8, 9, 10, 11] This is particularly important in the current digital world, with the exponential growth of virtual medicine. However, at least 15% of Americans lack access to the internet, or have little interest in mobile health technology. This is largely affected by age (elderly), low socioeconomic status and ethnic minorities, [12] which are some of the individuals at the highest risk for adverse outcomes among those with ASCVD.

This study has some limitations; given that some of the variables used from the MEPS are self-reported, there is a potential for recall bias. Since there is no standardized definition for SDM, different weightages and scoring systems may influence the association with the outcomes of interest. Assessment of SDM and outcomes was performed simultaneously and therefore, temporal association between SDM and outcomes could not be ascertained. Finally, it is difficult to tell from the dataset if the responses to the SDM questions were for the same clinician, a primary care or a cardiology outpatient visit.

In conclusion, our findings contribute to the growing body of evidence, suggesting that effective SDM is associated with better utilization of healthcare resources. We hope that these findings will encourage policy makers to further promote the utilization of SDM aids and tools, given its potential to improve health outcomes. A randomized control trial to evaluate the effect of SDM on patient reported outcome may be a valuable next step that could potentially promote the adoption of SDM as an important tool in the healthcare delivery process.

Declaration of Competing Interest

None of the authors reported any conflicts of interest.

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Table 1
Weighted Sample Socio-Demographic Characteristics and Shared Decision-Making Reported among US Adults, 18 years and older, with ASCVD.

	Shared Decision Making			P-value
	Poor	Average	Optimal	
Prevalence	10% (1622 individuals representing 1.5 million US adults)	43% (6974 individuals representing 6.4 million US adults)	47% (7622 individuals representing 6.9 million US adults)	
<i>Age groups (weighted%)</i>				
18–39	13.3%	41.9%	44.8%	0.008
40–64	11.0%	42.3%	46.7%	
65–74	8.8%	42.4%	48.8%	
≥75	9.1%	44.5%	46.4%	
<i>Race/ethnicity (weighted%)</i>				
Non-Hispanic White	9.2%	42.7%	48.1%	<0.001
Black	11.5%	42.8%	45.7%	
Asian	13.5%	49.1%	37.4%	
Hispanic	12.8%	44.0%	43.2%	
<i>Sex (weighted%)</i>				
Female	9.7%	44.0%	46.3%	0.15
Male	10.1%	42.1%	47.8%	
<i>Insurance status (weighted%)</i>				
Uninsured	13.5%	45.5%	41.0%	<0.001
Private	9.5%	41.7%	48.8%	
Medicaid	13.2%	43.3%	43.5%	
Medicare	9.5%	43.4%	47.1%	
<i>Level of income (weighted%)</i>				
High	8.1%	42.3%	49.6%	<0.001
Middle	10.0%	43.0%	47.0%	
Low	9.0%	44.9%	46.1%	
Poor/very low	13.4%	42.5%	44.1%	
<i>Education (weighted%)</i>				
Less than high school	11.5%	42.8%	45.7%	0.008
High school or equivalent	10.4%	44.7%	44.9%	
Some college or higher	8.6%	42.2%	49.2%	
<i>Region (weighted%)</i>				
Northeast	10.1%	42.8%	47.1%	<0.001
Midwest	8.0%	44.2%	47.8%	
South	10.1%	40.9%	49.0%	
West	11.7%	46.5%	41.8%	

Table 2
Shared Decision Making and Patient Reported Outcomes Among Adults with Atherosclerotic Cardiovascular Disease.

	Poor Shared Decision Making	Average Shared Decision Making	Optimal Shared Decision Making
Odds Ratios (95% CI)			
Medication Usage			
On statin therapy	Ref	1.32 (1.13–1.56)	1.26 (1.09–1.46)
On aspirin therapy	Ref	1.15 (1.01–1.33)	1.25 (1.07–1.45)
Health Resource Utilization			
2 or more ED visits	Ref	0.84 (0.70–1.01)	0.81 (0.67–0.99)
2 or more hospitalizations	Ref	0.97 (0.77–1.23)	1.08 (0.85–1.36)
Patient Perception of General Health			
Positive perception of health status	Ref	1.27 (1.07–1.51)	1.39 (1.17–1.65)
Adjusted mean difference (95% CI)			
Healthcare-Related Quality of Life			
SF-12 PCS	Ref	0.79 (–0.09 to 1.68)	0.94 (0.05 to 1.83)
SF-12 MCS	Ref	1.85 (0.99 to 2.70)	2.71 (1.82 to 3.59)
Expenditures in US \$\$ (95% CI)			
Adjusted mean annual healthcare expenditures	\$9780 (8735 to 10,825)	\$10,335 (9620 to 11,050)	\$10,796 (10,057 to 11,534)
Mean difference in annual healthcare expenditures	Ref	\$555 (–559 to 1669)	\$1016 (–75 to 2106)
Adjusted mean OOP annual healthcare expenditures	\$1076 (966 to 1187)	\$1179 (1078 to 1280)	\$1187 (1104 to 1270)
Mean difference in annual OOP healthcare expenditures	Ref	\$103 (–23 to 228)	\$111 (–16 to 238)

*OR: Odds ratio, adjusted for age, sex, race/ethnicity, level of income, health insurance, modified Charlson Comorbidity Index (without the cardiovascular component), cardiovascular risk factors.

Abbreviations; SF-12, 12-item short form; PCS, physical component score; MCS, mental component score, CI, confidence interval; ASCVD, atherosclerotic cardiovascular disease, OOP, out of pocket; ED, Emergency Department.

*Perception of health was assessed using the MEPS questionnaire on how participants self rated their health from 0 (poor) to 5 (excellent).

*Shared Decision Making questionnaire:

Does your provider ask/ show respect for medical, traditional and alternative treatments that the person is happy with? 1-never/sometimes, 2-usually, 3-always.

Does your provider ask you to help make decisions between choices of treatments? 1-never/sometimes, 2-usually, 3-always.

Does your provider present and explain all options to you? 1-no, 2-yes.

Does your provider ask about prescription medications /treatments other doctors may give you? 1-no, 2-yes.

Final composite SDM score ranged from 4 – 10, an average was developed; score of 1 was labeled 1-poor SDM, >1–2 labeled as 2-average SDM, >2 was labeled as 3-optimal SDM.

Steering Committee Member: Patient and Provider Assessment of Lipid Management (PALM) registry (no financial remuneration)

Authorship contributions

Victor Okunrintemi: Concept, draft and data analysis
 Javier Valero-Elizondo: Assisted in data analysis and editing the draft
 Neil J. Stone: Review and draft edit
 Ron Blankstein: Review and draft edit
 Michael J. Blaha: Review and draft edit
 Martha Gulati: Review and draft edit
 Salim S. Virani: Review and draft edit
 William A. Zoghbi: Review and draft edit
 Erin D. Michos: Review and draft edit
 Khurram Nasir: Concept, review and overall supervision

Central illustration

Shared decision making and patient reported outcomes among individuals with atherosclerotic cardiovascular disease

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