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Impact of the Pandemic on Gender Differences in Scientific Publication Authorship Among Turkish Adult Cardiologists

Türk Erişkin Kardiyologlar Arasında Bilimsel Yayın Yazarlığında Cinsiyet Farklılıklarına Pandeminin Etkisi

ORIGINAL ARTICLE
KLİNİK ÇALIŞMA

ABSTRACT

Objective: Despite efforts spent on promotion of gender equity in the academia, the gender gap is feared to have widened after the coronavirus disease 2019 pandemic. Herein, we aimed to compare the distribution of female authorship by Turkish adult cardiologists in journals indexed at PubMed before and after the pandemic.

Methods: In this cross-sectional study, an advanced search on PubMed (https://pubmed.ncbi.nlm.nih.gov/) was carried out based on the following criteria: "entrez date" and keywords "Turkey" and "cardiology" to identify papers that entered the online database in April-September 2019 and April-September 2020. After the study sample was determined, type of the article and details of the author list were recorded.

Results: Of 1318 articles screened, 708 met the inclusion criteria. Overall, 85 (12.0%) of first authors and 67 (10.0%) of senior authors were female. Females were less likely to first author original articles, editorials, case reports/series, and papers with international participation (9.5%, $P = .012$; 33.3%, $P = .045$; 18.3%, $P = .033$; 4.8%, $P = .032$, respectively). A higher proportion of females were in first and corresponding author positions in original articles (73.2%, $P = .032$; 76.5%, $P = .019$, respectively) but not in other article types (all $P > .05$), after emergence of the pandemic.

Conclusion: These suggest that significant gender differences exist with regard to authorships of scientific publications that were submitted by Turkish adult cardiologists. Future studies may aim to evaluate the trends across a wider time span and based on a more extensive scientific output follow-up.

Keywords: Academia, coronavirus disease 2019, COVID-19, gender, gender gap, women in cardiology

ÖZET

Amaç: Akademide toplumsal cinsiyet eşitliğinin teşvik edilmesine yönelik çaba sarf edilmesine rağmen koronavirüs hastalığı 2019 pandemisinin ardından eşitsizliğin artmasından endişe edilmektedir. Bu çalışmada, PubMed'de taranmakta olan dergilerde kadın Türk erişkin kardiyolog yazar dağılımının pandemi öncesi ve sonrası dönemler arasında kıyaslanması amaçlanmıştır.

Yöntemler: Bu kesitsel çalışmada, PubMed üzerinde (https://pubmed.ncbi.nlm.nih.gov/) "entrez date" ile "Turkey" ve "cardiology" anahtar kelimelerine dayalı bir gelişmiş arama gerçekleştirilerek veri tabanına Nisan-Eylül 2019 ve Nisan-Eylül 2020 tarihleri arasında giren makaleler saptandı. Çalışma örneklemi belirlendikten sonra, makalenin tipi ve yazar listesine ilişkin detaylar kaydedildi.

Bulgular: Taranan 1318 makaleden 708'i dahil edilme kriterlerini karşıladı. İlk yazarların 85'i (%12,0), kıdemli yazarların 67'si (%10,0) kadındı. Kadınların araştırma makalesi, editöryel, olgu sunumu/serisi ve uluslararası katılımlı makalelerde ilk yazar olma sıklığı daha düşüktü (sırasıyla %9,5, $P = ,012$; %33,3, $P = ,045$; %18,3, $P = ,033$; %4,8, $P = ,032$). Araştırma makalelerinde ilk ve ilgili yazar konumunda kadınların yer alma sıklığının pandeminin ortaya çıkışı sonrası daha fazla olduğu görüldü (sırasıyla %73,2, $P = ,032$; %76,5, $P = ,019$); ancak diğer makale tiplerinde bu bakımdan herhangi bir farklılık izlenmedi (tüm $P > ,05$).

Sonuç: Bu bulgular Türk erişkin kardiyologlar tarafından yayımlanmış bilimsel makalelerde yazarlıkta anlamlı cinsiyet farklılıkları olduğunu düşündürmektedir. Gelecekte yapılacak çalışmalarda, durumun daha geniş zaman aralığında incelenmesi ve bilimsel çıktının uzun vadede daha kapsamlı değerlendirilmesi göz önünde bulundurulabilir.

Anahtar Kelimeler: Akademi, cinsiyet eşitsizliği, kadın kardiyologlar, koronavirüs hastalığı-2019, KOVID-19, toplumsal cinsiyet

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In recent years, there has been a lot of interest in looking into gender differences in the authorship of scientific publications in the field of cardiovascular research, and it has mainly revealed disadvantaged positions for female authors. An examination of the National Institutes of Health-funded cardiovascular research articles submitted to cardiology journals indexed in PubMed over a 3-decade period (n=12 018) revealed an increase in the first authorship by females of 5% more than males in the last decade (2005-2015), owing primarily to articles published in journals with lower impact factors.[1] Males have continuously dominated senior authorship over the past 3 decades, with females holding 50% fewer senior author positions than their male counterparts.[1] These findings were supported by Ouyang et al.[2] who found that despite a significant increase in first and senior female authorship from 1980 to 2017, only one-fifth of senior authorship was held by females in research articles published in the *Journal of the American College of Cardiology* (JACC), *Circulation*, and *European Heart Journal* (EHJ). A study from Japan also pointed out that despite an increase from 13% to 20% between 2006 and 2009, a plateau was reached afterward, leaving female authors behind in the first authorship in 6 journals connected with Japanese societies.[3] Underrepresentation of female authors was also noted in publications cited in clinical practice guidelines and randomized clinical trials conducted in cardiology.[4-7]

Initiatives by women in cardiology have spent tremendous efforts to raise awareness and promote gender equity in academia.[8] Yet, the gender gap is feared to have widened since the outbreak of the coronavirus disease 2019 (COVID-19) pandemic since the consequences of the pandemic have affected women in a disproportionate and more severe manner.[9,10] Gender role stereotyping has been recognized as the major contributing factor, rendering women the primary caregiver for childcare and homeschooling, as well as for domestic work for family members who are unable to care for themselves. This was supported by a study of demographic and employment data from the United States, which found a significant decrease in the percentage of full-time female physicians who are parents of pre-school-aged children (from 17.98% to 14.10%, *P* = .009), but no significant change was observed among male physicians during the pandemic.[11] As a result, it has been projected that the challenges faced by female doctors and researchers during the pandemic will have an influence on their academic production. Accordingly, data have shown that during the pandemic, male researchers submitted more manuscripts and pre-prints, as well as clinical trial registrations.[12] However, there is scarce evidence with regard to the pandemic's impact on the gender distribution of authorships among cardiologists.[13]

In the current study, we aimed to retrospectively compare the distribution of female authorship by Turkish cardiologists in PubMed-indexed journals before and after the pandemic. We hypothesized that female Turkish cardiologists (1) overall represented a smaller proportion of first and senior authors in manuscripts published in PubMed-indexed journals and (2) were less likely to own these authorship positions during the COVID-19 pandemic than during the same months the previous year.

ABBREVIATIONS

COVID-19	Coronavirus disease 2019
EHJ	European Heart Journal
JACC	American College of Cardiology
IQR	Interquartile range
TÜBİTAK	Scientific and Technological Research Council of Turkey

Methods

Study Sample

An advanced search on PubMed (https://pubmed.ncbi.nlm.nih.gov/) was made based on the following criteria: "entrez date" and keywords "Turkey" and "cardiology." Papers that entered PubMed in April-May-June 2019, July-August-September 2019, April-May-June 2020, and July-August-September 2020 were categorized as group 1 (G1), group 2 (G2), group 3 (G3), and group 4 (G4), respectively. G1 and G2 were considered to represent the pre-pandemic period, whereas G3 and G4 were expected to reflect the post-pandemic period.

Only papers co-authored by at least 1 adult cardiologist affiliated with a Turkish institution were included. Papers that appeared in PubMed more than 10 days after their online or print publication dates, or within the next month, were not included. Online publishing dates were taken into account for papers with different online and print publication dates. Retractions and corrections/errata were also excluded. After the study sample was determined, type of the article and details of the author list (number of authors, international participation, gender distribution) were recorded.

In single-author papers, second and senior author roles were classified as "non-available." In papers with 2 authors, second and senior author positions were recorded the same. To consider a paper with international collaboration, at least 1 author had to be affiliated with only a non-Turkish institution. In papers with more than 1 corresponding authors, female corresponding authorship was considered if at least 1 of the corresponding author was female. If the first and second authors in the author list equally contributed to the study, only the author in the first order was considered the first author.

Gender of the authors was determined by their first names. If gender was unadjudicated from the name, institutional webpages were queried on the internet search engines (i.e., Google). One manuscript was removed from the study because the gender of the middle author could not be determined.

The study protocol was approved by the local ethics committee (Ege University Medical Research Ethics Committee; January 7, 2021; 21-1T/8).

Statistical Analysis

Kolmogorov–Smirnov test was done to test normal distribution. Continuous variables with skewed distribution were represented with median (interquartile range [IQR]) and compared using Mann–Whitney *U* test and Kruskal–Wallis test within 2 and 4 groups, respectively. Categorical variables were represented with numbers and percentages and were compared using chi-square test. Column proportions were compared using Z-test and *P* values were adjusted using the Bonferroni method. Statistical analysis was performed using Statistical Package for the Social Sciences software (IBM Corp. Released 2011. IBM

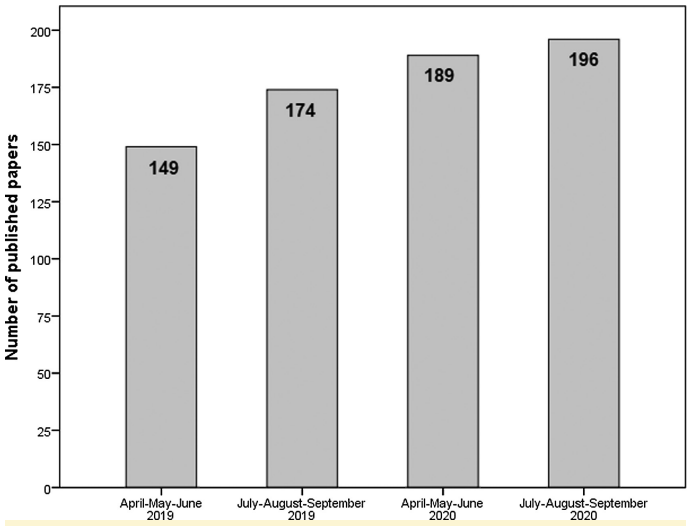

Figure 1. Bar chart showing number of publications per group.

SPSS Statistics for Windows, Version 20.0. Armonk, NY, USA: IBM Corp.). A *P* value <.05 was considered significant.

Results

Of 1318 articles screened, 708 met the inclusion criteria (n=149 in G1, n=174 in G2, n=189 in G3, n=196 in G4). Authorships were matched to gender. An increasing trend in the number of publications was noted across groups with time (Figure 1). Characteristics of the publications with regards to time at PubMed entry are summarized in Table 1. The number of authors per article and article types was found to be similar in each group (all *P* > .05) (Table 1).

Gender Distribution of Authorships of Overall Publications

Within the 708 papers analyzed, a small proportion of female authorship was observed. Only 85 (12.0%) of first authors and 67 (10.0%) of senior authors were female. 11.4% of second (n=77) and 10.0% of corresponding (n=71) authorship were occupied by females. Ownership of first, second, senior, and corresponding author positions stratified by time at PubMed entry is shown in Figure 2.

Characteristics of Publications with Regards to Strategic Authorship Ownership by Females

Original articles, editorials, case reports/series, and papers with international participation were significantly less commonly first authored by females (*P* = .012, *P* = .045, *P* = .033, and *P* = .032, respectively) (Figure 3) (Supplementary Material 1). Females and males were equally likely to be first authors on other sorts of articles (all *P* > .05) (Supplementary Material 1). Corresponding authorship by females was also less common in original articles, editorials, and case report/series (*P* = .019, *P* = .025 and *P* = .021, respectively), whereas it was comparable with males in other types of articles (Figure 4) (Supplementary Material 2). No statistically significant differences were observed regarding type of the article or international participation status between female and male senior-authored papers (all *P* > .05) (Supplementary Material 3).

Impact of Strategic Authorship Ownership on Gender Distribution in the Author List

When the paper was first written by a female, females were more likely to hold corresponding authorship (*P* < .001), while no such difference was observed between males and females for second or senior authorship (both *P* > .05) (Supplementary Material 4). When the senior authorship was owned by a female, second authors were also more likely to be females (*P* = .010) and a greater number of female middle authors existed (*P* = .002) (Supplementary Material 5). Female first and second authorship were more common when corresponding author was a female (*P* < .001 and *P* = .002, respectively) (Supplementary Material 6).

Table 1. Characteristics of Publications with Regards to Time in PubMed Entry

	April-May-June 2019 (n=149)	July-August-September 2019 (n=174)	April-May-June 2020 (n=189)	July-August-September 2020 (n=196)	*P*
Total number of authors per article	5 (5)	5 (5)	5 (5)	5.5 (4)	.222
Single author paper, n (%)	7 (4.7)[a,b]	15 (8.6)[b]	9 (4.8)[a,b]	4 (2.0)[a]	.036*
Paper with international participation, n (%)	18 (12.1)	19 (10.9)	24 (12.7)	22 (11.2)	.951
Original article, n (%)	89 (59.7)	94 (50.0)	117 (61.9)	130 (66.3)	.110
Editorial, n (%)	2 (1.3)	4 (2.3)	4 (2.1)	2 (1.0)	.746
Review article, n (%)	4 (2.7)	7 (4.0)	12 (6.3)	9 (4.6)	.435
Letter to the editor, n (%)	28 (18.8)	33 (19.0)	30 (15.9)	24 (12.2)	.263
Case report/series, n (%)	24 (16.1)	29 (16.7)	22 (11.6)	29 (14.8)	.535
Guidelines, consensus reports, n (%)	2 (1.3)	4 (2.3)	2 (1.1)	2 (1.0)	.544
Other articles, n (%)†	0	3 (1.7)	1 (0.5)	0	.512

*Each superscript letter (a; b; a,b) denotes a subset of PubMed entry categories whose column proportions do not differ significantly from each other at the .05 level;
†Updates on previous research (n=1), perspective (n=1), meeting report (n=1), 'how to' paper (n=1).

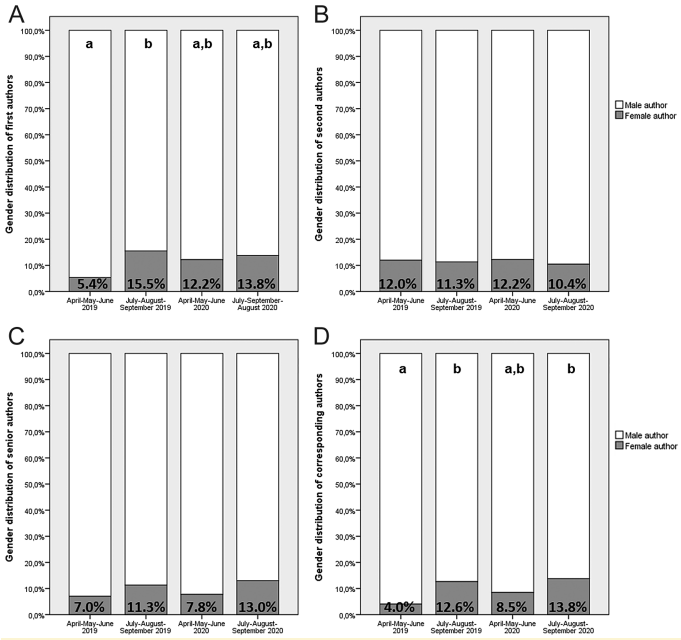

Figure 2. Box-plot graph showing gender distribution among first (A), second (B), senior (C), and corresponding (D) authors. *P* values for comparison between G1 and G4 are *P* = 0.032 (A), *P* = .951 (B), *P* = 0.200 (C), *P* = 0.013 (D). *Each letter in columns (a; b; a,b) denotes a subset of PubMed entry categories whose column proportions do not differ significantly from each other at the .05 level. ¤Second and senior authors coded non-available in single-author publications (n = 35). Corresponding author information non-available in one publication.

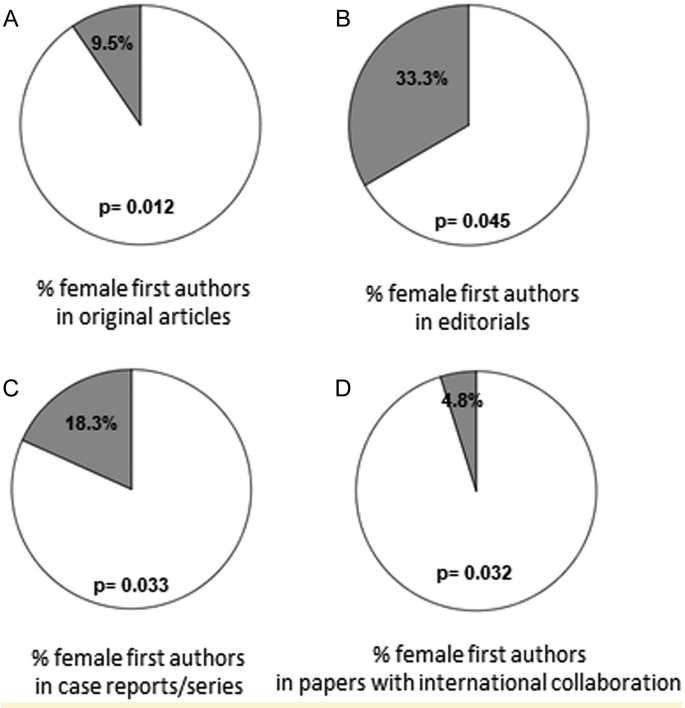

Figure 3. Pie charts demonstrating proportion of female first authorship in original articles (A), editorials (B), case reports/series (C), and papers with international collaboration (D).

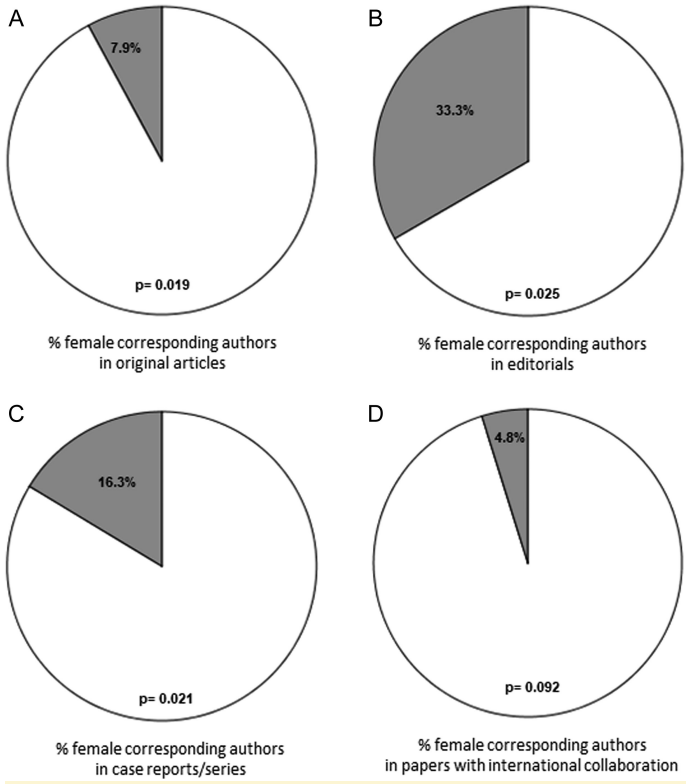

Figure 4. Pie charts demonstrating proportion of female corresponding authorship in original articles (A), papers with international collaboration (B), editorials (C), case reports/series (D).

Comparison of Gender Distribution in the Author List Before and After the Pandemic

Of the 708 articles assessed, 323 and 385 entered PubMed before (G1+G2) and after (G3+G4) the declaration of the pandemic, respectively. Comparison of their characteristics with regards to having entered PubMed in the pre- and post-pandemic period is shown in Table 2. Less single-author and more original article papers were published in the post-pandemic period (*P* = .036 and *P* = .042, respectively) (Table 2).

Female first, second, senior, and corresponding authorship was comparable before and after the pandemic (all *P* > .05). More female middle authors existed after the pandemic (*P* = .007) (Table 3). When compared with the pre-pandemic era, a higher proportion of females were in first and corresponding author positions in original articles only (*P* = .032 and *P* = .019, respectively) but not in other article types (all *P* > .05) (Supplementary Material 7).

Discussion

This is the first study that investigates gender representation in authorships of publications by Turkish adult cardiologists. Key findings are given as follows: (1) Female adult cardiologists were underrepresented in authorships in cardiology publications; (2) Proportion of first and corresponding authorship by females were influenced by the type of the article; (3) Papers with international participation were significantly less first authored by females; (4) As female authors owned strategic

Table 2. Comparison of Characteristics of Publications Before and After the Pandemic

	Before the pandemic (April-May-June-July-August-September 2019) (n=323)	After the pandemic (April-May-June-July-August-September 2020) (n=385)	*P*
Total number of authors per article	5 (5)	5 (4)	.113
Single author paper, n (%)	22 (6.8)	13 (3.4)	.036*
Paper with international participation, n (%)	37 (11.5)	46 (11.9)	.839
Original article, n (%)	183 (56.7)	247 (64.2)	.042*
Editorial, n (%)	6 (1.9)	6 (1.6)	.759
Review article, n (%)	11 (3.4)	21 (5.5)	.191
Letter to the editor, n (%)	61 (18.9)	54 (14.0)	.081
Case report/series, n (%)	53 (16.4)	51 (13.2)	.237
Guidelines, consensus reports, n (%)	6 (1.9)	4 (1.0)	.525
Other articles, n (%)†	3 (0.9)	1 (0.3)	.336

**P* value >.05 denotes statistical significance;
†Updates on previous research (n=1), perspective (n=1), meeting report (n=1), how to paper (n=1).

positions in the author list, an increase in female representation in the author list was observed; (5) Overall, there was no significant change in gender distribution within strategic authorship positions after the outbreak of the pandemic; and (6) After the pandemic, the proportion of female authors who had first and corresponding authorship positions was greater in original articles.

Our findings have shown that the proportion of female authorship was consistently low across all investigated time periods, peaking at 15.5% in July-August-September 2019 with respect to first authorship and 13.0% in July-August-September 2020 with respect to senior authorship. Interestingly, the proportions of female authorship in various positions on the author list appeared to be lower than in prior reports from other countries.[2,3,14] However, it should be noted that prior studies have not specifically investigated manuscripts authored by at least 1 adult cardiologist but instead explored the overall gender distribution in manuscripts submitted to cardiovascular journals.

It has been proposed that cardiology, as one of the medical specialties involving less females, may have lower representation of women in research and research productivity.[2] According to data from the Turkish Medical Association, females made up 42.62% of the 38536 medical faculty students in Turkey during the 2009-2010 academic year.[15] In 2020, the proportion of female medical faculty students at Ege University and Hacettepe University Faculty of Medicine were 42.8%[16] and 55.6%,[17] respectively. Although the current proportion of female cardiologists licensed by the Republic of Turkey Ministry of Health is not accessible, a study analyzing the gender distribution of 7790 candidates who took the National Medical Specialist Examination between 2007 and 2009 showed that 20% of the 262 candidates who matched at a cardiology training program were females.[18] This was in line with data from the year 2006 that showed 17.1% of the 1153 cardiologists among 45980 specialists in Turkey were females.[19] Of note, cardiology was the only non-surgical specialty among the top 10 specialties in Turkey with the least female/male physicians ratios.[19] According to the full member profile of the Turkish Society of Cardiology, a non-governmental organization with 2789 full members by October 01, 2021 has similarly elaborated that 18% of its full members are females (n=501 females and n=2288 males). Overall, these suggest that while about 1 in every 2 medical students in Turkey is female, only around 1 in every 5 cardiologists is female, which is in line with previous international reports.[20-23] Female involvement in cardiology in the United States ranges between 10% and 21%, with a nadir of 7.2% specifically in interventional cardiology,[20-22] and is 18% in the United Kingdom.[23] In a field

Table 3. Comparison of Gender Distribution in the Authorships Before and After the Pandemic

	Before the pandemic (April-May-June-July-August-September 2019) (n=323)	After the pandemic (April-May-June-July-August-September 2020) (n=385)	*P*
Female first author, n (%)	35 (10.8)	50 (13.0)	.380
Female second author, n (%)†	35 (11.6)	42 (11.3)	.891
Female senior author, n (%)†	28 (9.3)	39 (10.5)	.611
Female corresponding author, n (%)†	28 (8.7)	43 (11.2)	.265
Number of female middle author(s) per article	0 (0)	0 (1)	.007*

**P* value >.05 denotes statistical significance;
†Second and senior authors coded non-available in single-author publications (n=35). Corresponding author information is not available for 1 publication.

dominated by males, it would be impossible to expect a balanced gender distribution in authorships of cardiology publications.

In addition, the desire for academic promotion is universally the leading motivation of medical doctors for publishing. Exploration of gender distribution among academic physicians across 43 state universities in Turkey with medical schools between January 1 and 15, 2010, has revealed that there were 40 female and 244 male cardiology faculty, resulting in an even lower female cardiologist representation in the academia (14.1%).[18] Despite the lack of data that would reflect recent years, this is consistent with the anticipation that women engaged in research and scientific activities will make up an even smaller share of the total number of female cardiologists. It should also be noted that the current study did not evaluate the unique female cardiologists who contributed as authors, and the proportion of female cardiologists may potentially reflect contributions by the same female cardiologists. In any case, increasing female cardiologist representation in authorships can be achieved by introducing workplace adjustments that support gender equity and policies that aim to increase the productivity of females. Individual efforts should also be taken, such as taking advantage of networking opportunities with colleagues not just from the same country but also from other countries, which may impact the low proportion of female first-authored papers with international participation reported in our study.

Our findings that female first and second authors are more common when females hold corresponding authorship positions are consistent with the study by Ouyang et al.[24] who found more female authors in the author list when corresponding authors were females in the analysis of all articles published in the 20 top impact cardiology journals in 2017 (n=2379 articles). Another finding from our study was that senior authorship by females led to a greater number of female middle authors, as well as a higher likelihood of a female second author. Previous research by Ouyang et al[2] and DeFilippis et al[13] also suggested that first authors were more likely to be females when the senior authorship was held by a female. These findings highlight the importance of presence of a female mentor to help develop a female supportive research environment.[25]

During the COVID-19 pandemic, fewer papers related to the disease were first authored by females compared to papers from 2019 published in the same medical journals.[26] Data from registered reports and pre-prints also revealed that female first authors submitted fewer papers to medRxiv in March 2020 and April 2020 (30.41% and 22.2%, respectively) compared to same months in 2019 (both 34.21%).[27] In addition, in agreement with the findings of Andersen et al.[26] female first authors contributed less to COVID-related research compared to research in other areas within medRxiv-submitted papers (18.02% vs. 32.49%).[27] The only paper exploring the impact of the COVID-19 pandemic on cardiology publications compared the gender representation in authorships of manuscripts published in JACC, Circulation, Journal of American Medical Association Cardiology, and EHJ in March-June 2019 and March-June 2020.[13] Overall, the proportion of female first (22.3% females in 2019 and 27.4% females in 2020) and senior (15.0% in 2019 and 19.3% in 2020) authors was higher in 2020 compared to 2019, with only the higher prevalence of female first authorship reaching statistical significance,[13] and the same trend in first authorships of original articles was found in our study. However, the study by DeFilippis et al[13] did not specifically focus on authorships by female cardiologists; therefore, head-to-head comparison with our study is not reasonable.

Despite an increase in childcare and household activities by male participants during the pandemic (in the year 2020) compared with the previous year, survey data showed that neither of the responsibilities of female participants was alleviated.[28] Indeed, findings from another survey demonstrated that unpaid care work by females increased dramatically, where the prevalence of women devoting ≥4 hours daily to housework and domestic care increased from 15.9% to 41.8% during the pandemic.[29] Therefore, findings of our study are striking in terms of indicating more original articles were published in the post-pandemic period, as well as a higher proportion of females first authoring original articles. It is encouraging since these may suggest that contribution of female cardiologists to original articles as first authors was not halted during the pandemic, and, in fact, it was even increased compared to the pre-pandemic period. Data from the Scientific and Technological Research Council of Turkey (TÜBİTAK) reflect a similar trend, with the proportion of female researchers who applied to and were sponsored by TÜBİTAK (including project coordinators) in 2020 being at least the same as in the previous 3 years. A possible reason is that women are more used to juggling work–life balance than men.[30] Still, our findings should be interpreted cautiously since the time interval used to define the post-pandemic period may intersect with pre-pandemic production phase. Future studies may therefore aim to evaluate the trends of gender distribution in authorships across a wider time span and based on a more extensive scientific output follow-up.

This study has several limitations. First, some papers that were classified among the post-pandemic publications may actually represent work performed in the pre-pandemic period. To overcome this limitation, online publication dates were used instead of print dates. Future studies may aim wider time span. In addition, the exact proportion of female adult cardiologists in Turkey is not readily available for the interpretation of our findings. Yet, even if it was known, it still would not have been possible to utilize findings from this study to infer the proportion of actively participating female cardiologists to research activities because counted female authorships do not represent unique authors. Third, despite being one of the world's most popular biomedical databases, PubMed also contains predatory publications. However, because the number of papers written by Turkish cardiologists that are indexed in the Science Citation Index (SCI) or SCI-Expanded (SCI-E) is likely to be fewer than those indexed in PubMed, we selected PubMed as the data source to increase the study sample size. Finally, possible human error in gender determination cannot be neglected.

Conclusion

Our findings suggest that significant gender differences exist with regard to authorships of scientific publications that were submitted by Turkish adult cardiologists. Although strategic authorship positions are overall held less by females, a significant increase

in female first and corresponding authorship in original articles, besides more female middle authors, was observed during the pandemic. Future studies may aim to evaluate the trends of gender distribution in authorships by adult cardiologists across a wider time span and based on a more extensive scientific output follow-up.

Ethics Committee Approval: The study protocol was approved by the local ethics committee (Ege University Medical Research Ethics Committee; January 7, 2021; 21-1T/8).

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - D.K., L.T., M.K.; Design - D.K.; Supervision- L.T., M.K.; Materials - D.K.; Data Collection and/or Processing - D.K.; Analysis and/or Interpretation- D.K., L.T, M.K.; Literature Review - D.K., L.T., M.K.; Writing - D.K.; Critical Review - L.T., M.K.

Declaration of Interests: The authors declare that they have no competing interest.

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Supplementary Material 1. Characteristics of Publications with Regard to Gender of the First Author

	Male First Author, n (%)	Female First Author, n (%)	*P*
Single-author paper (n=35)	28 (80.0)	7 (20.0)	.175
Paper with international participation (n=83)	79 (95.2)	4 (4.8)	.032*
Original article (n=430)	389 (90.5)	41 (9.5)	.012*
Editorial (n=12)	8 (66.7)	4 (33.3)	.045*
Review article (n=32)	29 (90.6)	3 (9.4)	1.000
Letter to the editor (n=115)	98 (85.2)	17 (14.8)	.317
Case report/series (n=104)	85 (81.7)	19 (18.3)	.033*
Guidelines, consensus reports (n=10)	9 (90.0)	1 (10.0)	1.000
Other articles (n=4)†	4 (100.0)	0	1.000

**P* value >.05 denotes statistical significance;
†Includes updates on previous research (n=1), perspective (n=1), meeting report (n=1), 'how to' paper (n=1).

Supplementary Material 2. Characteristics of Publications with Regards to Gender of the Corresponding Author†

	Male Corresponding Author, n (%)	Female Corresponding Author, n (%)	*P*
Single author paper (n=35)	29 (82.9)	6 (17.1)	.151
Paper with international participation (n=83)	79 (95.2)	4 (4.8)	.092
Original article (n=430)	396 (92.1)	34 (7.9)	.019*
Editorial (n=12)	8 (66.7)	4 (33.3)	.025*
Review article (n=32)	29 (90.6)	3 (9.4)	1.000
Letter to the editor (n=114)	102 (89.5)	12 (10.5)	.851
Case report/series (n=104)	87 (83.7)	17 (16.3)	.021*
Guidelines, consensus reports (n=10)	9 (90.0)	1 (10.0)	1.000
Other articles (n=4)‡	4 (100.0)	0	1.000

**P* value >0.05 denotes statistical significance;
†Corresponding author information non-available in one publication.
‡Updates on previous research (n=1), perspective (n=1), meeting report (n=1), 'how to' paper (n=1).

Supplementary Material 3. Characteristics of Publications with Regards to Gender of the Senior Author*

	Male Senior Author, n (%)	Female Senior Author, n (%)	*P*
Paper with international participation (n=83)	79 (95.2)	4 (4.8)	.095
Original article (n=425)	381 (89.6)	44 (10.4)	.652
Editorial (n=6)	5 (83.3)	1 (16.7)	.468
Review article (n=25)	24 (96.0)	1 (4.0)	.499
Letter to the editor (n=102)	94 (92.2)	8 (7.8)	.439
Case report/series (n=101)	90 (89.1)	11 (10.9)	.733
Guidelines, consensus reports (n=10)	8 (80.0)	2 (20.0)	.262
Other articles (n=3)†	3 (100.0)	0	1.000

*Senior author information non-available in single-author publications (n=35);
†Updates on previous research (n=1), perspective (n=1), meeting report (n=1), 'how to' paper (n=1).

Supplementary Material 4. Authorship Details with Regards to Gender of the First Author

	Male First Author (n=623)	Female First Author (n=85)	*P*
Female second author, n (%)†	66 (11.1)	11 (14.1)	.432
Female senior author, n (%)†	60 (10.1)	7 (9.0)	.758
Female corresponding author, n (%)†	7 (1.1)	64 (76.2)	<.001*
Number of female middle author(s) per article	0 (0)	0 (0)	.680

**P* value >.05 denotes statistical significance;
† Second and senior authors coded non-available in single-author publications (n=35). Corresponding author information non-available in one publication.

Supplementary Material 5. Authorship Details with Regards to Gender of the Senior Author

	Male Senior Author (n = 606)	Female Senior Author (n = 67)	*P*
Female first author, n (%)	71 (11.7)	7 (10.4)	.758
Female second author, n (%)†	63 (10.4)	14 (20.9)	.010*
Female corresponding author, n (%)†	57 (9.4)	8 (11.9)	.508
Number of female middle author(s) per article	0 (0)	0 (1)	.002*

**P* value >.05 denotes statistical significance;
† Second and senior authors coded non-available in single-author publications (n = 35). Corresponding author information non-available in one publication.

Supplementary Material 6. Authorship Details with Regards to Gender of the Corresponding Author

	Male Corresponding Author (n = 636)	Female Corresponding Author (n = 71)	*P*
Female first author, n (%)	20 (3.1)	64 (90.1)	<.001*
Female second author, n (%)†	62 (10.2)	15 (23.1)	.002*
Female senior author, n (%)†	59 (9.7)	8 (12.3)	.508
Number of female middle author(s) per article	0	0	.492

**P* value >.05 denotes statistical significance;
† Second and senior authors coded non-available in single-author publications (n = 35). Corresponding author information non-available in one publication.

Supplementary Material 7. Comparison of Gender Distribution in the Authorships of Original Articles, Editorials, Case Reports/Series, and Papers with International Participation Before and After the Pandemic

	Before the Pandemic (April-May-June-July-August-September 2019), n (%)	After the Pandemic (April-May-June-July-August-September 2020), n (%)	*P*
Female first authored original articles (n = 430)	11 (26.8)	30 (73.2)	.032*
Female first authored editorials (n = 12)	1 (25.0)	3 (75.0)	.545
Female first authored case reports/series (n = 104)	12 (63.2)	7 (36.8)	.239
Female first authored papers with international participation (n = 83)	0 (0)	4 (100.0)	.066
Female corresponding authored original articles (n = 430)	8 (23.5)	26 (76.5)	.019*
Female corresponding authored editorials (n = 12)	1 (25.0)	3 (75.0)	.545
Female corresponding authored case reports/series (n = 104)	9 (52.9)	8 (47.1)	.858
Female corresponding authored papers with international participation (n = 83)	0 (0)	4 (100.0)	.125
Female senior authored original articles (n = 425)†	18 (40.9)	26 (59.1)	.864
Female senior authored editorials (n = 6)†	0 (0)	1 (100.0)	1.000
Female senior authored case reports/series (n = 101)†	4 (36.4)	7 (63.6)	.356
Female senior authored papers with international participation (n = 83)	1 (25.0)	3 (75.0)	.625

**P* value >.05 denotes statistical significance;
†Second and senior authors coded non-available in single-author publications (n = 35). Correspondingauthor information non-available in one publication.