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Gender Differences in Academic Productivity within Pediatric Dentistry Departments in Turkey

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ORIGINAL ARTICLE

Gender Differences in Academic Productivity within Pediatric Dentistry Departments in Turkey

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ABSTRACT

Objective: To investigate the differences in the academic productivity of male and female academicians from the departments of pediatric dentistry in the Faculties of Dentistry in Turkey. **Methods:** A search was made of international studies indexed in PubMed published up until January 2021 by a total of 241 academicians in the Departments of Pediatric Dentistry of 79 Faculties of Dentistry in Turkey. The total number of international publications for each faculty member was obtained from the institutional websites and thorough searches of PubMed and Web of Science. H-index and the number of citations were established through an advanced search of the Web of Science. **Results:** The study included 241 faculty members, consisting of 62 (25.7%) males and 179 (74.3%) females, from 79 faculties of dentistry. Male academicians had a statistically significantly larger number of citations from their publications indexed in PubMed than their female counterparts ($p = 0.003$). An examination of the h-index values from the Web of Science database revealed that male faculty members had significantly higher h-indices than female faculty members ($p = 0.005$). **Conclusions:** Although a majority of academicians in pediatric dentistry are female, large differences exist between female and male faculty members in citations and h-indices.

Key words: academic performance; academic productivity; H-index; gender; pediatric dentistry

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INTRODUCTION

Attitudes and beliefs about the education of women and the role of women in education started to change in the early 20th century. Despite the increase in the number of women studying in university and receiving bachelor's degrees when compared to the past, the number of women with professions is still noticeably low. It is known that in the early 1980s, women accounted for less than 5 percent of all dental students,¹ but over the years, the number of women graduating from faculties of dentistry has increased, resulting in an almost equal number of female and male dentists. This represents a rapid improvement in gender equality in just a few decades.² Despite the increasing number of women in dentistry, it has been suggested that women cannot be as professionally active as men. A study by Campbell reported that 85% of female dentists were actively employed,³ while Linn reported 77% of female dentists being professionally active.⁴

In academic medicine, research shown gender inequality to exist in different medical fields.⁵⁻¹⁰ Despite the increase in the number of women enrolling in universities over the last three decades, the number of women holding senior academic positions has not increased in proportion.^{11, 12} Studies into the benefits of gender diversity in the work environment have concluded that an increase in female representation in senior academic positions would increase the overall productivity of an institution.¹³ Despite this progress, gender inequality in dentistry persists in several areas, including on the editorial boards of dental journals,¹⁴ in department head and faculty dean positions,¹⁵ and in the most senior position¹⁶ of major dental organizations. Female dentists continue to be out-earned by their male counterparts, with the income inequality in dentistry being claimed to be greater than that seen in other medical branches or law.¹⁷ Obstacles to the

advancement of female physicians in academia include the time spent on family responsibilities, unconscious gender biases that limit opportunities and that affect the evaluation of job offers, and lower level of institutional support than is enjoyed by their male counterparts.^{18, 19} It is believed that frequent conflicts in academic environments lead to high rates of exhaustion and dissatisfaction among women, that women often face social and personal dilemmas relating to the work-family balance, and that these factors may affect their academic productivity. However, female dentists have reported that such factors are not the primary obstacle to their full participation in the academic dentistry workforce.

Despite the developments in recent years, studies examining different medical disciplines suggest that women's academic productivity and their likelihood of being appointed to higher academic positions are still lower than that of their male counterparts.^{8, 20, 21} In particular, it has been shown that women are expected to meet higher standards than their male counterparts for recruitment into academic positions. It is not known whether this situation persists in academic dentistry, and there is limited evidence of gender inequality in the authorship of dental articles.^{22, 23}

In Turkey, the number of women working as pediatric dentists is higher than for male dentists, in contrast to the other medical fields, while there has to date been no research of academic productivity. An examination of academic studies in pediatric dentistry could, therefore, be considered beneficial. The present study investigates the differences in the academic productivity of male and female academicians from the departments of pediatric dentistry in the Faculties of Dentistry in Turkey, while also evaluating the number of researches and their contributions to literature.

METHODS

This study was granted ethical approval by the Hamidiye Faculty of Dental Medicine Scientific Research Ethics Committee of University of Health Sciences on 01.15.2021, and all searches were completed on 02.07.2021.

Subjects recruitment

A search was made of international studies indexed in PubMed and Web of Science published up until January 2021 by a total of 241 academicians working as Assistant Professors, Associate Professor and Professors in the Departments of Pediatric Dentistry of all Faculties of Dentistry (79) in Turkey. The name, surname, title, age, year of graduation and year of dental specialization of all faculty members (241) working

full-time in the faculty departments were obtained through a detailed Internet search of institutional websites and the academic data management systems of the universities. For information not available on the Internet, the administrator of the relevant institution was contacted.

Specific methods used

The gender of all participants was identified based on personal information recorded on an academic website (<https://akademik.yok.gov.tr>). Due to the heterogeneity of titles in different institutions, academic staff ranked below Assistant Professor were not included in the study. The total number of international publications indexed in PubMed and Web of Science databases for each faculty member was obtained from the institutional websites containing indexed publications, through searches of these two databases using the person's name and surname by two different researchers (B.K.E and M.K) at different times. If the researchers agreed on the compatibility of the collected data, the obtained data were included in the comparison sets. For female academicians with two surnames, detailed searches were made for the two surnames separately and together. International and national studies that were unavailable on these databases were excluded from the study. In cases of people with the same name and/or identical publication titles being identified; publication titles indicating topics considerably outside of the faculty member's specialty; or publications with the same name that were published prior to the graduation date of the faculty member, accurate and consistent results were assured by making an advanced search using the name and the current institution of the faculty member. The study also evaluated the number of publications as first and last authors. The h-index and the number of citations were established through an advanced search of the Web of Science, including the faculty member's name and current institution.

The Web of Science Core Collection is a subscription-based database, which includes over 20,300 journals spanning across academic disciplines and books in addition to conference abstracts and 69 million article records from 1976 to 2018. The Web of Science database has a stronger coverage of pre-1996 academic journals and is not significantly different from similar databases such as Scopus post-1996. Also, multifactor objective sets of criteria, such as journal publishing standards, citation analysis, and editorial process, are evaluated for inclusion in a journal in the Web of Science database. Similar to Web of Science (except PubMed is a free search engine), PubMed follows strict guidelines for journal selection, including life sciences and biomedical journals, administered by the US National Library of Medicine at the National Institutes of Health.^{24, 25}

Data analysis

Descriptive statistics of the study variables were expressed as mean (\pm) standard deviation, median (min; max), frequency distribution and percentage, and the normality of continuous variables was assessed using a Kolmogorov-Smirnov test. For categorical variables, Pearson’s Chi-Square test was used to compare between-group differences in frequency. Measurements of normally distributed variables were compared with an Independent Samples t-test (Student t-test) between two independent groups, and an ANOVA between three or more groups. Measurements of non-normally distributed variables, in turn, were compared with a Mann-Whitney U test between two independent groups, and a Kruskal-Wallis test between three or more groups. All statistical comparisons were assessed using IBM SPSS Statistics (Version 25.0. Armonk, NY: IBM Corp.). The level of statistical significance was set at $p < 0.05$.

RESULTS

The study included 241 working full-time faculty members, consisting of 62 (25.7%) males and 179 (74.3%) females, from all (79) dentistry faculties in Turkey. The demographic characteristics of the study group are presented in Table 1. When the academicians in the study group were classified according to academic rank, there were 130 (53.9%) assistant professors (103, 79.2% female), 42 (17.4%) associate professors (28, 66.7% female), 69 (28.6%) professors (48, 69.6% female), with more female academicians recorded at each rank ($p < 0.001$) (Table 2).

An analysis of the gender distribution of academicians and the time since undergraduate education, publications, first and last author positions, h-index and number of citations, revealed a statistically significant difference in the number of citations and the h-indices of the male and female academicians. Although no statistically significant result was revealed, it was found that male faculty members had higher publications and had higher rate of last author than female faculty members. Male academicians had a statistically significantly larger number of citations from their publications indexed in databases than their female counterparts (201.5 [95% confidence interval, CI 109.4–293.5] and 92.6 [95% CI 64.1–121.3], respectively, $p = 0.003$) (Table 3). An examination of the h-index values from the Web of Science database revealed that male faculty members had significantly higher h-indices than female faculty members (5.3 [95% CI 4.1–6.5] and 3.6 [95% CI 2.9–4.1], respectively, $p = 0.005$) (Table 3). When the time from undergraduate education was compared, no statistically significant difference was established between the female and male academicians at any academic rank. On average,

Table 1. Demographic characteristics of academicians from the departments of pediatric dentistry

Characteristics	N	%
Gender		
Male	62	25.7
Female	179	74.3
Academic Status		
Assist. Prof	130	53.9
Assoc. Prof	42	17.4
Professor	69	28.6
Age (year)		
25-35	83	34.4
36-45	81	33.6
46-55	51	21.2
56-80	26	10.8
Professional experience (year)		
0-10	119	49.4
11-20	80	33.2
>21	42	17.4

Table 2. Comparison of academic level by gender

Academic status	Total group N(%)	Male N(%)	Female N(%)	p-value
Assist. Prof	130 (53.9)	27 (20.7)	103 (79.3)	< 0.001*
Assoc. Prof	42 (17.4)	14 (33.3)	28 (66.7)	< 0.001*
Professor	69 (28.6)	21 (30.4)	48 (69.6)	< 0.001*

the female academicians had graduated 18.25 years ago (95% CI 16.66–19.83) compared to 19.15 years ago (95% CI 16.95–21.34, $p = 0.539$) for males. When the study group was classified by academic rank, no significant difference was noted in the study variables of male and female academicians in the assistant professor and associate professor groups. In the professor group, the number of citations differed significantly between male and female academicians (9.6 [95% CI 7.3–11.8] and 6.4 [95% CI 6.2–8.7], respectively, $p = 0.04$) (Table 4).

DISCUSSION

The present study has examined the effect of gender on academic studies in pediatric dentistry, and found a statistically significant difference in the h-indices and the number of citations from academic studies between female academicians and their male counterparts, despite the female superiority in numbers. This finding is consistent with those reported by previous studies of this subject in the field of dentistry and in other fields of medicine.^{22, 23, 26, 27}

Table 3. Comparison of academic productivity and time after graduation by gender

	Total group Mean (95% CI) [Min-Max]	Male Mean (95% CI) [Min-Max]	Female Mean (95% CI) [Min-Max]	p-value
Academic productivity				
Pubmed Publications	10.87 (9.07-12.68) [0-126]	13.42 (8.71- 18.12) [0-126]	10.02 (8.18-11.87) [0-79]	0.109
First Author	3.58 (3.02- 4.14) [0-27]	3.85 (2.61-5.10) [0-27]	3.49 (2.86-4.11) [0-27]	0.575
Last Author	2.2 (1.6-2.8) [0-53]	3.0 (1.2-4.8) [0-53]	1.9 (1.6-2.8) [0-22]	0.114
Citation	120.69 (88.70-152.68) [0-1687]	201.52 (109,46-293,57) [0-1687]	92.69 (64.09-121.30) [0-1459]	0.003*
h-index	4.01 (3.46-4.55) [0-22]	5.31 (4.07 -6.54) [0-22]	3.56 (2.97-4.15) [0-21]	0.005*
Time after graduation				
Total group	18.5 (17.2-19.8) [6-48]	19.2 (16.9-21.3) [6-38]	18.3 (16.7-19.8) [6-48]	0.539
Assist. Prof	12.2 (11.2-13.2) [6-31]	11.7 (9.8-13.7) [7-24]	12.3 (11.1-13.2) [6-31]	0.649
Assoc. Prof	18.45 (17.2-19.7) [12-26]	19.29 (16.8-21.8) [12-24]	18.0 (16.5-19.5) [12-26]	0.327
Professor	28.95 (27.2-30.7) [17-48]	28.5 (25.5-31.5) [19-40]	29.2 (27.1-30.7) [17-48]	0.719

Table 4. Comparison of professor-grade female and male academics in terms of academic productivity

Academic productivity	Gender	N	Mean (95% CI) [Min-Max]	p-value
h-index	Male	21	9.6 (7.3-11.8) [4-22]	0.077
	Female	48	7.4 (6.2-8.7) [0-21]	
Citation	Male	21	434.4 (216.1-652.7) [61-1647]	0.04*
	Female	48	249.8 (162.2-337.3) [0-1459]	
First author	Male	21	6.6(4.0-9.2) [1-27]	0.492
	Female	48	7.6(6.1-9.0) [1-27]	
Last author	Male	21	7.1 (2.2-12.0) [0-53]	0.360
	Female	48	5.3 (3.8-6.8) [0-22]	
PubMed publications	Male	21	26.7 (15.5-37.9) [10-126]	0.582
	Female	48	24.1(19.8-28.3) [6.00-79]	

Despite the increasing role of women in working life in recent years, there have been several studies conducted in the field of healthcare, especially in medical sciences, recording female physicians as being less academically active than their male counterparts.^{5,6,8} Similar to these fields, female productivity in the field of dentistry has

been reported to be low, especially in the academic field.^{22, 23} The present study, in which the focus is academicians working in the pediatric dentistry fields in Turkey, found the number of female pediatric dentists to be much higher than the number of their male counterparts. Although scarce, there have been previous

studies involving dental academicians examining the effect of gender on academic productivity.^{22,23} Simon et al. compared the academic productivity of female and male dental academicians and established a significant difference in the time from graduation, the number of Pubmed publications and the h-indices of the two groups.²³ Karhade et al, on the other hand, found that female pediatric dentists working in the top 15 faculties of dentistry funded by the National Dental and Craniofacial Research Institute recorded lower academic productivity than their male counterparts, which was attributed to the acceptance of females to the professorship chairs as academicians being later than in their male counterparts.²² The present study examined the academic productivity of faculty members considering the same criteria, and established a significant difference in the number of citations and the h-indices related to gender, while there was no difference in the number of PubMed publications, first author or last author positions, or the time since graduation between the two genders.

In their study of orthopedic surgeons, Hoof et al.²⁷ identified a significant difference in the h-indices of female and male assistant professors, but no significant difference in other academic ranks. The present study, unlike the study mentioned, identified no significant difference between the two genders in the assistant professor and associate professorship groups, while there was a significant difference in favor of male pediatric dentists, especially in terms of the number of citations, in the professor group. In a study of urologists by Mayer et al.,²⁶ male physicians at all academic ranks were found to have higher h-indices and more working years than their female counterparts. In the present study, no significant difference was established in the number of working years of male and female dentists following graduation, and the h-index values were similar to those reported by Mayer et al.

There have been previous studies attributing the limited academic activity of female physicians to family responsibilities,²⁸ to low stress tolerance in working life²⁹ and to the gender bias of senior managers.³⁰ Although there is a greater number of female pediatric dentists in Turkey, their male counterparts have been found to be almost three times more productive in terms of research, suggesting that the same problems exist in our country. Female dentists were found to be have a greater desire to advance in their career and to improve their skills to higher levels than men.³¹ In the present study, the number of women working in academia was high, which was consistent with previous studies, while in contrast with some studies, the percentage of females seeking promotion and wanting to stand out academically was high. The findings of the present study can be considered remarkable, as in pediatric dentistry, females are in the majority, but have lower numbers of citations, and accordingly, lower h-indices

than the small number of male pediatric dentists. It is believed that further studies are needed to identify the reasons for this finding.

There have been previous studies indicating that female dentists are more inclined to pursue a career in private practice and clinical dentistry rather than in academia, which was attributed to the flexible working conditions in private practice as opposed to the stricter rules in academia.^{32,33} In other studies, female dentists reported being less respected by students, and found patient behavioral patterns to be more challenging during clinical applications, and it was determined these could undermine the participation of female dentists in working life and their desire to advance in their career.^{29,34} There have been further studies indicating that unconscious biases about female dentists affect their success in job applications and interviews, their appointment to academic projects and positions, and even the acceptance of articles sent to scientific journals.³⁰ The low productivity of female academicians, although greater in number, may result from these biases.

Strengths of this study include consideration of two strongly correlated indexing databases for evaluation of academic productivity. By excluding the international and national studies that were unavailable on PubMed, we aimed to detect the quality of productivity in high rank databases. This study has also limitations. Because we used the websites of 79 dental faculties in Turkey and perform manual searches in PubMed and ResearchGate databases for identification, there is a possibility that academic ranks and research degrees were not up to date at the time of our review. There is also the possibility that all publications and bibliometric directories could not be identified due to the presence of non-English alphabet letters and the change of the last name after marriage.

Previous studies comparing the times from graduation between male and female academicians determined that female dental academics were appointed to their positions more recently than their male counterparts.²¹⁻²³ In the present study, no statistically significant difference was identified in the time since graduation between male and female faculty members. One of the findings of this study was that although the number of publications was comparable between male and female professors, the difference in citation index between the two groups was statistically significant, indicating that the difference in this academic level was in the quality of the publication rather than the number of publications. There have been studies indicating that although women have no difficulty in achieving academic ranks, their relative lack of productivity when compared to their male counterparts may be due to them taking on more family responsibilities and having to balance their family lives and careers.^{18,19}

CONCLUSION

In pediatric dentistry departments of dentistry faculties in Turkey greater number of publications and higher h index are associated with higher academic rank and at this academic rank, male academicians have more quality publications than their female counterparts.

In the light of the results from this and previous studies, it can be seen that even today, in the 21st century, female dentists have difficulty continuing their academic life. Accordingly, state policies should be developed to improve the participation of female dentists in academia and to increase their productivity, while society should be better informed so as to reduce the unconscious biases against female academicians. Female faculty members, who usually work more than their male counterparts in their efforts to balance their career and family lives, should be supported in gaining access to higher positions in their faculties.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest. The data that support the findings of this study are available on request from the corresponding author.

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