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VIEWPOINT

Implementing a Women's Cardiovascular Health Training Program in a Cardiovascular Disease Fellowship

The MUCHACHA Curriculum

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ABSTRACT

Sex- and gender-specific training for cardiovascular clinicians is essential to enhance knowledge and quality of women's cardiovascular health care. In 2016, the University of Pennsylvania cardiovascular fellowship program established a dedicated women's cardiovascular health curriculum, motivated by the fellow-in-training desire to gain formal and focused training in this emerging field. (J Am Coll Cardiol Case Rep 2020;2:164–7) © 2020 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Cardiovascular disease remains the most frequent cause of death of women in the United States (1). Although the last few decades have seen an explosive growth in awareness of and research in women's cardiovascular health (CVH), important knowledge gaps still exist among cardiovascular professionals. In a single-center survey of multidisciplinary postgraduate medical trainees, a majority agreed that a gender medicine curriculum should be taught, but a similar majority reported that these concepts were rarely or never presented in their programs (2). Experts in women's CVH have outlined sex- and gender-specific cardiovascular education for all health care professionals as a future goal and have endorsed the development of educational initiatives to facilitate the delivery of this care (3).

In 2016, the cardiovascular disease fellowship training program at the University of Pennsylvania established a dedicated woMen's CardiovAsCular HeAlth (MUCHACHA) curriculum, motivated by a fellow-in-training (FIT) desire to gain formal and focused knowledge and skills in women's CVH. This paper describes the approach to creating and implementing this curriculum in an adult cardiology fellowship program.

APPROACH TO CURRICULUM DESIGN

The impetus for this curriculum was based on an expressed FIT need for enhanced clinical competence, research, quality improvement, and career development opportunities in women's CVH. Because the recognition of pregnancy-related complications as risk factors for cardiovascular disease and mortality has grown (4,5), FIT and institutional women's CVH leaders recognized the importance of dedicated education beyond what is delineated in the American College of Cardiology 2015 Core Cardiovascular Training Statement, with regard to pregnant women with adult congenital heart disease and women with stable ischemic heart disease (6). Working in a quaternary referral center, FITs perceived an increase in

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the number of clinical consults regarding women's CVH issues in both the inpatient and ambulatory settings. They also noticed a rise in the number of American Board of Internal Medicine (ABIM) certification examination questions related to women's CVH and were motivated to strengthen their competencies.

Additionally, the opportunity to create a culture of collaboration and shared care with colleagues in obstetrics-gynecology was identified, as emphasized by the American Heart Association and the American College of Obstetricians and Gynecologists (7) and supported by the 2019 Accreditation Council for Graduate Medical Education Common Program Requirements (8), which emphasized diversity and inclusion in education and multidisciplinary teamwork. This ethos also aligns with the concept of the "heart team," which is permeating much of cardiovascular care. With the increasing exposure to institutional women's CVH leaders, the Penn Women's Cardiovascular Health Program, and the Penn Pregnancy and Heart Disease Program, this curriculum was also considered a recruitment opportunity and potential springboard for FITs interested in this career niche.

CURRENT CURRICULUM

The current curriculum is divided into 2 components, the didactic and the experiential (**Figure 1**). The foundation of the didactic curriculum is the FIT yearlong conference series on women's CVH (**Figure 2**). Since 2016, these 8 subject-based lectures have been delivered monthly throughout each academic year. The lectures are generally case-based and use ABIM-style multiple-choice questions to encourage content retention and link to the certification examination. Experts from across subspecialty disciplines deliver these lectures to FITs. As part of this series, innovative educational tools were incorporated, such as the Poll Everywhere (San Francisco, California) audience response system (framed around relevant certification examination questions) and "gamification" through sessions such as "MUCHACHA Jeopardy." Twice per year, a multidisciplinary problem-based case conference is held for cardiology and obstetrics-gynecology trainees in collaboration with maternal-fetal medicine in which the diagnoses and management plans for complex patients are discussed. This series has fostered a sense of community and familiarity between large departments and has created avenues for collaborative quality improvement and research projects, including one based in the electronic health record that is focused on improving lipid management in the postpartum setting (9). Similarly, on the faculty level, twice per year, cardiology faculty hold a case-based conference for the maternal-fetal medicine fellows and faculty.

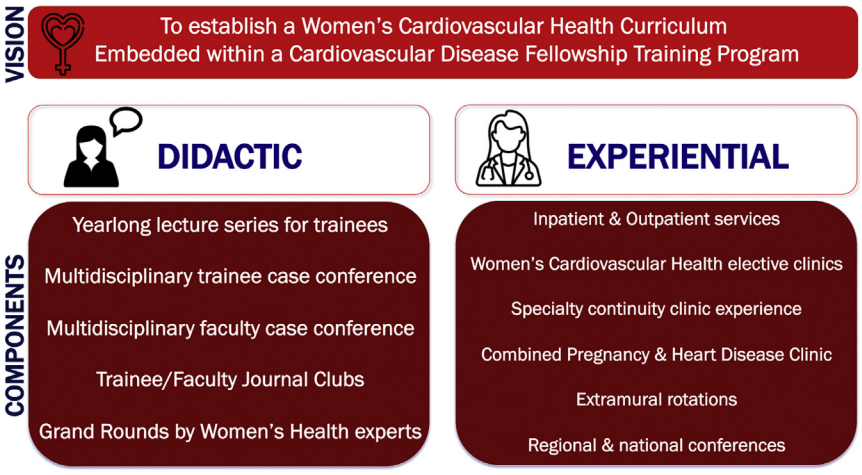
An average of 2 women's CVH topics per year are incorporated into the annual FIT Journal Club schedule. Over the past 4 years, FITs have presented on a range of topics including peripartum cardiomyopathy, microvascular disease, and spontaneous coronary artery dissection and have invited faculty discussants from the spectrum of basic to clinical to systems science research. These presentations have the potential to serve as the launching point for FIT research projects, as has been the case for several FITs thus far in the authors' experience. In collaboration with the Penn Women in Cardiology group, multiple internationally renowned experts in women's CVH have been nominated, invited, and successfully hosted for an institutional cardiovascular medicine grand rounds over the past 4 years. These visiting grand rounds speakers have served as sources of support, mentorship, and sponsorship for FITs and early career faculty.

All FITs have opportunities to evaluate and treat women with cardiovascular conditions on the inpatient and outpatient services and to rotate in the women's CVH ambulatory clinics during elective rotations. This model ensures that FITs are exposed to these disease states even though many complex patients are referred to faculty practices. In the third year of general fellowship, FITs who are training in women's CVH have the option to choose an immersive ambulatory continuity clinic experience with a women's CVH faculty mentor and are supported to gain additional experience in women's CVH at extramural sites. In the 2019 to 2020 academic year, FITs will have the option to participate in a new combined pregnancy and heart disease clinic, held once per month and jointly staffed by faculty in maternal-fetal medicine and women's CVH. FITs are also encouraged and supported to attend regional and national women's CVH conferences and seminars to broaden their knowledge, increase their visibility, and experience networking, mentorship, and sponsorship opportunities with thought leaders in the field.

EXPERIENCE AND CHALLENGES

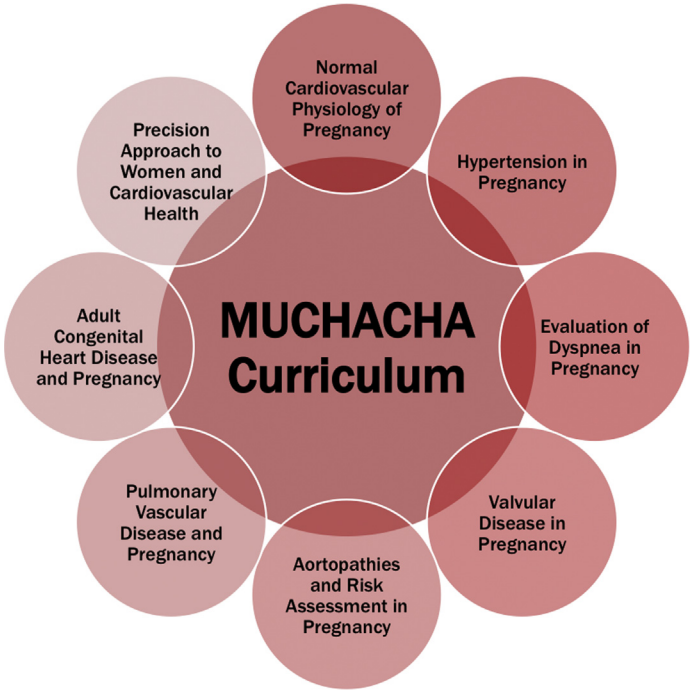
The MUCHACHA curriculum has received a tremendously positive reception among FITs and faculty. In pooled evaluations of the 2017-2018 didactic curriculum (n = 34), 97% of FITs rated the overall

FIGURE 1 Vision and Framework



Vision and framework of the University of Pennsylvania Cardiovascular Disease Fellowship Women's Cardiovascular Health Curriculum.

FIGURE 2 Components of the Didactic Curriculum of the University of Pennsylvania



Components of the didactic curriculum of the University of Pennsylvania Cardiovascular Disease Fellowship Women's Cardiovascular Health Curriculum. MUCHACHA = curriculum title is derived from woMen's CardiovAsCular HeAlth.

conference quality as either "very good" or "excellent," and 91% thought that the level of material was appropriate for the target audience. Partly as a result of the incorporation of women's CVH into the standing curriculum, topics such as spontaneous coronary artery dissection have become part of the standard lecture series on acute coronary syndromes for medical students and FITs. Previously "orphaned" conditions like myocardial infarction with nonobstructive coronary arteries, cardiac syndrome X/microvascular dysfunction, and coronary vasospasm have now received dedicated time and formal inquiry in the curriculum. All FITs are well equipped to care for women in their practices after graduation, regardless of cardiovascular specialty choice. In addition, our program allows FITs who are interested in women's CVH as a career niche to obtain high-quality and high-volume training.

Initial challenges to the curriculum included scope and selection of topics, dedicating adequate time within our curriculum, and scheduling issues with a multidisciplinary team. Each year's iteration has become an opportunity to further refine the didactic and experiential components with comprehensive feedback from FITs and faculty.

FUTURE DIRECTIONS AND CONCLUSIONS

The burden of cardiovascular disease among women in the United States is striking. Compared with men,

young women are experiencing worsening rates of morbidity and mortality related to coronary heart disease (10,11). Cardiovascular conditions are the leading cause of pregnancy-related deaths in the United States, which already has the highest maternal mortality rate of any developed country (5). Educating the next generation of FITs on the recognition of risk factors and disease characteristics unique to or more common in women is the first step in addressing sex-based disparities in care and outcomes. In the coming years, expansion of clinical experiences and provision of additional professional development opportunities are planned for FITs interested in women's CVH. Robust and structured interdisciplinary opportunities are being developed in basic science, clinical, and population health research in addition to systems science and quality improvement training pathways for interested FITs. The collaborative relationships fostered among FITs and faculty in this division and the Department of Obstetrics and Gynecology through this curriculum are the bedrocks of these initiatives.

The creation of a formal and structured women's CVH curriculum within fellowship training programs ensures that all FITs gain knowledge and expertise in sex- and gender-specific cardiovascular care. Our hope is that these efforts will improve the education of future generations of trainees; encourage team-based approaches to care, research, and quality improvement; and ultimately, reduce disparities in prevention and treatment of cardiovascular diseases in women.

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