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Review article

Mentoring models in neurosurgical training: Review of literature

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ABSTRACT

Background: Effective mentoring is an invaluable element in the development of next generation of neurosurgeons. A mentor helps to develop professional core values, technical and non-technical skills, attitudes and disposition required to be qualified and competent neurosurgeon. Giving the invaluable significance of mentoring in neurosurgery, we undertook this literature review to identify mentoring models evaluating its success and relative benefit.

Methods: Literature search identified using MeSH word 'mentor', mentoring, mentorship, mentoring model, neurosurgery' in MEDLINE, EMBASE and Scopus databases from 1990 to 2016. Literature reviewed to identify status of mentoring in neurosurgery, potential barriers, pitfalls and future framework for mentoring in neurosurgery. Additional articles identified through manual search of reference lists.

Results: A total of 247 studies were obtained from electronic databases, after removing duplicates, abstracts, letters to the editor and non-neurosurgery papers. Sixteen full text articles retrieved out of which five met the inclusion criteria. Generally, there is paucity of articles regarding mentoring in neurosurgery, all included papers were written in English Language, all of them described mentoring model used including simulation, distance, collaborative, facilitative tele-mentoring and peer mentoring.

Conclusion: Mentoring in Neurosurgery is an important aspect of personal and professional development of neurosurgical trainees, currently there is decline in traditional apprenticeship due to increase demand for modern use of specialised technology, simulation and tele-medicine in neurosurgery practice. Effective and efficient mentoring will be an interplay of six mentoring models (collaborative, facilitative, distance, simulation, tele mentoring and peer mentoring) identified.

1. Introduction

Effective mentoring is an invaluable element in the development of next generation of neurosurgeons. A mentor helps to develop professional core values, technical and non-technical skills, attitudes and disposition required to be certified and competent neurosurgeon. A mentor offers dedicated support and didactic guidance when discussing complicated cases, operations or cases [1]. In general, surgical training has been based on the Halstedian apprentice model which entails passive personal development through role modelling and mentoring by senior colleagues [2]. Many prominent of neurosurgeons of today look back with gratitude on the palpable mentor–mentee relationship with a senior colleague who served as a teacher and role model for clinical and neurosurgical skills. Mentors can be a significant bridge between what is taught and what is needed by providing one-to-one tutelage, purposeful opportunities, objective feedback and detailed and tested instructions. Mentor exact great influence on their trainees' career and ultimate success hence mentorship is a critical issue to address regarding raise the next generation of neurosurgeons. Mentoring is a symbiotic relationship aimed at promoting career satisfaction and fulfilment in practice for both the mentor and mentee in a supportive environment created by the mentor to facilitate growth and smooth transition [3]. For example, heuristics are rules of thumb that experts learn through trial and error. Many of them apply to the elements of manual or perceptual skills and are used during surgical dissection on a daily basis. Examples are the way that surgeons cut through tissues at right angles to lines of tension. Heuristics are the "elements of skill rather than total performance." Patkin breaks down the types of heuristics. There is motor, which include handling tissues and anastomoses. There are perceptual, which involve "the trained eye." These include recognizing anatomic variants [4]. These can be learned and perfected through effective skill mentoring. In addition, heuristics help with common problems in teaching surgery. For example, these include tremor and creating or planning proper geometry of anastomoses. In addition, they include visualization of what the end product should be before even dealing with the

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pathology. Tremor is a difficult problem for surgeons. Surgical geometry is absolutely critical which can be learned through mentoring. To enhance the development of mentorship in neurosurgery and to prevent further erosion of these vital relationships, it is important to understand the dynamics of mentoring and its impact on career satisfaction and productivity.

Mentoring is undeniably a priceless resource in any profession, especially for those pursuing careers in neurosurgery. However, many trainees lack access to palpable mentors or fail to use mentoring mechanism effectively. In this article we explore the current state of mentoring in neurosurgery, examine potential barriers and avoidable pitfalls and discuss methods of facilitating effective and efficient mentorship. Also to provide direction for future research in neurosurgery mentoring.

Giving the invaluable significance of mentoring in neurosurgery, we undertook this literature review to identify mentoring models evaluating its success and relative benefit.

2. Methods

Literature search identified using MeSH word 'mentor', mentoring, mentorship, 'neurosurgery' in MEDLINE, EMBASE and Scopus databases from 1990 to 2016. Literature reviewed to identify current status in neurosurgery, potential barriers, pitfalls and future framework for mentoring in neurosurgery. Additional articles identified through manual search of reference lists.

Two of the authors independently reviewed the titles and abstracts of retrieved publications and selected relevant articles for possible inclusion in the review. In the case of disagreement, the third author was consulted and a decision was made by consensus of all authors. In cases of doubt, full text articles were retrieved for review and discussion. Two of the authors independently reviewed all full-text articles that met these criteria.

We applied two inclusion criteria to full text version of this review, articles based in neurosurgery, mentoring program or principle supporting development and personal growth of mentee neurosurgeon including specific skills development. Each of the study evaluated for specific mentoring program observed, its objectives, application and outcomes. We excluded duplicate titles and articles that were clearly outside the scope of this review.

3. Results

A total of 247 studies were obtained from electronic databases including Embase, Medline, PubMed and Scopus. After removing duplicates, abstracts, letters to the editor and non-neurosurgery papers 16 full text articles retrieved out of which five met the inclusion criteria. Generally, there is paucity of articles regarding mentoring in neurosurgery.

All included papers were written in English Language, all of them described mentoring model or principle used including simulation mentoring, distance mentoring, collaborative and facilitative mentoring and tele-mentoring. Study designs not clear for two of the studies.

All articles reviewed described mentoring programs and tools in Neurological training centres in America, Canada, New Zealand and Ethiopia. Participants were mainly trainee neurosurgeons, consultant neurosurgeon, remote neurosurgeons, simulators and technological models (Fig. 1).

Several mentoring models described in the reviewed articles were simulation mentoring, group and distance mentoring, collaborative and facilitative mentoring and tele-mentoring. Also

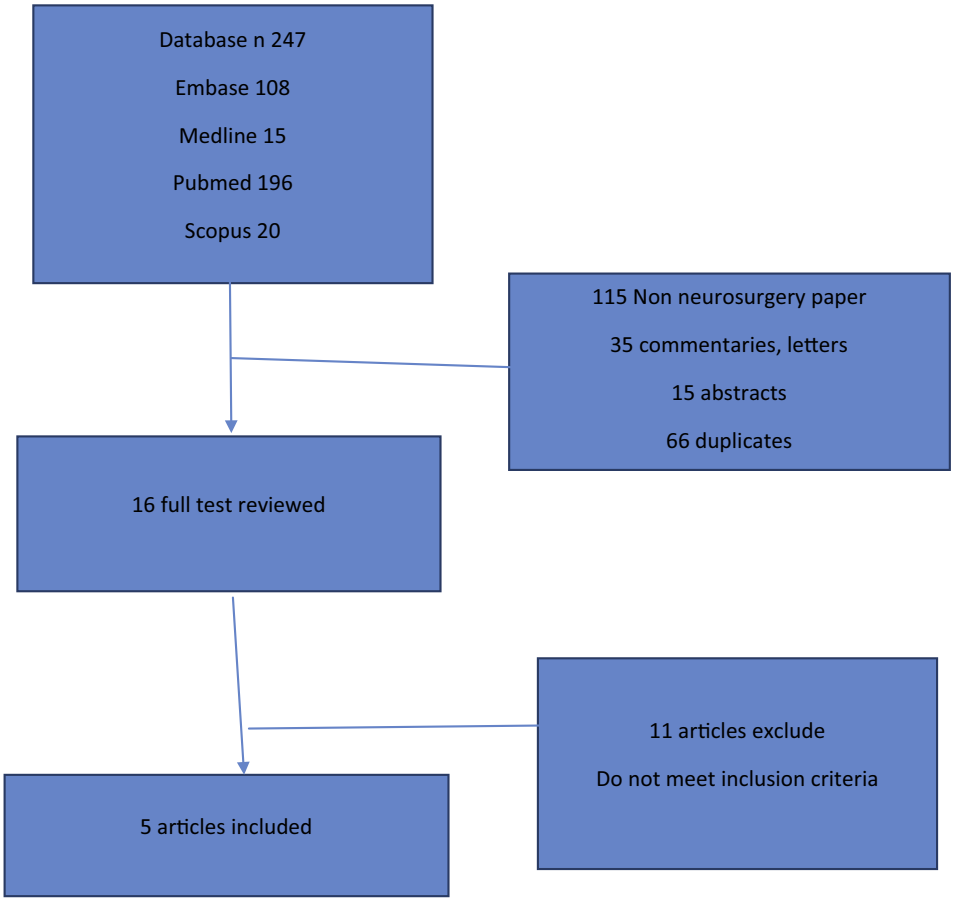

Fig. 1. Search flow diagram.

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