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Sex Ratio of Graduated Medical Students of the School of Medicine in Mostar for the Period 2003-2020

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ABSTRACT

Background: In many countries today, there is an increase in the share of women practicing medicine. This trend has been called the "feminization" of medicine. The aim of this study was to determine whether there is a trend towards the feminization of medicine within the School of Medicine in Mostar.

Methods: The examinees were medical students who graduated from the School of Medicine from 2003 to 2019. Male:female ratios were calculated for each year and for the entire study period. The entire study period was divided into 3-time intervals: 2003-2007, 2008-2013 and 2014-2019. These time intervals were compared according to the male:female ratio.

Results: During the studied time periods there were 67.30% female graduates and 32.70% male graduates with a male:female ratio of 0.49:1. There were statistically significantly more females than males in all examined periods. There was a trend towards an increased share of females since the percentages of females in 2003-2007, 2008-2013 and 2014-2019 were 64%, 65% and 71%, respectively. However, the differences in sex shares between these periods were not statistically significant.

Conclusions: The results of this cross-sectional study showed a significantly greater share of females than males among graduates and a trend towards a statistically non-significant increase in the share of females from the first to the last generation of graduates, which is in line with global trends.

Key words: women, feminization, sex ratio, medical profession, school of medicine

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INTRODUCTION

In most countries women are the majority of students enrolling in medical schools, which has led to a greater proportion of women among physicians. This phenomenon has been named the "feminization of medicine" (1). In the past, medical practice was reserved for men. This domination of men prompted certain countries to introduce mandatory quotas for women while enrolling in medical colleges (2). Today, there is a steady increase in the number of female physicians, which is independent and unstoppable by any state regulation (3-5).

Some opinions regarding female doctors have provoked a heated debate (6-8). There are claims that an increased number of women practicing medicine has led to reduced productivity and inefficiency of the healthcare system, and that educating women to become physicians has been a "waste of money" (6).

The steady increase in the proportion of female doctors has been documented in many countries and recognized by the World Health Organization (2-5,9). This trend was reported both in developed (2-4) and less developed countries (5,10). To our knowledge, the sex ratios of medical students and physicians in Bosnia and Herzegovina were not adequately studied. We wondered whether this phenomenon is present in our country. Therefore, the aim of this study was to investigate trends relating to the male to female ratio of medical graduates within the School of Medicine in Mostar.

PARTICIPANTS AND METHODS

Participants

The study group comprised medical students who graduated from the School of Medicine of the University of Mostar from 2003 to 2019. Matriculated students who were enrolled but did not graduate from the School of Medicine in Mostar for any reason were not included in the study.

Methods

Data on the number and sex of medical students were obtained retrospectively from the archives of the Student Office of the School of Medicine. The percent share of men and women and the male:female ratio was calculated for each examined year and for the entire study period. The entire study period was divided into 3-time intervals: 2003-2007, 2008-2013 and 2014-2019. These time intervals were compared according to the male:female ratio.

Statistical analysis

The chi-square test was used to analyze differences in sex between the examined time periods. p-values <0.05 were regarded as being statistically significant. All statistical analyses were performed using SPSS for Windows (Version 13.0; SPSS Inc., Chicago, IL, USA).

RESULTS

Six hundred and thirty-six students meeting both inclusion and exclusion criteria were included in this study. Between 2003 and 2019 inclusively, 428 (67.30%) women and 208 (32.70%) men graduated from the School of Medicine in Mostar. The sex ratio within the whole study period was 0.49:1. The subjects' sex distribution during the examined years is shown in Table 1.

Table 1 shows an increase in the number of graduates in each subsequent period (144 → 218 → 274). This increase was largely due to a change in the enrollment policy of the School of Medicine (increased enrollment quota and more matriculants) and, to a lesser extent, to the accumulation of students who renewed their study year.

There were statistically significantly more women than men in all 3 time periods ($\chi2 = 7.92$; df = 1, p = 0.0049; $\chi2 = 12.43$; df = 1, p = 0.0004; $\chi2 = 13.03$; df = 1, p = 0.0003) (Figure 1).

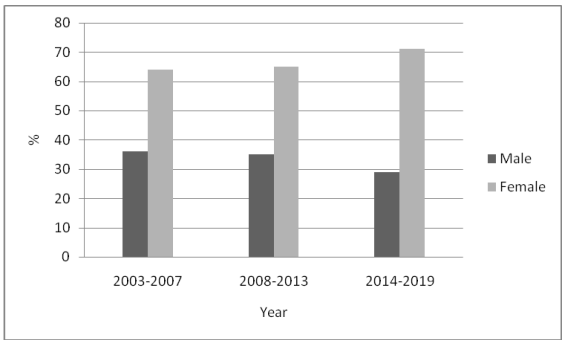

Figure 1. Percentages of men and women who graduated from the School of Medicine in Mostar in 2003-2007, 2008-2013 and 2014-2019.

Table 1. Sex ratios of medical students

Year/Period	Male (%)	Female (%)	M/F
2003	10 (40)	15 (60)	0.66:1
2004	14 (42.42)	19 (57.58)	0.74:1
2005	5 (17.24)	24 (82.76)	0.21:1
2006	12 (35.30)	22 (64.70)	0.55:1
2007	11 (47.83)	12 (52.17)	0.92:1
2008	16 (41.03)	23 (58.97)	0.70:1
2009	13 (35.14)	24 (64.86)	0.54:1
2010	10 (30.30)	23 (69.70)	0.44:1
2011	12 (29.27)	29 (70.73)	0.41:1
2012	10 (32.26)	21 (67.74)	0.48:1
2013	15 (40.54)	22 (59.46)	0.68:1
2014	14 (28.57)	35 (71.43)	0.40:1
2015	18 (27.69)	47 (72.31)	0.38:1
2016	12 (29.27)	29 (70.73)	0.41:1
2017	12 (31.58)	26 (68.42)	0.46:1
2018	11 (28.21)	28 (71.79)	0.39:1
2019	13 (30.96)	29 (69.04)	0.45:1
2003 – 2007	52 (36.11)	92 (63.89)	0.57:1
2008 – 2013	76 (34.86)	142 (65.14)	0.54:1
2014 – 2019	80 (29.20)	194 (70.80)	0.41:1
2003 - 2019	208 (32.71)	428 (67.29)	0.49:1

There were no statistically significant differences in sex between 2003-2007 and 2008-2013 ($\chi 2 = 0.015$; df = 1, p = 0.912), between 2003-2007 and 2014-2019 ($\chi 2 = 0.69$; df = 1, p = 0.406) and between 2008-2013 and 2014-2019 ($\chi 2 = 0.51$; df = 1, p = 0.476).

DISCUSSION

This study showed a statistically significant larger proportion of women compared with men in all studied time periods. The trend of an increasing share of women within the observed periods was found, since the share of women in 2003-2007, 2008-2013 and 2014-2019 was 64%, 65% and 71%, respectively. Although the sex differences between the periods were not statistically significant, we can say that our findings regarding the sex ratio of medical graduates are in line with global trends.

Since countries with a trend towards the feminization of medicine are different in their historical, cultural and economic characteristics, various reasons for feminization were offered (11-17). Our explanation for our results is based on anecdotal evidence and experience, not on scientific evidence. We believe that female pupils are more inclined to learn and are more likely to spend time studying at the expense of enjoyable and entertaining activities. There is anecdotal evidence that the best elementary students from Mostar enroll in the Gymnasium Fra Grga Martić and the Gymnasium Mostar in Mostar. These two grammar schools are the main reservoirs of medical matriculants in Mostar. Of the 51 students (17 men and 34 women) from Bosnia and Herzegovina enrolled in the School of Medicine in Mostar in the academic year 2019/2020; 22 of them (43%) graduated from these two high schools. An analysis of the grades of whole generations of boys and girls in all primary and secondary schools in the studied area should test our hypothesis and elucidate whether girls are more promising students academically than boys. However, such sociological research is beyond the scope of this paper.

Due to the theoretical possibility that the preponderance of female graduates of the Mostar School of Medicine was the result of the preponderance of females in the population of the area gravitating towards the faculty, we analyzed the sex structure of the population of the City of Mostar, the Federation of Bosnia and Herzegovina and the four cantons gravitating towards faculty. Of the 51 newly enrolled students from Bosnia and Herzegovina in the 2019/2020 academic year, 98.03% were from these four cantons. We used data from the 2013 census of population,

households and dwellings in Bosnia and Herzegovina (18), and calculated sex ratios (Tables 2 and 3). A slight female preponderance in the population of the analyzed administrative divisions cannot explain the strong female preponderance among graduates of the Mostar School of Medicine, identified in this work.

Table 2. Sex shares of residents of the City of Mostar and graduates of the School of Medicine in Mostar (2013)

	Male %	Female %	M/F
City of Mostar	48.40	52.60	0.94:1
Graduates of School of Medicine in Mostar	40.54	59.46	0.68:1

Table 3. Male/female ratios of the population of the Federation of Bosnia and Herzegovina and cantons gravitating towards faculty (the 2013 Population Census)

Federation of Bosnia and Herzegovina	0.96:1
Herzegovina Neretva Canton	0.96:1
West-Herzegovina Canton	0.99:1
Central Bosnia Canton	0.99:1
Herzeg-Bosnian Canton	1.01:1

The trend of an increased share of women within the overall medical profession was reported in Malta (3), Bangladesh (5), the United States of America (19-21), the United Kingdom (22), Oman (23) and China (24). In Israel (4), Brazil (25,26), Guinea-Bissau, Mozambique and Cabo Verde (10), feminization is exclusively expressed among younger members of the profession.

Despite the fact that women in medicine are represented in much higher percentages than in the general population, the position of women in medicine is not very encouraging. Moreover, the accumulation of women in certain specialties is thought to reduce the "higher status" of these specialties. As such, they become significantly less attractive to their fellow physicians (11). McKinstry publicly expressed his dissatisfaction with the increase in the number of women in medicine and linked the feminization of medicine to the decrease in the efficiency of the healthcare system (6). The World Health Organization, on the other hand, states that the harmonization and achievement of equality between women and men in medicine contribute to the improvement of the health system (27).

Introducing mandatory quotas for women enrolling in medical schools has changed the perception of the medical profession as a "man's world"(12). It is interesting that the initial rise in the share of female physicians was not stabilized. Nowadays, the number of women in medicine is still rapidly increasing and this trend seems to be maintained independently, free from any state legislation (2,13). The reasons for the trend's persistence are manifold. Phillips (14) stated that there could be two trends within this trend. On the one hand, the trend may be due to the selection of other more profitable occupations by men (14,15), which is in agreement with the opinion held by Elston (22). Kilminster et al. (16) demonstrated that there was a minimal sex difference in motivation for college enrollment. On the other hand, the trend could be a consequence of today's egalitarian views on women (14). Ross (17) stated that today's attitudes in society have changed and that medical students prefer to work for a living, rather than to live solely for work. He also claimed that all those who consider medicine today to be a "pink necklace profession" should be encouraged to recognize women and men who have leadership potential and to encourage them to strive for future leadership roles (17), as advocated by the World Health Organization (27).

CONCLUSIONS

The results of this study have shown that a greater number of women than men graduated from the School of Medicine in Mostar across all studied time periods. Our findings are in line with global trends. There was a trend towards an increased proportion of women within the 3 observed time sections, but the differences in sex shares between the periods were not statistically significant.

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CONFLICT OF INTEREST
Author GK declares that she has no conflict of interest; author IČZ declares that she has no conflict of interest; author ZŠ declares that he has no conflict of interest; author BJ declares that he has no conflict of interest.

AUTHORS' CONTRIBUTIONS
GK: acquisition of data, literature review, contribution to study conception and design, supervision, writing the paper; IČZ: contribution to study conception and design, literature review, supervision, interpretation of data, critical revision of the paper; BJ: study conception and design, supervision, critical review, assistance in writing the paper.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE
This research does not require an ethics review, as it was based on a retrospective review of the archives of the Student Office of the School of Medicine in Mostar. This study was based on the analysis of a dataset in which the data were anonymized. No identifier or group of identifiers which would allow the release of private information to an individual were provided in the manuscript.

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