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Evolution of Medical Students' Understanding of Systems-Based Practice: A Qualitative Account

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Abstract

Reflective writing is a useful tool in medical education to analyze student experiences and measure development of certain skills. This tool is particularly useful in identifying skill components of systems-based practice. These skills are necessary for any practicing physician, but are of particular importance as they are a required residency competency. There is now additional focus on systems-based practice with the passage of the Patient Protection and Affordable Care Act (ACA). In this qualitative, grounded theory study, the reflective writings of students at a United States medical school were analyzed using the constant comparative method to explore how the focus of a medical student progresses through the clinical curriculum. The interprofessional team of researchers specifically sought to determine if areas of medical student focus evolve vertically across the curriculum and if in the process students develop an understanding of systems-based practice. The data supported both of these objectives, and actively supports future research to identify ways, both inside and outside the curriculum, to leverage the students' natural progression of focus in order to expand systems-based practice education.

Keywords

Grounded Theory, Reflective Writing, Medical Education, Systems-Based Practice

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Evolution of Medical Students' Understanding of Systems-Based Practice: A Qualitative Account

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Reflective writing is a useful tool in medical education to analyze student experiences and measure development of certain skills. This tool is particularly useful in identifying skill components of systems-based practice. These skills are necessary for any practicing physician, but are of particular importance as they are a required residency competency. There is now additional focus on systems-based practice with the passage of the Patient Protection and Affordable Care Act (ACA). In this qualitative, grounded theory study, the reflective writings of students at a United States medical school were analyzed using the constant comparative method to explore how the focus of a medical student progresses through the clinical curriculum. The interprofessional team of researchers specifically sought to determine if areas of medical student focus evolve vertically across the curriculum and if in the process students develop an understanding of systems-based practice. The data supported both of these objectives, and actively supports future research to identify ways, both inside and outside the curriculum, to leverage the students' natural progression of focus in order to expand systems-based practice education. Keywords: Grounded Theory, Reflective Writing, Medical Education, Systems-Based Practice

Introduction

With the development of specific competencies for graduate medical education by the Accreditation Council for Graduate Medical Education (ACGME; ACGME, 2008) and the more recent passage of the ACA (Sommers & Bindman, 2012), physicians who are able to effectively practice within the context and constraints of a health care system are critical. Though much has been written about these *systems-based practice* skills and how medical schools could teach them (Barffour, Gupta, Gururaj, & Hyder, 2012; Brandon & Mullan, 2013; Carey & Colby, 2013; Chen, O'Sullivan, Pfennig, Leone, & Kessler, 2012; Dunn, Dalton, Dorfman, & Dunn, 2004; Gillen et al., 2013; Hankins et al., 2001; Kanthan & Senger, 2011; Kronz, Westra, & Epstein, 1999; LeMelle, Arbuckle, & Ranz, 2013; McGinty, Larson, Hodas, Musick, & Metz, 2012; Roberts, Jarvis-Selinger, Pratt, Lucking, & Black, 2013; Roberts et al., 2012; Sheu, O'Brien, O'Sullivan, Kwong, & Lai, 2013; Szymczak & Bosk, 2012), the recent increased focus on health care systems provides ample rationale for additional study. In this research, the overall problem was to analyze medical student reflective writings to explore how the focus of a medical student progresses through the clinical curriculum.

This research problem was supported by the following research objectives:

- Determine if areas of medical student focus evolve vertically across the curriculum
- Determine if students develop an understanding of systems-based practice

Preparing medical students to be clinicians in a health care system is a task for the intended audience of all medical schools, therefore this local study of medical students at the University of Mississippi Medical Center School of Medicine (UMMC) is of global importance. By understanding how systems-based practice skills are acquired and also related to practice, medical educators can leverage these phenomena and supplement them with curriculum and other support for a more effective clinical experience. While these reflective writings were simply documentation of the students' observations, feelings, and knowledge surrounding their first encounters with patients, through qualitative research the writings produced insight into how skills were acquired in their clinical experiences.

Literature Review

"Reflective practice" has become an essential component of medical student education in increasingly complex and changing health care systems. The use of this type of learning in undergraduate medical education "increases student awareness and promotes the creating of personal meaning of one's reactions, values, and premises" (Kanthan & Senger, 2011). Reflective writing also develops the skills of critical thinking, clinical reasoning, and professionalism. The reflective writing itself can also foster lifelong learning and guide physicians as they encounter the complexities of practice within a system (Wald, Borkan, Taylor, Anthony, & Reis, 2012). The cognitive exercise of reflective writing is also useful in documenting medical student concerns and the writings are an important resource for analyzing medical student development (Santen & Hemphill, 2011).

The unique combination of these two abilities of reflective writing (linking clinical experiences to personal meaning and documenting medical student skill development) proved to be a useful research tool to apply to the clinical experiences of undergraduate medical education. Currently, however, undergraduate medical education is "preoccupied" by teaching only components of the healthcare system, such as knowledge of disease and treatment, rather than both the components and how they relate to the system as a whole (Johnson, Miller, & Horowitz, 2008). Even curriculum components focused specifically upon teaching systems-based practice (organization, financing, delivery models, etc.) were only somewhat effective with variable results (Rivo et al., 2004). This disconnect results in students without an emphasis on quality and patient safety that naturally results from a focus on systems-based practice entering the realm graduate medical education.

The Accreditation Council for Graduate Medical Education (ACGME), the organization for accreditation of residency programs, in 1998 began an initiative to emphasize outcomes in graduate medical education. These outcomes were linked to six general competencies (ACGME, 2008), and systems-based practice is one of these. It is defined by the ACGME as practice with "an awareness of and responsiveness to the larger context and system of healthcare, as well as the ability to call effectively on other resources in the system to provide optimal health care" (Stewart, 2001). This competency may be described with one question the learning might ask: "How can I work with the health care system to improve patient care?" (Wittich, Reed, McDonald, Varkey, & Beckman, 2010). Unfortunately, this competency has been shown to be very broad and difficult to both identify and explain (Ziegelstein & Fiebach, 2004).

Continuing the theme of system-based practice, the ACA was passed in March 2010 (Sommers & Bindman, 2012) and expanded health coverage to millions of additional individuals and reformed insurance. In addition, there were strong commitments to implementing and developing new and better approaches to the system of delivery of health care (Sommers & Bindman, 2012). Medical educators immediately took note of this systems-based practice component of the ACA. Even though the need for identification and

implementation of ways to further emphasize and teach systems-based practice has been established in both undergraduate medical education and graduate medical education, the stakes surrounding this vague competency have now been raised even higher by the ACA which will indirectly yet quickly *require* learners to complete their training ready to practice within accessible, high-quality, and cost-effective health care systems (Voorhees, Prado-Gutierrez, Epperly, & Dirkson, 2013).

Taking this confluence of ideas about reflective writing, systems-based practice, undergraduate and graduate medical education, and the ACA into consideration, the research problem and objectives were developed. They were carefully crafted in order to, when met, fill the gap in the literature that exists around how a medical student's focus changes through clinical experiences and the ways this phenomenon can influence systems-based practice skills.

Role of the Researcher

The authors of this manuscript each contributed in a unique way to the study. This particular manuscript is the second in a series of qualitative research manuscripts produced from the medical students' reflective writing data. As such, the roles of some authors varied by manuscript. The first author, Mr. Rutledge, was the primary writer for this manuscript. Drs. Jones and Bailey were the primary researchers and provided context, experience, and guidance. Dr. Stewart was responsible for the collection, organization, and maintenance of the data. The combination of the authors' unique backgrounds and research interests (health policy, medical education, health related professions, and the practice of medicine) was deliberate. The collaboration was not only intended to support the interdisciplinary and interprofessional mission of our institutions, but also to broaden the relevance, applicability, and generalizability of what the authors consider to be a rich and exciting base of data.

Ethical issues were carefully considered through the Institutional Review Board (IRB) application process. Because this new research activity presented no more than minimal risk to human participants, expedited review of the research protocol was sought from and approved by the UMMC IRB, sufficiently addressing ethical issues. Minimal risk is defined by the IRB as "the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests" (IRB, 2012, n.p.). Confidentiality was ensured by analyzing only de-identified reflective writings.

Only Dr. Stewart was subject to potential bias as course director for the Introduction to Clinical Medicine Course because the writing assignment involved student experiences over which he has some control. This was addressed through his role in providing data rather than analysis or production of results.

The authors discussed and confirmed that Guba's model of truth value, applicability, consistency, and neutrality (Krefting, 1991; "Qualitative Research Guidelines Project," 2013; Shenton, 2004) would apply to this research in order to ensure rigor and trustworthiness. The interprofessional team approach, asynchronous data review, and step-wise analysis further ensured credibility, rigor, and non-biased results.

Methodology

A grounded theory design was chosen to study this phenomenon. This form of qualitative inquiry provides a method for researchers to study social phenomena from a framework that focuses on the significance of interpretation and meaning in the data (Merriam, 2011), making it an appropriate application for the research problem and

objectives of this study. Data were provided in the form of reflective writings completed by a single cohort of medical students as they progressed through their second, third, and fourth years during academic years 2008-2009, 2009-2010, and 2011-2012. As part of course requirements, students are required to write a reflective essay upon completion of their first patient encounter in the second year, and in the beginning of the medicine block in the third and fourth years of the medical curriculum. After students turned in the assignment, essays were de-identified and provided to the researchers to analyze.

The interprofessional researchers employed the constant comparative method to analyze the data, which “combines systematic data collection coding, and analysis with theoretical sampling in order to generate theory that is integrated, close to the data, and expressed in a form clear enough for further testing (Conrad, Neumann, Haworth, & Scott, 1993)”. The constant comparative method has been used for a number of years, but has been confirmed even recently as a modern and contemporary way to conduct this type of research (Kolb, 2012). When used to generate theory, this method can be applied to social units of any size (Conrad et al., 1993; Glaser & Strauss, 1967; Kolb, 2012). Each essay was analyzed line-by-line and coded. During each phase of analysis the researchers constantly questioned each other and compared the data.

Step 1: identification of recurring concepts.

Step 2: individual analyses of concepts and emerging themes compared, and initial codes for categories developed

Step 3: individual re-analysis of data to determine if initial codes held true

Step 4: categories condensed, and major themes identified

Results

Most of the themes that emerged from the data analysis were related to medical student feelings and perceptions. This emergence of an overarching theme is consistent with the grounded theory methodology. These feelings and perceptions can be further summarized into a theme of concerns, or anxieties: concerns about unknown experiences (clinical encounters, physical exams), concerns about knowledge shortcomings (lack of clinical knowledge), or concerns about interpersonal stress (“fitting in” or knowing how to act (Prince, Boshuizen, van der Vleuten, & Scherpbier, 2005)). As the analysis continued, it became clear that the sources of these concerns *were aligned with the year of the curriculum*.

Demographics for the subjects were limited by the anonymous nature of the data collection and analysis. However, because the same cohort (class) of students was followed through the second, third, and fourth years, the numbers and demographics of that particular class were known:

Age as a fourth year student:

24 – 26: 46.9%

27 – 29: 43.8%

30 – 32: 8.3%

33 or older: 1.0%

Gender:

Male: 51.0%

Female: 49.0%

Race:

White: 82.3%

Black: 9.4%

Asian Indian: 3.1%

Other: 4.2%

Variance in the numbers from year to year was insignificant and due only to academic irregularities such as withdrawal, dismissal, repeating a year, or leave of absence.

Like the data, the results were organized by year of the curriculum. In the second year, the medical student reflective writings were primarily focused on the medical student concern of anxiety. Nearly every medical student reflective essay from the second year mentioned one of the following words: nervous, discouraged, unprepared, fear, awkward, anxiety. Some excerpts that are evidence of this overall theme follow.

- “I don’t know exactly what I am doing.”
- “I don’t know how to do a physical exam for the life of me.”
- “I was so nervous before I walked in.”
- “I could not help but feel a little awkward and ill prepared.”
- “I was certainly aware of my inadequacies.”

These reflective essays confirm that the initial transition from the pre-clinical learning environment to the clinical learning environment is one that is saturated in anxiety and fear and completely focused on the self.

By the third year, the self-based concerns shift to the patient in the continued evolution of the students’ understanding of systems-based practice. Some excerpts that are evidence of this overall theme follow.

- “I tried with all my might to see the world from his eyes.”
- “I told him he that he was respected.”
- “I legitimately cared for him.”
- “I was worried about him.”

These reflective essays confirm that after the initial clinical experiences, the students have become more concerned with the patient than with themselves. With more confidence in clinical skills and thus less attention paid to them, the students’ humanistic and empathetic qualities have started to develop.

By the fourth and final year, the students’ concerns shift again to self, but this time also to the system of healthcare. The concepts of self and system in the fourth year are solidly intertwined. Students begin making decisions about patients based on how, through the system, they will be affected. Some excerpts that are evidence of this overall theme follow.

- “I was very hesitant to pick [a complicated and lengthy case] as one of my patients.”
- “Despite the poor prognosis, he was still transferred to us with full code resuscitation status.”
- “Pulmonary made all the decisions about discharge.”
- “I know much more now about how the process of house medicine worked.”

- “I’d like to place him in a nursing home if his family agrees.”

These reflective essays confirm that fourth year students’ concerns lie primarily in working with the healthcare system and how it will affect them.

Discussion

Medical student concerns, particularly anxiety, are well documented (Chittenden, 2009; Whipple, Barlow, Smith, & Goldstein, 2006). Some of these studies are quantitative and utilize data collection instruments such as surveys. One weakness of this type of study is that it is difficult to observe the evolution of medical student concerns as students progress through a traditional longitudinal, year-based curriculum.

Both the types and sources of medical student concerns change as the student develops professionally and as the learning environment and level of autonomy change. A better tool for analyzing themes and experiences is a qualitative analysis of medical students’ reflective writing.

It became clear that reflective writing can not only teach the skills to promote systems-based practice, but can also show the researcher how else the acquisition of systems-based practice skills is occurring through clinical experiences.

Because most of what is learned “takes place not within formal course offerings but within medicine’s *hidden curriculum*,” (Hafferty, 1998) reflective practice is useful in identifying a hidden curriculum (Gaufberg, Batalden, Sands, & Bell, 2010). This research has shown that students, either naturally or as a result of a hidden curriculum, orient themselves towards systems-based practice as they progress through clinical experiences.

The implications of these findings will impact the undergraduate medical curriculum such that less emphasis is placed on the health care system and more is placed on teaching systems-based practice. Similarly, the findings support additional tools for attaining the ACGME systems-based practice competency and the preparation of future physicians for the effects of the ACA. Most importantly, this confirmation of the progression of a medical student’s focus towards systems-based practice can fill the gap in the literature about the development of systems-based practice skills and the progression of medical student focus.

One limitation of this study is that the data were obtained before the increased awareness of systems-based practice as a result of the ACA. However, an increased awareness could potentially lead to either a faster progression towards systems-based practice or increased content in the curriculum about systems-based practice.

These results have implications for medical educators everywhere, particularly those in the United States who must prepare future physicians to meet the demands of the ACA. Future research can identify the sources of this progression towards systems-based practice and the best ways to leverage them and the curriculum to expand education around this important concept.

The data in this study showed that medical student focus evolves vertically across the curriculum, and that in the process students naturally develop an understanding of systems-based practice. This fills a gap in knowledge and provides a basis for medical educators to craft a curriculum that specifically prepares students to practice effectively within the healthcare system that is evolving as a result of the ACA.

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