The advancement of medical education through innovative research and simulation learning: a discussion with Dr. Viren Naik, Medical Director of the University of Ottawa Skills and Simulation Centre

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ABSTRACT

The spotlight of UOJM's 4th issue is medical education. We met with Dr. Viren Naik, anesthesiologist, associate professor at the University of Ottawa (uOttawa), and Medical Director of the University of Ottawa Skills and Simulation Centre (uOSSC). He is also a core team member of the Academy of Innovation in Medical Education (AIME), uOttawa's centre for advancing medical education research.

Dr. Naik is actively involved in research, with over 60 peer-reviewed publications and grants. He was also the previous chair of the Written Examination in Anesthesia with the Royal College of Physicians and Surgeons of Canada. In this interview, we discuss the advancement of medical education with the skills and simulation centre, the future of the medical curriculum, and how to be involved in medical education as students.

RÉSUMÉ

Dans cette 4e édition du JMUO, le sujet mis en lumière est l'éducation médicale. Nous avons rencontré le Dr Viren Naik, anesthésiologiste, professeur agrégé de l'Université d'Ottawa (uOttawa) et directeur médical du Centre de compétences et simulation de l'Université d'Ottawa (CCSUO). C'est aussi un membre important de l'Académie pour l'innovation en éducation médicale (AIME), le centre de l'Université d'Ottawa qui a pour but de faire avancer la recherche en éducation médicale.

Dr Naik est un chercheur très dynamique qui a plus de 60 publications et subventions évaluées par les pairs à son actif. Dans le passé, il a aussi présidé l'examen écrit en anesthésiologie du Collège royal des médecins et chirurgiens du Canada. Durant l'entrevue, nous avons discuté de l'avancement de l'éducation médicale au Centre de compétences et simulation, de l'avenir du cursus médical et de la façon que les étudiants peuvent participer à l'éducation médicale.

Tell us about yourself, your education background, and your research interests.

I'm an anesthesiologist; I trained and did my MD at U of T [the University of Toronto] and did my residency at U of T (I was sort of all U of T). I then went on staff at U of T. Going back a little bit further, I had some passion for teaching. I used to teach swimming lessons, tennis lessons, and I think you know if that's something you enjoy doing. What's great about medical education is that you always have an opportunity to teach below you: 2nd years (probably) have an opportunity to teach 1st years, and 4th years [to] 3rd years, and residents to medical students and it moves on. Those opportunities for teaching have always been there, essentially. So, I was lucky, and my passion for teaching was recognized; someone pointed me to the direction of furthering that interest and I did a Master's of Education degree during my residency actually, and following that, I got recruited to St. Mike's hospital in Toronto. Basically at that point, I was asked to

run a simulation centre in Toronto and did that for a number of years at which point Dr. Kitts and Dr. Bradwejn came looking for someone to help build a simulation centre in Ottawa, and that winds me here in Ottawa. I'm actually back in school myself; I have a student number because I am doing my Executive MBA at uOttawa [University of Ottawa].

What is the Academy of Innovation in Medical Education and how did AIME's endeavors shape the curriculum at uOttawa?

What you're seeing happening at medical schools across Canada, in fact, across the world, is that medical education research centres or offices are opening up. The logic here is that we've been teaching medicine probably the same way we've taught it since the turn of the century, very apprenticeship-like. Obviously we've had some [changes] like PBL [problem-based learning] or CBL [case-based learning], but at the end of the day, we have curriculum reforms or we teach things differently, and we don't necessarily have the impact of those changes to support our thoughts that we're doing things better for the students. A fairly recent innovation over the last decade is that if we think our curriculum or assessment strategies are making a difference, we should actually measure that, and the best way of measuring things is doing research. So, AIME is one of those medical education research centres that looks at innovations in medical education and whether or not those innovations are making a difference by studying those different interventions. There are other centres across Canada that have similar mandates, but AIME was one of the first centres in Canada, created and started by the late Meridith Marks, and serves that capacity. Realistically, it is an office where clinicians who are interested in medical education, such as myself, can not only do research or have the support to do research, but can also collaborate with PhDs, who have expertise in education, on higher order research.

What are some trends in medical education from when you were a student to now?

I think the biggest trends we are seeing is that medical education is very different today based on challenges that are there that weren't there when I was a student. We know that medical knowledge and technical procedures [are] doubling every 6 years. That's an exponential growth. [How] can we teach everything that we have to know plus all the stuff that is growing exponentially in this finite (sort of) training period? There are issues of work hour reforms: no longer are you in the hospital for 48 hours in a row like I might have been in my residency. There are patient safety issues that ask whether or not we should be learning things for the first time on patients, and medical students who [you] will rightly hear saying, "I'm not comfortable doing these things". As well, we are seeing the exponential growth of technology. So how do we take all of these things and pull them together to provide a better education experience? [One] of the things we're talking about now is an outcome-based approach as opposed to a time-based approach. So, now [you are] working towards achieving competencies as opposed to [spending] 5 years and hoping that you have achieved those competencies. There is also the recognition that at the end of medical school and residency, you don't know everything you need to know. Learning is lifelong and you need to continue to refresh and continue to stay on top of things. We are trying to create a culture of lifelong learning as opposed to these static finite systems.

How is competency-based residency different than the current time-based residency and do you think they will produce better physicians later on?

To the first part of the question, the difference I think about competency-based training is [that] in the old system, the apprenticeship model (time-based), we had an opportunity to work with a person or people for a long period of time and essentially by immersion, you were probably getting all the competency needed. Now with all the challenges of moving around hospitals and moving around mentors and faculty, it is more difficult to make a true assessment. What competency-based medicine does is that first and foremost, it provides what it is we are trying to achieve on an outcome basis, and that's important for the faculty so they have a good idea of where we need to get a trainee to, and also [for the] students so they know where to get to. Now in it's extreme form, it would mean that once you've achieved those competencies, you're ready to move on to the next stage of your life, or to the exams, etc. That is still a bit difficult to do, as we are still in the infancy of competency-based training and there are logistics that would make it challenging. However, I think that competency-based training is helping us look at our current training critically and tease away those aspects that may not be necessary for a competent anesthesiologist or a competent internist. So maybe there [is efficiency] that can be achieved in training. Maybe training might not need to take as long; maybe it might take longer. These are the questions we are asking. So here, at the University of Ottawa, we are [going to] be starting the first competency-based training program in Anesthesia in July of 2015, and the goal of that program will be the first program in Canada that trains an anesthesiologist in one year less, a four year program as opposed to a five year [program]. We recognize that it may take longer, but our goal is to train all the trainees in one year less.

Are there any programs or procedures you would like to see implemented in medical education?

I think competency-based is the biggest change we're [going to] see in residency. When you talk about procedures, what we are seeing is more minimally invasive approaches to everything, whether it's taking a tumour out of the brain or some diseased [tissue]. Again, the challenge is that the more minimally invasive we get, the greater the learning curve and the more difficult it is for faculty to provide [and] allow the trainee to have

some autonomy. You can imagine that it is much easier to correct a trainee in an open procedure than it is when [you have] instruments inside a closed cavity. For that reason, the biggest programs and the biggest thing you're seeing in Ottawa is using simulation to accelerate the learner through the steep part of the learning curve so that the early successes and failures can be learned through simulation. Thus, when you get to the operating room, you are now on a flatter part of that asymptote and the learning that you will have in the clinical setting will be richer.

I think the biggest challenge we still have is that we recognize that doctors do not manage patients in isolation; it is really a team sport. Our education strategies are still focused on the individual; you all do individual tests and when you go to do your OSCEs, it's individual OSCEs. But realistically, we work in teams with nurses, physio[therapists], and social workers in what we call a true inter-professional collaboration. Given that we do an inter-professional collaboration in the real world, we have to wrap our heads around and try to tackle how we can incorporate inter-professional education in all levels, from undergraduate [to] postgraduate. We hope that if we can educate [students] better with inter-professionalism, and recognize [that] it is a team sport, that will feed forward into clinical practice. What we know already from studies, [including] the Canadian Adverse Events Study, is that if you improve inter-professional collaboration, patient safety is actually improved [1].

What is the University of Ottawa Skills and Simulation Centre (UOSSC) and what kind of programs are offered for students through the centre? Which specialties are most involved with the centre?

The University of Ottawa Skills and Simulation Centre is a joint venture between the Ottawa Hospital and the University of Ottawa. We opened in October 2010 [and] we are now over 3 years old. It is officially the largest simulation centre in Canada. What we offer here is an opportunity for students to learn procedures and encounters that they will experience in the clinical setting and [we want to] accelerate them through that learning curve. More importantly, we want to expose them to rare and unexpected things that they need to know, like cardiac arrest and trauma, because clinical experiences with emergencies are more luck of the draw, and it may not be appropriate to give a trainee management autonomy. The simulation centre provides an environment to experience crises competencies that you may not have an opportunity to experience in a finite residency.

Every specialty department in the University uses the Skills and Simulation Centre, from Psychiatry, where they use the centre to learn how to do electroconvulsive therapy, to the more obvious surgical specialties that learn how to do specific procedures.

How does simulation play a role in medical education at the undergraduate level? From your experience and research, why is simulation important?

Simulation can help [give] trainees and students the opportunity [to] learn procedures that I had to learn for the first time on patients, and lets you get comfortable with them. Imagine now you have an environment that is free of the pressures of time to perform a procedure, free of the stress from a patient's discomfort, and [free of] the safety aspects for the patient. Faculty [members] are also now in an environment where they don't have the pressure of needing to see more patients and they can spend more time for that direct feedback. The nice thing about the simulation for the undergraduates is [that] instead of having a procedure or encounter intervened upon or taken away because it is taking you too long or it is not the right learning environment, you get to manage this encounter and this procedure all the way from beginning to end. What we find to be most powerful is talking about that after you have managed the entire procedure or encounter, so you get to be hands on the whole time and talk about it after in what we call a "debriefing" to learn what you did well and what you can learn from. Naturally, at the undergraduate level when you've got so much to learn, simulation works best when you have some of the basic knowledge [of] physiology and pathophysiology underneath you. Then, in second year, [or] once you have all the base knowledge of physiology and pathophysiology, you can come to the simulation centre to apply what needs to be learned.

How does Ottawa compare with other schools' simulation centres?

So, as said before, this is the largest simulation centre in Canada. I think a few things define us beyond size. I think one of the reasons I moved to Ottawa was that you have a large faculty who is dedicated to medical education. Other schools may have more faculty interested in research or other academic things, but Ottawa has a large number of people interested in medical education and that are actually interested in simulation specifically, so that is a tremendous resource for the students. As well, I would like to argue that this simulation centre is different from other centres [in that it] … has been constructed after a formal needs assessment and has specific learning objectives. For lack of a better word, you are not coming here to play with the mannequins, the dolls, nor the pieces of equipment. You are coming here for a specific intervention or learning objective.

The last thing that defines us, as said earlier, is the collaboration with AIME, where we work to try to assess and evaluate all of our interventions and disseminate what we have learned through publications, invited lectures, and other academic forums.

Retention of information is a hot topic among students. Your 2009 Canadian journal of anesthesia paper proposed several methods of improving long-term retention [2]. In both the classroom and in the simulation centre, which methods are most successful for information retention?

Medicine is challenging because it has so much volume really. Sometimes people ask me: "is med school hard?". I don't like to say it is difficult in terms of complexity. I certainly think I struggled more with my undergraduate course in physics. The challenge with medicine is the volume. That's tricky because with volume, we can only juggle so much. I think that [a strategy] for information gathering is to try to turn the learning from a passive conduit to active. Are you likely to remember a lecture that you just sort of sat there and got a message on your iPhone from a friend, or do you try to actively engage in the lecture? By active engagement, I mean asking questions, increasing two-way communication of the information as it is happening, trying to make it relate to cases, and asking about those cases. The more you question the information coming in, the more likely it is to be retained. As well, I talked earlier about the power of teaching and the opportunities to teach in medical school. Anyone can tell you that the minute you teach something, you remember it and you know it better than if you didn't teach it. So, if there is an opportunity to teach a junior colleague, take that opportunity, sit down and say this is what I understand about the cardiac cycle, for example. I assure you that the minute you explain it to someone, not only are they learning but you are also learning it better. Going forward into residency and practice, again we have to recognize the importance of active engagement of lifelong learning. Active engagement happens through simulation, and question-and-answer, and it is active participation in the learning as opposed to passive learning. There are so many distractions out there today that if you just take in information passively it's unlikely to stick.

Do you have any advice for students who want to be involved with medical education?

If you love teaching, don't stop doing it. Don't think that just because you are in medical school you will have to wait awhile. There are always opportunities as discussed. I think that there is a big difference between teaching and education. I think that teaching is something we should all do, but if you are interested in changing and looking at the way we teach, that's what medical education is about. If you are looking to change the systems and the way we teach things, like many of your tutors and faculty do, then medical education might be for you. I think that students at the University of Ottawa have a tremendous opportunity, given what I said about so many faculty resources with interest in medical education, to knock on someone's door. You would be surprised how willing someone is to buy you a coffee and tell you about how they got interested. Knock on those doors and find out what opportunities there are. Just like me, get mentored or coached into what the next best steps are. There are so many available people at uOttawa to discuss that with.

REFERENCES

1. Baker GR, Norton PG, Virginia F, Blais R, Brown A, et al. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. CMAJ. 2004;170:1678-1686.
2. Bould MD, Naik VN. Teaching how to expect the unexpected: improving the retention of knowledge for rare clinical events. Canadian Journal of Anesthesia. 2009;56:14-18.

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