

Neuro-ophthalmology in Saudi Arabia: Clinical practice, challenges, and future directions

Bashaer Aldhahwani

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Abstract:

PURPOSE: This study provides an overview of neuro-ophthalmology in Saudi Arabia, evaluates the clinical practice of neuro-ophthalmology in the country, identifies the challenges, and implements recommendations to improve practice in this field.

METHODS: This cross-sectional study consisted of two surveys: The first survey was conducted with 32 general ophthalmologists and neurologists, while the second was conducted with six practicing neuro-ophthalmologists in Saudi Arabia.

RESULTS: All six neuro-ophthalmologists reported that they were Saudi Arabian nationals who worked either in Riyadh or other major cities in the Eastern and Western regions of the country. Only one of the six neuro-ophthalmologists was trained as a neurologist. Fifty percent of the neuro-ophthalmologists were trained in Saudi Arabia. Two out of the six neuro-ophthalmologists also reported providing services that were related to other specialties. Poor salary prospects for a neuro-ophthalmologist and the lack of availability of local fellowship programs were the most frequently reported reasons accounting for the lack of career interest in neuro-ophthalmology among medical residents.

CONCLUSION: The study findings revealed that there is inadequate access to neuro-ophthalmologists in Saudi Arabia and that career interest in neuro-ophthalmology is very low among Saudi ophthalmologists and neurologists. Provision of sponsored subspecialty training opportunities, local fellowship programs, and early exposure may help increase interest in the field. The future of neuro-ophthalmology in Saudi Arabia will be determined by curious, creative, and passionate young physicians.

Keywords:

Neuro-ophthalmology, Saudi Arabia, survey

INTRODUCTION

The Kingdom of Saudi Arabia (KSA) is a large country with a population approaching 30 million. The major provider of health care services in Saudi Arabia is the Ministry of Health, which provides modern ophthalmic care to Saudi citizens, allocating as much as 10% of total health care resources to eye care. With the establishment of the King Khaled Eye Specialist Hospital in 1982, the modern ophthalmic care system in Saudi Arabia has made marked progress in decreasing the prevalence of blindness in the elderly by more than 10% in just over a decade.^[1] However, there are regions in the

country that are underserved while others have relative surpluses of general ophthalmologists and ophthalmic subspecialists.

Neuro-ophthalmology combines the fields of neurology and ophthalmology with a focus on diseases that bridge both disciplines. It manages visual disturbances resulting from factors related to the brain, nervous system, and optic nerve disease.^[2] However, neuro-ophthalmology remains an unpopular and poorly funded subspecialty globally in comparison to other subspecialties such as those related to the retina, glaucoma, anterior segment, and pediatrics.^[3] Whilst practiced informally as a subdiscipline of neurology and ophthalmology in Saudi Arabia, the field needs to be further developed academically and recognized as a clinical specialty.

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Western Region Ophthalmology Program, Mecca, Saudi Arabia

Address for correspondence:
Bashaer Aldhahwani,
Resident, Western Region
Ophthalmology Program,
Mecca 4769-24239,
Saudi Arabia.
E-mail: bashaird.92@gmail.com

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The results of a recently published study, “*Profile of neuro-ophthalmic practice around the world*” in 2018^[4] highlights the number of neuro-ophthalmology practitioners examined across 15 countries. When it comes to neuro-ophthalmologists around the world, Israel, Switzerland, and Australia have a high rate with 3.1, 2.65, and 2.09 neuro-ophthalmologists per million, respectively, while Turkey, Brazil, and India, have 0.14, 0.10, and 0.8 neuro-ophthalmologists per million, respectively. Saudi Arabia comes in near the bottom. According to data provided by the Saudi Commission for Health Specialties, there are currently eight practicing neuro-ophthalmologists in Saudi Arabia. This figure suggests that Saudi Arabia has approximately 0.25 neuro-ophthalmologists per 1 million people. Thus, there is a severe shortage of neuro-ophthalmologists in Saudi Arabia as compared to other countries.

Local Saudi neuro-ophthalmology training programs have been obsolete for a while now; therefore, professionals are now forced to seek training programs outside the country. On the other hand, local training programs in ophthalmic and neurological subspecialties are well-established and receive ample funding. To counteract an impending human resource crisis in the field, effective strategies must be implemented to increase professional interest in neuro-ophthalmology.^[5] Thus, this study evaluates the state of clinical practice of neuro-ophthalmology in Saudi Arabia, identifies the challenges, and implements recommendations to improve future practice.

METHODS

This study used a cross-sectional research design and comprised two surveys. The first survey targeted general ophthalmologists and neurologists, whereas the second survey targeted practicing neuro-ophthalmologists. Accordingly, data were obtained from 32 general ophthalmologists ($n = 17$; 53.1%) and neurologists ($n = 15$; 46.9%) who responded to an e-mail survey that was conducted by the Saudi Commission

for Health Specialties. Additionally, six out of eight practicing neuro-ophthalmologists in Saudi Arabia responded to the survey.

The two surveys were evaluated and validated by three consultants. Ethical approval for this study was obtained from the King Abdullah Medical City International Review Board (IRB). The two surveys were self-administered. The respondents were followed up after a few days and their responses were recorded. All information provided in the survey form was encoded and processed for statistical analysis.

RESULTS

The responses provided by the participants of the first survey to questions about the availability and importance of practicing neuro-ophthalmologists in their departments and related questions are summarized in Table 1. As can be inferred from this table, career interest in neuro-ophthalmology is very low among Saudi ophthalmologists and neurologists. Most ophthalmologists and neurologists expressed a willingness to attend in neuro-ophthalmology-related meetings or clubs in Saudi Arabia once or twice a year.

Table 2 displays demographic, professional, and educational information about the six practicing neuro-ophthalmologists in Saudi Arabia who responded to the second survey, and shows how long the respondents had been practicing neuro-ophthalmology and how frequently they attended neuro-ophthalmology-related scientific meetings or clubs in Saudi Arabia. Results of the analysis pertaining to respondents' experience in the field of neuro-ophthalmology in Saudi Arabia showed that all participants actively participate in resident teaching. Moreover, 4 out of 6 had published research and had participated in scientific meetings.

Table 3 displays the numbers of patients that respondents reported seeing each week, the source of their neuro-

Table 1: Availability of neuro-ophthalmologists, referrals of cases to neuro-ophthalmologists, access to neuro-ophthalmology, and the need for a neuro-ophthalmologist's opinion ($n=32$)

Survey question and response options		No.	%
Is there a practicing neuro-ophthalmologist in your department?	Yes	5	15.6
	No	27	84.4
In your clinical practice, was there a time when you needed to refer a case to a neuro-ophthalmologist?	Yes	30	93.8
	No	2	6.3
Can you estimate how many referrals you make per month?	None	1	3.1
	<2 cases	13	40.6
	2-5 cases	16	50.0
	More than 5 cases	2	6.3
When referring a patient to a neuro-ophthalmologist, is it necessary to do a neuro-imaging test first?	YES, we cannot refer the patient without neuro-imaging.	19	59.4
	NO, not necessarily; it depends on the case.	13	40.6
Do you think patients have adequate access to neuro-ophthalmology?	Yes	4	12.5
	No	28	87.5
Would you be interested in attending a neuro-ophthalmology workshop or scientific meeting to improve your knowledge about the basic science and practices of neuro-ophthalmology?	Yes	31	96.7
	No	1	4.1
If you had to choose a subspecialty, would you select neuro-ophthalmology?	Yes	9	28.1
	No	23	71.9

ophthalmology referrals, and whether hospital protocol required their approval for referrals.

Table 4 shows the perceived advantages of practicing neuro-ophthalmology in Saudi Arabia, such as a relative lack of issues in receiving payments from patients. Table 5 displays results related to the challenges to practicing neuro-ophthalmology in Saudi Arabia, such as an inadequate number of neuro-

ophthalmologists to meet patient needs. This explains why there is a lack of interest in pursuing neuro-ophthalmology as a career among Saudi resident medical trainees. The most commonly reported reasons were poor salary prospects (66.7%) followed by lack of availability of local fellowship programs, lack of surgery-related clinical experience (50.00%), and technical difficulty according to specialty (16.7 %).

Table 2: Demographic characteristics of the neuro-ophthalmologists who participated in the second survey (n=6)

Survey question and response options	No.	%	
What is your nationality?	Saudi	6	100.0
In which region do you work?	Riyadh	3	50.0
	Western region	2	33.3
	Eastern region	1	16.7
Where do you practice neuro-ophthalmology?	University hospital	3	50.0
	Ministry of Health	2	33.3
	Armed forces hospital	1	16.7
	Ophthalmology	5	83.3
What specialty training did you undergo before pursuing neuro-ophthalmology?	Neurology	1	16.7
	Saudi Arabia	3	50.0
Where did you complete your neuro-ophthalmology fellowship training?	Outside the country	3	50.0
	Yes	4	66.7
Are you practicing neuro-ophthalmology only?	No	2	33.3
	<5 years	3	50.0
	Between 5-10 years	1	16.7
How long have you been practicing neuro-ophthalmology in Saudi Arabia?	More than 10 years	2	33.3
	Once	4	66.7
	2-3 times	1	16.7
How many times have you attended neuro-ophthalmology-related scientific meetings or clubs in Saudi Arabia?	More than 3 times	1	16.7

Table 3: Clinical experience in the field of neuro-ophthalmology in Saudi Arabia (n=6)

Survey question and response options	No.	%	
How many neuro-ophthalmology patients do you see per week?	<20 patients	1	16.7
	20-40 patients	3	50.0
	More than 40 patients	2	33.3
Where do your neuro-ophthalmology referrals come from?	An ophthalmologist	4	66.7
	A neurologist	2	33.3
Does the protocol of the hospital require your approval of the referrals?	Yes	5	83.3
	No	1	16.7
What is the average wait time for patients to undergo a Magnetic Resonance Imaging scan?	2-6 days	1	16.7
	1-3 weeks	2	33.3
	More than 3 weeks	3	50.0
For complex cases that require the decision of a multidisciplinary team (e.g., neurologist, neuro-radiologist, neuro-surgeon), how often do you meet?	Rarely	1	16.7
	Sometimes	3	50.0
	Usually	2	33.3

Table 4: Advantages of practicing neuro-ophthalmology in Saudi Arabia (n=6)

What do you consider to be the advantages of practicing neuro-ophthalmology in Saudi Arabia?	No.	%	
There are no issues regarding payment from patients.	Agree	3	50.0
	Neither agree nor disagree	3	50.0
	Disagree	0	00.0
There is easy access to procedures such as Magnetic Resonance Imaging scans and Temporal Artery Biopsies.	Agree	3	50.0
	Neither agree nor disagree	1	16.7
	Disagree	2	33.3
There is equality in terms of salary across all ophthalmic specialties.	Agree	2	33.3
	Neither agree nor disagree	2	33.3
	Disagree	2	33.3

Table 5: Challenges to practicing neuro-ophthalmology in Saudi Arabia (n=6)

What do you consider to be the challenges that are involved in practicing neuro-ophthalmology in Saudi Arabia?		No.	%
The number of neuro-ophthalmologists is adequate to meet patient needs.	Agree	1	16.7
	Neither agree nor disagree	1	16.7
	Disagree	4	66.7
The number of patients that are attended to is not significant compared to other subspecialties.	Agree	4	66.7
	Neither agree nor disagree	0	00.0
	Disagree	2	33.3
The average annual income of a practicing neuro-ophthalmologist is not comparable to those in other subspecialties.	Agree	2	33.3
	Neither agree nor disagree	1	16.7
	Disagree	3	50.0

Finally, participants were asked what improvements they believed would lead to better neuro-ophthalmological practice in Saudi Arabia. Responses included a well-organized and clear curriculum for local fellowships in university hospitals or medical centers to have fewer patients per clinic because most patients require long critical discussions with physicians, and faster access to imaging and laboratory investigations.

DISCUSSION

The main objectives of this study were to provide an overview of neuro-ophthalmology in Saudi Arabia, evaluate the state of clinical practice of neuro-ophthalmology in the country, identify the challenges, and implement recommendations to improve future practice. These objectives were addressed using survey data obtained from 32 general ophthalmologists and neurologists and six practicing neuro-ophthalmologists.

In 2030, it is estimated that the Saudi population will be around 40 million.^[6] Therefore, a reasonable suggestion based on recommendations of the North American Neuro-Ophthalmology Society and the American Academy of Ophthalmology, which recommend one neuro-ophthalmologist per one million population,^[7] would be to work toward having 40 neuro-ophthalmologists within the next 10 years. In order to do that, we need to replace about three or four full-time equivalent neuro-ophthalmologists each year in Saudi Arabia who can serve all regions of the kingdom with state-of-the-art facilities.

The findings of this study suggest that, in order to reach this goal and to address to the manpower shortage in the filed the suggested recommendations should be followed.

First, the main obstacle to entry into the neuro-ophthalmology subspecialty is the lack of local fellowship training opportunities. In France, in the mid 90s, to meet the shortage in neuro-ophthalmology practitioners, they developed a post-graduate university diploma program in neuro-ophthalmology which led to a dramatic increase in educational, clinical, and research activity in neuro-ophthalmology.^[8]

Nowadays, the Saudi Commission for Heath Specialties and the authorities at the Dhahran Eye Specialist Hospital and King Fahad University Hospital in the eastern region of Saudi Arabia are working hard to re-establish outstanding local neuro-ophthalmology programs that they have already established in 2019 with only one position per 2 years.

Second, in Saudi Arabia we need to generate interest and improve awareness in the field of neuro-ophthalmology in order to attract trainees to the subspecialty and emphasize the importance and need of specialty in the country. This can be accomplished by providing effective and early exposure to the subspecialty among resident medical trainees. There is a mandatory 2-month rotation during the 4-year residency program in ophthalmology. Although it is not a part of the mandatory neurology residency curriculum, there has been an increasing interest by neurology residents in undergoing some form of elective training in neuro-ophthalmology and many have spent a 1- or 2-month observership.

Even with limited availability of local fellowship programs, by only increasing the number of ophthalmologists and neurologists who are interested in the neuro-ophthalmology, there will be great opportunity for international full paid scholarships as provided by most health care and educational institutes in Saudi Arabia, which is fully supported by our government. This strategy of the international training focus can help us overcome this shortage in upcoming years and has been successfully achieved in many other medical subspecialties.

Third, for the currently practicing neuro-ophthalmologists in Saudi Arabia, they should participate actively in the international Neuro-Ophthalmology scientific meeting and become members of the American and European Neuro-ophthalmology societies in order to contribute scientifically to represent our practice in the field. This will help us in many ways: it will build a good relationship between Saudi neuro-ophthalmology communities and enable us to become international pioneers in the field. Thus, we can create our own Saudi Neuro-Ophthalmology Society to sponsor an annual scientific meeting with local and international speakers. This educational meeting should include seminars, workshops, discussions of cases and best practices in neuro-ophthalmic research, and training in basic neuro-ophthalmology science and patient care. Resident participation in such scientific meetings it will increase awareness about neuro-ophthalmological diseases and their treatment, and will encourage them to conduct more research and publish articles in the field. In addition, general ophthalmologists and neurologists should utilize such learning opportunities to supplement their own understanding of neuro-ophthalmological diseases to

improve referral practices and management plans. This step has been implemented before by many countries. For example, since many years Korea had only two neuro-ophthalmology societies: one run by ophthalmologists and the other by neurologists founded in 2009. Since then, the Korean Society of Neuro-ophthalmology has held biannual meetings, with more than 100 neurologists/ophthalmologist in attendance. They establish their treatment guidelines for the medical community of Korea, and their society organized a committee for textbook compilation with the goal of publication. Kim *et al.* state, "In spite of the relatively short history, we have seen a marked progress in neuro-ophthalmology in Korea over the past decade."^{19]}

In conclusion, the future of neuro-ophthalmology in Saudi Arabia will be determined by curious, creative, and passionate young physicians with a genuine interest in answering the many unsolved questions in our subspecialty. It is the responsibility of the seniors to motivate them and, at the same time, to preserve favorable health system structures. We anticipate that, once most of the aforementioned recommendations are implemented, we will be able to take neuro-ophthalmology in Saudi Arabia to the next level.

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Conflicts of interest

There are no conflicts of interest.

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