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Editorial

Quality of cardiovascular care in 2024



1. Introduction

Cardiovascular disease remains the leading cause of mortality globally [1], necessitating innovative Quality Improvement (QI) strategies to improve patient outcomes and healthcare delivery. Historically, QI initiatives in cardiovascular care were primarily focused on addressing immediate clinical shortcomings [2]. Over decades, these efforts have transformed into a systematic pursuit of excellence, grounded in evidence-based practices and continuous feedback loops. In this special issue of the American Heart Journal Plus, authors have shared diverse lessons from QI across the spectrum of cardiovascular care in order to streamline care and improve clinical outcomes.

2. Evolving medication utilization

The management of cardiovascular diseases is a constant evolution with guidelines frequently being updated as new literature is published. However, there are often delays between when guidelines are published and when practices are adopted [3]. This delay in management is particularly evident in patients with heart failure with preserved ejection fraction (HFpEF), a condition historically challenging to treat due to limited effective pharmacological options. Until recently, no single pharmacological treatment had been shown to convincingly reduce morbidity and mortality in patients with HFpEF. For many years, the American Heart Association (AHA) had recommended to treat HFpEF by focusing on comorbid conditions such as hypertension. The study by Riaz et al. [3] reviews the trends in utilization of the various medications among patients with HFpEF from 2008 through 2020.

Two of these trends in particular are important to discuss. First, in 2016, the AHA issued a statement regarding drugs that may exacerbate HF and advised against the use of calcium channel blockers for patients with HF [4]. However, the utility of these agents increased during the study time, likely due to older recommendations to manage comorbid conditions. Even prior to this, in 2013, the AHA HFpEF guidelines have no direct mention of calcium channel blockers but do recommend ACE-inhibitors/angiotensin receptor blockers for hypertension management in HFpEF patients [5]. Secondly, while the utilization of β -blockers was relatively decreased, they were still the most predominant medications prescribed. This practice was extrapolated from evidence for β -blockers in patients with heart failure with reduced ejection fraction (HFrEF). However, the guidelines for HFpEF in 2013 & 2016 still emphasized the use of ACE-inhibitors/angiotensin receptor blockers which arguably are better agents than most β -blockers at treating hypertension. These two examples identify significant discrepancies between guideline recommendations and real-world prescribing patterns. In 2022, the latest AHA

guidelines were published, emphasizing newer therapies like angiotensin receptor/neprilysin inhibitors and SGLT-2 inhibitors as class II recommendations [6]. Despite guidelines advocating for angiotensin receptor/neprilysin inhibitors and SGLT-2 inhibitors, traditional medications such as beta-blockers remain prevalent.

These examples highlight a critical gap in translating evidence into practice, underscoring the need for continued education and dissemination of clinical guidelines. Studies like this are imperative in identifying the gaps in guideline adaptation and to bring awareness to the research utilized in writing guidelines.

3. Economic treatment paradigms

Integrating new technologies into clinical practice also plays a crucial role in advancing cardiovascular care. However, they do not come without significant costs. The American Medical Association reports that health care spending in the United States (US) reached \$4.5 trillion in 2022 [7]. Experts suggest that the US health care system often prioritizes high-margin specialty treatments over primary and preventive care, which contributes to high costs [8]. Increasing costs are not only a burden on individuals and families but also can have broader economic implications. Therefore, now more than ever, it is important for us to embrace new technologies with criticism including cost-effectiveness.

A study by da Rosa Decker et al. [9] provides an economic perspective on adopting new technologies. This study, done in Brazil, aims to assess the cost-effectiveness of end-tidal carbon dioxide (EtCO₂) monitoring during cardiopulmonary resuscitation for in-hospital cardiac arrest outside the intensive care unit and emergency room in a middle-income country setting. The researchers conducted a cost-effectiveness analysis comparing two strategies: cardiopulmonary resuscitation with EtCO₂ monitoring and cardiopulmonary resuscitation without EtCO₂ monitoring. The study's cost-effectiveness analysis demonstrated that integrating capnography is economically viable, especially in middle-income countries. Effectively, it shows that the benefits of improved outcomes and resource utilization outweigh the costs of implementation.

At the individual patient level, providers are not expected to actively think about the cost of life saving therapies while implementing them. However, these costs are not negligible, and approaching it from a national level is what many countries are now doing. Many countries standardize values to guide decisions regarding incorporating new technologies into their healthcare systems. Examples include the Incremental Cost-Effectiveness Ratio (ICER) and the Willingness-to-Pay ratio (WTP). The ICER is a way to measure the value of a medical

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treatment by comparing its cost to its effectiveness. It is calculated by taking the difference in cost between two possible treatments and dividing it by the difference in their effectiveness. Essentially, it answers the question: “How much more does this treatment cost, and how much more effective is it compared to another option?”. WTP refers to the maximum amount of money that a nation is willing to spend to gain a benefit or avoid a harm. It answers the question: “How much do people value certain outcomes in healthcare, like extra years of life or a higher quality of life?”

These values help ensure that healthcare resources are used efficiently. By comparing the cost of new treatments to their effectiveness and aligning these with what people are willing to pay for certain health outcomes, health systems can prioritize spending on treatments that offer the most value for money. As healthcare costs continue to rise in the US, finding sustainable solutions is important to providing high-quality care without excessive costs, which ultimately are paid for by the patients.

4. Addressing disparities in cardiovascular care

Healthcare disparities remain a significant challenge in cardiovascular care, with evidence indicating that race, sex, and socioeconomic status significantly influence treatment and outcomes. Addressing these disparities is crucial for achieving positive outcomes.

Although cardiovascular disease is the leading cause of death among women, studies have shown that women with acute coronary syndromes have worse outcomes compared to men. Women in the US culturally underestimate their risk of heart disease compared to diseases predominant in women such as breast cancer [10]. Women who present with symptoms labeled as “atypical chest pain” often times have a delay in diagnosis and revascularization. Despite the benefits of radial access in reducing bleeding and mortality, women are less likely to receive this access during percutaneous coronary intervention. These biases are not a consequence of neglect, but rather are thought to be due to a subconscious bias from under representation of women in large randomized controlled trials along with the lack of women-centric recommendations. The review article by Burgess and Mamas [10] discusses how biological differences may account for some of the differences in outcomes between men and women, there are many policy, healthcare structural and procedural factors than can be adjusted to narrow sex-based inequalities.

In a study aimed to evaluate sex-based disparities and in-hospital outcomes of patients with atrial fibrillation with and without dementia, Baral et al. [11] discovered that patients with atrial fibrillation and dementia have higher mortality and a lower likelihood of getting catheter ablation and electrical cardioversion. The study also found that females are less likely to get catheter ablation and electrical cardioversion, even though they have similar in-hospital mortality compared to males. This study highlights the need for personalized medicine that considers individual characteristics, such as sex and cognitive status, in clinical decision-making. Keeping in mind these differences can lead to more equitable care and improved outcomes for patients. We should remain aware of potential biases and advocate for care based on objective evidence rather than subjective confounders.

Other studies have also identified discrepancies in outcomes by race and socioeconomic status. Markson et al. [12] wrote about identifying potential correlations to acute myocardial infarction (AMI) in pregnancy and found that black patients were four times more likely to have AMI per 10,000 obstetric-related encounters. Though black females constitute approximately 13 % of the US female population, they represent 35.6 % of patients with pregnancy-associated AMI. Patients from low economic status were also at higher risk of having pregnancy-associated AMI. Patients with AMI were also more likely to be smokers, stimulants users, and to have obesity and hypertension, all risk factors for coronary artery disease. These findings highlight the importance of addressing social determinants of health and providing targeted interventions to

reduce disparities. Addressing racial and socioeconomic disparities in cardiovascular care is difficult but essential for achieving health equity. By understanding the unique challenges faced by different populations, we can implement strategies to improve outcomes and reduce disparities.

A study from New Zealand by Newport et al. shows that disparities can also exist due to unintended cultural ignorance [13]. The Māori people are the Indigenous Polynesian people of New Zealand. Through interviews with the Māori people, researchers were able to identify three barriers to care – cultural misunderstandings, discrimination, and inadequate resourcing. These factors contribute to delays in seeking care and worse outcomes. The authors set goals to improve cultural education in health services and have also delivered education about cardiopulmonary resuscitation and automated external defibrillator use within these communities. Developing cultural competency and addressing systemic barriers can enhance healthcare outcomes for patients from various backgrounds. We should be cognizant that patients have different medical opinions due to their cultures and incorporate appropriate questions into our patient-physician discussions to avoid misunderstandings.

5. The role of technology in enhancing patient care

Technological advancements have the potential to revolutionize quality in cardiovascular care by improving patient management, streamlining workflows, and enhancing clinical decision-making.

A study by Allen et al. [14] demonstrates the impact that clinical decision support (CDS) tools can have on patient care. By providing timely alerts, a CDS tool enhanced coordination and management for adult congenital heart disease (ACHD) patients. It required multiple adjustments utilizing the Plan-Do-Study-Act method, but the researchers were able to facilitate better communication among multidisciplinary teams and identify 48 ACHD patients that otherwise would have had delays in their complex medical managements. Information technology teams are crucial in optimizing the effectiveness of CDS tools and can have real meaningful impacts in the lives of patients. These CDS tools support physicians by streamlining patient care and improving efficiency. Continuous refinement and optimization of these tools are essential to maximize their potential benefits.

Electronic medical record systems (EMRs) can also be fitted with decision support tools (DST) to reduce unnecessary procedures and testing. It is estimated that between 10 and 30 % of cardiac testing is considered to be inappropriate [15]. A study by Ashraf et al. aimed to reduce the inappropriate ordering of transthoracic echocardiograms, researchers employed a series of three PDSA quality improvement cycles and were ultimately unsuccessful in reducing the inappropriate orders of echocardiograms. They were limited by the COVID-19 pandemic; however, their insights are valuable to anyone pursuing quality improvement in their own practices. They concluded that local practice patterns should be identified before developing a DST. Generalized DSTs published in the literature may be a good starting point when developing a custom DST, but customized DSTs will likely yield better results. Ultimately, decision support tools, combined with targeted education, are best at reducing healthcare costs and improving patient care by minimizing unnecessary testing. As healthcare systems continue to integrate technology, understanding the strengths and limitations of these tools is crucial for maximizing their impact.

Tools outside of EMRs can also contribute to advancements in the quality of cardiovascular care. The Dilated Cardiomyopathy (DCM) Consortium is a multisite investigator group that conducts research studies focused on the genetics and genomics of DCM. The DCM Project Portal is a novel approach to leveraging the internet to interact with the participants of large research groups [16]. Jordan et al. developed a self-guided portal designed to register, determine eligibility, and consent patient for studies. Key features include bi-directional communication with study staff, automated reminders, and the ability for participants to

invite family members. These are intended to foster long-term engagement and minimize loss to follow-up. While there are limitations such as internet access in patients greater than 77 years of age, lower socioeconomic status, and non-English speaking patients, digital platforms such as DCM Project Portal represent a new standard for broadening research participation and improving data collection. With improvements in infrastructure and access to internet to patients after the COVID-19 pandemic, more individuals can get enrolled in studies. These online models can also be implemented for recruitment and management of other studies as well.

6. Improving patient adherence and program completion

Understanding factors that influence patient adherence and completion rates in healthcare programs is crucial for optimizing outcomes. The study by Regan and Fritz [17] found that the rates of completion of cardiac rehabilitation in the US vary between 40 and 60%. Factors influencing participant drop out include cost, work or home responsibilities, co-morbidities, belief that the programs are too hard or too easy, and dissatisfaction with staff or facilities. In the group of “Finishers” of cardiac rehabilitation, patients tend to be older, female, more likely to have Medicare insurance, lower depression scores, and more family support.

Targeting interventions such as enhancing social support and providing financial assistance may improve completion rates and adherence to cardiac rehabilitation programs. Pressure from policy makers on private insurance companies could potentially reduce or eliminate co-pays. Charity funds can be developed. Social support through including family members during cardiac rehabilitation orientation may provide an additional source of encouragement to continue participating in cardiac rehabilitation. Being aware of the social and financial factors affecting completion of rehabilitation programs can lead to development of systems and policy changes. The reduction of barriers to participation can lead to higher rates of recovery and better outcomes for patients.

7. Conclusion

In this issue of the American Heart Journal Plus, a diverse group of authors have shared primary data, clinical experience, and reviews of the literature that inform the state of the quality of cardiovascular disease in 2024. They have identified a number of important gaps that our community needs to address in how care is delivered and also informed the strategies by which we may be able to bridge some of those gaps. These insights highlight the importance of continuous learning and adaptation in the ever-evolving field of cardiovascular medicine, ultimately improving patient outcomes and advancing the quality of care.

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