Kidney Medicine

Have We Embraced Active Learning in Nephrology Education?

Helbert Rondon-Berrios and James R. Johnston

Interest in nephrology as a specialty has been declining in the last decade.[1] One posited explanation for this decline has been that nephrology encompasses highly complicated topics that are poorly taught.[2] The standard lecture, a passive learning technique, is still used by many nephrology training programs[3] to fulfill the Acreditation Council for Graduate Medical Education (ACGME) mandate for regularly scheduled didactic sessions. However, there is limited evidence that the lecture format is associated with improvements in knowledge retention[4] or scores on the in-training examination[5] or specialty board examinations.[6] Nephrology educators should look for alternative approaches to address this problem.

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A wealth of educational research has shown that active learning provides deeper comprehension and retention of content material compared with passive learning approaches.[7] Bonwell and Eison define active learning as anything that "involves students in doing things and thinking about the things they are doing."[8(p 2)] Graffam[9] recognizes 3 key components in active learning: (1) intentional engagements, (2) purposeful observations, and (3) critical reflection. Intentional engagements are purposeful learning experiences in which trainees perform what we want them to learn (eg, fellow examines a patient). Purposeful observations involve trainees watching and listening to someone doing what we want them to learn (eg, fellow observes a renal attending giving bad news to a patient). Critical reflection brings all components together, in which the learner makes meaning out of their experience and information and brings the learning process into his or her consciousness. Passive learning is a valid strategy to disseminate basic knowledge to large groups, but in contrast to active learning, passive learning fails to connect new information with prior experience. Data for active learning implementation in nephrology education remains modest at best during preclerkship years,[10] but it is largely unknown at the postgraduate level.

In this issue of *Kidney Medicine*, Renaud et al,[11] applying the theory of planned behavior as their frame of reference, performed a sequential explanatory mixed-methods study (ie, analyzing both quantitative and qualitative data) surveying and interviewing nephrology faculty at 6 government teaching hospitals in Singapore with the purposes of exploring: (1) perceptions about active learning, (2) perceptions of difficult teaching topics in nephrology, (3) relationship between the basic notions of the theory of planned behavior and the extent of active learning use to teach difficult topics in nephrology, and (4) factors affecting active learning adoption.

The authors used the framework of the theory of planned behavior to try to correlate certain factors to the actual behavior of using active learning. The theory of planned behavior is a theory in social psychology developed by Ajzen in 1985 as an extension of the theory of reasoned action developed by Ajzen and Fishbein[12] in 1975, which aims to predict future behavior based on people's current beliefs. The theory of planned behavior has been used to predict a wide range of behavioral outcomes, such as smoking cessation, exercise, and condom use. The theory of planned behavior proposes that a specific behavior is influenced by the intention to perform that specific behavior.

Intention in this context is determined by 3 sets of beliefs: (1) attitude, (2) subjective norm, and (3) perceived behavioral control. Attitude refers to the degree to which a person (eg, a nephrology faculty) has a favorable or unfavorable assessment of the behavior of interest (eg, using active learning). Subjective norm relates to a person's belief whether peers or people of importance in their network (eg, nephrology division chief, fellowship director, faculty colleagues, and nephrology fellows) approve or disapprove of the behavior. Perceived behavioral control refers to one's perception of the ease or difficulty performing the behavior of interest (eg, a nephrology faculty contemplates how difficult it would be to integrate audience response system into her hyponatremia lecture).

Nevertheless, the theory of planned behavior has been criticized, especially because of its limited predicted validity.[13] Using linear regression, Renaud et al showed that favorable assessment of active learning was the strongest predictor of the theory of planned behavior construct of attitude, and attitude accounted for most of the variance in intention. Intention had only a moderate influence on using active learning behavior. Similarly, within the construct of subjective norm, nephrology faculty considered nephrology trainee approval of active learning methods as the most influential.

Although there are multiple barriers for the implementation of active learning strategies in nephrology education, teacher belief is probably one of the major hurdles.[14] With no andragogical background, most medical faculty believe that to be a good teacher one only needs to be a subject expert.[15] However, faculty beliefs are susceptible to change with proper faculty development. Nephrology faculty in this study were more likely to implement active learning in their teaching if they have

more than 5 years of teaching experience, have a leadership role, or teach more than 1 difficult topic per year. It is likely that more experienced faculty in leadership positions have received faculty development and feel more comfortable using active learning in their teaching.

Another factor we need to consider for active learning implementation is the institutional culture.[16] "Culture eats strategy for breakfast" is a famous quote attributed to Peter Drucker, legendary management consultant and writer. Changing to active learning requires a significant time investment, as well as enthusiasm, faculty development, and support from administration. Selecting a few faculty members interested in education (ie, faculty champions) can facilitate the transition to active learning by having them show the way to others. Initial efforts should focus on junior faculty, who are more susceptible to change. These junior faculty can then be used as "trainers" to work with others. Using an incremental approach is likely to result in better outcomes. Faculty champions can attend junior faculty teaching activities and give them constructive feedback with suggestions on how to incorporate active learning. The trainers can provide instructive materials and facilitate formal professional development (eg, support their attendance at a seminar or workshop on teaching at their own institution or other training options outside their institution, such as the Harvard Macy Institute Program for Educators in Health Professions). Outside individual nephrology programs, there are ample available opportunities to engage in active learning. For instance, there is a large international nephrology community that has embraced active learning through e-learning. Using social media, nephrologists across the globe have engaged in games (eg, NephMadness), online journal clubs (eg, NephJC), and interactive learning (eg, GlomCon), among others.[17]

The idea of changing all the formal didactics to active learning activities might seem overwhelming. Most nephrology faculty participants in this study used low-hanging-fruit active learning strategies such as interactive lectures as their preferred teaching methods. Interactive lectures are teaching sessions in which the instructor inserts a break at least once per class. This provides the trainees the opportunity to participate in an activity that lets them work directly with the material. Incorporating 3 to 4 multiple-choice questions in a lecture is a simple way to transform a traditional lecture into an interactive lecture. There are also a number of other active learning techniques that can be gradually incorporated into a nephrology curriculum but will likely require some professional development. Interestingly, only a little more than half the participants in this study reported using active learning to teach difficult topics such as fluid, electrolyte, and acid-base disorders or hemodialysis adequacy. These topics are likely considered difficult to teach because they require trainees' solid understanding of basic science (eg, electrolyte physiology and urea kinetics). Some of the comments gathered during the interview phase of this study corroborated this idea as some faculty expressed concerns about using active learning in trainees who lack a solid background knowledge and "the content is not there to apply," tacitly favoring passive learning instead. We would argue that a well-planned active learning curriculum can incorporate these passive strategies, such as reviewing foundational material before asking trainees to apply it to clinical case scenarios (eg, flipped classroom).

We live in a time when faculty are pressured to meet increasing service and research demands and generate more clinical income and research funding. With less and less time allocated for teaching and other academic activities, it can be difficult to motivate faculty to adopt active learning. Therefore, incentives should be provided in the form of bonuses, administrative support, promotion opportunities, and institutional recognition.

In conclusion, the results of the study by Renaud et al are difficult to extrapolate to other educational environments but show that active learning is still not widely implemented in nephrology education. The literature suggests that a few individual US nephrology training programs have embraced active learning as part of their formal curriculum.[18–20] We believe this trend will continue to increase over the next several years. However, a cultural shift inside individual programs is necessary to achieve this goal. Professional development, finding faculty champions, gradual implementation, and faculty incentives are key to transition to active learning.

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