Current trends in medical education: Role of rural placement

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Abstract

The purpose of this paper is to review recent trends and innovations in medical education with special interest in training in general and rural medicine by means of a thematic analysis of the recent literature.

We identify six main trends: (1) the shift from teacher- to learner-centred approaches; (2) multilevel integration between subjects; (3) transition from process-based to competency-based training; (4) application of simulation technique in medical education; (5) increasing role of the utilization of online and IT technologies; and (6) the decentralization of clinical placements from main urban hospitals to longitudinal placement in peripheral urban and rural facilities with emphasis on generalist training.

We conclude that benchmarking of medical education to the world standards requires staying abreast of the new trends in medical education and the visionary leadership to implement methods that have been proved effective. In low- and middle-income countries introduction of some new approaches such as longitudinal rural placement, online learning or simulation techniques, requires substantial funds which the universities cannot afford alone without the government support. Desperate needs for doctors in Papua New Guinea rises the dilemma between satisfying the health system needs by producing more graduates at low-cost curricula and the need to meet quality global standards of medical education by implementing new and more effective approaches to teaching and learning.

Key words: medicine, medical training, rural medicine.

Trends in medical education

Shift from teacher to learner-centred approaches

In the last two decades, medical education, following all higher education, has gone through unprecedented changes with the focus shifting from teacher-centred towards interactive, learner-centered approaches (Harden & Hart, 2002). Shifting the focus towards the student-learner involves de-emphasizing the role of the
lecture and changing the role of an academic teacher from providing knowledge to encouraging, motivating, facilitating, leading discussion, and assessing achieving learning objectives and competencies. Bringing self-directed learning into the centre of attention involves the learner as an active participant and boosts the advance of deep learning (Mansur, Kayastha, Makaju & Dongol, 2012). Problem-based learning (PBL) and case-based learning (CBL) are learner-centred approaches where the teacher acts as a facilitator. These approaches utilize real life problems as a focus for learning basic science and clinical knowledge along with clinical reasoning skill (Mansur et al., 2012).

**Multilevel integration between subjects**

Another observed shift towards integrated learning entails movement from traditional subject-based curriculum to an integrated approach. Integrated curriculum diminishes compartmentalization of disciplines and reduces overloaded curriculum while focusing on achieving required competencies of graduating physicians (Hassan, 2013; Quintero, et al., 2016). Traditional medical education based on a succession of subjects studied in different departments has been criticized for low effectiveness in achieving a competent doctor because of unnecessary repetition and isolation between subjects (Association of American Medical Colleges, 1984). Horizontal integration crosses borders between sciences and premedical sciences while vertical integration reaches to an advanced level applying sciences in clinical problem solving (Gaddam, Gowda, & Vaidyanathan, 2015; Hassan, 2013). Thwin (2016) pointed out the role of mind maps utilization in integration between sciences and clinical application. To assure the integration, modern medical curricula move towards systems teaching with organized references to common pathology. As noted earlier, in more advanced years in training, there is an increasing involvement of problem-based learning and case-based learning. An integrated approach, rooted in clinical application, is supported by constructivism philosophy of adult pedagogy (Quintero, et al., 2016).

**Transition from process-based to competency-based training**

Following international trends in medical education, training in Australia is at the transition stage from process-based requirements to competency or outcomes/competency-based standards (Iobst et al., 2010; Roberts et al., 2011). Ensuring that core competencies are achieved by a medical program, graduates’ competencies have become an overarching component in constructing modern medical curricula (Olopade, Adaramoye, Raji, Fasola, & Olapade-Olaopa, 2016; Ross, Hauer, & van Melle, 2018). Dath and Iobst (2010) underlined the pivotal role of front-line teachers in the effective implementation of adult learning pedagogy and competency based strategy. Apart from clinical competencies, students are required to advance generic competencies essential to their future roles in the health system (Shah, Desai, Jorwekar, Badyal, & Singh, 2016; ten Cate, 2017). These include bio-ethics and communication skills, interpersonal skills, skills to build doctor-patient relationship, working in a team, decision-
making capability, management and organization skills, and IT skills (Majumder, D’Souza & Rahman, 2004).

Application of simulation techniques

One of the current trends in medical education is utilization of simulation techniques which is becoming an essential component of most medical programs (Ker & Bradley, 2010; see Figure 1). Among factors contributing to the proliferation of simulation techniques are listed such as shortening training time, conducting training at a suitable time, team-based learning and assuring patients’ safety (see Figure 1).

There is a growing body of evidence that clinical skills attained in medical simulation settings transfer directly to better patient care and improves patient outcomes. Medical simulation engages learners in an exceptional clinical education experience in a safe, realistic and effective environment. In the simulated environment, learners can practice in a risk free and realistic environment that enables students to build self-confidence through skills mastery (Al-Elq, 2010; Weller, Nestel, Marshall, Brooks, Conn, 2012). Evidence is building that simulation based medical education with deliberate practice is equally effective and sometimes even more effective than the traditional Halsted’s approach “see one, assist one, do one” in effective skills acquisition which are transferable to the clinical situation (Domuracki, Moule, Owen, Kostandoff & Plummer, 2009). A meta-analysis of 14 randomized control trials demonstrated that that simulation-based medical education with deliberate
practice is more effective than the traditional approach to clinical education towards competency acquisition (p<0.001, effect size 0.7) (McGaghie, Issenberg, Cohen, Barsuk & Wayne, 2011).

Factors contributing to achieving better results in simulation based medical education are: reduced undesired interference and stress level; chance to tailor training to individuals; and opportunity to practice repeatedly until competency is achieved which is especially important for slower learners (Bradley, 2006). Additional benefits of simulation techniques are avoidance of risk to patients and learners and the enhancement of skills and knowledge transfer to the real situation (Bradley, 2006; Weller, et al., 2012). Simulation based medical education has been introduced successfully to the clinical assessment armamentarium, for example, in trauma management and resuscitation (Chan, et al., 2018; McGahie, Issenberg, Petrusa & Scalese, 2010) and in critical care medicine (Beal, et al., 2017). It has been long practiced in Advanced Trauma Life Support and Resuscitation workshops aimed at achieving and assessing desirable competencies. However, effective use of simulation technology is a complex, multi-stage process that requires adequate training of instructors and attention to priorities followed at a local clinical setting (McGahie et al., 2010). McGaghie et al. (2011) further argue that for simulation technique with deliberate practice to be effective, it has to fulfil the following conditions: highly motivated learners; defined learning objectives and tasks; appropriate level of difficulties; focused, repetitive practice; rigorous measurement tools; informative feedback with error corrections; performance evaluation; and advancement to the next task. There is no doubt that simulation technology can produce substantial educational benefits.

**Increasing role of online and IT technologies in medical education**

Advancements in IT technologies encouraged medical education to turn increasingly to web-based instruction, e-learning and virtual education (Ward, Gordon, Field & Lehmann, 2001). Easy access to internet and computers and increased computer literacy places more demand on utilizing technology-based learning at a time convenient to the learner (Harden & Hart, 2002). Flipped learning is gaining an increased popularity in higher education. It is blended mode of learning where the students are given theoretical material online to study and perform task individually while the face-to-face group teaching time is utilized on interaction with experts which is required for development of higher cognitive skills among students (Greener, 2016; Figure 2). Wood (2016) demonstrated that a flipped mode of delivery was well perceived by students and two thirds will recommend it to be used in other units.

For instance, in pharmacology subjects, students appreciated blended mode and recommended extension to other subjects provided the program is well-structured, materials of a high quality and a sufficient number of interactive tutorials is offered (Morton et al., 2016). It is acknowledged that medicine is a practice-based discipline and therefore complete replacement of traditional teaching by online teaching is not possible.
However, increasingly there is discussion how internet learning can complement traditional teaching in medicine. Other studies advocate that blended learning could be utilized to teach subjects that traditionally occupied only a small amount of time within the curriculum, such as dermatology, radiology, and ear, nose and throat surgery (Mahnken, Baumann, Meister, Schmitt & Fischer, 2011; Silva, Souza, Silva Filho, Medeiros, Criado, 2011; Grasl et al., 2012).

**Decentralization of clinical training with shift to longitudinal generalized practice in rural environment**

Another contemporary movement in undergraduate medical education is decentralization of clinical training by moving it from training in large specialized hospitals towards supervised general practice. There is a growing body of literature that assesses decentralized clinical training predominantly from Australia, North America, Canada and, more recently, South Africa. Although rural placement and longitudinal generalist practice showed comparable and sometimes superior results to traditional training through short specialist blocks, it is facing longstanding stereotypes regarding training outside large urban hospitals viewed as waste of time and far away from “real medicine” in big hospital centers centres (Tesson, Curran, Pong & Strasser, 2005). Clinical clerkship in traditional medical curricula places the accent on relatively short block rotations and frequent changes in disciplines. A new model proposing the longitudinal integrated clerkship (LIC) is one model that is gathering sizable support internationally and being increasingly implemented in rural and urban settings (Hirsh, Ogar, Thibault & Cox, 2007; Krupat et al., 2009). Another study recorded that positive outcomes of LIC include comparable or sometimes better academic results, more advanced patient-centered communication skills, higher-order of cognitive and clinical skills, and more willingness to embrace increased responsibility with patients than among students placed on short block rotations in large central hospitals. Additionally, longitudinal exposure of the medical students to rural blocks influences them to pursue generalist carrier in rural environment (Halaas, Zink, Finstad, Bolin & Center, 2008).

However, placing students at decentralized sites is a complex logistic task, which requires effort and resources on the site of the medical school and the training site (Wilson et al., 2009). Moving a part of clinical training away from the institutional core academic hospital requires visionary leaders at the medical

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**Figure 2. Traditional vs. flipped classroom models.**

school to upscale the decentralized training (Sen Gupta & Murray, 2006). The same authors further argue that an optimal assessment in decentralized training should be based on outcome-competency assessment and be kept simple.

In recent years, a number of medical schools redirected their clinical educations programs to provide students with an opportunity to practice in rural environments. In 2000, Australia was one of the first countries that implemented a national policy offering longer rural programs to undergraduate medical students. This policy is one of many tactics aiming to increase number of rural doctors (O’Sullivan, McGrail, Russell, Chambers & Major, 2018). Between 2009 and 2015 the number of general practice training places in Australia have doubled, and that placed demand on the recruitment of more GP supervisors (Dath et al., 2010). For instance, at Flinders Medical School students spent the whole of the third-year in rural community settings (Worley, Silagy, Prideaux, Newble & Jones, 2000). Several studies have demonstrated that when the rural-exposed cohort of students was compared to the corresponding urban students group with training based on acute care in centralized hospitals, the rural group showed a comparable or higher level of performance on common exams (Worley, Esterman & Prideaux 2004; Glasser, Hunsaker, Sweet, MacDowell & Meurer, 2008). The literature suggests that students trained at smaller rural and remote sites are not academically disadvantaged and students perceived their learning experience as more meaningful that that they would expect from training in the urban specialized hospitals. (Birden & Wilson, 2012; Van Schalkwyk, Kok, Conradie & Van Heerden, 2015). Furthermore, the students at generalist practice have exposure to an undifferentiated wider range of patients than at highly specialized units (Wilson et al., 2009).

These rural placement initiatives aim to produce more candidates willing to undertake practice in rural and remote areas. These eventually may lead to a long-term solution for recruitment and retaining doctors in rural facilities (Tesson et al., 2005). It has been shown that a greater exposure of students to practice in rural environment during their medical education increases the chances of rural practice as a professional career path (Shelker, Zaharic, Sijnja & Glue, 2014; Farmer, Kenny, McKinstry & Huysmans, 2015; de Villiers et al., 2017; Wenghofer, Hogenbirk & Timony, 2017).

Rural blocks offer opportunities for community outreach medical education providing students with better understanding of public health and preventive medicine. Along with adopting a decentralized model of clinical training, some universities also offer curriculum that places a strong emphasis on primary health care including rural and remote health issues (Amalba, van Mook, Mogre & Scherpibier, 2016; Hays, 2007; Tesson et al., 2005). The medical curricula should take into consideration the health needs of the community concerned encompassing health promotion and illness prevention, assessment and targeting of population needs, and awareness of environmental and social factors in disease.
Conclusion

We conclude that benchmarking of medical education to the world standards requires staying abreast of the new trends in medical education and the visionary leadership to implement methods that have been proved effective. In low- and middle-income countries, introduction of some new approaches such as longitudinal rural placement, online learning or simulation techniques, requires substantial funds which the universities cannot afford alone without the government support. Desperate needs for doctors in Papua New Guinea rises the dilemma between satisfying the health system needs by producing more graduates at low-cost curricula and the need to meet quality global standards of medical education by implementing new and more effective approaches to teaching and learning.

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