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Original Article

Gender Influences on Subspecialty Selection among Adult Cardiology Fellows in Pakistan: A Survey of Determinants and Trends

Reema Qayoom[1], Muhammad Mohsin[1], Kubbra Rahooja[1], Deebaj Nadeem[1], Faiza Sikandari[1], Faisal Qadir[1], Zubair Mumtaz[1], Ghazala Irfan[1]

[1]National Institute of Cardiovascular Diseases (NICVD), Karachi, Pakistan

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Corresponding Author:
Dr. Ghazala Irfan, Associate Professor, Cardiac Electrophysiology at National Institute of Cardiovascular Diseases, Karachi, Pakistan.
Email: ghazala.irfan@gmail.com

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Abstract

Objectives: To identify the factors influencing subspecialty choices among adult cardiology fellows in Pakistan and to examine whether these factors differ by gender.

Methodology: A multi-item, multiple-choice online survey was conducted among adult cardiology Fellows in Training (FITs) in Pakistan pursuing cardiovascular subspecialties between January and May 2023.

Results: A total of 195 FITs completed the survey, yielding a 55% response rate. Of these, 109 (55.9%) were male and 86 (44.1%) were female. Female FITs were younger than their male counterparts, with 69.8% (60/86) of females vs. 48.6% (53/109) of males in the 25–29 age group. Additionally, a greater proportion of female FITs were single compared to males (67.4% vs. 49.5%). Regarding subspecialty interest, 41% (80) of FITs expressed an interest in Interventional Cardiology (IC), 18.5% (36) in Electrophysiology (EP), 12.8% (25) in Critical Care (CC), and 17.9% (35) in Cardiac Imaging (CI). The remaining FITs were uncertain about their specialty.

Conclusion: Female FITs are less inclined to pursue Interventional Cardiology, citing concerns about radiation exposure and the field's male-dominated culture. However, there is an emerging trend of female FITs opting for Electrophysiology, a finding that contrasts with similar studies conducted internationally.

Keywords: Adult Cardiology, Cardiovascular, Interventional Cardiology, Electrophysiology, Critical Care, Fellows in Training

INTRODUCTION

Postgraduate medical training in Pakistan has seen remarkable growth since the country's independence, with the number of specialists increasing from just seven in 1947 to over 18,000 today [1]. This expansion has largely been fueled by the increasing number of locally trained specialists, whose qualifications are now internationally comparable [2].

However, selecting a subspecialty after completing a cardiology fellowship remains a significant challenge for Fellows in Training (FITs). In the United States, for instance, women comprise 15-18% of cardiology fellows, but the percentage of these female trainees who pursue subspecialty training is notably smaller [3].

Gender differences in subspecialty preferences have been widely documented. According to the 2018 British Junior Cardiologists' Association survey, 43% of male trainees chose interventional cardiology as their preferred advanced module, compared to just 29% of female trainees. A similar disparity was observed in electrophysiology, with 17% of male trainees versus 6% of female trainees opting for this field. Conversely, women were more likely to choose subspecialties such as imaging, heart failure, and devices, though the absolute number of male trainees in these fields remained higher [4].

The persistency of these gender imbalances over recent years suggests a complex interplay of factors that contribute to the underrepresentation of women in certain cardiology subspecialties. However, there is a notable lack of data on the factors influencing subspecialty choice among cardiology fellows in Pakistan. This study aims to explore the key determinants shaping subspecialty selection among adult cardiology fellows in training in Pakistan and to investigate whether these factors vary by gender.

METHODOLOGY

Study Design: This study utilized a cross-sectional, multi-item, multiple-choice online survey to assess determinants influencing adult cardiology fellows-in-training (FITs) in Pakistan in their choice of cardiovascular sub-specialties.

Ethics: The study was conducted after obtaining ethical approval from the Institutional Review Board (ERC-01/2023). Participants provided informed consent before completing the survey.

Setting: The survey was conducted among adult cardiology FITs across various institutions in Pakistan. Data collection took place over a five-month period, from January 2023 to May 2023.

Participants: The study targeted 195 cardiology FITs pursuing specialized training in cardiovascular sub-specialties, including clinical cardiac electrophysiology (EP), interventional cardiology (IC), cardiac imaging (CI), and critical care (CC). Inclusion criteria were FITs actively enrolled in training programs within Pakistan during the study period.

Variables: The primary variables included demographic and personal factors such as Gender, Age, Marital status, Parenting status, Ethnicity, Spousal educational status and Faculty composition of their training program

Secondary variables included professional factors influencing sub-specialty choice, such as mentorship availability, opportunities, interests, lifestyle preferences, and occupational health considerations.

Data Sources/Measurement: A structured, multi-item survey tool was developed to collect data. Questions assessed the importance of various factors in sub-specialty selection using a 5-point Likert scale, where 1 denoted "not at all important" and 5 denoted "extremely important." Additionally, respondents could provide free-text responses to elaborate on their choices. The survey included items on mentorship, career opportunities, lifestyle preferences, and occupational health concerns.

Bias: To minimize bias, the survey was designed to be anonymous, reducing the risk of socially desirable responses. Additionally, pairwise deletion was employed to handle missing values in the exploratory factor models, ensuring robustness in statistical analysis.

Study Size: A total of 195 cardiology FITs participated in the study, representing a diverse range of sub-specialties.

Quantitative Variables: Quantitative variables included Likert-scale ratings of factors influencing sub-specialty choice. Scores ranged from 1 (not at all important) to 5 (extremely important). Demographic and personal variables were also analyzed for their potential influence on responses.

Statistical Methods: Data were analyzed using IBM SPSS Statistics for Windows version 25.0. Descriptive statistics were computed for demographic and professional characteristics. Chi-square test and Fisher's exact test was used for categorical variables and Mann-Whitney U test for non-parametric comparisons

Exploratory factor analysis was conducted to identify key determinants of sub-specialty choice, with pairwise deletion used for handling missing data. A mean Likert score of ≥3.5 was considered significant for identifying important factors.

RESULTS

Participant Flow and Demographics: Out of 354 invited FITs, 195 (55%) completed the survey. Of the respondents, 55.9% (109/195) were male and 44.1% (86/195) were female. Female FITs were predominantly in the 25-29 age group (69.8% vs. 48.6% male, p=0.012). A higher proportion of female FITs were single (67.4% vs. 49.5% male, p=0.035).

Baseline Characteristics: Sindhi participants were most common (39.5%), with no significant gender-based differences (p=0.146). Female FITs were exclusively Pakistani citizens, while 4.6% of male FITs held visas (p=0.044).

Professional and Training Details: A higher proportion of female FITs were in Year 2 of their fellowship (48.8% vs. 31.2% male, p=0.075). Interventional cardiology (IC) was the most common choice (41%). More male FITs preferred IC (50.5% vs. 29.1% female, p=0.003). Female FITs showed a higher but statistically insignificant interest in electrophysiology (22.1% vs. 15.6% male, p=0.246) and cardiac imaging (22.1% vs. 14.7% male, p=0.180).

Specialized Comparisons (IC vs. Non-IC Preferences): Among those preferring IC, younger (25-29 years) and unmarried FITs were more common among females (68% and 84%) compared to males (36.4% and 45.5%; p=0.027). Female FITs with non-IC preferences had higher frequencies of working spouses (86.4% vs. 45.8% male, p=0.004).

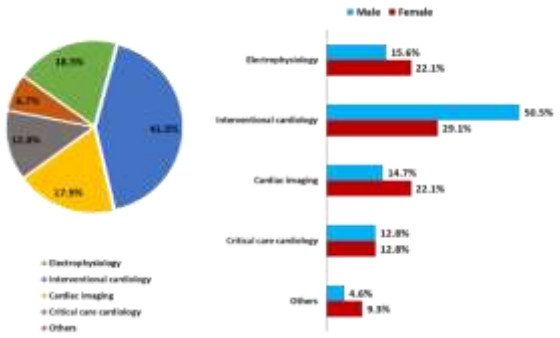

Figure 1: Distribution of anticipated field in adult cardiology

Influencing Factors for Sub-Specialty Choice: Majority (69.7%) valued mentorship, with no significant gender differences (p=0.526). Approximately 59% of respondents found these helpful, with no significant gender variation (p=0.276).

Table 1: Comparison of baseline characteristics and anticipated specialization between male and female FITs

	Total	Male	Female	P-value
Total (N)	**195**	**109 (55.9%)**	**86 (44.1%)**	-
Age				
25 - 29 years	113 (57.9%)	53 (48.6%)	60 (69.8%)	0.012
30 - 34 years	76 (39%)	52 (47.7%)	24 (27.9%)	
35 - 39 years	5 (2.6%)	4 (3.7%)	1 (1.2%)	
40 - 44 years	1 (0.5%)	0 (0%)	1 (1.2%)	
Race/ Ethnicity?				
Sindhi	77 (39.5%)	36 (33%)	41 (47.7%)	0.146
Punjabi	27 (13.8%)	13 (11.9%)	14 (16.3%)	
Siraiki	10 (5.1%)	5 (4.6%)	5 (5.8%)	
Pashtun	37 (19%)	25 (22.9%)	12 (14%)	
Balochi	10 (5.1%)	6 (5.5%)	4 (4.7%)	
Urdu speaking	27 (13.8%)	21 (19.3%)	6 (7%)	

Kashmiri	2 (1%)	1 (0.9%)	1 (1.2%)	
Others	4 (2.1%)	2 (1.8%)	2 (2.3%)	
Decline to provide	1 (0.5%)	0 (0%)	1 (1.2%)	
Marital status?				
Single / never married	112 (57.4%)	54 (49.5%)	58 (67.4%)	
Married	80 (41%)	54 (49.5%)	26 (30.2%)	
Separated	1 (0.5%)	1 (0.9%)	0 (0%)	0.035
Widowed	1 (0.5%)	0 (0%)	1 (1.2%)	
Divorced	1 (0.5%)	0 (0%)	1 (1.2%)	
Working Spouse				
No	35 (43.8%)	31 (57.4%)	4 (15.4%)	
Yes, more than 50 hours per week	20 (25%)	9 (16.7%)	11 (42.3%)	0.004
Yes, less than 50 hours per week	23 (28.8%)	13 (24.1%)	10 (38.5%)	
Decline to provide	2 (2.5%)	1 (1.9%)	1 (3.8%)	
Flexible working hours of spouse				
No	18 (41.9%)	8 (36.4%)	10 (47.6%)	0.455
Yes	25 (58.1%)	14 (63.6%)	11 (52.4%)	
Do you have children?				
No	27 (32.5%)	18 (32.7%)	9 (32.1%)	
Yes	55 (66.3%)	37 (67.3%)	18 (64.3%)	0.369
Decline to provide	1 (1.2%)	0 (0%)	1 (3.6%)	
Number of children				
1 child	29 (52.7%)	19 (51.4%)	10 (55.6%)	
2 children	18 (32.7%)	13 (35.1%)	5 (27.8%)	0.948
3 children	5 (9.1%)	3 (8.1%)	2 (11.1%)	
More than 3 children	3 (5.5%)	2 (5.4%)	1 (5.6%)	
Planning to have more children				
No	10 (18.2%)	6 (16.2%)	4 (22.2%)	
Yes	31 (56.4%)	23 (62.2%)	8 (44.4%)	0.457
Nor sure	14 (25.5%)	8 (21.6%)	6 (33.3%)	
Future plans to have children				
No	0 (0%)	0 (0%)	0 (0%)	
Yes	15 (55.6%)	11 (61.1%)	4 (44.4%)	0.466
Nor sure	1 (3.7%)	1 (5.6%)	0 (0%)	
Decline to provide	11 (40.7%)	6 (33.3%)	5 (55.6%)	
Residency status				
Pakistani citizen	190 (97.4%)	104 (95.4%)	86 (100%)	0.044
Visa holder	5 (2.6%)	5 (4.6%)	0 (0%)	
Graduation				
Pakistani graduate	178 (91.3%)	98 (89.9%)	80 (93%)	
Foreign graduate	15 (7.7%)	11 (10.1%)	4 (4.7%)	0.109
Decline to provide	2 (1%)	0 (0%)	2 (2.3%)	
Year of Adult Cardiology Fellowship Training				
Year 1	40 (20.5%)	26 (23.9%)	14 (16.3%)	
Year 2	76 (39%)	34 (31.2%)	42 (48.8%)	0.075
Year 3	71 (36.4%)	45 (41.3%)	26 (30.2%)	
Others	8 (4.1%)	4 (3.7%)	4 (4.7%)	
Number of cardiovascular faculty in training program				
1-10	53 (27.2%)	30 (27.5%)	23 (26.7%)	
11-20	20 (10.3%)	9 (8.3%)	11 (12.8%)	0.614
>20	119 (61%)	69 (63.3%)	50 (58.1%)	
Decline to provide	3 (1.5%)	1 (0.9%)	2 (2.3%)	
Number of female cardiovascular faculty in training program				
1-10	144 (73.8%)	83 (76.1%)	61 (70.9%)	
11-20	13 (6.7%)	8 (7.3%)	5 (5.8%)	0.683
>20	30 (15.4%)	14 (12.8%)	16 (18.6%)	
Decline to provide	8 (4.1%)	4 (3.7%)	4 (4.7%)	
Training institution				
Community hospital	98 (50.3%)	58 (53.2%)	40 (46.5%)	
University	33 (16.9%)	21 (19.3%)	12 (14%)	
University affiliated	34 (17.4%)	19 (17.4%)	15 (17.4%)	0.130
Military Medical Center	8 (4.1%)	4 (3.7%)	4 (4.7%)	
Others	18 (9.2%)	7 (6.4%)	11 (12.8%)	
Decline to provide	4 (2.1%)	0 (0%)	4 (4.7%)	
Anticipated Sub-specialty field				
Electrophysiology	36 (18.5%)	17 (15.6%)	19 (22.1%)	0.056

Interventional cardiology	80 (41%)	55 (50.5%)	25 (29.1%)	
Cardiac imaging	35 (17.9%)	16 (14.7%)	19 (22.1%)	
Critical care cardiology	25 (12.8%)	14 (12.8%)	11 (12.8%)	
Others	13 (6.7%)	5 (4.6%)	8 (9.3%)	
Decline to provide	6 (3.1%)	2 (1.8%)	4 (4.7%)	
Resources beneficial in helping to make decisions about specialty choices in cardiology				
Online videos of role models you can identify with and how they made their specialty choice, overcame challenges in their field	115 (59%)	68 (62.4%)	47 (54.7%)	0.276
More opportunities for direct mentorship with male and female leaders in the field	136 (69.7%)	74 (67.9%)	62 (72.1%)	0.526
Others	2 (1%)	1 (0.9%)	1 (1.2%)	0.866
Not sure	12 (6.2%)	7 (6.4%)	5 (5.8%)	0.861

Table 2: Comparison of baseline characteristics between male and female FITs stratified by anticipated specialization as IC vs. non-IC

	Interventional cardiology			Non-Interventional cardiology		
	Male	**Female**	**P-value**	**Male**	**Female**	**P-value**
Total (N)	**55 (68.8%)**	**25 (31.3%)**	-	**54 (47%)**	**61 (53%)**	-
Age						
25 - 29 years old	20 (36.4%)	17 (68%)		33 (61.1%)	43 (70.5%)	
30 - 34 years old	33 (60%)	8 (32%)	0.027	19 (35.2%)	16 (26.2%)	0.477
35 - 39 years old	2 (3.6%)	0 (0%)		2 (3.7%)	1 (1.6%)	
40 - 44 years old	0 (0%)	0 (0%)		0 (0%)	1 (1.6%)	
Race /Ethnicity						
Sindhi	13 (23.6%)	12 (48%)		23 (42.6%)	29 (47.5%)	
Punjabi	8 (14.5%)	4 (16%)		5 (9.3%)	10 (16.4%)	
Siraiki	1 (1.8%)	1 (4%)		4 (7.4%)	4 (6.6%)	
Pashtun	17 (30.9%)	3 (12%)		8 (14.8%)	9 (14.8%)	
Balochi	3 (5.5%)	1 (4%)	0.196	3 (5.6%)	3 (4.9%)	0.474
Urdu speaking	11 (20%)	2 (8%)		10 (18.5%)	4 (6.6%)	
Kashmiri	0 (0%)	1 (4%)		1 (1.9%)	0 (0%)	
Others	2 (3.6%)	1 (4%)		0 (0%)	1 (1.6%)	
Decline to provide	0 (0%)	0 (0%)		0 (0%)	1 (1.6%)	
Marital status						
Single / never married	25 (45.5%)	21 (84%)		29 (53.7%)	37 (60.7%)	
Married	30 (54.5%)	4 (16%)		24 (44.4%)	22 (36.1%)	
Separated	0 (0%)	0 (0%)	0.001	1 (1.9%)	0 (0%)	0.456
Widowed	0 (0%)	0 (0%)		0 (0%)	1 (1.6%)	
Divorced	0 (0%)	0 (0%)		0 (0%)	1 (1.6%)	
Working spouse						
No	18 (60%)	1 (25%)		13 (54.2%)	3 (13.6%)	
Yes, more than 50 hours per week	4 (13.3%)	2 (50%)	0.308	5 (20.8%)	9 (40.9%)	0.030
Yes, less than 50 hours per week	7 (23.3%)	1 (25%)		6 (25%)	9 (40.9%)	
Decline to provide	1 (3.3%)	0 (0%)		0 (0%)	1 (4.5%)	
Flexible working hours of spouse						
No	4 (36.4%)	3 (100%)	0.051	4 (36.4%)	7 (38.9%)	0.892
Yes	7 (63.6%)	0 (0%)		7 (63.6%)	11 (61.1%)	
Do you have children?						
No	10 (33.3%)	1 (25%)		8 (32%)	8 (33.3%)	
Yes	20 (66.7%)	3 (75%)	0.738	17 (68%)	15 (62.5%)	0.575
Decline to provide	0 (0%)	0 (0%)		0 (0%)	1 (4.2%)	
Number of children						
1 child	11 (55%)	3 (100%)		8 (47.1%)	7 (46.7%)	
2 children	7 (35%)	0 (0%)	0.330	6 (35.3%)	5 (33.3%)	0.873
3 children	2 (10%)	0 (0%)		1 (5.9%)	2 (13.3%)	
More than 3 children	0 (0%)	0 (0%)		2 (11.8%)	1 (6.7%)	
Planning to have more children						
No	3 (15%)	1 (33.3%)		3 (17.6%)	3 (20%)	
Yes	11 (55%)	1 (33.3%)	0.688	12 (70.6%)	7 (46.7%)	0.288
Nor sure	6 (30%)	1 (33.3%)		2 (11.8%)	5 (33.3%)	
Future plans to have children						
No	0 (0%)	0 (0%)		0 (0%)	0 (0%)	
Yes	6 (60%)	1 (100%)	0.428	5 (62.5%)	3 (37.5%)	0.248
Nor sure	0 (0%)	0 (0%)		1 (12.5%)	0 (0%)	
Decline to provide	4 (40%)	0 (0%)		2 (25%)	5 (62.5%)	

Residency status						
Pakistani citizen	50 (90.9%)	25 (100%)	0.119	54 (100%)	61 (100%)	-
Visa holder	5 (9.1%)	0 (0%)		0 (0%)	0 (0%)	
Graduation						
Pakistani graduate	48 (87.3%)	24 (96%)		50 (92.6%)	56 (91.8%)	
Foreign graduate	7 (12.7%)	0 (0%)	0.063	4 (7.4%)	4 (6.6%)	0.632
Decline to provide	0 (0%)	1 (4%)		0 (0%)	1 (1.6%)	
Year of Adult Cardiology Fellowship Training						
Year 1	11 (20%)	2 (8%)		15 (27.8%)	12 (19.7%)	
Year 2	15 (27.3%)	11 (44%)	0.060	19 (35.2%)	31 (50.8%)	0.284
Year 3	28 (50.9%)	9 (36%)		17 (31.5%)	17 (27.9%)	
Others	1 (1.8%)	3 (12%)		3 (5.6%)	1 (1.6%)	
Number of cardiovascular faculty in training program						
1-10	13 (23.6%)	4 (16%)		17 (31.5%)	19 (31.1%)	
11-20	5 (9.1%)	4 (16%)	0.330	4 (7.4%)	7 (11.5%)	0.904
>20	37 (67.3%)	16 (64%)		32 (59.3%)	34 (55.7%)	
Decline to provide	0 (0%)	1 (4%)		1 (1.9%)	1 (1.6%)	
Number of female cardiovascular faculty in training program						
1-10	40 (72.7%)	18 (72%)		43 (79.6%)	43 (70.5%)	
11-20	7 (12.7%)	0 (0%)	0.136	1 (1.9%)	5 (8.2%)	0.342
>20	7 (12.7%)	5 (20%)		7 (13%)	11 (18%)	
Decline to provide	1 (1.8%)	2 (8%)		3 (5.6%)	2 (3.3%)	
Training institution						
Community hospital	30 (54.5%)	6 (24%)		28 (51.9%)	34 (55.7%)	
University	9 (16.4%)	1 (4%)		12 (22.2%)	11 (18%)	
University affiliated	8 (14.5%)	7 (28%)	0.005	11 (20.4%)	8 (13.1%)	0.500
Military Medical Center	2 (3.6%)	2 (8%)		2 (3.7%)	2 (3.3%)	
Others	6 (10.9%)	6 (24%)		1 (1.9%)	5 (8.2%)	
Decline to provide	0 (0%)	3 (12%)		0 (0%)	1 (1.6%)	
Anticipated Sub-specialty field						
Electrophysiology	34 (61.8%)	13 (52%)	0.408	34 (63%)	34 (55.7%)	0.432
Interventional cardiology	39 (70.9%)	18 (72%)	0.920	35 (64.8%)	44 (72.1%)	0.398
Cardiac imaging	1 (1.8%)	1 (4%)	0.562	0 (0%)	0 (0%)	-
Critical care cardiology	2 (3.6%)	1 (4%)	0.937	5 (9.3%)	4 (6.6%)	0.590

Table 3: Distribution of various factors deemed important by FITs for the selection of electrophysiology

	Total	Male	Female	P-value
Total (N)	**36**	**17**	**19**	**-**
Mentorship				
Having mentors or role models you identify with	3.78 ± 1.51	3.71 ± 1.57	3.84 ± 1.5	0.792
Having a female mentor or role model	3.5 ± 1.38	3.24 ± 1.35	3.74 ± 1.41	0.284
Having role models who demonstrate work-life balance in this field	3.89 ± 1.43	3.88 ± 1.41	3.89 ± 1.49	0.98
Opportunity				
Opening available in desired training program	3.72 ± 1.52	3.53 ± 1.46	3.89 ± 1.59	0.481
Likelihood of employment after completion of training	3.69 ± 1.26	3.82 ± 1.24	3.58 ± 1.3	0.569
Importance of being an expert in the field	3.61 ± 1.34	3.59 ± 1.18	3.63 ± 1.5	0.924
Innovation in the field	3.78 ± 1.33	3.82 ± 1.19	3.74 ± 1.48	0.849
Interest				
Personal interest in the specialty subject area	4.03 ± 1.48	3.94 ± 1.48	4.11 ± 1.52	0.746
Opportunity for immediate gratification or sense of accomplishment	3.58 ± 1.32	3.35 ± 1.22	3.79 ± 1.4	0.328
Analytical process that goes into decision making	3.61 ± 1.38	3.59 ± 1.37	3.63 ± 1.42	0.927
Opportunity to perform hands-on procedures	3.42 ± 1.48	3.06 ± 1.48	3.74 ± 1.45	0.174
Less emergencies with less likelihood of being called in overnight	3.36 ± 1.51	3.29 ± 1.53	3.42 ± 1.54	0.806
Other				
Financial advantages	3.97 ± 1.52	4.06 ± 1.39	3.89 ± 1.66	0.752
Prestige hierarchy or status	3.44 ± 1.3	3.41 ± 1.12	3.47 ± 1.47	0.889
Opinions of other important people in your life	3.5 ± 1.54	3.47 ± 1.42	3.53 ± 1.68	0.916
Other	3.06 ± 0.95	3.06 ± 0.9	3.05 ± 1.03	0.985

Table 4: Distribution of various factors deemed important by FITs for the selection of interventional cardiology

	Total	Male	Female	P-value
	80	**55**	**25**	**-**
Lifestyle				
Can extend years of training (1 vs. 2 years)	3.43 ± 1.51	3.71 ± 1.5	2.8 ± 1.35	0.011
Occupational Health				

Less Gender discrimination or harassment	3.34 ± 1.42	3.25 ± 1.46	3.52 ± 1.36	0.443
Less physically demanding nature of job (e.g. wearing heavy lead for longer hours)	3.54 ± 1.29	3.56 ± 1.37	3.48 ± 1.12	0.79
Procedure Length	3.49 ± 1.2	3.55 ± 1.18	3.36 ± 1.25	0.526
Mentorship				
You identify with other physicians in the specialty	3.40 ± 1.43	3.36 ± 1.56	3.48 ± 1.12	0.738
Encouragement from Mentors	3.39 ± 1.26	3.27 ± 1.34	3.64 ± 1.04	0.228
Female role models	3.25 ± 1.34	3.2 ± 1.38	3.36 ± 1.25	0.623
No “Old boys club” culture	3.2 ± 1.38	3.09 ± 1.4	3.44 ± 1.33	0.298
Opportunity				
Flexibility in job prospects/opportunities over lifetime	3.51 ± 1.36	3.51 ± 1.46	3.52 ± 1.12	0.974
Likelihood of employment after completion of training	3.76 ± 1.34	3.75 ± 1.44	3.8 ± 1.12	0.868
No desire to shorten training length	3.26 ± 1.38	3.38 ± 1.43	3 ± 1.26	0.256
Interest				
Greater interest in the field	3.11 ± 1.4	3.13 ± 1.45	3.08 ± 1.29	0.889
No technical difficulties	3.30 ± 1.12	3.22 ± 1.2	3.48 ± 0.92	0.335
Desire for different type of patient contact	3.46 ± 1.27	3.51 ± 1.37	3.36 ± 1.04	0.63
Less anticipated pressure on the job	3.48 ± 1.27	3.4 ± 1.37	3.64 ± 1.04	0.438
Other factor				
Other	2.95 ± 0.42	2.93 ± 0.5	3 ± 0	0.474

Table 5: Distribution of various factors deemed important by FITs for the selection of other sub-specialties

	Total	Male	Female	P-value
	60	30	30	-
Lifestyle				
Did not want to extend years of training	3.52 ± 1.65	3.5 ± 1.63	3.53 ± 1.7	0.938
Wanting to have children in the next 5 years	3.48 ± 1.19	3.73 ± 1.2	3.23 ± 1.14	0.103
Flexible working hours	3.67 ± 1.45	3.73 ± 1.44	3.6 ± 1.48	0.724
Occupational Health				
Least radiation exposure concerns during childbearing	3.63 ± 1.47	3.47 ± 1.57	3.8 ± 1.37	0.385
Least radiation exposure concerns for personal well-being	3.67 ± 1.34	3.53 ± 1.33	3.8 ± 1.35	0.444
No gender discrimination	3.43 ± 1.43	3.33 ± 1.32	3.53 ± 1.55	0.592
Less physically demanding nature of job (e.g. wearing heavy lead)	3.57 ± 1.35	3.57 ± 1.33	3.57 ± 1.38	>0.99
Less procedure Length	3.67 ± 1.39	3.5 ± 1.36	3.83 ± 1.42	0.356
Mentorship				
You identify with other physicians in the specialty	3.37 ± 1.56	3.2 ± 1.49	3.53 ± 1.63	0.413
Encouragement from Mentors	3.35 ± 1.34	3.47 ± 1.31	3.23 ± 1.38	0.504
Female role models	3.38 ± 1.4	3.23 ± 1.38	3.53 ± 1.43	0.412
No “Old boys club” culture	3.35 ± 1.39	3.3 ± 1.42	3.4 ± 1.38	0.783
Opportunity				
Flexibility in job prospects/opportunities over lifetime	3.5 ± 1.64	3.5 ± 1.66	3.5 ± 1.66	>0.99
Likelihood of employment after completion of training	3.62 ± 1.51	3.7 ± 1.53	3.53 ± 1.5	0.672
Shortened training length	3.47 ± 1.55	3.37 ± 1.65	3.57 ± 1.45	0.62
Interest				
Greater interest in field	3.38 ± 1.6	3.43 ± 1.55	3.33 ± 1.67	0.811
No technical difficulties	3.22 ± 1.24	3.17 ± 1.23	3.27 ± 1.26	0.757
Desire for different type of patient contact	3.32 ± 1.43	3.37 ± 1.4	3.27 ± 1.48	0.789
Anticipated less pressure on the job	3.22 ± 1.37	3.5 ± 1.36	2.93 ± 1.34	0.109
Other factor				
Other	2.87 ± 0.6	2.83 ± 0.53	2.9 ± 0.66	0.668

DISCUSSION

Data from the Association of American Medical Colleges (AAMC) reveal notable gender disparities in the representation of women and men in adult cardiology training programs. From 2017 to 2018, women accounted for just 21.4% of all adult cardiology trainees, with men comprising 78.6%. Within subspecialties, interventional cardiology (IC) (10.2%) and electrophysiology (EP) (11.6%) showed the greatest gender imbalance, in contrast to advanced heart failure/transplantation (31.2%) and adult congenital heart disease (46.7%) [5-6].

Despite an increase in female representation across a variety of medical and surgical specialties, women remain underrepresented in interventional fields, which continue to rank at the bottom in terms of gender balance [7]. Understanding why this disparity persists is the aim of this study. Several factors

contribute to gender disparities in the pursuit of cardiovascular subspecialties, including sociocultural norms, work-life balance and family planning, the absence of female role models and mentors, career aspirations, professional development opportunities, institutional support, financial considerations, and salary discrepancies [8].

Our findings suggest that female fellows in training (FITs) tend to be younger and more likely to be single compared to their male counterparts. This could be due to the fact that male FITs, often married with family responsibilities, may pursue fellowship training at a later stage in their careers.

In our survey, 80 (41%) FITs expressed interest in specializing in interventional cardiology, 36 (18.5%) in electrophysiology, 25 (12.8%) in critical care, 35 (17.9%) in cardiac imaging, with the remainder undecided. Key factors influencing the choice of EP included personal interest, financial incentives, access to role models, the field's innovative potential, and the availability of training opportunities. These findings offer a fresh perspective, contrasting with trends identified in recent international studies [3]. Notably, the increasing role of female mentors has emerged as a significant factor in attracting female FITs to the growing field of electrophysiology in Pakistan.

For interventional cardiology, the primary motivations for both male and female FITs were employment prospects post-fellowship, field interest, and flexible working hours. With interventional cardiology being a well-established field in Pakistan, the likelihood of employment is higher, further influencing career decisions. Gender differences in social constraints, including work-life balance and societal expectations, may further shape subspecialty choices [5, 9-11].

When selecting critical care and cardiac imaging, factors such as shorter training durations, minimal radiation exposure, and more flexible working hours were pivotal. Professional development goals seem better aligned with steady hours rather than the challenges presented by job-specific criteria like workplace difficulties or long hours [12].

Interestingly, although international data suggests that women perceive a lack of diversity and suitable role models in interventional fields (including IC and EP) as barriers [13], our results diverged, showing less concern among female FITs regarding these challenges.

Limitations: This study has several limitations. The response rate was relatively low (55%), which may affect the generalizability of our findings. Non-respondents might hold different views, potentially introducing bias. Furthermore, the disproportionately high representation of female FITs in our sample does not reflect the typical gender distribution in cardiology, further limiting the applicability of our results.

Future studies should aim for higher response rates and more representative samples to provide a broader understanding of gender disparities in cardiology subspecialties.

CONCLUSION

Cardiology Fellows in Training highly value mentorship, work-life balance, and professional growth opportunities. Female FITs are less inclined toward interventional cardiology, citing concerns about radiation exposure and the perception of it as a male-dominated field. Conversely, the growing trend of women pursuing electrophysiology in Pakistan highlights the positive impact of mentorship and emerging opportunities.

Addressing gender imbalances in cardiovascular subspecialties requires a multifaceted approach, including cultural transformation, targeted mentorship programs, and institutional support. By addressing these factors, the field can create an inclusive environment that nurtures the aspirations of all aspiring cardiologists, ultimately diminishing gender disparities.

AUTHORS' CONTRIBUTION

RQ, MM, KR, DN, FS, FQ, and GI: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. RQ, MM, KR, DN, FS, ZM, FQ, and GI: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

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