

Why residents should teach: A literature review

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ABSTRACT

Resident doctors contribute significantly to the quality of undergraduate medical training and it is assumed that by participating in the process, they also improve their own professional competency. We decided to investigate whether there is evidence to support this assumption. Our hypothesis, the physician-as-teacher rule, stated that *"A skilled teacher has an increased likelihood of becoming a competent clinician, than a skilled clinician has of becoming a competent teacher"*.

We conducted a literature review to search for evidence to confirm or refute this assumption. Twenty-four articles written after 1990 were identified as relevant from 132 references we generated by searching Medline. The identified articles were qualitatively reviewed to identify key research conclusions and/or main discussion points. The findings from the review were collated and discussed. None of the studies showed specific evidence of how teaching results in improved professional competence. However, there was evidence that teaching ability correlated positively with the perception of clinical competency. There was also need for improved supervision and training programmes for residents in teaching skills.

The review provided evidence that teaching influenced the perceived professional competency of physicians positively. Physicians who were perceived as competent were those who taught effectively, and who had a basic understanding of teaching and learning. The review shows that training in teaching is essential for physicians, and that further research is still needed to demonstrate the effect of good teaching on professional competency.

KEY WORDS: Teacher training, clinical teaching, medical residents, supervision, teaching skills

One of the notable changes in medical education in the past 20 years has been the training of clinical teachers to teach effectively. This development has also witnessed medical residents being increasingly involved in teaching graduate medical students. Plenty of information is available in medical literature on the teaching roles of medical residents and how they and the students they teach can maximally benefit from the process.^{1,2} These include studies that have examined the residents' role in teaching at different levels of the educational process, the effect of teaching by residents on undergraduate education³ and the effect of good supervision by attending staff on the quality of residents' teaching skills.^{4,5} Other studies have focused on the qualitative aspects of the teaching process, on how to improve and evaluate the impact of teacher training programs,^{6,7,8,9} and on the extent of the residents' participation in undergraduate medical education.^{5,10} Such studies have shown that residents contribute substantially to the education of medical students^{11,12} and that medical students perceive them as the most important clinical trainers.¹³ In addition, residents revealed the need for supervision from superiors in order to improve their teaching skills.^{3,6} Presently, there is enough proof in the literature explaining why medical residents should teach.^{3,5,10,11,12,13,14} There is also evidence that the knowledge and professional competency of resi-

dents correlates positively with their perceived teaching abilities.^{3,9} However, in many of these studies, it is (implicitly) suggested that residents who can teach effectively are more likely to become competent physicians. Although this seems logical,¹² there are few (if any) studies that have thoroughly examined the claim. We, therefore, decided to review the medical literature for evidence that could shed more light on this subject. Our hypothesis, which we called the physician-as-teacher rule, was that *"A skilled teacher has an increased likelihood of becoming a competent clinician, than a skilled clinician has of becoming a competent teacher"*.

Physician-as-Teacher rule

The literature in medical education shows that despite the lack of good didactic skills, attending doctors (and medical residents) are delegated the task of teaching undergraduate students in the clinical setting. The majority of the physicians who teach, possess little or no formal training in teaching, and employ the skills they acquired from their own experiences as students or residents when teaching.¹⁵ Some cultivate their teaching styles in practice, through trial and error and by reflecting on personal experience.^{16,17} Others develop a working knowledge of the principles of teaching and learning through

observation, adopting positive and rejecting negative examples of clinical instruction.¹⁸ So far, possessing good clinical skills alone is not enough for the physician to teach effectively. This is because the skills of diagnosing illnesses or performing clinical procedures are different from those used in teaching. Teaching is a component of education, and education by itself, is a vocation. The assumption that the physician is synonymous with a teacher is therefore wrong.

There is evidence in medical literature suggesting that in addition to being competent, analytical, and up to date in one's area of expertise, a basic understanding of educational theory and training in teaching is required to teach effectively.^{16,19} Knowledge of the subject matter as well as the process of knowledge transfer and receipt is therefore pertinent in teaching. This mechanism and the dynamics involved, however, are concepts that standard medical curricula do not teach. It is therefore a misconception to assume, that without (prior) training in teaching, a good physician would make a good teacher. Figure 1 illustrates how the components of effective teaching contribute to the cognitive skills, clinical proficiency and teaching ability of the physician.

On the one hand, we can see how the different responsibilities of the physician interact with each other, and on the other how they interact with the physician's cognitive skills, clinical proficiency and teaching ability. Expert medical knowledge and good clinical skills form the cornerstones of teaching in this context, because teaching is taking place in the clinical setting. These in turn, facilitate the development of relevant cognitive skills and clinical proficiency that the learner requires as a medical professional. The knowledge of educational principles and teaching skills also contribute to the development of cognitive skills as seen in this illustration.

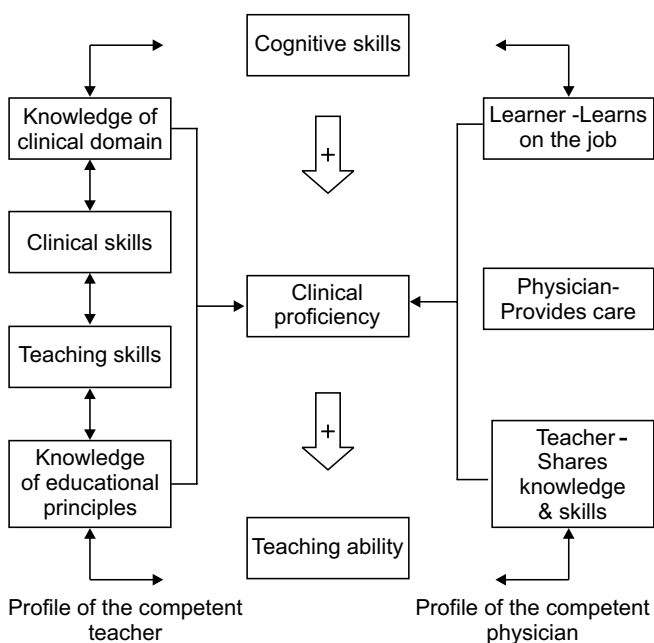


Figure 1: The Physician-as-teacher rule

This illustration can also explain why many physicians lack effective teaching skills on completing their professional training, because most residency programs focus only on the right half of the process in the diagram. When we look at the illustration as a whole process, we may understand why physicians who can teach effectively, are regarded as good clinicians. The combined benefits of the components of effective teaching and the effects of the responsibilities as physicians are additive and augment each other. The inputs from both processes therefore add up and lead to improved cognitive skills, clinical proficiency and teaching ability. With this theoretical background, it is logical to assume that teaching and/or the ability to teach are important requirements for becoming a competent physician. Conversely, we cannot say that the knowledge of medicine or proficiency in clinical skills are requirements that would make one a skilled teacher. Our hypothesis, the physician-as-teacher rule, is therefore based on the premise, that if physicians are schooled in the principles of good teaching, their teaching skills should improve their clinical competence.

Literature Analysis

We chose to examine all the relevant literature that investigated the supervisory and teaching roles of medical residents, and the perceptions of any one (or more) of the stakeholders on the subject. The stakeholders referred to were medical students, medical residents, and attending staff. All medical disciplines in which the supervision of medical students took place were included. We did a database search on Medline (National Library of Medicine) using the following key words: “medical residents OR junior doctors”, “teaching”, “training” “medical students” “supervision” and “perceptions”. We selected relevant review and research papers published on the subject after 1990 because we were interested in the latest developments in the area. The initial search resulted in 132 articles, which we scaled down to 49 based on the closeness of title to the subject of interest. Both authors conducted a second screening procedure separately, by analysing the abstracts of the selected papers. Articles whose study objectives did not address any of the review’s two central questions or whose results reported very low response rates (i.e. < 50%) were excluded. Twenty-four articles were eventually selected. The approach we adopted in the analysis was to examine the selected literature based on two central questions namely,

- Does teaching improve professional competence?
- Is training or supervision in teaching skills necessary for physicians?

The findings from the analysis were then used to evaluate if our hypothesis could be accepted or rejected. After the first session of reading, another six articles were dropped because the teaching roles of medical residents did not form their central objective. Most of the articles finally included in the review (n=14) were quantitative research surveys that investigated the perceptions of the stakeholders on various aspects of medical residents’ teaching and supervisory responsibilities.^{3,7,8,13,14,15,20,21,22,23,24,25,26,27} The medical disciplines that were

involved included surgery, paediatrics, internal medicine, family medicine, and radiology. The articles were explorative studies that varied between small^{7,22} and large^{13,28,29} scale surveys, and whose research designs involved at least 4 different methodological approaches.^{20,24,28,26} The remaining four articles included one cross-sectional survey of medical students' perceptions of the subject, two qualitative studies, and one literature review.^{6,19,29,30} The heterogeneity of the studies and the observed variability in research designs made meta-analysis inappropriate for the review.

Another problem we encountered in preparing the review was how to properly define the competent clinical teacher and physician. Since there were several ways of defining a competent clinical teacher, we decided to use Irby's definition partly because of his renowned expertise on the subject and more importantly, because his description suited the objective of our review.¹⁹ The competent clinical teacher was defined as being in possession of the clinical knowledge of medicine, patients, and the context of practice, as well as educational knowledge of learners, general principles of teaching and case-based teaching scripts. Like the competent clinical teacher, it was also difficult to properly define the competent physician due to the complexity and constant changes in the expectations and demands of medical science, societal norms and patient care on physicians. We defined the competent physician as one who is professionally competent, respectful, honest, caring and one who upholds patient confidentiality.³¹

Does teaching improve professional competence?

During their professional training, medical residents perform administrative, managerial, and technical duties. They also teach medical students and peers, and it this last activity that we paid attention to in this review. The duties medical residents perform in clinical practice reflect their professional profile, namely the "physician", "learner" and "teacher". These roles are determined by the context in which they are expected to function, and can be represented as a triangle shown in Figure 2, whose ends are continuously interchanging with each other. It reflects how residents are randomly and haphazardly changing their roles.

As is known in the medical profession, the primary professional responsibility of the medical resident doctor is as a physician, who in the hospital setting, is required to provide care and

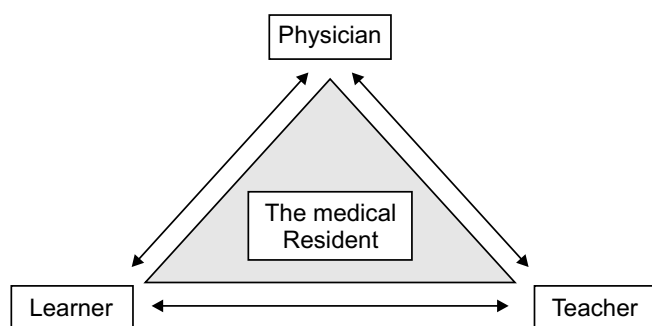


Figure 2. The responsibilities of medical residents in clinical practice

good health service to the patients. As aspiring specialists in their chosen fields, they are learners or apprentices i.e. "learning on the job", and a proportionate amount of their learning is acquired in the process of performing their professional duties. Lastly, the "resident as teacher", performs the didactic function of sharing his/ her knowledge with medical students in the wards, during grand rounds and in the outpatient clinics. In practice, medical residents often combine two or more of these roles simultaneously. For example, during grand rounds with consultants/ specialist physicians they can be seen as "physicians and learners", likewise during ward rounds with the medical students they function as "physicians and teachers".

As to whether teaching results in an improvement in the professional competence of medical residents, we could not find sufficient direct evidence to support this in the literature. Scheiner et al²⁰ demonstrated that when radiology residents and attending radiologists underwent a similar standardized training program to teach medical students, the performance of the latter was just as effective as that of the attending-radiologists. In a qualitative study that investigated how medical residents perceived their teaching role in the clinical setting, residents supported the notion that teaching medical students helped them in being better clinicians.⁶ They supported their views with comments reflecting the theory that teaching stimulated critical thinking and reflection on knowledge. They noted that being stimulated to reflect served as a motivator to constantly keep their clinical knowledge abreast which enhanced self-learning. In an attempt to prepare surgery house officers for their teaching role, Sheets et al conducted a detailed review of the medical literature for information on the subject.²¹ They reviewed studies on the teaching role of residents (house officers), how different stakeholders perceived teaching by residents, and how if necessary, teaching could be improved. This review provided valuable information on the role of residents as teachers of medical students. It showed that suitable teaching conditions, training in teaching, frequent and constructive feedback in teaching, and supervision by attending staff, were some of the aspects that were lacking in most educational settings. The review demonstrated that medical residents contributed significantly to the education of medical students, and that they (residents) enjoyed and were willing to teach medical students. It also included studies in which medical residents reported that teaching medical students improved their individual clinical and intellectual skills. In their internal audit study of the role of surgical house staff in the education of clinical clerks, Minor and Poenaru showed that teaching was beneficial for residents and that they could be taught to teach better.²² Pelletier and Belliveau showed that formal teaching by surgical residents enhanced knowledge acquisition, relative to self-study and lecture attendance.²³ In another large-scale comparative study, the perceptions of residents and faculty were investigated for the definition of the good and effective teacher.²⁴ This study showed that the good clinical teacher was not only enthusiastic about teaching, but also able to stimulate intellectual curiosity and motivate self-directed learning in the students. Effective teachers were further described in the study, as good, competent and credible physi-

cians who served as good role models in dealing sensitively with patients and families. Most of the studies described above showed a positive causal relationship between teaching and the medical residents' perception of improved professional competence. Unfortunately, none of them provided specific evidence that could explain or confirm this relationship.

Is training (or supervision) in teaching skills necessary?

Providing learners with the necessary materials and experiences that can facilitate individual learning is an important function of the educational process. As learning is not an automatic process, it is necessary to know how the process works. The literature on educational theory provides different descriptions of the process of learning. These descriptions underlie our ability to analyse and diagnose educational problems and guide applied research. They also share a similarity in the way they describe the concept of acquisition and the compilation of knowledge, for example, the theory that knowledge has to be bundled and systematically packed in such a way, that it is easily transferable and retrievable for application by the learner when solving problems.^{32,33} The concept of approach to learning is also described in the literature, but unlike educational theory, it highlights the "qualitative" aspect of education that is concerned with how learners organize and apply information.³⁴ The background that learning involves a process, that if well understood, can improve teaching is clear. This is particularly relevant since the teaching responsibilities delegated to medical residents in many medical institutions have increased substantially.^{21,22} Training teaching skills in residency training programmes is therefore essential and should be encouraged.^{21,22,25,28}

In a survey that investigated the qualities of good and effective teachers among paediatric residents and faculty,²⁴ the style and content of what teachers taught were found to be important. Recommendations were made on why and how training in teaching skills should be encouraged. These included physicians spending more time on learning both the content of what to teach and how to teach. Irby also showed why it was important for clinical teachers to understand the (medical) educational process, and how it reinforces and improves their own didactic, cognitive and clinical skills.¹⁹ In 1996, Blount and Jolissaint²⁹ investigated how primary care and non-primary care US army residents perceived the teaching behaviours of their faculty staff. Their responses indicated that (certain) teaching behaviours of the faculty staff needed to be improved. In another study, Bing-You and Greenberg²⁶ investigated the perceptions of 26 residents in internal medicine who participated in a series of teaching workshops over a six-month period. The rationale for conducting the study was that formal instruction improves the teaching skills of residents.^{35,36,37} There was a high level of participation by the residents in the study, reflecting their desire and appreciation for formal instruction in teaching. The residents considered teaching to be an important part of their role and were willing to teach medical students. Other studies corroborated these findings^{6,9,27} and showed that residents were willing to be evaluated for their teaching, provided the assessment methods were clear, formal and structured.⁶ Sheets et al²¹ provided comprehensive proof

on the importance of teaching by residents and why it should be encouraged. They argued that faculty administrators should formally and widely acknowledge the teaching role of residents and that appropriate teaching skill improvement activities should be undertaken. Two different qualitative studies also provided explanations for why such training programs in teaching were necessary as well as why the supervision by attending staff was important for this.^{6,30}

The information we have so far shows that training physicians to teach effectively is important. Adequate guidance and supervision for junior doctors is also mandatory. Our assumption that the process of knowledge acquisition would be better understood if (and when) physicians are aware of the fundamental theories of learning is also supported. There are many advantages in this for clinical teachers, for example, they would be more conscious of how they compile their own knowledge as well as how this process occurs in the students they teach. By understanding how the information they transfer is processed, physicians can anticipate and relate better with the learning difficulties medical students encounter. Finally, the significance of different educational concepts in teaching and the individual approaches to learning can be appreciated better. Figure 3 shows how these concepts constitute and facilitate the process of learning and the interrelationship between them.

Figure 3 shows the way teaching contributes to both the educational process of the students and to the professional development of medical residents (physicians). It stimulates self-improvement, expands the knowledge base and improves both the teaching and clinical skills of the medical resident. Conversely, it contributes to the educational process of medical students through the direct didactic activities residents provide, the good role models they form for the latter to emulate and the important link they provide between the attending staff and medical students. The figure also shows how the supervision by attending staff physicians is important and how effective supervision results in a better quality of education for both residents and students.

Discussion

The purpose for conducting this review was to identify if there was evidence that possessing good teaching skills would result in professionally competent physicians. The hypothesis, which we called the physician-as-teacher rule, was that "A *skilled teacher has an increased likelihood of becoming a competent clinician, than a skilled clinician has of becoming a competent teacher*". We approached this investigation by answering two central questions, whether teaching improves the professional competence of physicians and whether training or supervision in teaching skills was necessary for physicians. The information generated from this review provided some answers to the central questions, which we discussed in each section. There were explanations suggesting that teaching undergraduate students contributed positively to the (perceived) professional competency of medical residents. Unfortunately, there were no studies found that objectively backed up these suggestions.

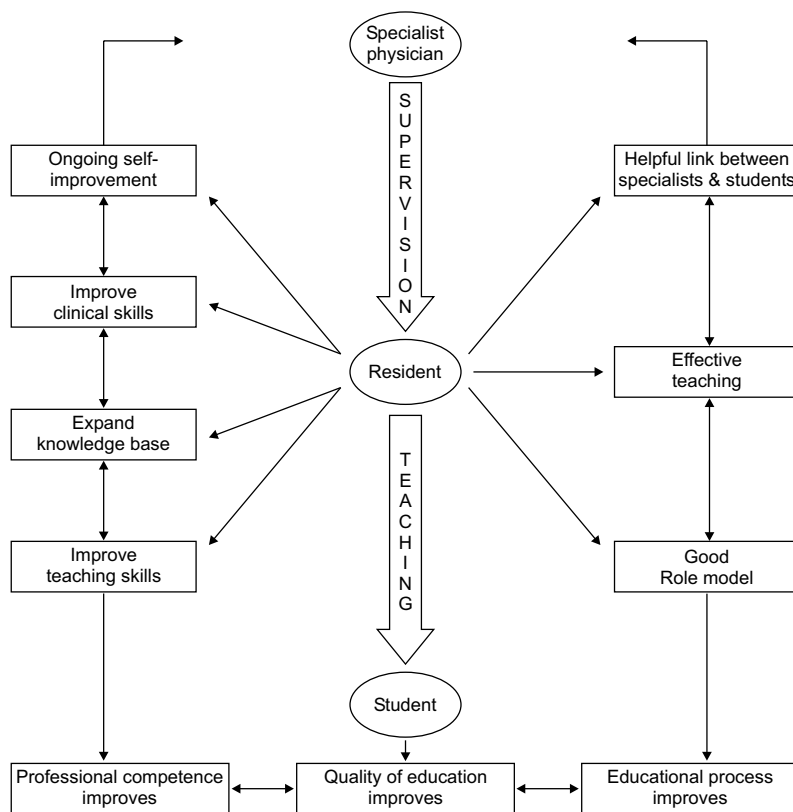


Figure 3: Teaching in the clinical setting

Other findings found to be important and which were strongly recommended, included training in teaching skills for medical residents as well as proper and sufficient supervision by attending staff.

Regarding the legitimacy of our hypothesis, we found evidence that teaching improved the perceived professional competency of medical physicians. The evidence found was largely subjective and lacked validation. Regardless of this however, no studies were found that disproved it. This review also showed that physicians perceived as competent were those who taught effectively, and who also possessed the basic understanding of teaching and learning. We acknowledge that the hypothesis discussed in this review still needs to be validated, and that additional research is needed to assess the strength of the relations described in this paper. Nonetheless, we wish to emphasize the importance of training teaching skills in the professional development of physicians and recommend its inclusion in the curricula of postgraduate medical training.

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