Perceptions about Training during Endocrinology Residency Programs in India over the Years: A Cross-sectional Study (PEER India Study)

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Background: Residents’ perception on quality of endocrinology training in India is not known. This study aimed to evaluate the perceptions about endocrinology residency programs in India among current trainees as compared to practicing endocrinologists. Methods: Trainees attending a preconference workshop at the annual conference of Endocrine Society of India (ESI) were given a questionnaire designed to evaluate their perceptions on their training. These evaluated the reasons for choosing endocrinology, their experiences during residency, and career plans. Practicing endocrinologists attending ESICON with at least 5-year experience were evaluated as controls. Results: Questionnaires from 63 endocrine trainees and 78 practicing endocrinologists were analyzed. Endocrinology is perceived to be the super-specialty with the best quality of life (QOL) but fair with regard to financial remuneration. Among current trainees, 61.89%, 31.74%, and 34.91% are satisfied with training in clinical endocrinology, laboratory endocrinology, and clinical/translational research, respectively. The corresponding figures for practicing endocrinologists are 71.78%, 25.63%, and 30.75%, respectively. Exposure to national endocrinology conferences during their endocrinology residency was adequate. However, exposure to international endocrinology conferences, research publications, project writing, and grant application are limited. Laboratory endocrinology is rated as the most neglected aspect during endocrine residency. Most of the trainees want to establish their own clinical practice in the long run. Very few trainees (17.46%) wish to join the medical education services. Conclusion: There is a good perception of QOL in endocrinology in spite of average financial remuneration. There is dissatisfaction with the quality of training in laboratory endocrinology and clinical research. Very few endocrine trainees consider academics as a long-term career option in India.

Keywords: Diplomate of National Board, doctorate of medicine, endocrinology, residency, training

Introduction

History of postgraduate training program in endocrinology in India can be traced back to 1969 when the first Doctorate in Medicine (DM) residency was started at Postgraduate Institute of Medical Education and Research, Chandigarh.[1] This slowly grew to 7 centers offering endocrinology residency in 1992.[2] The last decade has seen a significant increase in the number of endocrinology residency programs in India, with more than 78 DM endocrinology seats (26 centers) and 9 Diplomate in Endocrinology (Diplomat of National Board [DNB]) seats in a year (7 centers), apart from 11 seats at All India Institute of Medical Sciences, Delhi (over 3 years), available across the country.[2,3] However, in spite of this exponential increase in the seats of endocrinology residency, no data is available on the quality of endocrinology training in India, especially the perceptions of the trainee doctors, for whom these courses are meant. Hence, the aim of this study was to evaluate the perceptions about training during endocrinology residency.
programs in India among the current residents and compare the same with practicing endocrinologists who had completed their endocrinology residency at least 5 years prior.

**METHODS**

The Expert Endocrine Examination (EEE) workshop for residents in endocrinology was held from 9 am to 5 pm on October 20, 2016, as a part of preconference workshop of 46th annual conference of the Endocrine Society of India (ESI), at New Delhi. The residents/trainees were either in their 2nd or 3rd year of the 3-year endocrinology residency programs in India (DM or DNB in endocrinology). This workshop brought the top endocrine faculties as well as residents at different institutes, at a common platform, to discuss the clinical approaches and management of common endocrinology disorders. A self-administered questionnaire was handed over to all the participating residents at the beginning of the program. Those who agreed to take part in this study were given 15 min to complete the questionnaire, which was subsequently collected back.

This self-administered questionnaire was developed by a team of experts, with the aim of assessing the perception of residents in the following fields: perceptions of endocrinology as a long-term career option; quality of training in clinical, laboratory and research during residency; preferred areas in the field of endocrinology; preferred reference journals; scope and exposure to research, project writing, and grants during residency; and long-term career goals in endocrinology. The questionnaire consisted of 29 multiple choice questions with the scope of marking more than 1 choice as the preferred answer. The 15 min allocated time for filling the questionnaire was based on a pilot study done in 10 endocrinologists before the event. The pilot study also helped avoid repetitiveness and duplication of questions and ensured reliability. Following the EEE workshop, randomly selected practicing endocrinologists attending the ESI Annual conference from October 21, 2016, to October 23, 2016, were requested to fill the questionnaire as a control group.

**Questionnaire**

The questionnaire consisted of 6 domains. The first domain of 2 questions evaluated the respondents’ perception of endocrinology with regard to other specialities based on the quality of life (QOL) and financial remunerations offered. The second domain had 4 questions, which collected information on demography of the participants (age, sex, marital status, and age at the time of joining endocrine residency). The third domain included three questions to evaluate when and how did the participant decide on choosing endocrinology as a long-term career option. The fourth domain (10 questions) evaluated participants’ perceptions on quality of endocrinology training in India (clinical, laboratory, and research), preferences in endocrine subspecialties, preferences in journals, and rating the exit examinations. The fifth domain (6 questions) evaluated participants’ experiences in attending national and international endocrinology conferences, writing research papers, nature of publications generated, and applying for grants. The sixth and the last domain asked 4 questions, which evaluated the future plans of participants.

**Statistical analysis**

Summary statistics were prepared for responses to each question. Because not every participant answered all questions, the percentage of respondents providing a given answer was calculated individually for each question, using the number of respondents to that question as the denominator. Initially, we created a simple Excel database, which was analyzed using Statistical Package for Social Sciences (SPSS®, Armonk, NY: IBM Corp) version-20 software.

**Results**

A total of 68 residents attended the EEE program, of which 65 returned the filled questionnaires. Questionnaires from 63 endocrinology trainees (median age 31; [30–34] male: female = 45:18; Group-1), with > 80% questions in the questionnaire answered were analyzed. In addition, questionnaires from 78 practicing endocrinologists (median age 40.5; [38–45] males: female = 62:16) were analyzed as controls (Group-2). The median year for completion of endocrinology residency among the practicing endocrinologists was 2009 whereas most current residents will complete their endocrinology residency by 2017.

Endocrinology was voted as the super-specialty with best QOL both by residents and practicing endocrinologists [Table 1]. With regard to financial remuneration, both groups felt that cardiology offers the best returns [Table 1]. Endocrinology was voted fifth among the 8 super-specialties with regard to financial remuneration [Table 1]. However, there was not much difference among the various specialties apart from cardiology and gastroenterology.

Only 22 (34.92%) and 30 (47.62%) residents reported that they had a qualified endocrinologist among faculties during their MBBS and MD training, respectively. The corresponding figures among practicing endocrinologists were 20 (25.64%) and 24 (30.76%), respectively. Most of the doctors decided to take up endocrinology as a career option during their MD training (30 in Group-1 [47.62%] and 46 in Group-2 [58.97%]). Sixteen (25.39%) and 9 (14.29%) current endocrinology residents decided to do DM/DNB endocrinology during their post-MD senior residency in endocrinology and internal medicine, respectively.

Among the current residents, 61.89%, 31.74%, and 34.91% were satisfied with training in clinical endocrinology, laboratory endocrinology, and clinical/translational research, respectively. The corresponding figures in practicing endocrinologists were 71.78%, 25.63%, and 30.75%, respectively [Table 2]. When enquired regarding the most preferred branch/subspecialty in endocrinology, current residents and practicing endocrinologists voted for pediatric endocrinology and adrenals, respectively [Table 3]. Diabetes
though constituting the majority of the patients visiting the endocrinology clinics was voted second last and last by the current residents and practicing endocrinologist, respectively [Table 3]. When enquired about which aspect of endocrinology being most neglected during endocrinology residency, laboratory endocrinology consistently received the maximum score (36.5% among residents and 42.31% among practicing endocrinologists (42.31%).

When asked to rate the quality of DM endocrinology exit examinations in India (using a score of 1 with 1 being the worst and 10 being the best), the current residents and practicing endocrinologists gave a score of 7 (6–8) and 7 (5–8), respectively (median [25th percentile–75th percentile]) ($P = 0.928$). The corresponding scores for DNB endocrinology exit examinations in India were 5 (0–8) and 5 (1–6), respectively ($P < 0.001$).
The most preferred and read journals in endocrinology among both groups were Journal of Clinical Endocrinology and Metabolism (JCEM), followed by Indian Journal of Endocrinology and Metabolism (IJEM). Interestingly, Clinical Endocrinology (Oxford) was disproportionately more popular among the practicing endocrinologists; whereas New England Journal of Medicine was more popular among the current residents. Also interestingly, diabetes though constituting the bulk of patients seen in any endocrinology practice, none of the top journals dedicated to diabetes practice (Diabetes Care, Diabetologia, Diabetic Medicine among others) featured in the list of preferred and read journals [Table 4].

Most current residents as well as practicing endocrinologists attended national conferences during their endocrinology residency [Table 5]. However, exposure to international conferences is negligible during residency with 84.12% current residents having no exposure [Table 5]. Publication of research papers during residency is negligible with 93.64% of current residents either have not published a single paper or have published a maximum of 3 papers during their residency [Table 5]. Among those who had published during their residency, the most common type of publication was case reports (46.80%; n = 66), followed by original articles (38.88%; n = 56), reviews (23.40%; n = 33), brief reports (20.83%; n = 30), clinical images (15.97%; n = 23), and letters to editor (15.27%; n = 22). There is minimal exposure to writing and receiving grants for conducting clinical research during endocrine residency. Forty current residents (63.49%) and 40 practicing endocrinologists (51.28%) had not written a single research project during their endocrine residency. 23 current residents (33.82%) and 36 practicing endocrinologists (46.15%) had exposure to writing 1–2 research projects during residency.

Only 2 practicing endocrinologists (2.56%) have written 3–4 research projects during residency. Similarly, there is minimal knowledge among the doctors with regard to applying for travel grants for research presentations at different conferences. Fifty-one current residents (63.49%) and 54 practicing endocrinologists (51.28%) had never applied for or received a travel grant during residency. Five of current residents (7.93%) and 18 practicing endocrinologists (23.07%) had applied for or received 1–2 travel grants during residency.

When asked about future plans and where they see themselves 5 years from the present, most of the current residents wanted to be entrepreneurs (viz., establish their own clinic and/or hospital; 50.79%) [Table 6]. In contrast, among the practicing endocrinologists, working in the corporate medical sector was the most preferred career option (48.72%). Very few doctors (residents [17.46%] and practicing endocrinologists [12.82%]) wished to join the medical education services by joining as a faculty in different medical colleges across the country.

| Table 4: Preferred journal in endocrinology for reference |
|-----------------------------------------------------------|
| Residents (Group-1) (n=63)                                 |
| Journal of Clinical Endocrinology and Metabolism (53)      |
| Indian Journal of Endocrinology and Metabolism (38)        |
| New England Journal of Medicine (38)                      |
| Clinical Endocrinology (Oxford) (14)                      |
| Lancet (9)                                                 |
| Endocrine practice (8)                                    |
| Thyroid (2)                                                |
| Controls (Group-2) (n=78)                                 |
| Journal of Clinical Endocrinology and Metabolism (72)      |
| Indian Journal of Endocrinology and Metabolism (38)        |
| Clinical Endocrinology (Oxford) (40)                      |
| New England Journal of Medicine (34)                      |
| Lancet (8)                                                 |
| Endocrine practice (2)                                    |
| Thyroid (8)                                                |

Values in parentheses represent the absolute number of votes received by each journal followed by the percentage

| Table 5: Research and networking in endocrinology residency |
|-------------------------------------------------------------|
| Score | Group-1 (n=63) (%) | Group-2 (n=78) (%) | Group-1 (n=63) (%) | Group-2 (n=78) (%) | Group-1 (n=63) (%) | Group-2 (n=78) (%) |
|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 0     | 9 (14.28)         | 4 (5.12)         | 53 (84.12)        | 52 (66.67)        | 26 (41.26)        | 14 (17.95)        |
| 1-3   | 35 (55.56)        | 32 (41.02)       | 9 (14.28)         | 22 (28.20)        | 33 (52.38)        | 38 (48.71)        |
| 4-6   | 18 (28.57)        | 24 (30.77)       | 1 (1.59)          | 2 (2.56)          | 4 (6.34)          | 12 (15.38)        |
| 7-9   | 1 (1.59)          | 6 (7.69)         | 0                 | 2 (2.56)          | 0                 | 10 (12.82)        |
| >9    | 0                 | 8 (10.25)        | 0                 | 0                 | 0                 | 4 (5.12)          |

Discussion

This study was an attempt to gauge the perceptions on endocrinology training in India over the years. Perception of current residents, majority of who will be finishing their residency in 2017 was compared with practicing endocrinologist who on an average finished their endocrinology training 7 years prior. To remove any reporting bias, the personal details of the respondents and the institution they were associated with during their residency were not collected.

Endocrinology was consistently voted as the stream with best QOL, both by the residents and the practicing endocrinologists.
Cardiology, followed by Gastroenterology/Hepatology and Medical Oncology were voted as the streams with best financial remunerations. This is in accordance with global trends. In the Medscape Physician Compensation Report 2016, a survey comprising nearly 19,200 physicians in over 26 specialties, orthopedics, and cardiology were voted as the top 2 specialties with regard to financial remuneration. Gastroenterology and oncology were ranked fourth and ninth in the list, whereas endocrinology was ranked second last among the 26 specialties, scoring just better than pediatrics. However, in contrast to our study, with regard to QOL and job satisfaction, endocrinology was voted third last, only above internal medicine and nephrology in the Medscape survey. The difference may be due to a greater prevalence of endocrine disorders in India, and a more entrepreneur friendly health-care system operating in the country.

In our study, 24.11% doctors (residents or practicing endocrinologists) are females. In the USA, 36% of all endocrinologists are females and are ranked seventh among the 26 specialties evaluated to have the most female physicians (maximum in obstetrics and gynecology: 55%). This difference may be due to a lower percentage of women choosing to take up internal medicine in India.

Only one-third of the current endocrinology residents had exposure to a qualified endocrinologist among their faculty during MBBS and MD training. This highlights that exposure to endocrinology in the early part of medicine career is limited, which may impact the decision to select endocrinology as a long-term career option later in life. Interestingly, a previous study among internal medicine residents by Kalra et al. 2010 revealed a preference of cardiology, diabetology, and endocrinology as career options. Perceptions of increased volumes of the patient management and financial remunerations due to high prevalence of diabetes in India fuelled the inclination to take up endocrinology. Currently, nearly 1 in 4 Indians is either having diabetes or has a very high risk of developing diabetes in the near future (prediabetes). However, there is no structured exposure to endocrinology at most teaching colleges in India. Exposure to endocrinology during internal medicine residency is limited to “diabetic” clinics and few isolated “interesting” cases admitted to the ward. This is also evident from the fact that 39.68% doctors decided to take up endocrinology as a long-term career option, only during their post-MD senior residency in endocrinology/internal medicine when they had a better exposure to the different facets of the subject. Here also, it must be highlighted that are very few senior resident posts available in endocrinology for the pre-DM period. In addition, registrar posts in endocrinology in private or corporate hospitals are scarce, limiting exposure to endocrinology early in the medical career.

Most of the current as well as practicing endocrinologists were satisfied with the quality of clinical endocrinology training in India. However, the satisfaction scores were poor with regard to training in laboratory endocrinology and clinical/translational research, where less than one-third of the doctors were satisfied in the current scenario. This is evident from the observation that publication of research papers during residency was negligible with 93.64% of current residents having published 0–3 papers, with a majority of them being case reports; 63.5% residents having never written a research project or applied for a grant. Low satisfaction with training in laboratory endocrinology is also highlighted when enquired about the most neglected aspect of endocrinology training; laboratory endocrinology consistently received the highest score in both groups. Biochemistry and laboratory medicine is an integral part of endocrinology, the execution and interpretation of which is often complex and complicated. Hence, the curriculum of endocrinology should have a greater component of active working in the laboratory, which would equip the doctors better for later in life. With regard to exit examinations, DM endocrinology exit exams were rated significantly better than DNB endocrinology exit examinations.

JCEM and IJEM are the two most widely read journals among endocrinologists in India. This survey highlights the rapid growth of IJEM, especially in India, a relatively young journal in the field of endocrinology. It is surprising to note that none of the diabetes journals figured in the top 6 lists of most favored/read journals which were exclusively dominated by endocrinology and medicine journals. This is also reflective in the doctors’ choice in the most preferred subspecialty of endocrinology. Diabetes was voted last and second last by the residents and the practicing endocrinologists. This is ironical as diabetes constitutes the bulk of the patients seen in endocrinology practice.

A majority of the current residents want to set up their own practice in the long run. This is in contrast to the current practicing endocrinologists, where a majority prefers to work in the corporate health sector. Unfortunately, very few doctors want to join the medical education services in endocrinology.
in the different medical colleges across the country. Hence, there is an urgent need to improve the services (salary, working conditions, scope for research, and grants) among government medical colleges in India to make it more attractive for the current generation to work there, which is critical to the long-term quality of endocrinology training in India.

Conclusion
To summarize, this study highlights that in general there is a good perception of QOL in endocrinology. Females contribute a quarter of endocrinologists in India, in accordance with global trends. Exposure to endocrinology occurs pretty late in the life of a medical student. There is a lot of dissatisfaction with the quality of training in laboratory endocrinology, and clinical research which needs to be addressed, not only to improve the endocrinology services in the long run but also to improve the quality of research output in endocrinology from India. Steps are needed to make academics a more attractive career option among endocrinologists in India.

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Conflicts of interest
There are no conflicts of interest.

References
1. Menon PS. Endocrinology in India. Indian J Endocrinol Metab 1997;1:38.
2. Bajaj S, Ghosh S, Kalra S. Endocrinology training in India. Indian J Endocrinol Metab 2015;19:448-50.
3. Information Desk. Available from: http://www.mciindia.org/InformationDesk/CollegesCoursesSearch.aspx?N = 92. [Last accessed on 2016 Nov 19].
4. Peckham C. Medscape Physician Compensation Report; 2016. Available from: http://www.medscape.com/features/slideshow/compensation/2016/public/overview?page=1. [Downloaded on 2016 Nov 19].
5. Kalra S, Agrawal N, Unnikrishnan AG, Sahay R, Kalra B. Pursuit endocrinology – Perceptions, understanding and reactions of students undertaking internal medicine training regarding endocrinology. Endocr Abstr 2010;22:P177.
6. Dutta D, Mukhopadhyay S. Intervening at prediabetes stage is critical to controlling the diabetes epidemic among Asian Indians. Indian J Med Res 2016;143:401-4.
7. Dutta D, Mukhopadhyay S. Comment on Anjana et al. Incidence of diabetes and prediabetes and predictors of progression among Asian Indians: 10-year follow-up of the Chennai urban rural epidemiology study (CURES). Diabetes Care 2015;38:1441-1448. Diabetes Care 2015;38:e146.
8. Dutta D, Choudhuri S, Mondal SA, Maisnam I, Reza AH, Ghosh S, et al. Tumor necrosis factor alpha -238G/A (rs 361525) gene polymorphism predicts progression to type-2 diabetes in an Eastern Indian population with prediabetes. Diabetes Res Clin Pract 2013;99:e37-41.
9. Chatterjee K, Sen C. Endocrinology during internal medicine residency: The dark side of the moon. Indian J Endocrinol Metab 2015;19:857-8.
10. Dutta D. The making of an endocrinologist in India: Life and times at institute of post graduate medical education and research Calcutta. Indian J Endocrinol Metab 2015;19:676-9.
11. Dutta D, Chowdhury S. Endocrine labomas. Indian J Endocrinol Metab 2012;16 Suppl 2:S275-8.