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Perception of Pediatric Neurology Among Non-neurologists

Mohammed M. S. Jan, MBChB, FRCPC

ABSTRACT

Pediatric neurology is considered a relatively new and evolving subspecialty. In Saudi Arabia, neurologic disorders in children are common, and the demand for trained pediatric neurologists is strong. The aim was to study the perception of the pediatric neurology specialty among practicing generalists and their referral practices. Attendees of a symposium on pediatric epilepsy comprehensive review for the generalist were included. A structured 25-item questionnaire was designed to examine their demographics, training, practice, and referral patterns. One hundred nineteen participants attended the symposium, and 90 (76%) questionnaires were returned. Attendees' ages were 22 to 70 years (mean 32 years), with 65.5% female physicians. There were 32% consultants, 51% trainees, and 17% students. Most physicians (67%) were practicing general pediatrics. Only 36% received a structured pediatric neurology rotation during training. Children with neurologic complaints constituted 28.5% of those seen in their practice, and they referred 32.5% of them to pediatric neurology. Only 32% were moderately or highly confident in making the diagnosis or providing the appropriate treatment. Those who received a structured pediatric neurology rotation felt more comfortable in their management ($P = .03$). Many physicians (38.5%) had no direct access to a pediatric neurologist for referrals. To conclude, pediatric neurologic disorders are common in daily practice. Most generalists did not receive a structured neurology rotation during their training and were not highly confident in diagnosing and treating these children. Given the limited number of pediatric neurologists, I highly recommend that generalists receive appropriate neurologic training. (*J Child Neurol* 2004;19:1-5).

Pediatric neurology is considered a relatively new and evolving subspecialty.¹ Over the last century, remarkable advances at both the basic and clinical levels have considerably improved our ability to evaluate and treat children with neurologic disorders.¹ These disorders are common, particularly in Saudi Arabia, as a result of the common traditional practice of consanguineous marriages, which may reach up to 70% in some sectors of our community.^{2,3} However, trained pediatric neurologists are few and are available in certain tertiary care centers of larger Saudi cities. Pedi-

atric neurology services are generally busy, with a large volume of referrals and consultations.⁴⁻⁷ Many cases seen by general pediatricians are primarily neurologic, accounting for up to 25% of all consultations to pediatrics with a high ratio of follow-up visits to new patients of about 3.4:1.^{5,7} General practitioners working in primary care were found to have less confidence in handling patients with neurologic disorders than patients with other common medical conditions.⁸ In another study, up to 54% of pediatricians referred more than 90% of their children with neurologic complaints to pediatric neurologists.⁶ Some authors found increasing pressure on the pediatric neurology service because of functional or self-limiting conditions.⁵ They concluded that appropriate neurologic training of general pediatricians might reduce this unnecessary pressure.

We recently evaluated the attitudes of medical students toward pediatric neurology and found that the majority had unfavorable attitudes.⁹ Most students felt that their teaching experiences were not strong, and only a small percentage actually selected pediatric neurology as the first future career choice.⁹ This is not encouraging given the strong

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Table 1. Topics Covered in the Final Program of the Pediatric Epilepsy Comprehensive Review for the Generalist Symposium (May 7, 2003)

Topic	Presenter	Subspecialty	Duration (min)*
Seizure Classification	Prof Ali O. Shaabat	Neurology	25
Epilepsy Syndromes	Prof Generoso Gascon	Epileptology	30
Epilepsy, Cognition, and Behavior	Dr Mohammed M. S. Jan	Neurology	35
Complicated Febrile Seizures	Prof John Girvin	Epilepsy surgery	25
Genetics in Epilepsy	Prof Generoso Gascon	Epileptology	30
Approach to Neonatal Seizures	Dr Maha Gashlan	Neurology	30
Electroencephalography in Pediatric Epilepsy	Dr Yousef Al-Said	Neurophysiology	30
Neuroimaging in Epilepsy	Dr Sattam Lingawi	Neuroradiology	30
Nonepileptic Paroxysmal Events	Dr Rogia Aidarous	Neurology	25
New Antiepileptic Drugs	Dr Mohammed M. S. Jan	Neurology	25
Update on Epilepsy Surgery	Dr Bassam Addas	Neurosurgery	25
Approach to Status Epilepticus	Dr Abeer Hassan	Neurology	25

*Duration of the presentation excluding the discussion time.

demand for this specialty in our region. The perception of the pediatric neurology specialty among practicing generalists and their referral practices has received limited attention.⁵⁻⁸ It was for this reason that the present study was undertaken. In my experience, many generalists feel uncomfortable dealing with pediatric neurology patients resulting from multiple factors, particularly relating to their teaching experiences and lack of effective referral system. I aimed to explore these issues and examine their impressions and referral patterns to pediatric neurology.

METHODS

The study included attendees of a pediatric epilepsy comprehensive review for the generalist symposium conducted in collaboration between the Department of Pediatrics, King Abdulaziz University Hospital, and the Department of Neurosciences, King Faisal Specialist Hospital and Research Center, Jeddah, Saudi Arabia, on May 7, 2003. These two institutions are large tertiary care facilities that provide adult and pediatric care for most of the regional population of western Saudi Arabia. King Abdulaziz University Hospital is linked to the College of Medicine and Allied Health Sciences, which is the main teaching center of the western region. The 1-day symposium was directed to the level of general practitioners, residents, fellows, and general pediatricians. There were 12 clinical presentations covering different aspects of pediatric epilepsy in the form of updated reviews (Table 1). Ten speakers from both departments, including two distinguished international speakers, gave these presentations. The study author was a member of the organizing committee and the chairman of the scientific committee. The symposium was accredited for 6 continuous medical education hours by the Saudi Council for Health Specialties.

Before participating in the study, the attendees were assured that taking part in the study was voluntary and that their identity would remain anonymous. A structured 25-item questionnaire was designed to examine their demographic characteristics, training, qualifications, and practice experiences. Attendees were asked about the percentages of children with neurologic disorders that they usually see in their daily practice and the percentages that they would then refer to pediatric neurology (Table 2). The next section of the questionnaire included three Likert scale items¹⁰ to exam-

ine the participant's practice and confidence in dealing with pediatric neurology patients (Table 3). Response categories to the Likert scale items were 1 = not at all, 2 = somewhat, 3 = moderately so, and 4 = very much so (see Table 3). Then the participants were asked to select one of the best and worst aspects of pediatric neurology based on their experiences (Table 4). The last section included a question about access to a pediatric neurologist for referrals and an overall evaluation of the symposium. A final open-ended item was given for additional comments. The symposium organizing committee facilitated the distribution of the questionnaires at the registration time. The completed forms were collected when the continuous medical education certificates were distributed at the end of the day.

Table 2. Qualification, Practice, and Referral Patterns of the Attendees

Variable	Number/Total* (%)
Qualification	
1 Medical degree only	29/81 (36)
2 Arab/Saudi board	22/81 (27)
3 FRCPC/FRCS	6/81 (7.5)
4 MRCP	3/81 (4)
5 Other	7/81 (8.5)
6 None	14/81 (17)
Practice	
1 University hospital	32/80 (40)
2 Ministry of health	23/80 (29)
3 Military/National Guard hospital	9/80 (11)
4 Private hospital	6/80 (7.5)
5 Other	10/80 (12.5)
Children seen with neurologic complaints	
1 Less than 10%	14/79 (18)
2 10-20%	25/79 (31.5)
3 20-40%	17/79 (21.5)
4 40-60%	16/79 (20)
5 More than 60%	7/79 (9)
Children with neurologic complaints referred to a pediatric neurologist	
1 Less than 10%	20/75 (27)
2 10-20%	13/75 (17)
3 20-40%	12/75 (16)
4 40-60%	11/75 (15)
5 More than 60%	19/75 (25)

*Total number of those who responded to the question.

FRCPC = fellow of the Royal College of Physicians of Canada; FRCS = fellow of the Royal College of Surgeons of Canada; MRCP = member of the Royal College of Physicians (United Kingdom).

Table 3. Results of the Likert Scale Items Examining Physician's Practice and Confidence in Dealing With Pediatric Neurology Patients

Question Items	Percentage	Mean Score*
Do you frequently see and follow children with neurologic disorders?		2.6/4
1 Not at all	5	
2 Somewhat	44	
3 Moderately so	41	
4 Very much so	10	
Do you feel comfortable diagnosing children with neurologic disorders?		2.3/4
1 Not at all	7.5	
2 Somewhat	60.5	
3 Moderately so	21	
4 Very much so	11	
Do you feel comfortable treating children with neurologic disorders?		2.4/4
1 Not at all	10.5	
2 Somewhat	58.5	
3 Moderately so	11.5	
4 Very much so	19.5	

*Minimum score = 1; maximum score = 4.

The data were tabulated and analyzed using χ -square statistics for categorical variables.¹¹ The magnitude of significant associations is presented as *P* values, odds ratios, and the 95% confidence interval for the odds ratios.

RESULTS

One hundred nineteen participants attended the symposium. Ninety (76%) questionnaires were returned; however, nine forms were incomplete and therefore excluded. The remaining 81 questionnaires were included. The attendees' ages ranged between 22 and 70 years (mean 32, SD \pm 10), with 65.5% women. There were 32% consultants or specialists, 51% trainees (interns, residents, fellows), and 17% medical students. Excluding medical students, most physicians (67%) were practicing in the field of general pediatrics, 19.5% in neurology, 9% in neurosurgery, and 4.5% in general practice. The number of years of postgraduate training ranged between 1 and 14 (mean 5.2, SD \pm 3). Most physicians (69%) were trained within Saudi Arabia, and

16.5% received North American training. Overall, only 36% received a structured pediatric neurology rotation during their postgraduate training lasting 2 to 3 months (mean 2.2, SD \pm 0.5). The number of years in practice (medical students excluded) ranged between 1 and 36 (mean 9.4, SD \pm 8). The majority (87%) practiced within the Jeddah area. Of those in general practice or pediatrics, 43% had future plans for subspecialization, 38.5% being in the neuroscience field. Table 2 summarizes the qualification, practice, and referral patterns of the attendees. They reported that children with neurologic complaints constitute an average of 28.5% of the children they see in their practice, and they refer an average of 32.5% of these children to pediatric neurology (see Table 2). Participants interested in pursuing a career in neurology were less likely to refer more than 20% of their patients to pediatric neurology when compared with those who are interested in other subspecialties (20% vs 69%; *P* = .04). The majority (61.5%) had access to a pediatric neurologist for referrals within the same hospital. The remaining 38.5% had to refer the child to another hospital within the same city (20.5%) or another city (7%) or to an adult neurologist within the same hospital (11%).

Table 3 shows the results of the Likert scale items examining participants' practice and confidence in dealing with pediatric neurology patients. It is clear that although these physicians frequently see and follow children with neurologic complaints, the level of confidence in making the diagnosis and providing treatments was not high. Only 32% were moderately or highly confident in diagnosing or treating children with neurologic disorders (see Table 3). Those who received a structured pediatric neurology rotation during training felt more comfortable in managing their patients (*P* = .03) but had referral patterns similar to those who never received a structured rotation. As well, residents were 9.3 times more likely to feel uncomfortable in establishing the diagnosis when compared with consultants and specialists (95% CI 2.5–36; *P* = .0002); however, they were as likely to feel uncomfortable in providing treatments and in referring patients to pediatric neurology. Table 4 shows the responses of attendees regarding the best and worst aspects of pediatric neurology and the correla-

Table 4. Participant's Responses Regarding the Best and Worst Aspects of Pediatric Neurology and the Correlations With Position and Gender

Question Items Regarding Pediatric Neurology	Total Response (%)	Attendee (%)		Gender (%)	
		Consultant	Other	Female	Male
Best aspects					
1 Helping children	45.5	17	83	69.5	30.5
2 Challenging and interesting field	36.5	48	52	59	41
3 Good prognosis and recovery	10	62	38	87.5	12.5
4 Job opportunities	1.5	0.00	100	0.00	100
5 Other	6.5	0.00	100	100	0.00
Worst aspects					
1 Poor prognosis and treatment	45	36	64	53	47
2 Difficult and complicated	25	28	72	83	17
3 Emotionally stressful	16	17	83	82	18
4 Long training	7	80	20	60	40
5 Other	7	40	60	60	40

tions with their position and gender. Nonconsultants were 8.8 times more likely to feel that helping children is one of the best aspects when compared with consultants (95% CI 2.6–32; $P = .0001$). This was also true for women when compared with men ($P = .002$). Women were also more likely to feel that the good prognosis and recovery of children is a strong aspect ($P = .01$). At the same time, they were more likely to feel that pediatric neurology disorders are difficult and complicated ($P = .0002$) or that the specialty is emotionally stressful ($P = .01$) when compared with men (see Table 4). Other differences did not reach statistical significance because of the small numbers. Regarding the overall evaluation of the symposium, 27% felt that it was excellent, 48.5% very good, 23% good, and 1.5% fair, and none gave it a poor rating. Consultants were more likely to give an excellent or very good rating when compared with residents (92% vs 67%; $P = .04$).

DISCUSSION

The study results suggest that most non-neurologists do not feel comfortable handling pediatric neurology patients. About one third of patients seen in their practice had neurologic complaints. This is slightly higher than the 24 to 25% reported by other authors.^{5,7} This could be the result of the hospital settings of our physicians, which were mostly large general hospitals rather than primary care facilities. On the other hand, the physicians referred about one third of their neurology patients to pediatric neurology, which is lower than what has been reported previously.⁶ Maria and English found that 54% of pediatricians referred more than 90% of their children with neurologic complaints to pediatric neurologists, and 75% referred more than 50%.⁶ These pediatricians showed a significantly lower self-assessment score than did other pediatricians in knowledge and skills in performing a neurologic examination. Only 25% of our physicians referred more than 60% of their neurology patients to neurologists. This significantly lower referral rate could reflect the limitation in access to pediatric neurologists, which was true for more than one third of the physicians in our sample. The other possible explanation is their relatively long clinical experience postgraduation (mean 9 years). Interestingly, physicians who were interested in pursuing a career in neurology were less likely to refer their patients, reflecting higher confidence level. In fact, the overall confidence level in making the diagnosis and providing treatments was not high in the studied sample. Only one third were moderately or highly confident in diagnosing or treating children with neurologic disorders; however, those who received a structured pediatric neurology rotation during training (36%) felt more comfortable in managing their patients. As expected, residents were less confident in establishing the diagnosis; however, they were as likely as consultants to feel uncomfortable in providing treatments and in referring patients to pediatric neurology. In other words, completing the pediatric residency did not alter the

difficulties they felt in handling neurologic cases. Although the assessment and management of neurologic disorders require specific knowledge, skills, and attitudes, which can be supported by medical education,¹² some investigators have found a decline in general neurology education and that the education was deficient in training physicians to manage general neurologic disorders.^{9,13} The education of medical students about epilepsy, for example, a very common pediatric neurology problem, was often fragmented and incomplete.¹⁴

Regarding participants' responses about the best and worst aspects of pediatric neurology, we were able to identify some factors that can be influenced to promote careers in the field among generalists. Although many of them felt that pediatric neurology is a challenging and interesting field that provides help to children, they also felt that many disorders are difficult and complicated and carry a poor prognosis with limited treatments. Some reported that pediatric neurology is emotionally charged and requires very long postgraduate training. In our recent study evaluating the attitudes of medical students toward pediatric neurology, my colleagues and I found that although 92% found neurologic disorders challenging and interesting, the majority (77–100%) had unfavorable attitudes. Most students felt that their teaching experiences were not strong, and only 9 (6%) actually selected pediatric neurology as the first future career choice.⁹ The actual clinical pediatric experience can influence many of these misconceptions and apprehension.¹⁵ Al-Asnag and Jan found that the pediatric clerkship experience did not increase the likelihood of selecting pediatrics as the first future career choice; however, many impressions and concerns about children were positively influenced.¹⁵ As well, researchers have found that many students will change their early medical career choices.¹⁶ They compared students' early career choices with their employment 11 years after qualification and found 65% working within the first choice.¹⁶ This would encourage us to continue to stimulate and interact with residents and generalists to increase their interest in pediatric neurology. This is particularly important given the shortage of pediatric neurologists in our country. A recent study assessed physicians working in the field of pediatric neurology using a burnout inventory and a general health questionnaire.¹⁷ They found that 27.5% of the respondents had attained a burnout status, and 93% were suffering from stress-related neurosis.¹⁷ There seems to be a global shortage of pediatric neurologists that needs to be evaluated and addressed systematically.

There are some limitations to this study. First, the sample was somewhat biased toward women, who represented two thirds of the attendees. In fact, women had stronger positive and negative impressions about pediatric neurology reaching statistical significance (see Table 4). In general, women are much more likely to be interested in pediatrics.¹⁵ Kaplowitz et al confirmed a continuing recent trend for women to have a greater interest in careers in pediatric specialties.¹⁸ Second, the sample was relatively small and

might not be representative of generalists because these participants selected to attend this neurology symposium, which could reflect their difficulties or interest in the field. In fact, one third of those who had future plans for subspecialization selected neurology, reflecting their interest in the specialty. This fact can limit our ability to generalize from these findings. However, the study sample was heterogeneous, with a good response rate (76%), wide age variation, and representation from a number of institutions and physician categories. Most physicians were practicing in the field of general pediatrics or general practice. The symposium received positive evaluation in general, although residents gave it a lower score when compared with consultants. Some of the consultants' opinions could have been favorably biased because some of them were presenters or practiced in the neuroscience field.

In conclusion, pediatric neurologic disorders are common in daily practice. Most generalists did not receive a structured neurology rotation during their training and were not highly confident in diagnosing and treating these children. Given the limited number of pediatric neurologists, I highly recommend that generalists receive appropriate neurologic training. This can be accomplished during their residency and by attending interactive continuous medical educational activities, such as our symposium.

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