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LIPID ABNORMALITIES AND CARDIOVASCULAR PREVENTION (G DE BACKER, SECTION EDITOR)

Shared Decision-Making and Patient Empowerment in Preventive Cardiology

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Abstract Shared decision-making, central to evidence-based medicine and good patient care, begins and ends with the patient. It is the process by which a clinician and a patient jointly make a health decision after discussing options, potential benefits and harms, and considering the patient's values and preferences. Patient empowerment is crucial to shared decision-making and occurs when a patient accepts responsibility for his or her health. They can then learn to solve their own problems with information and support from professionals. Patient empowerment begins with the provider acknowledging that patients are ultimately in control of their care and aims to increase a patient's capacity to think critically and make autonomous, informed decisions about their health. This article explores the various components of shared decision-making in scenarios such as hypertension and hyperlipidemia, heart failure, and diabetes. It explores barriers and the potential for improving medication adherence, disease awareness, and self-management of chronic disease.

Keywords Shared decision-making · Patient empowerment · Preventive cardiology · Cardiovascular prevention · Atherosclerotic cardiovascular disease

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Introduction

Shared decision-making and patient empowerment involve several key steps. Risk communication is an essential component of shared decision-making and patient empowerment in the primary prevention of atherosclerotic cardiovascular disease (ASCVD). Clear and accurate risk communication is critical to successfully conveying the future probability of a heart attack or stroke. This may help motivate adherence to healthy lifestyle and behavioral changes. This process is challenging when individuals lack insight into their disease. Acknowledging and helping the individual resolve this barrier can help foster the development of an informed, shared decision about best management strategies [1, 2•, 3].

Encouraging patient engagement with healthcare beyond the clinic setting can help patients develop an understanding of the intricate inter-relationship of lifestyle choices, medications, and disease. For example, self-monitoring of blood pressures in hypertensive patients is one intervention that has been shown to enable behavioral changes and bridge gaps in the traditional patient-clinician relationship. Patients who monitor their own blood pressures demonstrate improved medication adherence and healthier lifestyle choices [4]. Not only does self-monitoring provide a more complete picture of blood pressure variability than do clinic measurements, but it also gives patients insight into their condition. Patients are able to directly observe the relationship between their blood pressure, symptoms, and actions (such as medication adherence and dietary choices) and are able to identify self-management strategies that best reflect their priorities. By demonstrating direct causal relationships through immediate feedback, self-monitoring improves adherence to medications and lifestyle changes.

In order to improve chronic disease outcomes, it is essential to identify and resolve barriers to successful outpatient management of conditions. The PARTNER framework [5•] summarizes the factors that providers reported were necessary for effective collaboration in the goal of blood pressure control. These care management functions include the following: (1) partnering with patients, providers, and the community; (2) arranging follow-up care; (3) resolving barriers to adherence; (4) tracking treatment response and progress; and (5) educating and engaging patients in self-management. The PARTNER framework offers a checklist of care management functions that can help promote successful collaboration between doctors and patients. By targeting and optimizing these variables, it may be possible to achieve more rapid blood pressure control.

Personalized communication is one strategy that has been shown to facilitate risk factor optimization. In the COACH study (Coaching Patients On Achieving Cardiovascular Health), patients received regular personal coaching via telephone and mailings to achieve the target levels for their particular coronary risk factors. This was a highly effective strategy for reducing risk factors in patients with coronary heart disease [5•]. Similarly, in the TEXT ME study (Tobacco, Exercise and Diet Messages trial), patients with cardiovascular risk factors were randomized to receive four text messages per week for 6 months in addition to usual care or usual care without additional communication [6••]. These text messages contained advice, motivational reminders, and encouragement to change lifestyle behaviors. The study found that the group receiving text messages had significant reductions in LDL-C, systolic blood pressure, BMI, and smoking, and significant increases in physical activity as compared to the control group. These studies demonstrate that actively engaging patients in care and guiding them through their treatment can facilitate empowerment and increase success in cardiovascular risk reduction.

Self-management education represents another strategy to encourage patient engagement and improve health outcomes. Self-management education is very different from traditional patient education: while traditional patient education offers information and technical skills, self-management education teaches patients problem solving skills (Table 1). While traditional patient education defines the problems, self-management education allows patients to identify their own problems and provides a flexible framework for decision-making that can be adapted in real-time to changing circumstances. Self-management education complements, rather than replaces, traditional patient education [2•].

Patient Empowerment and ACC/AHA Cholesterol Guidelines

The American College of Cardiology/American Heart Association released updated guidelines in 2013 for the treatment of cholesterol and reduction of ASCVD risk. A central feature of these guidelines is the clinician-patient risk discussion. Designed for lower risk primary prevention individuals especially, this recognizes that despite high quality evidence for statin therapy in patients at elevated risk of ASCVD, shared decision-making is still essential in initiating statin therapy. This approach recognizes the impact of shared decision-making and patient engagement on medication adherence and overall health outcomes. The 2013 ACC/AHA guidelines endorse the view that “guidelines must not replace clinicians’ compassionate and mindful engagement of the patient in making decisions together. This is appropriate practice] of evidence based medicine” [7•].

During the clinician-patient risk discussion (Fig. 1), it is essential to communicate that an individual’s risk estimate, calculated based on the ASCVD risk estimator app (via pooled cohort equations), is a group average from a representative sample. Patients must understand that factors unique to each individual may alter the risk estimate in ways that are difficult to quantify. Thoughtful engagement and discussion of each patient’s unique risk factors such as a possible family history of premature cardiovascular disease in one or more relatives is the best strategy to reduce risk. The discussion should center on reviewing lipids and addressing treatable non-lipid risk factors, endorsing healthy lifestyle modifications in the realm of diet and exercise, and providing necessary advice and materials to enact these changes.

When recommending statins as first-line therapy, it is appropriate to discuss the expected reduction in risk of heart attack and stroke, as well as the possibility of adverse effects and drug-drug interactions. In addressing statin adverse effects, clinicians may choose to explore the 5Ms: metabolism, muscle, medication interactions, major organ effects, and memory [8]. This discussion should take place within the broader context of patient preferences. Throughout the discussion, the clinician should invite the patient to ask questions and express values and lifestyle considerations [9••]. An ideal clinician-patient risk discussion weighs expected benefits and risks, conveying the concept of net benefit. Moreover, if the risk decision is uncertain over a broad range of ASCVD risk, additional factors that contribute to net reclassification (improving the risk score) can be used to inform such a decision. The guidelines proposed family history of premature ASCVD, coronary artery calcium score $\geq$300 Agatston units, hs-CRP$\geq$2 mg/L, and ankle brachial index <0.9. An LDL-C$\geq$160 mg/dl or an unusually high lifetime risk can be similarly used as well.

Patient Empowerment and Heart Failure

Heart failure has an extremely high rate of readmission after hospitalization, with up to 44 % of patients re-hospitalized

Table 1 Self-Management versus traditional management education

	Self-Management	Traditional management
Focus	Patient-specified problems	Provider-defined problems
Tailoring	Self-tailoring (patient collects data and changes their own regimen)	Provider collects data from patient and changes their regimen
Underlying hypothesis	Change in self-efficacy leads to change in health status	Change in health behaviors lead to change in health status
Metric	Self-reported level of health and functional status	Patient's adherence to prescribed regimen

within 6 months of discharge [10, 11]. A randomized trial assessing an education and support intervention showed increased patient adherence, significantly reduced 1-year readmission/mortality and costs of care for patients with heart failure [12]. The study focused on the five sequential care domains for chronic illness: (1) patient knowledge of the illness, (2) relation between medication and illness, (3) relation between health behaviors and illness, (4) knowledge of early signs and symptoms of decompensation, and (5) knowledge of where and when to obtain assistance.

During the initial phase, an experienced cardiac nurse provided patient education and made home visits for those patients who were unable to regularly travel to the hospital. The nurse conducted an hour-long face-to-face session within 2 weeks of hospital discharge using a teaching booklet. During the subsequent telemonitoring phase, patients were contacted by phone on a weekly basis for 4 weeks, then biweekly for 8 weeks, and then monthly for a total intervention period of 1 year. These call reinforced domains but did not modify medication regimens or provide treatment recommendations.

The study showed that education and support interventions alone without further medical management were highly effective in reducing readmissions and in-hospital costs of heart failure patients. The percentage of patients with all-cause readmission was reduced by 30 % and by as much as 40 % for heart failure-related readmission [10].

Another study that assessed the effects of telephone-delivered supportive counseling showed improvement in outcomes in patients with heart failure. Benefits were apparent in domains of purposeful participation in goal attainment, self-management of heart failure, and perception of functional health [13]. The telephone-delivered empowerment focused on patients' self-identified priorities. The goal of the intervention was to foster a sense of self-efficacy in enacting change and attaining self-management goals. A standardized script was developed to guide the nurse calls. The telephone-delivered empowerment intervention began 1–3 days after discharge from the hospital and recurred at 2,4,6,8, and 12 weeks after discharge.

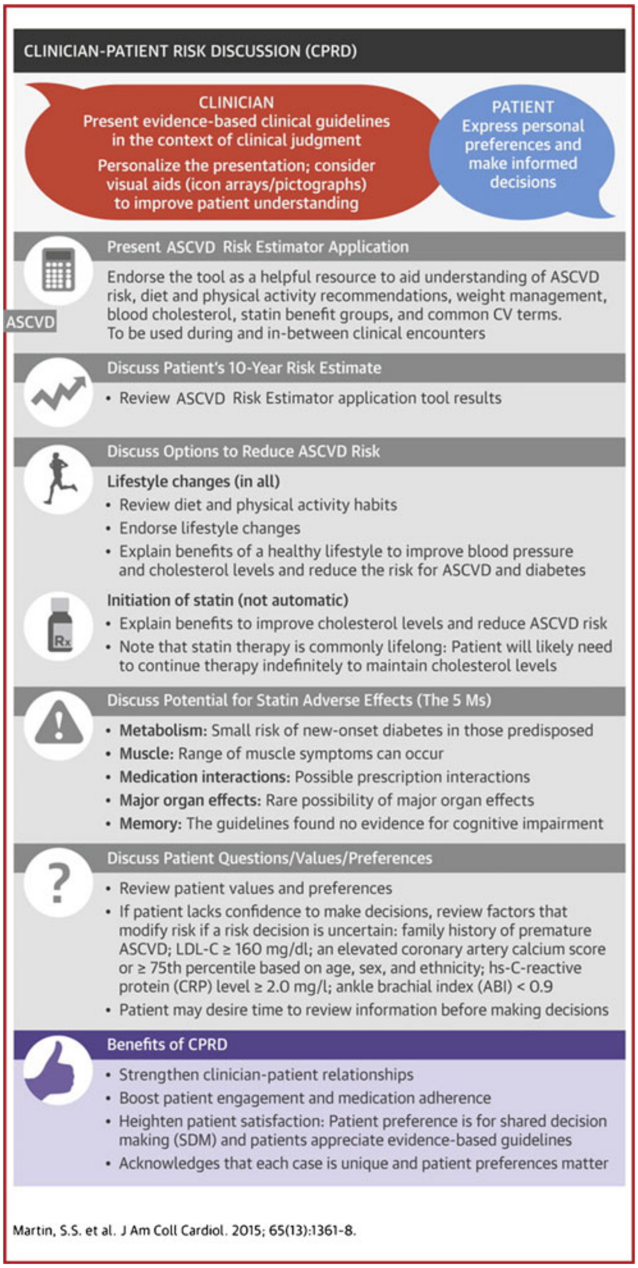
The study showed that telephone-delivered empowerment facilitated self-management of heart failure. Of note, there was no difference in reported Power as Knowing Participation in Change Tool (PKPCT) scores and SF-36 physical health component summary scores. However, the intervention group showed statistically significant improvements in adherence to the treatment plan with respect to checking daily weights, checking for peripheral edema, and maintaining a low salt diet. Overall, the members of the empowerment intervention group were better able to manage their heart failure through self-care activities than were members of the control group.

Patient Empowerment and Diabetes

Studies have shown that empowerment strategies are effective in addressing glucose management in patients with diabetes. A recent clinical trial explored the use of patient-centered consultations for patients with type 2 diabetes. These consultations used patient-centered motivational strategies with an emphasis on medication adherence and shared decision-making. This approach allowed patients to feel understood and to develop a trusting relationship with the provider. With this technique, 59 % of participants stated that they followed the treatment plan to a high or very high extent, as defined by the patients' own self-assessment [14]. Other studies have similarly shown that empowering patients and encouraging health literacy, self-efficacy, and self-care behaviors can improve HbA1c levels in patients with Type 2 DM [15].

Barriers to Patient Empowerment

There are several potential barriers to patient empowerment and risk communication, some of which exist at the provider level. Embracing empowerment means making a paradigm shift that is often difficult because the traditional approach to care is learned early in the training and socialization of most health care professionals. In contrast to the traditional approach, empowerment is not something one does to patients but rather a reciprocal dynamic that can develop only when the provider acknowledges that the patient is ultimately in control of his or her own care [3]. Under this paradigm, the physician's role is to provide the patient with the necessary



CLINICIAN-PATIENT RISK DISCUSSION (CPRD)

CLINICIAN
Present evidence-based clinical guidelines in the context of clinical judgment
Personalize the presentation; consider visual aids (icon arrays/pictographs) to improve patient understanding

PATIENT
Express personal preferences and make informed decisions

Present ASCVD Risk Estimator Application

Endorse the tool as a helpful resource to aid understanding of ASCVD risk, diet and physical activity recommendations, weight management, blood cholesterol, statin benefit groups, and common CV terms. To be used during and in-between clinical encounters

Discuss Patient's 10-Year Risk Estimate

- Review ASCVD Risk Estimator application tool results

Discuss Options to Reduce ASCVD Risk

Lifestyle changes (in all)

- Review diet and physical activity habits
- Endorse lifestyle changes
- Explain benefits of a healthy lifestyle to improve blood pressure and cholesterol levels and reduce the risk for ASCVD and diabetes

Initiation of statin (not automatic)

- Explain benefits to improve cholesterol levels and reduce ASCVD risk
- Note that statin therapy is commonly lifelong: Patient will likely need to continue therapy indefinitely to maintain cholesterol levels

Discuss Potential for Statin Adverse Effects (The 5 Ms)

- **Metabolism:** Small risk of new-onset diabetes in those predisposed
- **Muscle:** Range of muscle symptoms can occur
- **Medication interactions:** Possible prescription interactions
- **Major organ effects:** Rare possibility of major organ effects
- **Memory:** The guidelines found no evidence for cognitive impairment

Discuss Patient Questions/Values/Preferences

- Review patient values and preferences
- If patient lacks confidence to make decisions, review factors that modify risk if a risk decision is uncertain: family history of premature ASCVD; LDL-C ≥ 160 mg/dl; an elevated coronary artery calcium score or ≥ 75th percentile based on age, sex, and ethnicity; hs-C-reactive protein (CRP) level ≥ 2.0 mg/l; ankle brachial index (ABI) < 0.9
- Patient may desire time to review information before making decisions

Benefits of CPRD

- Strengthen clinician-patient relationships
- Boost patient engagement and medication adherence
- Heighten patient satisfaction: Patient preference is for shared decision making (SDM) and patients appreciate evidence-based guidelines
- Acknowledges that each case is unique and patient preferences matter

Martin, S.S. et al. *J Am Coll Cardiol*. 2015; 65(13):1361-8.

Fig. 1 Conceptual framework for clinician-patient risk discussion. The clinician-patient risk discussion (CPRD) is an intersection of evidence, clinical judgment, and patient preference. *ACC* American College of Cardiology, *AHA* American Heart Association, *ASCVD* atherosclerotic cardiovascular disease, *CAC* coronary artery calcium, *CRP* C-reactive protein, *CV* cardiovascular, *LDL-C* low-density lipoprotein cholesterol, *SDM* shared decision-making. (Adapted from Martin SS, Sperling LS, Blaha MJ, Wilson PW, Gluckman TJ, Blumenthal RS, et al. Clinician-patient risk discussion for atherosclerotic cardiovascular disease prevention: importance to implementation of the 2013 ACC/AHA Guidelines. J Am Coll Cardiol. 2015;65(13):1361–8, with permission from Elsevier) [9••]

information and tools to take charge of the disease or their cardiovascular risk factor management.

Another barrier is the difficulty in keeping current with frequently changing guidelines. For instance, the eighth Joint National Committee recently recommended relaxing the systolic blood pressure target from 140 mmHg to 150 mmHg or less in elderly persons [16]. However, soon thereafter, five members of the JNC8 panel issued their dissenting viewpoint, arguing against relaxing the BP target [17]. The subsequent Systolic Blood Pressure Intervention Trial (SPRINT) trial, which included many elderly persons at high risk for cardiovascular events (but excluded subjects with diabetes), showed that targeting a systolic blood pressure of <120 mmHg resulted in lower cardiovascular event rates and death compared to the traditional target of <140 mmHg [18]. Of note, the number needed to treat (NNT) to prevent one major cardiovascular event or death was 61 over the median 3.3 years of the trial. Some patients may feel that the addition of another medication to lower the systolic blood pressure may not be worth the potential benefit if the concept of NNT is explained to them. Frequently shifting recommendations represent a moving target for patients and providers, and are frustrating for patients to make sense of, even with guidance from experienced clinicians.

Patient factors such as health literacy, education, and access to healthcare and resources also pose significant barriers to empowerment. In the simplest scenario, patients may lack knowledge about etiology, consequences, and preventive strategies relevant to their disease. Other scenarios present more challenges; for instance, patients may possess incorrect or fragmented knowledge based on experiences of close friends and relatives and may be reluctant to part with these views due to the salience of their experiences. No less daunting is when patients hold a fatalistic view of cardiovascular disease as an unavoidable phenomenon governed by genetics or fate, pre-determined by past lifestyle choices, and beyond personal control in the present.

Another barrier to patient empowerment is the less tangible phenomenon of risk perception, which is both idiosyncratic and challenging to define and address in the context of clinician-patient interactions. For instance, it has often been said that hypertension is a silent killer. Patients who demonstrate over-reliance on concrete sensory feedback may fail to recognize the negative impact of uncontrolled blood pressure or cholesterol, as these conditions are typically asymptomatic and the consequences are not immediately apparent.

Risk perception is also influenced by a combination of factors unique to each patient, such as experiences of disease in the family, age, and sex [19]. Based on personality and past experiences, some patients may associate cardiovascular disease with inevitably poor outcomes. Convinced of the futility of risk reduction strategies, these patients may deliberately avoid objective evaluation of their own risk factors. For effective communication and shared decision-making to take place, providers must explore patients' ideas, fears, and expectations and invest in building rapport with the patient over time.

Patient Activation Measure as a Rising Tool

The Patient Activation Measure (PAM) is a promising new tool designed to foster patient empowerment by measuring activation. This 22-item scale is a valid, highly reliable measure that reflects a developmental model of activation. Activation involves four stages: (1) believing the patient role is important; (2) having the confidence and knowledge necessary to take action; (3) taking action to maintain and improve one's health; and (4) staying the course even under stress. Because the PAM is highly reliable at the person level, it may be employed in the outpatient setting to assess activation and to personalize care plans.

One advantage of the PAM is that it is a developmental measure; therefore, interventions can be tailored to the individual's stage of activation. Patients at early stages of activation may benefit from interventions designed to increase knowledge about their condition and treatment options. Patients at later stages of activation may require interventions designed to enhance their skills and sense of self-efficacy in the management of chronic conditions. Since the measure maintains precision across different demographic and health status groups, it also has utility at the group level in evaluating and comparing the efficacy of interventions and health care delivery systems. Changes in the activation levels of patient populations can be used as an indicator of the performance of providers, specific interventions, or delivery systems.

The PAM has been used as the first step in understanding patient activation and its role in health care quality, outcomes, and cost containment [20]. Studies have shown a positive relationship between patient activation and quality of care provided in patients being treated for type 2 diabetes [21]. Patients with high PAM scores are more likely to engage in self-management behaviors and utilize self-management services; these patients also report higher medication adherence compared to patients with the lowest PAM scores [22]. In addition, the utility of the PAM scale extends beyond older populations with chronic health conditions; younger patients with risk factors for chronic disease can also derive benefit from the PAM when it is used to guide reduction of modifiable risk factors [23].

Future of Patient Empowerment

A growing body of evidence suggests that the foundation of improved health outcomes, better care, and lower costs is built upon engaged patients who are active participants in their care. The future of patient empowerment may lie in technological advancements and better access of patients to these technologies. Early studies have shown that patient access to medical records improves communication, adherence, and patient empowerment [24]. Thus, healthcare organizations are now focusing on inviting patient engagement through electronic means.

Randomized controlled studies assessing the effects of electronic medical records have demonstrated that access to patient portals improves outcomes in chronic diseases such as diabetes, hypertension, and depression. For example, one study noted significant reductions in HbA1c in the intervention group (consisting of patients with access to electronic records) compared to the control group [25]. Systematic reviews examining the effects of patient portals have shown significant improvements in self-management of chronic diseases, as well as improvements in the quality of care provided by clinicians. These advances have partly been a byproduct of more numerous opportunities for clinician-patient communication and education afforded by patient portals [26].

As the burden of chronic diseases continues to grow globally, the impact of non-adherence becomes more significant. Healthcare practices are increasingly relying on mobile technologies to enhance communication and education with the goals of improving adherence and quality of life and promoting cost effective health care. A systematic review of the literature to evaluate effectiveness of mobile health in supporting patient adherence to treatment plans found that in 40 % of the studies, short message service ("text messaging") was the most commonly used mobile adherence tool. Approximately 60 % of the studies found high usability, feasibility, and acceptability of mobile interventions and a significant improvement in adherence behaviors and disease-specific clinical outcomes [27].

Barriers to the use of patient portals include limited interest or in some cases lack of access in the approximately 15 % of Americans (generally those over the age of 70) who do not use the Internet. These factors are strongly influenced by demographic and personal characteristics such as age, ethnicity, education, health literacy, health status, and role as caregiver. Future studies should focus on identifying specific populations and healthcare contexts that would be most suited to efforts at improving patient engagement through electronic communication methods. Ultimately, adoption by patients and endorsements by providers will come when existing patient portal features align with patients' and providers' information needs and functionality requirements [28].

A systemic review assessing the effects of patient portals on chronic disease outcomes showed that very few studies found an association between use of patient portals and improved outcomes. However, about 40 % of papers reported improvements in medication adherence, disease awareness, and self-management of disease, as well as decreased frequency of office visits, increased utilization of preventive medicine, and more frequent extended office visits at the patient's request for the purpose of providing additional information [29].

Conclusion

Patient empowerment aims to enhance an individual's capacity to make decisions about their health-related behaviors and to take control over the management of their chronic conditions. It develops through clinician-patient partnership and shared decision-making and ultimately improves patient adherence to treatment [30]. Furthermore, patient empowerment strategies have been shown to positively impact healthcare outcomes and will likely help shape the future of medical practice.

Compliance with Ethical Standards

Conflict of Interest Swetha Kambhampati, Tamara Ashvetiya, Steven Driver, Neil J. Stone, Roger S. Blumenthal, and Seth S. Martin declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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