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## Women in dentistry: A perspective on major universities in Saudi Arabia. Part 2: Analysis and statistical data

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**Abstract** *Purpose and significance:* The purposes of this study were to: (1) report the number of female graduates from the two oldest dental schools in Saudi Arabia; (2) compare the number of male and female graduates per year from these two major schools; and (3) compare these numbers of female dental graduates to those in the United States for the most recent year available, 2007.

*Methods:* This study was conducted using a descriptive non-experimental design. The study sample was the number of dental school graduates from the two major dental schools in Saudi Arabia.

*Results:* There were 1621 graduates of the College of Dentistry of King Saud University (KSU) since its inception up to 2007 of which 853 graduates were males and 768 were females, respectively. The total number of graduates from the Faculty of Dentistry of King Abdulaziz University (KAU) since its inception up till 2007 was 628 of which 264 were males and 364 were females. There was no statistically significant difference between the total number of male and female dental school

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graduates, although there was a significant difference between KSU and KAU dental schools. The proportion of female graduates from the two major Saudi dental schools was just over 50 % in 2007, which is slightly higher than the 45% female graduates from dental schools in the United States and Puerto Rico.

*Conclusions:* Females currently comprise approximately half of the enrolled dental students at the KSU and KAU, a percentage slightly greater than that in the United States. The substantial enrollments suggested that women in Saudi Arabia consider dentistry to be an excellent career choice.

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## 1. Purpose of study

The purpose of this study was to: (1) obtain information about the number of female graduates from the two oldest dental schools in Saudi Arabia; (2) determine if there were differences between number of male and female graduates per year from these two dental schools; and (3) compare the current admission status of female graduates in Saudi Arabia with their female graduate counterparts in the United States.

## 2. Methods

### 2.1. Study design

A descriptive type of design was employed. The subjects were dental student who graduated from the two oldest dental schools in Saudi Arabia namely King Saud University (KSU) in Riyadh and King Abdulaziz University (KAU) in Jeddah, respectively including male and female graduates for all the years since the first class of students enrolled in each school from inception up till 2007.

The total number of graduates from KSU College of Dentistry was 1621 (26 classes) of which 853 were males and 768 were females. The total number of graduates from KAU Faculty of Dentistry was 628 (15 classes) comprising 264 males and 364 females.

### 2.2. Data collection and procedure

The Dean's office in each of the two dental schools was contacted and the requested information and data were provided regarding the purpose of the study.

### 2.3. Ethical issues

Ethical issues were taken into consideration. The study was descriptive and the information gathered was available to the public. No consent form was needed from individuals, since there was no direct contact with the graduates. The information about graduates was given in aggregate for each class of dental students, and no identifying information about individual students was sought. Therefore, confidentiality and anonymity considerations did not arise.

### 2.4. Data analysis

The data collected from the two major universities about the dental students were screened and entered (with the use of codes) into a statistical program (SPSS version 16) for data

analysis. There were descriptive analyses and graphical plots of data, along with independent-sample *t*-tests.

## 3. Results

### 3.1. Overall results

The two dental schools in Saudi Arabia were established in different years. The KSU College of Dentistry was established in 1975 and started enrollment of male dental students in 1976, followed by the enrollment of females two years later. As at 2007, 26 classes had graduated from KSU College of Dentistry. Two classes were males only and the remaining 24 classes were males and females. KAU has graduated 15 classes of males and females since its inception in 1985.

Table 1 shows the profile of graduation from KSU from 1981/1982 to 2006/2007 sessions. Table 2 similarly shows the

**Table 1** Number of yearly graduates from King Saud University College of Dentistry, Riyadh.

Graduation year	Male graduates	Female graduates	Total graduates
1981–1982	7	–	7
1982–1983	11	–	11
1983–1984	14	15	29
1984–1985	14	24	38
1985–1986	14	11	25
1986–1987	7	35	42
1987–1988	39	30	69
1988–1989	30	34	64
1989–1990	39	40	79
1990–1991	41	40	81
1991–1992	54	53	107
1992–1993	31	37	68
1993–1994	23	17	40
1994–1995	55	28	83
1995–1996	52	23	75
1996–1997	51	42	93
1997–1998	30	28	58
1998–1999	29	21	50
1999–2000	27	30	57
2000–2001	34	22	56
2001–2002	25	29	54
2002–2003	39	41	80
2003–2004	32	32	64
2004–2005	51	45	96
2005–2006	50	48	98
2006–2007	54	43	97
Total	853	768	1621

**Table 2** Number of yearly graduates from King Abdulaziz University Faculty of Dentistry, Jeddah.

Graduation year	Male graduates	Female graduates	Total number of graduates
1992–1993	9	19	28
1993–1994	6	13	19
1994–1995	20	17	37
1995–1996	16	14	30
1996–1997	12	20	32
1997–1998	19	17	36
1998–1999	11	18	29
1999–2000	15	22	37
2000–2001	22	23	45
2001–2002	11	24	35
2002–2003	20	25	45
2003–2004	20	26	46
2004–2005	24	31	55
2005–2006	32	44	76
2006–2007	27	51	78
Total	264	364	628

profile of graduation from KAU from 1992/1993 to 2006/2007 sessions. Fig. 1 shows the distribution of the number of graduates per year at KSU and KAU since the first class graduated from each school.

Table 3 shows the gender distribution of the total numbers and percentages of graduates from the KSU and KAU dental schools. The total number of graduates was 2249. College of Dentistry of KSU dental school accounted for 72.1% of the total number of graduates, and of these, females represented 47.4%. The KAU Faculty of Dentistry accounted for 27.9%

of the graduates, of which 57.9% were females. It can be seen also that the percentage of male graduates was higher in KSU, while the percentage of female graduates was higher in KAU.

With regard to gender, Fig. 2 shows the distribution of the total number of male and female graduates from the KSU and KAU dental schools over the years since the opening of each dental school.

An independent-sample *t*-test was conducted for the total number of graduates, using gender and dental school location as factors. Using gender, Table 4 shows the results of the independent-sample *t*-test for annual graduates of KSU and KAU. The mean number of annual graduates for males was 27.24 with a standard deviation of 14.92, and the mean number of annual graduates for females was 29.03 with a standard deviation of 11.28. The results of the independent-sample *t*-test were  $t_{(78)} = -0.60$  and  $P\text{-value} = 0.55042$ . This indicated that there was no significant difference between males and females for the mean annual number of dental school graduates.

3.2. Specific results

Specific results were obtained for each dental school (KSU and KAU) to determine if any statistically significant differences exist in gender-related admission.

3.2.1. KSU

Table 5 shows the results of the independent-sample *t*-test for gender-specific annual graduates of KSU dental school. The mean number of annual KSU College of Dentistry male graduates was 32.81 with a standard deviation of 15.48, and the mean number of annual female graduates was 32.0 with a standard deviation of 10.84. The results of the independent-sample *t*-test were  $t_{(48)} = 0.212$  and  $P\text{-value} = 0.833$ , which meant

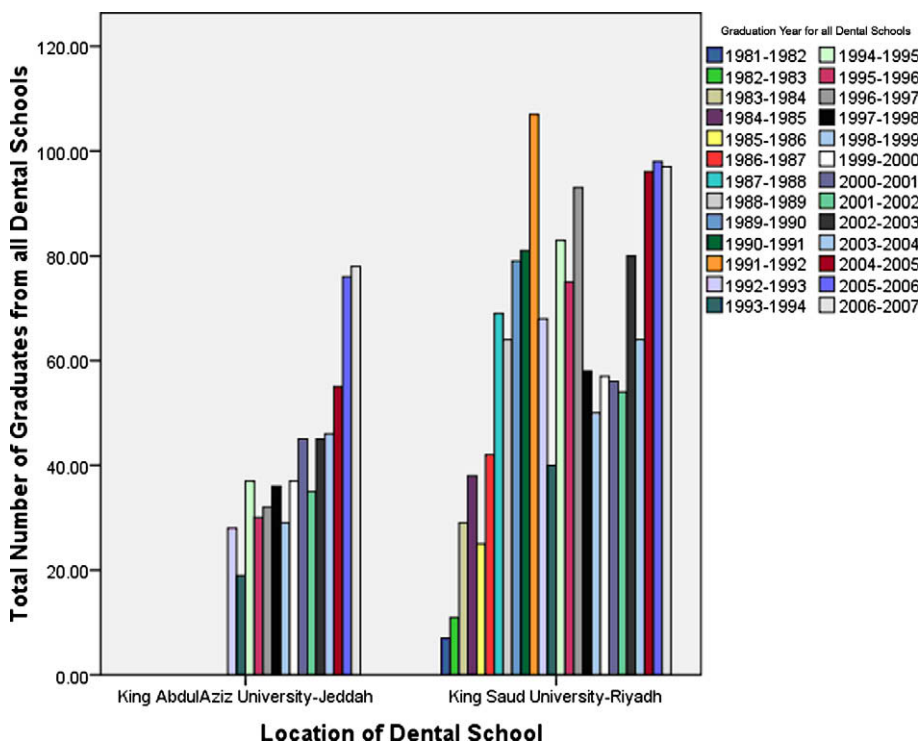
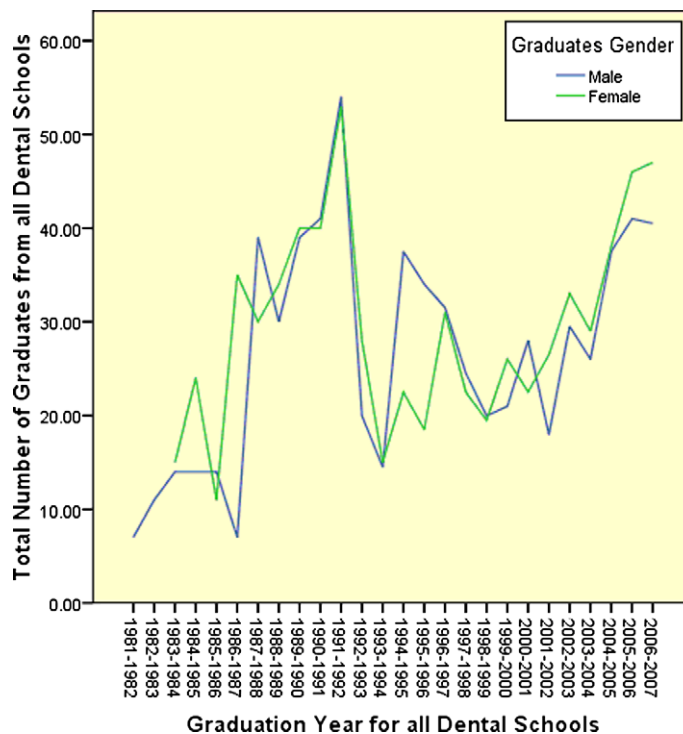


Figure 1 Distribution of yearly graduates at KAU and KSU dental schools.

**Table 3** Total number and percentage of dental school graduates from KSU and KAU.

Dental school	Gender				Total	
	Male		Female		N	%
	N	%	N	%		
KSU	853	52.6	768	47.4	1621	72.1
KAU	264	42.1	364	57.9	628	27.9
Total N	1117	49.7	1132	50.3	2249	100



**Figure 2** Distribution of total number of male and female graduates from KSU and KAU dental schools.

**Table 4** Independent-sample *t*-test for all the male and female graduates from KSU and KAU dental schools.

Gender	N <sup>a</sup>	Mean	Standard deviation	<i>t</i>	Sig. (2-tailed) <sup>*</sup>	95% confidence interval for difference	
						Lower	Upper
Male	41	27.24	14.92	-0.60	0.550	-7.69	4.13
Female	39	29.03	11.28				

<sup>a</sup> N is the number of classes.

<sup>\*</sup> P-value.

**Table 5** Independent-sample *t*-test for gender-specific graduates from KSU College of Dentistry for all classes.

Gender (KSU)	N <sup>a</sup>	Mean	Standard deviation	<i>t</i>	Sig. (2-tailed) <sup>*</sup>	95% confidence interval for difference	
						Lower	Upper
Male	26	32.81	15.484	0.212	0.833	-6.854	8.469
Female	24	32.0	10.84				

<sup>a</sup> N is the number of classes.

<sup>\*</sup> P-value.

**Table 6** Independent-sample *t*-test for gender-specific graduates from KAU Faculty of Dentistry for all classes.

Gender (KAU)	<i>N</i> <sup>a</sup>	Mean	Standard deviation	<i>t</i>	Sig. (2-tailed)*	95% confidence interval for difference	
						Lower	Upper
Male	15	17.60	7.13	-2.017	0.053	-13.438	0.104
Female	15	24.27	10.63				

<sup>a</sup> *N* is the number of classes.

\* *P*-value.

that there was no significant difference between the mean number of annual male and female KSU graduates.

### 3.2.2. KAU

Table 6 shows the results of the independent-sample *t*-test for annual graduates of KAU dental school in respect of gender. The mean number of annual male KAU Faculty of Dentistry graduates was 17.60 with a standard deviation of 7.13. The mean number of annual female dental school graduates was 24.27 with a standard deviation of 10.63. The results of the independent-sample *t*-test were  $t_{(28)} = -2.017$  and *P*-value = 0.053, which meant that there was no significant difference between the annual number of male and female graduates for the KAU Faculty of Dentistry.

## 4. Discussion

The 2004 census showed that the population of the Kingdom of Saudi Arabia was about 22 million, with 44.6% being females (Ministry of Finance and Economy, 2006). Currently, the Kingdom is undergoing a period of rapid change evolving at an accelerating pace into a developed society with high standards of living and a secure way of life. Education has been viewed as the primary means by which these desired outcomes could be achieved. As a result, expanding and improving educational opportunities for both men and women are expected to lead to political, social and economic development.

The education of women is essential for the development of the new society and women will critically provide important contributions to further nation-building. Modern education for women in the Arab world is considered recent in its history. In countries like Saudi Arabia, modern education for women is a 20th century event.

Consequently, the importance of gender in the development of a modern society is a worthy subject for research in Saudi Arabia. The Institute of Medicine of the National Academies of Science of the United States in a recent publication (Institute of Medicine, 2001) stressed that gender is an important basic human variable that should be considered and studied at all levels of health-related research. For such a reason, we considered that it was timely to study the role of gender in dental education and dental care in Saudi Arabia. It became evident during this study that there has been a considerable increase in the number of graduating female dentists, attaining a level approximately the same as male dentists.

The first reason for this phenomenon could be that until recently, career options were limited for women other than education and medicine. Second, male students in Saudi Arabia

are urged to study abroad while girls are discouraged by tradition or marriage. As a result, females are taking the opportunity to study in Saudi Arabia without the burden of traveling abroad and being away from their families, especially since dental schools in the Kingdom are advanced and postgraduate education in advanced dental specialties has become available. The substantial recent increase in dental school enrollment shows that many highly-educated women in Saudi Arabia are eager to become dentists who provide improved public health while earning the higher qualifications necessary to enter this professional labor force. Earning economic independence has been an important motivating goal for women to have their own dental practice from the time that Hobbs practiced dentistry, as she noted in a letter published in 1886 (Hobbs, 1894). Moreover, dentistry is viewed as a prestigious and financially rewarding profession by the public, and is considered a very acceptable and fitting occupation for women in both liberal and conservative societies. In our opinion, most women prefer to be treated by female doctors, particularly in dentistry, gynecology and obstetrics. The past situation in the United States has been different. Sinkford et al. (2003) commented that US dental schools traditionally had hostile attitudes and stereotypes toward women, and viewed them as emotional, undependable, distracting, flighty, lacking in physical strength, undesirable for admission for training because they are more likely to get pregnant, and less capable than males.

Loevy and Kowitz (2002) have noted that in recent years the number of female dental school graduates in the United States has been increasing yearly, as women found that dentistry is a rewarding field with flexible hours and intellectually and psychologically satisfactory profession. In Saudi Arabia, over the past 30 years since the establishment of the first dental school in King Saud University Riyadh and the second dental school in King Abdulaziz University Jeddah, there have been nearly equal percentages of men and women graduates. In the United States early in the 20th century, the American Association of Women Dentists was established in 1921 to promote the presence of women in dentistry, but until the mid-1970s most dentists were males. This situation began to change around 1975 when the declaration of the International Year of Women called an increased attention to the status of women around the world (Sinkford et al., 2003).

Over the past three decades the number of female dental students in the United States has increased steadily. In 2002, the percentage of women enrolled as predoctoral dental students was 40.23% and 33.4% in advanced clinical dental specialties; the percentage of female dental graduates was 37.49%

and 15% for professionally active dentists Sinkford et al., 2003). Recent survey information (American Dental Association, 2007) from the American Dental Association for 2006–2007 indicated that for the 56 dental schools in the United States and the dental school in Puerto Rico there were 8431 predoctoral students of which 44.3% were females. Two thousand and twenty-six (44.9%) of the 2002 graduates were females (Puerto Rico is a self-governing commonwealth whose head of state is the President of the US. Accreditation of its dental school is under the aegis of the American Dental Association). Currently, there are 10,380 registered dentists in Saudi Arabia, of whom 4989 are females and 5391 males (Saudi Council for Health Specialties Statistics, 2008).

## 5. Conclusions

Approximately half of the dentists graduating from the two oldest dental schools (KSU and KAU) in Saudi Arabia are females. This proportion is slightly greater than that for the dental schools in the United States. Future research should investigate the need for additional women dentists in the Kingdom, examine again the extent of the preference for women patients to be treated by female dentists, and obtain data about the continuation of women dentists to remain in active practice. The need for female dentists in the Kingdom who have advanced clinical training is also an important subject for future study.

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