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INFLUENCE OF A PUBLICATION ROTATION IN A NEUROLOGY RESIDENCY PROGRAM IN A DEVELOPING COUNTRY

Aptitude in research is a prerequisite for anyone pursuing a residency in neurology or, in fact, any specialty. Many world-class centers recruit students for residency or doctoral training based on their research ability. In developing countries, clinical research publication records have often been dismal primarily due to heavy patient loads and a lack of dedicated research time being available to most physicians, even in academic settings.¹ The situation is worse in countries with fewer resources.¹

This needs to change as, without research, a scientific community cannot move forward. Developing countries need to support research potential and endorse publications as a surrogate marker of this potential. The future depends on the research aptitude of the younger generation of residents who should be introduced into the world of scholarship. As an assistive measure, our department initiated a new publication rotation where every resident was posted for 15 days in rotation under a mentor who guided him or her in publishing research papers and who helped work on research ideas. We then analyzed whether this rotation caused any change in residents' research aptitudes, based upon publication rates achieved.

Methods. The neurology residents of a leading teaching institute in North India (Postgraduate Institute of Medical Education and Research, Chandigarh) were included in the study. At any time, there are 11 trainee residents in the department. The aim of the study was to analyze any change in research aptitude after the publication rotation, which started on June 1, 2012. The research aptitude change was quantified as the increase in publications authored by the residents. Two time periods were analyzed: prepublishing (June 1, 2010–April 30, 2012) and postpublication rotation (June 1, 2012–September 30, 2013).

Inclusion criteria were as follows:

1. Any publication in clinical neurology (indexed and nonindexed) from the Department of

Neurology, Postgraduate Institute of Medical Education and Research, Chandigarh.

2. One of the neurology residents must have been a significant contributor, as an author on the publication.
3. The publication must have been published or accepted for publication within the defined period of prepublishing and postpublication rotation.

Exclusion criteria were as follows:

1. Any publication authored by faculty only.
2. Any publication outside the defined period of prepublishing and postpublication rotation.

Every resident was assigned for 15 days to the publication rotation once in 6 months, by rotation, beginning on June 1, 2012. The residents were initially encouraged by the mentors (consultants) to write case reports and clinical images based on the patients they had managed within the last 6 months, as preparing a case report or clinical image was considered the most appropriate way of learning to write a research paper for a beginner. Residents were encouraged to analyze landmark trials and review articles and send a Letter to the Editor (correspondence) if they found flaws or had a difference of opinion. Original articles were written under the guidance of the faculty. The 15 months after initiation of the publication rotation was compared to the 24 months preceding it.

Results. The number of publications by residents increased after the research publication rotation (table 1; supplemental data on the *Neurology*® Web site at Neurology.org). This increase was seen in both high- and low-impact journals, but there was a significantly greater number of publications in high-impact journals, defined here as those with an impact factor >4. In the prepublishing rotation period, only 1 paper was accepted by a high-impact journal; in the postpublication rotation period, 9 papers were accepted. The number of original articles produced was the same in both periods (3). Eleven Clinical Images were published during the postpublication rotation period compared to 1 in the prepublishing rotation period. Six Letters to the Editor were also

Supplemental data
at Neurology.org

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Table 1 Publications in the prepublication and postpublication rotation period

Publications	Impact factor	Prepublication (24 months)	Postpublication (15 months)
<i>Lancet Neurology</i>	23.46	0	1
<i>Nature Review of Neurology</i>	12.46	0	1
<i>Annals of Neurology</i>	11.193	0	0
<i>Brain</i>	9.915	0	1
<i>Clinical Infectious Disease</i>	9.374	0	1
<i>Neurology</i>	8.3	1	4
<i>JAMA Neurology</i>	7.58	0	0
<i>Journal of Neurology, Neurosurgery & Psychiatry</i>	4.924	0	1
<i>European Journal of Neurology</i>	4.162	0	0
<i>Journal of Neurology</i>	3.578	0	0
<i>Epilepsia</i>	3.96	1	0
<i>Annals of Hematology</i>	2.62	1	0
<i>American Journal of Tropical Medicine</i>	2.592	0	1
<i>QJM</i>	2.32	0	5
<i>JNS</i>	2.243	0	1
<i>American Journal of Emergency Medicine</i>	1.97	1	0
<i>Diabetes, Metabolic Syndrome and Obesity</i>	1.92	1	0
<i>CNNS</i>	1.234	0	1
<i>Clinical and Applied Thrombosis/Hemostasis</i>	1.016	0	1
<i>Taiwan Journal of Obstetrics & Gynaecology</i>	0.96	1	0
<i>Neurology India</i>	0.95	1	2
<i>Annals of Indian Academy of Neurology</i>	0.93	1	2
<i>International Journal of Neurosciences</i>	0.88	1	0
<i>Neurology Asia</i>	0.19	1	0
<i>BMJ Case Report</i>	0	0	5
Total		10	27
Total impact factor		22.68	116.658

published in the postpublication rotation period compared to none in the prepublication rotation period (table 2). The total impact factor increased from 22.68 to 116.66 ($p = 0.039$). Many papers written by the residents were rejected and some were still under review when this article was prepared.

Discussion. Our study shows that providing dedicated time for scientific writing along with mentoring to

trainees in a residency program is an effective way to inculcate an aptitude for publication.

In our institute, more than 7,000 patients attend the outpatient clinics, of which nearly 800 are neurology patients.² These patients are seen by 6 consultants and 11 neurology residents from 9 AM to 3 PM. After clinic, the residents are expected to reach their respective laboratories (EEG, Doppler, nerve conduction), which finish around 7 PM. Then, as the training demands, residents have to go to the ward to evaluate their allotted inpatients, on average 4 to 5. In addition, there are 12-hour night call shifts, which are not followed by an off-duty period. Research would obviously not be a priority for residents in this kind of environment. However, the quest for novel and meaningful research in any developing country depends on the next generation of neurologists before they are consumed and defused by the deluge of clinical responsibilities.

Table 2 Comparison of type of articles in prepublication and postpublication rotation period

Type of articles	Prepublication	Postpublication
Original articles	3	3
Case reports	6	7
Clinical image	1	11
Letter to editor	0	6

The neurology department of a leading teaching institute in North India (Postgraduate Institute of Medical Education and Research, Chandigarh) has tried to create a change in the research aptitude of trainee neurologists by initiating a research publication rotation. The increase in the number of publications from 10 to 27 was beyond our expectation, including 9 in high-impact journals (>4 impact factor). On the other hand, the rejection of many articles written by our residents exposed them to the highly competitive “publish or perish” world of research academia.^{3,4} We have not come across a similar study where measures have been put in place to improve research aptitude. We have convincingly shown that if properly guided, aptitude in research can be modified to a great extent. This measure would be apropos to developing countries. For someone with an innate interest in true scientific research, this could be the foundation stone for exploring greater avenues in their future career.

Limitations. The comparison between the prepublication and postpublication rotation period is difficult due to many factors. In our institute, entry and exit (after 3 years of residency) of residents occur every 6 months. Hence residents are not the same during the prepublication and postpublication rotation period. Moreover, even though every residents' rotation was of the same duration, many residents could not publish any article during or after. This cannot be considered as a failure of the rotation. Various factors, like nonavailability of good clinical material, rejection from journals, or the resident being a novice, were involved.

The publication rotation can significantly change the research aptitude of the residents, as was evident

in our study. Great researchers are not made overnight. These opportunities and encouragements may pave the way for an enriched scientific life for residents. Hence we propose that a publication rotation should be included in residency programs in developing countries.

AUTHOR CONTRIBUTIONS

P.W.V. and V.R.: data collection. V.V.Y.: data collection, drafting the manuscript, statistics. D.K.: concept, drafting, editing the manuscript, and critical review.

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