

Inculcating research curriculum in Operative Dentistry — Endodontics residency programme: Experience and outcomes

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Abstract

Incorporating research education and training in residency curriculum increases the understanding of evidence-based decision-making among doctors in training. Evidence suggests that the addition of research is linearly associated with improvement in clinical competence, and encourages the residents to shape their career as clinical investigators. The current paper was planned to share the experience of adding research into the core curriculum of Operative Dentistry-Endodontics residency programme at a tertiary care university hospital, and to evaluate the outcome achieved with that change.

Keyword: Curriculum, Research, Residency, Competence.

Introduction

Postgraduate residency training provides the doctors an opportunity to acquire knowledge and skills to become independent and competent clinicians. The overall aim of residency is to impart and motivate the residents to follow a career that could enhance their subject knowledge, and to inculcate professionalism and research skills. Research kindles the intellectual inquisitiveness and promotes critical thinking.¹

Studies demonstrate that incorporating research in residency curriculum increases the understanding of evidence-based decision-making among doctors in training. The addition of research is linearly associated with improvement in clinical competence and encourages the residents to shape their career as clinical investigators.¹⁻⁴

Most of the regulatory bodies that conduct exit-level examination for dentists, such as the Commission on Dental Accreditation (CODA) and the American Board of Dental Specialties (ABDS) in the United States, the Royal College of Dentists in Canada, the Arab Board of Dental Specialties in the Middle East, the College of Physicians

and Surgeons (CPSP) in Pakistan, the Royal College of Surgeons in England, Scotland, Ireland and Australia, all have the common approach of promoting research as a core educational competency.⁵

Operative Dentistry-Endodontics residency in Pakistan started in 1995. It was initially based on the model of poly-specialty restorative dentistry training offered in the United Kingdom. Later it evolved into an amalgamation of mono-specialty Endodontics training offered in the UK and Conservative Dentistry-Endodontics training in India.⁶ At the Aga Khan University (AKU), Karachi, the residency programme in Operative Dentistry-Endodontics started in 2002 as a clinical training programme affiliated with the CPSP for fellowship. However, with time, some fundamental changes were incorporated and research curriculum was introduced to inculcate research skills in the residents. The current paper was planned to share the experience of adding research into the core curriculum, and to evaluate the outcome achieved with that change.

Methods

The opinion-based paper looks at the single-centre experience at AKU of adding research curriculum to the main clinical curriculum of the clinical residency programme. The intervention, in the form of adding research training, was started in 2008. Firstly, it was made mandatory for all Operative Dentistry-Endodontics residents to attend one-month fundamentals of Epidemiology and Biostatistics course which is annually offered at the department of Community Health Sciences (CHS) on the AKU campus. The parent department bore the tuition fee for the residents for this training. One of the faculty members completed the Master's degree programme in clinical research from the CHS with the intention of providing dedicated research mentorship to the residents in the field of dental research. Weekly journal club session was organised and critical appraisal of literature along with refresher sessions related to study designs and biostatistics were made available to the residents. Later, the department of Surgery also started a formal research certificate training course to all residents as well. This was above and beyond the research teaching

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and training provided at the Operative Dentistry-Endodontics residency programme.

It was made mandatory for all residents to publish at least two papers before they could be allowed to sit in the exit-level Fellowship of CPSP (FCPS-II) examination. The surgical grand round presentation, in which residents used to present half-heartedly earlier, were made mandatory on a weekly basis and they were to present at least one study per year. Eight hours per week were dedicated for residents' scholarly and research work with no clinical duties assigned to them so that they may carry out their data collection, literature review and indulge in scientific writing to complete their assigned research projects.

Residents were encouraged to apply for research grants and present their scholarly output both nationally and internationally. Funding from the department of Surgery was fortunately available to create opportunity for the residents to travel abroad and represent the institution there. Since it is an opinion-based paper, no attempt is made to carry out data analysis.

Results

There was a significant increase in the number of publications post-intervention (Table-1). The biggest contributor to this increase were AKU faculty and residents of the Operative Dentistry-Endodontics

Table-1: Contribution of Operative Dentistry-Endodontics and allied disciplines in the Medline indexed impact factor journals in Pakistan.

Specialty contribution	JCPSP n (%)	JPMA n (%)	PJMS n (%)
Operative Dentistry-Endodontics	38 (15)	19 (11.7)	13 (36.2)
Periodontology*	11 (4.3)	5 (3.1)	2 (5.5)
Paediatric Dentistry*	5 (2.1)	4 (2.5)	1 (2.8)
Other specialties of dentistry	199 (88.6)	135 (82.8)	20 (55.5)
Total dental papers	253 (100)	163 (100)	36 (100)

*These disciplines were historically integral part of the Operative Dentistry curriculum in Pakistan. Now these are evolving or have evolved into distinct specialties.

JCPSP: Journal of the College of Physicians and Surgeons Pakistan; JPMA: Journal Of Pakistan Medical Association; PJMS: Pakistan Journal of Medical Sciences.

Table-2: Publications from Operative Dentistry-Endodontics programme full-time faculty from 2010 to 2020.¹⁴

Faculty	Publications	Citations	h-index	i-10 index
Author 1	136	792	13	18
Author 2	43	173	7	5
Author 3	38	182	7	6
Author 4	19	70	4	2

programme.

An increased number of papers were authored by the full-time faculty in the last 10 years which improved their citation metrics (Table-2).

Discussion

Literature suggests that residents appreciate training programmes that offer them an opportunity for research skills training.⁷ Residents felt that research training improves their clinical knowledge and critical thinking abilities. Studies have shown that incorporation of research curriculum is a determinant of success when it comes to the presentation of research projects at a competition or external forum.⁸ Residents at the AKU programme expressed great attentiveness towards research and academic activities, as is evident by the fact that most of them performed extraordinarily in research competitions, surgical grand rounds and conferences.

The inclusion of research training in the main curriculum of residency in the formative years of residency is likely to have a positive impact on residents' research productivity. However, it has also been shown that mere presence of research topics in the curriculum does not necessarily increase scholarship.^{8,9} A comprehensive approach and continuous mentorship by the faculty in teaching the art of critical appraisal of literature, fundamentals of study designs and the concepts of biostatistics to the residents is what brings in favourable results.

An important question is about the phase in which to introduce research in the residency; in the early years or in the senior years. Data favours early in the residency, preferably it should begin at the undergraduate level, as younger age of the learner means greater benefits of scholarship.¹⁰

The biggest barrier to resident scholarly activity is the insufficiency of time for academics. A study showed that shortage of time is responsible for the inability of residents to complete their research projects and shaping it to reach the manuscript submission stage.¹¹ AKU mitigated the problem by giving the residents dedicated time for research work. This specified time turned out to be the most productive for them.

Another barrier experienced in research productivity was research funding. Although there are a number of avenues to apply for grants, but for full-time clinical faculty members engaged in institutional clinical practice and having a number of overriding commitments, it was a challenge. The best solution was having a dedicated research associate with the job description of assisting

with such matters. Literature also suggests that the presence of research associates and coordinators improves publications in the residency programmes and teaching units.^{9,12,13}

Though data show significant improvement in academic output (Table-1), it is an underestimate of the publications from the AKU programme as a considerable number of papers were published internationally which are not part of the current data-set. However, it is satisfying to state that in almost all papers, residents are not only on the authorship list, but are mostly the first or second author. This practice of giving due intellectual property rights credit to the investigators is likely to bring in a culture of fairness, and when the residency graduates themselves become trainers in the future, it is expected that they will keep up the good practices and pass it on to the next generation of specialists.

Another benefit of having research curriculum in the residency programme was the by-product of having increased number of publications for the faculty. Before year 2010, the total publications of full-time faculty in Operative Dentistry-Endodontics programme was just 01. It rose to nearly 200 in just 10 years. This could be attributed to the overhauling that the residency programme underwent 10 years ago.

Conclusions

Addition of research curriculum increased the number of publications in high impact factor journals locally and internationally. It improved the competence of the residents in not only understanding of research, but to actually become clinical investigators in their careers. This change improved the research profile of the teaching faculty as well.

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