

Pregnancy and Parenting During Cardiology Fellowship

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Background—An increasing number of residents and fellows have children during training. However, little is known about the specific experience of cardiology fellows who become parents during training.

Methods and Results—A 66-question Internet-based survey about experiences of pregnancy during graduate medical training was administered between May 1 and July 15, 2013, to all trainees (N=1516) in the Mayo School of Graduate Medical Education across 3 academic sites. Questions explored the experiences of new mothers, fathers, and their fellow trainees. There were 644 survey respondents overall (response rate, 42%), and of 73 cardiovascular trainees, 29 (10 women [35%]) completed the survey. Of those surveyed, 59% reported having children. All trainee mothers reported making alterations to their training schedule due to pregnancy and maternity leave. Twenty percent of trainee fathers also reported changing their training because of their partner's pregnancy. Of trainees with children, 41% reported difficulty completing research because of pregnancy and childcare obligations. Nontrainee mothers were significantly more likely to breastfeed beyond 6 months compared with trainee mothers ($P=0.018$). A perceived stigma attached to pregnancy was reported by 62% of trainees. Both male and female trainees felt that their programs did not promote pregnancy-related schedule flexibility.

Conclusions—Our study shows that both men and women entering parenthood during cardiology training often have to change their schedule, research, and career path. Cardiology training programs should focus on curriculum design and supportive parenthood policies to both avoid negative stigma and optimize fellowship training during this time period. (*J Am Heart Assoc.* 2019;8:e012137. DOI: 10.1161/JAHA.119.012137.)

Key Words: breastfeeding • cardiology • fellowship • parenthood • pregnancy • training

Medical training, and cardiovascular training in particular, involves intense focus and continuous learning. Trainees are often encouraged to avoid disruptions in their training to optimize their educational experience and minimize stress on the “system.” Despite these pressures, many residents and fellows choose to have children during training,¹ but these choices have different implications for men and women in training. Women are more likely to delay childbearing during medical training than their male counterparts because of perceived negative consequences as a result of childbearing.² There are some data also showing that women adjust their schedules/rotations to accommodate the

transition into parenthood,³ but it is unclear if entering parenthood has ramifications on the schedules of male trainees. Traditionally, pregnancy during training served as a barrier to women in medicine because of few institutionalized policies for parental leave. While several studies have examined cumulative data of the impact of pregnancy and children on residents and fellows in graduate medical education, specific data on trainees in the more highly competitive fellowships are lacking.^{2,4}

Specialty training in cardiovascular diseases is one of the most sought after fellowships, with 1261 applicants in the 2018 match, the most for any specialty.⁴ Although more women are entering cardiovascular medicine compared with several decades ago, growth has slowed in the past decade, with cardiology leadership calling for an assessment of issues and barriers to women choosing cardiology as a field of practice. Some issues that have been identified include concerns about unacceptable lifestyle trade-offs as a cardiovascular specialist.^{5,6} This is evidenced by persistent findings that female cardiologists compared with men are less likely to marry, have children, have less support at home, and are twice as likely to experience an interruption in training of >1 month.⁷ Overall, little is known about the experience of cardiology fellows who become parents during training or its

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Clinical Perspective

What Is New?

- Almost all trainees in a cardiovascular diseases fellowship reported a stigma attached to pregnancy leave, a feeling of unfair burden by their peers, and a lack of institutional support and flexibility in regards to pregnancy-related health issues.

What Are the Clinical Implications?

- Both men and women often enter parenthood during cardiovascular diseases fellowship, and this may affect their training, research, and career path.
- Cardiology training programs should focus on curriculum design and supportive parenthood policies to both avoid negative stigma and optimize fellowship training during this time period.

effect on individuals and the field.⁸ There are also some unique issues and challenges to pregnancy among women during cardiology training, including low numbers of women in training (8% in US interventional programs, ≈22% in general cardiology programs), which may translate into program directors having little experience in dealing with maternal needs, long training duration (minimum 6 years after medical school graduation, often 7–10 years with research and subspecialty training) leading to maternal age at end of training of >35 years, and radiation exposure concerns during interventional rotations.

While female physicians frequently plan their pregnancy during training, their pregnancies are often viewed as unexpected by program directors.⁹ In order to address this growing trend of parenthood in training, there has been an increase in the number of programs that have instituted policies regarding pregnancy and parental leave.¹⁰ There has been a cultural shift in both meeting new mothers' needs (ie, allowance for maternity leave, improved policies and facilities to support lactation and breastfeeding) as well as an increased understanding of the impact on the nonchildbearing parent. In more recent years, there has been an increase in parental leave requests by the nonchildbearing parent, and this has led to increased demands on and ethical conversations by residency programs.¹¹ The following survey aims to analyze the experiences and impact of pregnancy, parenthood, and breastfeeding in a cohort of cardiology fellows.

Methods

The data that support the findings of this study are available from the corresponding author on reasonable request.

In 2013, Blair et al¹² administered an Internet-based survey on the experience of pregnancy during training to all trainees (N=1516) in the 269 graduate medical education (GME) programs in the Mayo School of Graduate Medical Education across 3 academic sites (Arizona, Florida, and Minnesota). Trainees were invited by email to complete the online questionnaire and informed that their participation in the survey was both voluntary and confidential. Survey data were collected between May 1, and July 15, 2013. There were 644 survey respondents overall (response rate, 42%). The current report examines respondents who identified themselves as part of a cardiology, interventional cardiology, heart failure, or other cardiovascular program. The Mayo Clinic Institutional Review Board deemed this study exempt (IRB no. 12-009031). Sixty-six core survey items were presented to all participants, which included a series of questions about perceptions of stigma related to pregnancy during training. Cardiovascular trainees who experienced a pregnancy, whether as the birth parent or partner, were presented up to 200 additional items depending on the number of pregnancies. Female trainees answered questions about their own experiences, while men answered questions about themselves and their nontrainee spouse/partner. Baseline characteristics including age, race, training location, postgraduate year of training, specific cardiology program, and sexual orientation were collected, along with number of pregnancies and children, whether fellowship training and call changes were made because of pregnancy, breastfeeding habits, research output, and overall career plan changes. Some responses were given as an agree/disagree statements, and others were open-ended for free response. The survey data were downloaded into SPSS Statistics v.22 (IBM, Armonk, NY) for analysis. Categorical variables were compared using the chi-squared test, and dichotomous variables were compared using Fisher's exact test. Continuous variables were compared using 2-sample *t* tests. *P* values of <0.05 were considered significant.

Results

Overall, 73 trainees (25 women [40%]) were invited from cardiology subspecialties to participate in the survey, of whom 29 (10 women [35%]) completed the survey. Women and men had identical response rates (40%). Twenty were training in general adult cardiology, 3 in echocardiography, 2 in heart failure, 2 in vascular medicine, 1 in interventional cardiology, and 1 in preventive cardiology. Twenty-three trainees were fellows in Minnesota, 4 in Arizona, and 2 in Florida. They reported postgraduate training years 4 through 9. Their ages ranged from 27 to 39, with a median age of 33.5 years. Only 2 female trainees reported being single, while the other 8

women and all of the 19 male trainees reported being in a committed relationship ($P=0.139$). These 29 trainees were included in the statistical analysis (Table 1).

More trainees reported having children (59%) than not having children (41%). Having children was similar between male and female trainees (50% versus 63%; $P=0.694$), and all trainees with children reported having a child during their training. Of trainees without children, 7 reported having plans to have children (2 women, 5 men) and 5 reported having no plans to have children or were unsure of whether to have children (3 women, 2 men) (no difference by sex; $P=0.558$).

Table 1. Participant Characteristics

Characteristic	Female Trainee (n=10)	Male Trainee (n=19)	P Value
Age in y, median (range)	32 (27–37)	34 (30–39)	0.186*
Race			
White	5	12	0.694*
Nonwhite/not disclosed	5	7	
Ethnicity			
Hispanic or Latino	1	1	>0.99*
Non-Hispanic/not disclosed	9	18	
Location			
Arizona/Florida	2	4	1.000*
Minnesota	8	15	
Postgraduate year			
4	2	6	0.166 [†]
5	2	2	
6	2	3	
7	2	6	
8	1	2	
9	1	0	
Program			
General cardiology	8	12	0.214*
Subspecialty cardiology	1	7	
Relationship status			
Single	2	0	0.139*
Committed	8	19	
Sexual orientation			
Heterosexual	10	19	>0.99*
LGBTQ/not disclosed	0	0	

LGBTQ indicates lesbian, gay, bisexual, transgender, and queer (or questioning).

*Fisher's exact test.

[†]2-sample t test.

None of the respondents in this survey reported adopting a child (Table 2).

Changes to Training, Research, and Career Plans

Of the 5 trainees who were mothers, all reported having been pregnant during their training. All made alterations to their fellowship rotations, including rescheduling nuclear medicine and catheterization laboratory rotations, not administering isotopes during pregnancy, and rescheduling rotations so that those with higher call responsibilities were completed before delivery ($P=0.003$). Two of the trainees who were fathers (17% of male respondents) also reported changing their training and call schedule because of a partner's pregnancy. Both mothers and fathers reported having difficulty completing research because of pregnancy and childcare obligations, with no significant difference between women (60%) and men (33%), $P=0.593$. No trainee mothers changed their career plans during or after pregnancy; only 1 trainee father reported changing career plans. Only 1 trainee mother reported needing to delay completion of her training program (Table 2).

Pregnancy and Breastfeeding Outcomes

Five female trainee respondents reported a total of 10 pregnancies, all of which took place during training. Few perinatal adverse events were reported overall, with only 1 unexpected preterm delivery attributable to cholestasis. Low fetal birth weight was reported 3 times (33.3%); 2 of these were the same mother, once from a twin pregnancy; the third was from the mother who had cholestasis. No miscarriages, stillbirths, or abortions were reported (Table 2).

All trainees who responded to the question reported breastfeeding after each live birth. In total, trainee mothers reported breastfeeding 10 children, with 5 stopping before 6 months and 5 breastfeeding beyond 6 months. Nontrainee mothers reported breastfeeding 16 children, with 1 stopping before 6 months and 15 breastfeeding beyond 6 months. Nontrainee mothers were significantly more likely to breastfeed beyond 6 months compared with trainee mothers ($P=0.018$) (Table 3).

Perceptions of Stigma Attached to Pregnancy During Training

Trainees were asked about perceptions of stigma related to pregnancy during training. Overall, 62% of trainees reported perceiving stigma attached to pregnancy from both male and female faculty members, and directed at both fathers and mothers who were trainees. Over 65% of all trainees also reported a lack of support to both new mothers and fathers from their peers. Sixty-nine percent of trainees reported

Table 2. Pregnancy Characteristics and Training Impact

Characteristic	Female Trainee (n=10)	Male Trainee (n=19)	P Value
Children			
Yes	5	12	0.694
No	5	7	
Respondents without children			
Plans to have?			
Yes	2	5	0.558
No/not sure	3	2	
Respondents with children			
How many?			
1	1	6	0.338
≥2	4	6	
Pregnancy 1	5	12	NA
Complications	1 bleeding	1 fertility treatment	
	1 preterm with twins and low weight	1 meconium aspiration	
	1 maternal hemorrhage		
Miscarriage/stillbirth/abortion	0	0	
Pregnancy 2	4	5	
Complications	1 low weight	1 GD	
	1 preterm with cholestasis		
Miscarriage/stillbirth/abortion	0	0	
Pregnancy 3	1	4	
Complications	1 GHTN	1 bleeding	
	1 low weight		
Miscarriage/stillbirth/abortion	0	1 ectopic with tubal rupture	
Pregnancy 4	0	2	
Complications	0	0	
Miscarriage/stillbirth/abortion	0	0	
>6 mo/still BF	5	14	
Did you change training because of pregnancy?			
Yes	5	2	0.003
No	0	10	
Did you change call because of pregnancy?			
Yes	3	2	0.117

Continued

Table 2. Continued

Characteristic	Female Trainee (n=10)	Male Trainee (n=19)	P Value
No	2	10	
Did you change career plans during pregnancy?			
Yes	0	1	>0.99
No	5	11	
Did you change career plans after birth?			
Yes	0	1	>0.99
No	5	11	
Did/do you anticipate completing program later than planned?			
Yes	1	0	>0.99
No	4	12	
Did pregnancy or parental leave impact research productivity?			
Yes	3	4	0.593
No	2	8	
Did pregnancy or parental leave impact pursuit additional degree?			
Yes	1	4	>0.99
No	4	8	
Would you do it over?			
Yes	5	10	>0.99
No	0	2	

All P values calculated by Fisher's exact test. BF indicates breastfeeding; GD, gestational diabetes mellitus; GHTN, gestational hypertension; NA, not applicable.

feeling burdened unfairly by their peers who took time off for pregnancy and for parental leave. Sixty-two percent of trainees felt that their program did not promote schedule

Table 3. Breastfeeding Results

Characteristic	Children of Trainee Mothers (n=10)	Children of Nontrainee Mothers (n=16)	P Value
Breastfeeding			
All children			0.018
Stopped <6 mo	5	1	
>6 mo/still breastfeeding	5	15	

P value calculated by Fisher's exact test.

flexibility related to either pregnancy or nonpregnancy health issues. Survey respondents reported that fathers were more likely to be treated favorably (69% favorable) when requesting leave related to parenthood compared with mothers (0% favorable). Interestingly, responses were similar in perceiving unfairness with which male and female trainees were treated when returning from parental leave (69.0% versus 72.4%). There were no differences in stigma perception between female and male trainee survey respondents, and the statistical insignificance did not change whether don't know/not applicable answers were included in the analysis or excluded (data shown with these answers excluded) (Table 4).

Discussion

Our study found that the majority of both women and men in cardiology training have children during their fellowship, with the biggest impact felt by mothers. We found that mothers were 5 times as likely to alter their fellowship rotations when compared with new fathers (100% versus 17%; $P=0.003$). These changes often occurred in the parts of their rotation that dealt with either fetal exposure risks to radiation or increased maternal stress load because of call responsibility in the weeks immediately before delivery. We also found that both mothers and fathers had difficulty completing research because of pregnancy and childcare obligations during training, with mothers reporting the effect twice as much as their male colleagues (60% versus 33%; $P=0.593$). Trainee mothers also reported low fetal birth weight in 33.3% of births as well as the inability to breastfeed their child past 6 months when compared with the nursing partners of trainee fathers (50% versus 6%; $P=0.018$). Both women and men in training equally perceived pregnancy as a stigma and a burden to their coworkers, and both felt a lack of support and schedule flexibility by their program. Although most of the perceptions of stigma were reported as equal among both mothers and fathers, we did find that fathers were more likely to be treated favorably when requesting parental leave when compared with mothers (69% versus 0%).

Although previous studies on pregnancy and parenthood have focused on attending staff in the field of cardiovascular diseases or general medical/surgical trainees, our study replicates several themes seen in those studies. We found that mothers in cardiology training were less likely than the male trainees' mothering partners to breastfeed beyond 6 months, consistent with other studies of cardiologist mothers.¹ Short maternity leaves among physicians, especially during training, may contribute to low rates of extended breastfeeding; studies have demonstrated that longer parental leave has a positive correlation with duration and exclusivity of breastfeeding.^{13,14} Once back to work,

Table 4. Stigma and Support Results

Characteristic	Female Trainee (n=10)	Male Trainee (n=19)	P Value	All Trainees (n=29)	
Stigma attached to pregnancy			>0.99		
Disagree/neutral	3	4		7	24.1%
Agree	7	11		18	62.1%
Don't know/NA*	0	4		4	13.8%
Male faculty support female trainees who become pregnant			>0.99		
Disagree/neutral	8	12		20	69.0%
Agree	0	0		0	0.0%
Don't know/NA*	2	7		9	31.0%
Female faculty support female trainees who become pregnant			>0.99		
Disagree/neutral	8	12		20	69.0%
Agree	0	1		1	3.4%
Don't know/NA*	2	6		8	27.6%
Male faculty support male trainees who become parents			>0.99		
Disagree/neutral	6	13		19	65.5%
Agree	0	2		2	6.9%
Don't know/NA*	4	4		8	27.6%
Female faculty support male trainees who become parents			>0.99		
Disagree/neutral	6	13		19	65.5%
Agree	0	2		2	6.9%
Don't know/NA*	4	4		8	27.6%
Male trainees support female trainees who become pregnant			>0.99		
Disagree/neutral	8	17		25	86.2%
Agree	0	1		1	3.4%
Don't know/NA*	2	1		3	10.3%
Female trainees support female trainees who become pregnant			>0.99		
Disagree/neutral	9	14		23	79.3%
Agree	0	1		1	3.4%
Don't know/NA*	1	4		5	17.2%
Male trainees support male trainees who become parents			>0.99		
Disagree/neutral	7	17		24	82.8%

Continued

Table 4. Continued

Characteristic	Female Trainee (n=10)	Male Trainee (n=19)	P Value	All Trainees (n=29)	
Agree	0	1		1	3.4%
Don't know/NA*	3	1		4	13.8%
Female trainees support male trainees who become parents			>0.99		
Disagree/neutral	8	16		24	82.8%
Agree	0	1		1	3.4%
Don't know/NA*	2	2		4	13.8%
Trainees felt unfairly burdened by those who took time off because they were pregnant			>0.99		
Disagree/neutral	1	1		2	6.9%
Agree	8	12		20	69.0%
Don't know/NA*	1	6		7	24.1%
Trainees felt unfairly burdened by those who took time off for parental leave			0.272		
Disagree/neutral	3	1		4	13.8%
Agree	7	13		20	69.0%
Don't know/NA*	0	5		5	17.2%
My training program accommodates schedule flexibility related to pregnancy			>0.99		
Disagree/neutral	10	14		24	82.8%
Agree	0	1		1	3.4%
Don't know/NA*	0	4		4	13.8%
My training program accommodates schedule flexibility related to nonpregnancy health issues			>0.99		
Disagree/neutral	7	16		23	79.3%
Agree	0	1		1	3.4%
Don't know/NA*	3	2		5	17.2%
Female trainees are treated more favorably than men when granting leave related to pregnancy and childbirth			0.000		
Disagree/neutral	9	13		22	75.9%
Agree	0	0		0	0.0%
Don't know/NA*	1	6		7	24.1%

Continued

Table 4. Continued

Characteristic	Female Trainee (n=10)	Male Trainee (n=19)	P Value	All Trainees (n=29)	
Male trainees are treated more favorably than women when granting leave related to pregnancy and childbirth			0.494		
Disagree/neutral	0	2		2	6.9%
Agree	9	11		20	69.0%
Don't know/NA*	1	6		7	24.1%
Female trainees are treated with equal fairness when returning from parental leave			>0.99		
Disagree/neutral	9	11		20	69.0%
Agree	0	1		1	3.4%
Don't know/NA*	1	7		8	27.6%
Male trainees are treated with equal fairness when returning from parental leave			0.728		
Disagree/neutral	8	13		21	72.4%
Agree	0	1		1	3.4%
Don't know/NA*	2	5		7	24.1%

All P-values calculated by Fischer's exact test. NA indicates not applicable. *Don't know/NA values not used in statistical analysis.

breastfeeding mothers in cardiovascular training experience numerous challenges to establishing a pumping routine, which contribute to the observed short duration of breastfeeding, including inadequate time, schedule inflexibility, and insufficient space/facilities.

We also found that many elements of stigma associated with pregnancy in training reported in previous studies were also experienced by our cohort of cardiology fellows. We found a high degree of both women and men reporting stigma in regards to pregnancy, faculty support, and trainee perception of burden on colleagues and the program. There are many potential sources of stigma inherent in GME training. Long hours and intense training requirements can already be difficult without the superimposed challenges of a pregnancy, whether one is a mother, father, or colleague of a parent. Pregnant trainees may have concerns of personal or fetal health and often experience overt shaming or personal guilt that their pregnancy required changes to their colleagues' schedules or otherwise disrupted the training program.¹⁵ The cotrainees may resent the unanticipated schedule or on-call changes required to accommodate their pregnant or newly

parturient colleagues.¹⁶ Once new parents return to work, parenting responsibilities, especially for women,¹⁷ compound the stress that trainees experience during GME.¹⁸ Pregnancy, childbirth, breastfeeding, and parenting are competing priorities for young physicians, and all are convenient targets of blame for fluctuations of trainee stress or poor performance. We surmise that until training programs have flexible alternatives to provide for the absence of a trainee without impacting other trainees' schedules, negative attitudes may continue to be perpetuated. It is because of these continued reports of stigma and stressors that the Alliance for Academic Internal Medicine has recently released recommendations for parental leave in GME, emphasizing the importance of a unified policy of 6 weeks' paid maternity leave for all women across GME, Family and Medical Leave Act-type protections for all trainees regardless of current employment duration, and parental leave allowances for the non-birth parent.¹⁹

We also found that the majority of our trainees felt that their training program did not accommodate for schedule flexibility with regard to pregnancy-related issues, and this likely also contributed to increased levels of blame and stigma associated with becoming a parent during training. The trainees felt unsupported by both their male and female faculty during their transition into parenthood. This perception of ill support may have been caused by several factors, including poor communication to both its faculty and trainees of a nonstandardized maternity policy, as well as the complete lack of a paternity leave policy. Without standardized paternal policies and protocols, fellowship programs and faculty may have different expectations and standards that vary from one trainee to the next, leading to the trainees' perception of a program being inflexible or not caring. As a result of the initial 2013 full study report, the Mayo School of Graduate Medical Education implemented a formal, institution and specialty-wide parental leave policy that applies to both birth parents and partner/spouse trainees. Even when there are formal policies, there may be negative attitudes regarding leave by both the program directors and residents. In a study of general surgery residents and program directors, Sandler et al²⁰ showed that a significant proportion of residents felt that they were a burden on their coresidents (33% of female and 18% of male parents). In addition, 61% of program director respondents believed that becoming a parent negatively impacts scholarly activities, clinical activities, and timeliness. In a single institution survey of trainee attitudes and experiences of pregnancy during residency, male residents placed less emphasis on time considerations and age than female residents as factors influencing their decisions to have children during residency.²¹ Conversely, our results found no differences on this emphasis based on sex. That study also found that male residents reported no influence of either negative or positive opinions by coresidents, faculty,

program director, or division chief on their personal decision to have children, whereas female residents reported a slight but statistically significantly higher influence of the opinions of residents, faculty, and leadership on their decisions to bear children during residency training.²¹ Although we did not look at this particular variable, we did find that both men and women in cardiovascular training equally perceived negative pressure from both their faculty and each other. The low perceived support among cardiology fellows and other negative attitudes and perceptions may be exacerbated in male-dominated specialties like cardiology, where there may be few female faculty serving as role models and even fewer women in leadership roles. An increased number of women in departmental leadership roles, particularly the department or division chief roles, has been associated with more positive perceptions by female residents of a supportive environment to become pregnant during training. Peers may also disproportionately view childbearing among women less favorably than when male trainees become fathers, which can affect trainee evaluations in some programs. In a 10-year longitudinal study of internal medicine residents, women who experienced pregnancy during residency received lower peer evaluation scores following pregnancy compared with their male colleagues.²²

While our findings are limited by sample size, they do go beyond the previous studies indicating that women in cardiovascular training are significantly more likely to change their training and more likely to be treated unfavorably when requesting leave related to parenthood compared with their male colleagues. These findings show continued differences in regards to parenthood between male and female trainees. Recognizing these gaps as well as the common parenthood themes shared equally between men and women could help shape GME policies that support adequate parental leave, childcare assistance, schedule flexibility around pregnancy and delivery, and breastfeeding support. Although these policies exist in several other competitive training programs, such as general surgery and orthopedic surgery, there are still perceived adverse consequences of childbearing during training. Weiss and Teucher²³ and Sandler et al²⁰ demonstrated that although such policies exist, a substantial minority of program directors believe that childbearing has a high risk of negatively impacting trainees' work ethic and productivity. In Weiss's study, several program directors were contacted by email with surveys regarding maternity leave policies. Of the 141 program directors who were contacted via email, 45 program directors responded, 80% of whom stated that they had formal policies for maternity leave, and 49% had a paternity leave policy. Despite these policies, most program directors reported that the majority of their trainees took no time off during training, but when time was taken off, there was little uniformity in how leave time was managed.

Both men and women in our study reported decreased research productivity related to entering parenthood, but few reported making changes to their plans for employment.

Some GME parenting policy recommendations are specific to women, including rotation and call adjustments, radiation exposure protections, and support to help women meet American Academy of Pediatrics recommendations of at least 12 months of breastfeeding.⁸ Other policies should be expanded to include male trainees with pregnant partners, as they also experience stress related to medical complications experienced by their partners, and who may require schedule and research productivity flexibility related to childcare responsibilities.²⁴ While no same-sex couples or adoptive parents completed our survey, these parents will need similar supports.

Trainees in cardiovascular diseases can be overwhelmed by the increased need for evidence-based medicine and procedural modalities, leading to high stress levels and trainee burnout.²⁵ Our study also went beyond the previous literature by cursorily reviewing how stressors may affect maternal and fetal health. We found that none of our female trainees reported a miscarriage, stillbirth, or abortion complicating their pregnancies, and only 1 unexpected preterm delivery was observed. This would indicate that overall health of the mother and fetus was intact, despite the strenuous nature of this fellowship. One third of newborns of female cardiology trainees met the criteria for low birth weight, which is higher than the national average of 8.1% in the United States.^{26,27} However, this was a small sample and therefore difficult to generalize to a broader population. Cardiology programs should take steps to maximize the mental and physical wellness of their pregnant trainees to promote optimal trainee and fetal health, and should prepare for perinatal complications, which may impact both female and male trainee parents.²⁷ Rates of perinatal adverse events were low, but trainees who experience these medical complications may need extra support or require unplanned time off. Support for a trainee whose partner or infant is suffering medical complications should be offered as well. This program support should continue after the childbirth and extend into the maternal leave process. Longer periods of maternity leave have been associated with decreased observations of postpartum depression and resident burnout.²⁸

Our study has several limitations. First, the overall response rate from the cardiology trainees was poor, with 29 of 73 total responses used in the analysis. This 40% response rate could represent a bias in the trainee's interest in discussing pregnancy, breastfeeding, and career goals. There may also have been an overrepresentation of parents versus nonparents among survey participants in light of the length of the survey instrument. Second, as this survey

collected retrospective data, recall bias may have affected trainees' ability to report accurately past events regarding their pregnancies. Finally, this study represents a single academic medical center and graduate medical program, but is balanced by responses from 3 diverse geographic sites.

Conclusions

Becoming a parent during training is common for both women and men during cardiology training and should be taken into consideration with curriculum design and program/institutional policies. It is common for trainees to make alterations to their training schedule during and after pregnancy, and research productivity may also be affected. New mothers may not have the ability to breastfeed their infants beyond 6 months without further support from their cardiovascular training programs. Pregnancy-related stigma is perceived by a high number of male and female cardiology trainees. It is also important to acknowledge that there are important and real differences between non-birth parents/fathers and birth parents/mothers in regards to the impact on rotation adjustments, career trajectory alterations, training duration, and research productivity. Non-birth parents are, in effect, "choosing" these accommodations and schedule alterations on the basis of what is best for their family and themselves, which is arguably also good for society. However, for new mothers in the midst of cardiology training there are no alternatives to the time off they must take for their own recuperation and the newborn's health. As long as these factors are a necessity for women and are optional for men, women in cardiology will continue to face more challenges after parenthood than men. Cardiology training programs can set the stage for the future of cardiology by striving to eliminate stigma and the real and perceived barriers to parenthood during training by embracing it as a part of the training process. Despite these common difficulties, most trainees do not alter their long-term career plans. In fact, most trainees with children in our survey said they would "do it over again," with comments such as "having children has been much more rewarding than any other personal experience" and "children are wonderful!" With continued awareness and support, trainees can succeed in their roles as both cardiologists and parents.

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Disclosures

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