Original Article

Future ophthalmology practice pattern: A survey of Saudi Board of Ophthalmology residents

Rakan S. Al-Essaa; Mohammed D. Al-Otaib; Bader S. Al-Qahtani; Emad M. Masuadi; Aamir Omair; Hind M. Alkatan

Abstract

Purpose: The main purpose of the study was to examine and identify factors that influence the future practice pattern of Saudi Board of Ophthalmology residents as well as their academic goals. This study also aimed to compare the plans and career goals of the current Saudi ophthalmology residents with a former cohort of Saudi ophthalmology residents.

Methods: All current residents of Saudi Board of Ophthalmology were invited to complete an anonymous online survey in March 2017. Residents were contacted by email. The survey contained questions on demographics, plans and factors influencing career choice of the residents in their future. Data were categorized by gender. Chi-square was used to assess the effect of gender on outcomes where appropriate.

Results: Of 150 residents surveyed, 91 (61%) responded to the survey. Having the ability to combine medicine and surgery was the most motivating factor for pursuing an ophthalmology residency training program (81% of respondents). Most residents expressed an interest in providing refractive surgery (62%), being involved in research activities (85%) and working part-time in the private sector (73%). The majority (81%) expressed a desire to practice in an urban setting as well as pursuing fellowship training (81%). Anterior segment (31%) and surgical retina (15%) were the most popular choices for fellowship training.

Conclusion: Increasing interest in joining fellowship training programs (mostly in surgical subspecialties) and being involved in research activities among current generation of ophthalmology residents have been observed compared to a previous cohort study in the same country.

Keywords: Ophthalmology, Residents, Training, Career

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Introduction

Due to the increasing prevalence of eye diseases in Saudi Arabia over the last three decades, considerable efforts have been undertaken to provide modern and comprehensive eye care services.1 In Saudi Arabia, eye care services are provided mainly by the Ministry of Health (MOH), allocating almost 10% of its resources for ophtalmic care.2 In addition to MOH, other governmental agencies and ministries, notably the National Guard, the Ministry of Defense, the Ministry of Education and the Ministry of Interior have their own ophthalmic care services that are provided to their employees.
and dependents. The opening of the King Khaled Eye Specialist Hospital (KKESH) in 1982 in Riyadh marked the beginning of modern ophthalmology in Saudi Arabia. KKESH has been recognized as the major provider of ophthalmic care in Saudi Arabia, treating more than 180,000 outpatients and 12,000 inpatients annually. Although eye specialist hospitals are available in the metropolitan areas, namely, Riyadh, Eastern region and Jeddah, there are regions that are underserved with lack of eye care services. Furthermore, the number of practicing ophthalmologists in Saudi Arabia in the year 2012 was 407, with a ratio of ophthalmologists to population 1:43,000. This was not equally distributed among different geographical areas of Saudi Arabia. In 2015 and 2020, the number of needed ophthalmologists is expected to increase to 700 and 1100, respectively.

The future practice of eye care in Saudi Arabia will be determined by multiple factors such as the expansion of new technologies, demographics of eye diseases and therapeutic advances. Although innovation and research have a pivotal role in shaping the future of ophthalmology practice, identifying the plans and career goals of current ophthalmology residents would also be helpful to predict the future pattern of ophthalmic practice in Saudi Arabia. Alwadani et al. carried out a questionnaire-based study to forecast the future ophthalmology practice trends in Saudi Arabia in 2007. The previous study has served as a platform for future research. In fact, repeated cross-sectional studies could be useful to compare results and detect changes in the trends in practice pattern of the current Saudi ophthalmology residents. The main purpose of the current study was to examine and identify factors that influence the future practice pattern of Saudi Board of Ophthalmology residents as well as their academic goals. This study also aimed to compare the plans and career goals of the current Saudi ophthalmology residents with a former cohort of Saudi ophthalmology residents.

Methods

This was an online cross-sectional study where a questionnaire has been distributed to all residents enrolled in the Saudi Board of Ophthalmology Residency Program. An electronic survey tool (Survey Monkey) was used to sample the participants in March 2017. The survey was composed of 12 multiple-choice questions. The questionnaire was sent to the participants by e-mail. A reminder email was sent to non-responders.

The questionnaire contained questions regarding demographics (age, gender, year and province of training), factors influencing their decision to pursue ophthalmology as a career and their plans about considering fellowship training, working in a private hospital, providing refractive surgery and being involved in research activities post-residency.

A pilot study was carried out by asking five ophthalmology residents to determine the content validity of the study’s questionnaire. All residents reported that the questionnaire items were clear and evoked no ambiguity. Face validity has been done by two faculty members specialized in medical education and biostatistics.

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 24 (IBM Corp., Armonk, NY). Descriptive statistics were presented as percentages and frequencies. Chi-square and Fisher’s exact tests were used to assess the influence of gender on outcomes where appropriate. A p-value <0.05 was considered statistically significant. The study was approved by King Abdullah International Medical Research Center (KAIMRC).

Results

Of 150 residents surveyed, 91 (61%) responded to the survey. Sixty-four residents (70%) were male and 27 (30%) were female. Half of respondents were trained in the Middle province (Riyadh). Junior residents (R1-R2) represented 64% of respondents. The distribution according to gender, age, academic ranking and province of training are summarized in Table 1.

Table 2 shows that many residents (73%) expressed an interest in pursuing a part-time private practice. More than half of the residents (62%) expressed intentions of performing laser refractive surgery post-residency. Most residents (85%) also expressed an interest to be involved in research activities by allocating at least 25% of their time on completion of residency training program. Most residents (81%) showed a desire to practice in urban settings such as Riyadh, Makkah/Jeddah and Eastern region, with only 15% intending to practice in less-developed settings such as Madinah, Jizan, Asir, Jouf, Hail and Qassim while the remainders (3%) were unsure [Table 3]. No significant differences were noted when comparing male residents with female residents.

Table 1. Demographic characteristics of respondents to the survey on ophthalmology career choices. Note: R, Resident.

| Respondents | Total no. (%) | Male no. (%) | Female no. (%) | P-value |
|-------------|---------------|--------------|---------------|---------|
| Age         |               |              |               |         |
| <25         | 6 (6.6)       | 2 (3.1)      | 4 (14.8)      | 0.085   |
| 25–29       | 73 (80.8)     | 52 (81.3)    | 21 (77.8)     |         |
| 30–34       | 12 (13.2)     | 10 (15.6)    | 2 (7.4)       |         |
| Province of training | | | | |
| Middle      | 43 (47.3)     | 30 (46.9)    | 13 (48.1)     | 0.610   |
| Western     | 31 (34.1)     | 20 (31.3)    | 11 (40.7)     |         |
| Eastern     | 13 (14.3)     | 11 (17.2)    | 2 (7.4)       |         |
| South       | 4 (4.4)       | 3 (4.7)      | 1 (3.7)       |         |
| Academic rank |           |              |               |         |
| R1          | 40 (44)       | 24 (37.5)    | 16 (59.3)     | 0.143   |
| R2          | 18 (19.8)     | 13 (20.3)    | 5 (18.5)      |         |
| R3          | 14 (15.4)     | 10 (15.6)    | 4 (14.8)      |         |
| R4          | 19 (20.9)     | 17 (26.6)    | 2 (7.4)       |         |
regarding age, province of training and future practice, academic ranking, interest in research, private practice and refractive surgery ($p > 0.05$).

Having the ability to combine medicine and surgery emerged as the most frequently cited factor to pursue an ophthalmology residency training program for 81% of residents. Workload flexibility and predictability (56%), high earning potential (51%), prestige (48%) and intellectual stimulation (45%) were also commonly cited as important factors.

When comparing male residents with female residents, male residents were more influenced by high earning potential (59% vs 30%, $p = 0.01$). On the other hand, female residents were more influenced by teaching opportunity (26% vs 9%, $p = 0.03$) [Fig. 1].

When asked what single leading factor had most influenced their decision to pursue an ophthalmology residency training program, 32% of residents cited the ability to combine medicine and surgery as the principal factor. No significant differences were noted when comparing male residents with female residents regarding their most single important factor influenced their decision to pursue an ophthalmology residency training program ($p > 0.05$).

Most residents (81%) indicated plans to pursue fellowship training on completion of residency. More than half of the residents (53%) preferred to pursue their fellowships in Saudi Arabia, while 24% wished to have their fellowships in North America, 4% elsewhere overseas and 19% were unsure at time of survey. None of the residents wished to practice as a general ophthalmologist. When asked specifically about their preferred subspecialty training choice, anterior segment was the most preferred subspecialty (31%), followed by surgical retina (15%), whereas ocularplastic and glaucoma were equally favored (9%). When comparing male residents with female residents regarding the preferred choice of subspecialty training, male residents were more interested in anterior segment (39% vs 11%, $p = 0.008$) and surgical retina (20% vs 4%, $p = 0.04$) while female residents were more likely to pursue pediatrics/strabismus (15% vs 0%, $p = 0.002$) and neuro-ophthalmology (11% vs 0%, $p = 0.007$) [Fig. 2].

**Discussion**

The specialty of ophthalmology has recently undergone rapid changes due to emerging technology and advances in diagnosis and treatment. Although workforce and updated technology are essential in providing high quality eye care, the demographic features, motivation and career goals of ophthalmology residents could also have a tremendous impact on the future pattern of ophthalmology practice in Saudi Arabia. Hence, eliciting the plans and career goals of residents could yield valuable data that can be used to predict the future changes and meet the needs in eye care in Saudi Arabia. The present study provides novel insight in how the aspirations and future career goals of current generation of residents may shape the future practice of ophthalmology in Saudi Arabia.

| Question                                | Total no. (%) | Male no. (%) | Female no. (%) | P-value |
|-----------------------------------------|---------------|--------------|----------------|---------|
| Planning for private practice           | 91 (100)      | 64 (70.3)    | 27 (29.7)      |         |
| Unsure                                  | 24 (26.4)     | 13 (20.3)    | 11 (40.7)      | 0.113   |
| Full time                               | 1 (1.1)       | 1 (1.6)      | 0 (0)          |         |
| Part time                               | 66 (72.5)     | 50 (78.1)    | 16 (59.3)      |         |
| Interest in refractive surgery          | 56 (61.5)     | 44 (68.8)    | 12 (44.4)      | 0.086   |
| Yes                                     | 6 (6.6)       | 3 (4.7)      | 3 (11.1)       |         |
| No                                      | 17 (26.4)     | 1 (1.6)      | 0 (0)          | 0.138   |
| Time allocated to research              |               |              |                |         |
| 0%                                      | 1 (1.1)       | 1 (1.6)      | 0 (0)          |         |
| 25%                                     | 49 (53.8)     | 39 (60.9)    | 10 (37)        | 0.193   |
| 50%                                     | 26 (28.6)     | 15 (23.4)    | 11 (40.7)      |         |
| 75%                                     | 2 (2.2)       | 2 (3.1)      | 0 (0)          |         |
| Unsure                                  | 13 (14.3)     | 7 (10.9)     | 6 (22.2)       |         |

**Table 2.** Survey responses to questions about future practice plans among Saudi Board of ophthalmology residents.

| Place of practice | Total no. (%) | Male no. (%) | Female no. (%) | P-value |
|-------------------|---------------|--------------|----------------|---------|
| Major             | 74 (81.3)     | 51           | 23             |         |
| Riyadh            | 41 (45.1)     | 31 (48.4)    | 10 (37)        | 0.193   |
| Makkah and Jeddah | 24 (26.4)     | 13 (20.3)    | 11 (40.7)      |         |
| Eastern region    | 9 (9.9)       | 7 (10.9)     | 2 (7.4)        |         |
| Minor             | 14 (15.4)     | 11           | 3              |         |
| Madinah           | 2 (2.2)       | 0 (0)        | 2 (7.4)        |         |
| Jizan             | 3 (3.3)       | 2 (3.1)      | 1 (3.7)        |         |
| Asir              | 1 (1.1)       | 1 (1.6)      | 0 (0)          |         |
| Jof               | 4 (4.4)       | 4 (6.3)      | 0 (0)          |         |
| Qassim            | 3 (3.3)       | 3 (4.7)      | 0 (0)          |         |
| Hail              | 1 (1.1)       | 1 (1.6)      | 0 (0)          |         |
| Unsure            | 3 (3.3)       | 2 (3.1)      | 1 (3.7)        |         |

**Table 3.** Distribution of Saudi Board of ophthalmology residents based on the preferred place of future practice in Saudi Arabia.
fellowship training on completion of residency. In fact, none of the residents wished to practice as a general ophthalmologist in the current study compared to 15% reported by Alwadani et al. in 2007. Almost two-thirds of the residents expressed a desire of providing elective refractive surgery and the majority of residents were interested in pursuing part-time private practice. Moreover, most residents wished to practice ophthalmology in urban settings, with only 15% were planning to practice in less-developed settings [Table 4]. These findings collectively point out a massive transition from primary care to more sub-specialization and into the private sector that will exacerbate the current lack of primary eye care services in rural communities. The trend toward more sub-specialization may be explained by the higher economic rewards, research opportunities and prestige associated with certain specialties.

Research in ophthalmology is being carried out actively in Saudi Arabia with a mission to advance knowledge about ophthalmology in general and particularly about endemic diseases. Published researches have contributed significantly in the world literature regarding several important ophthalmic disorders such as keratoconus, retinoblastoma,
congenital glaucoma and pediatric cataract that are common in Saudi Arabia mainly due to high prevalence of consanguinity.⁷ In the current study, 85% of residents were planning to devote at least 25% of their time post-residency to research activities, compared to 75% previously reported by Alwadani et al.; indicating a rising level of interest in research in the current cohort of Saudi ophthalmology residents.

Almost half of the residents prefer to pursue local fellowship training in both the current and Alwadani et al. studies. Anterior segment and surgical retina were the most popular choices for fellowship training [Table 5]. Forty-one percent of female residents were unsure about their preferred subspecialty choice at the time of survey compared to 20% of male residents. This could be explained by the fact that 78% of female residents participated in this study were junior residents (R1-R2) compared to 58% of male residents; implying limited exposure to some subspecialties. However, pediatric/strabismus subspecialty emerged as the most popular choice among female residents. The current study has shown that 15% of residents were planning to pursue surgical retina fellowship training compared to 9% previously reported by Alwadani et al. Interestingly, only one resident showed an interest in medical retina subspecialty which was selected as the most popular subspecialty among Canadian ophthalmology residents (36% of 128).⁷ Furthermore, the current study showed that oculoplastics was commonly cited as the preferred subspecialty (9%) compared to 6% in Alwadani et al. study. These findings suggest an increasing trend toward surgical fellowship programs among Saudi residents.

On the other hand, the popularity of pediatric ophthalmology has dropped from 9% reported by Alwadani et al. to 4% in the current study; raising a concern about the future of pediatric ophthalmology in Saudi Arabia. However, this trend is also applicable abroad. Hasan et al. reported that only 7% of ophthalmology residents in the United States were interested in pursuing fellowship training in pediatric ophthalmology.⁸ This finding can be presumably explained by several factors including challenges in examining a child, the need for patience to deal with parents, less turnover and low surgical rate, inability to discharge patients after surgery and the need for lengthy follow-up; therefore, less income rate per time spent for patient care.

As any questionnaire-based study, this study had several limitations. Low response rate of 61% had the potential of response bias even though the total number of actual final participants (91) was reasonable. The questionnaire was exclusively composed of closed-ended questions without adding open fields for personal comments; leading to lesser details. The high percentage of residents who are planning to be involved in research activities had the potential of response bias in favor of residents who are more interested in academic pursuits. Moreover, 26% of residents were undecided about their preferred subspecialty choice at the time of the survey which might have obscured the real picture regarding the most popular fellowship training programs among Saudi residents.

In conclusion, an increasing interest in joining fellowship training programs (mostly in surgical subspecialties) and being involved in research activities among current generation of ophthalmology residents have been observed compared to a previous cohort study in the same country. The trends identified in the present study provide an important predication as how the current residents will shape the future pattern of ophthalmic practice in Saudi Arabia. More specific studies are recommended to identify and confirm the influence of specific factors affecting the change of trend and the choice of career planning in ophthalmology residents. This will help the higher administrations in health institutes to guide their medical school graduates in their career planning in a way that matches the future country needs and health care system in line with the Saudi 2030 Vision.

Declaration statement

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References

1. Tabbara K, Blodi F. Ophthalmology in Saudi Arabia. Arch Ophthalmol. 1987;105:861–4.
2. Wagoner M, al-Rajhi A. Ophthalmology in the Kingdom of Saudi Arabia. Arch Ophthalmol. 2001;119:1539–43.
3. Al-Rajhi A, King Khaled and the King Khaled Eye Specialist Hospital. Middle East J Ophthalmol. 1999;7:1–2.
4. King Khaled Eye Specialist Hospital. Hospital statistics (2014) [homepage on the Internet] [cited 2017 January 28]. Available from: <http://www.kkesh.med.sa/en-us/About-us/hospital-statistics>.
5. Al Motowa S, Khandekar R, Al-Towerki A. Resources for eye care at secondary and tertiary level government institutions in Saudi Arabia. *Middle East Afr J Ophthalmol.* 2014;21(2):142–6.

6. Alwadani F, Alrushood A, Altokhy H, Alasbali T. A forecast of ophthalmology practice trends in Saudi Arabia: a survey of junior residents. *Middle East Afr J Ophthalmol.* 2010;17(4):343–8.

7. Noble J, Schendel S, Daniel S, Baerlocher M. Motivations and future trends: a survey of Canadian ophthalmology residents. *Can J Ophthalmol.* 2007;42:821–5.

8. Hasan SJ, Castanes MS, Coats DK. A survey of ophthalmology residents’ attitudes toward pediatric ophthalmology. *J Pediatr Ophthalmol Strabismus.* 2009;46(1):25–9.