REVIEW

Quality improvement and Future directions of Dental education

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Abstract: Education being an open system undergoing changes from time to time, there is a current need to overcome the disparities and match the demands from all perspectives. The future dentists need to be trained in terms of critical thinkers and problem solvers and more as an oral physician who can work in an interdisciplinary fashion. They should be highly equipped with technology and evidence based dentistry. The next generation students training methods should also change to digitally equipped versions and social Medias need to be used as means of professional platform as well. Learner centred education in the form of choice based credit system can help the institutions to achieve the desired outcomes providing cafeteria approach to the learners. The future direction of dental education is to propose, implement and improve quality initiatives in each step of curricular process.

Introduction:

Dental education had its beginning following a landmark report published by Dr. Gies in 1926, stating the importance of dentistry as a healing science and an essential component of higher education in the health professions to the Carnegie Foundation for the Advancement of Teaching.(1)

Dentistry is both an art and science. The success of a dentist is directly proportional to the depth of basic dental knowledge, skills and their attitude towards patients and the profession. Hence the dental educators play a key role in sculpting the future of dental undergraduates. The dental educators are responsible for teaching the right content at the right time by the right method that result in better outcomes.

In general, any education system is an open system, in which the feedbacks from all stakeholders make changes in the system as and when required. The important stakeholders of dental education system are the society, students, teachers, institution administrators and the governing council. The needs of the society and the directions given by the governing councils are two major influencers of the dental education system. Their needs are translated into institutional objectives. Quality assurance is aimed at fulfilling these quality objectives. This paper addresses the direction of objectives for future dental education based on the evidence available from literature.

Disparities and demands

World Health Organization has recognized human capital as the major building block of health care system. Universal health care will not be achieved unless the health care team reaches every community however poor or inaccessible they are. Dentists form members of such team but unfortunately they are not given equal opportunity as that of a general physician in government appointments for serving in primary health centers of rural India. With so many dentists entering the society each year from all the dental colleges in India, still the dentist population ratio remains unbalanced in rural areas when compared to urban areas.(2)

Accessibility of dental services to all in India is a serious problem. The absence of a primary health care approach is the major cause attributing to it. At present, the overall ratio of dentists to population in India is 1: 10,000 whereas in rural India one dentist is serving 2.5 lakhs of people. Dental college distribution is not balanced geographically and because of that there is a great difference in the dentist to population ratio in the urban and the rural areas. More than one million unqualified dental health-care providers, or ‘quacks’, are reported in India.(3) Few articles suggest that with increasing number of private dental colleges there are high chances of unemployment for future dentists. It is also mentioned that there will be more than one lakh oversupply of dentists by 2020.(4) Though both are contradicting, the later mentioned unemployment will

not arise if the graduates are trained well enough to serve in rural areas through community training programs and with proper knowledge to support primary health care. Albino et al[5] defined the four areas of disparities and demands in future dental practice to be socio economic disparity, patients with special health care needs, oral health care of children and cultural diversity. The query raised from the disparities and demands is whether the dental graduates of today, competent enough to meet the professional competition and are they trained in the right direction with relevant dental education?

Recommendations by reforms for change management in dental education

Following Flexner's report in 1910 that recommended major reforms needed in medical education to the Carnegie foundation, again in 2010, Carnegie foundation identified four challenging areas and proposed the respective recommendations. Though the reforms addressed medical education, it holds good for all health professions education. The reforms include, (i) standardization of learning outcomes and individualization of learning process, (ii) promotion of integration between formal knowledge and experiential learning, (iii) developing habits of inquiry by engaging them in challenging problems and improvement of quality care inclusive of population health and (iv) on developing professional identity through formal instruction of ethics, offering feedback and reflective opportunities and assessment of professionalism.[6]

The Quality chasm report[7] has recommended the vision for all programs and institutions engaged in clinical teaching of health professionals to be "*All health professionals should be educated to deliver patient-centred care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches, and informatics"*.

The American Commission on Dental Accreditation (CODA)[8] has recommended that dental education has to prepare the future dental providers in a way to ensure that the graduates will be "*competent in managing a diverse patient population and have the interpersonal and communications skills to function successfully in a multicultural work environment*" and that they are "*competent in assessing the treatment needs of patients with special needs*". Clinical community-based training is essential in future and curriculum needs to be revised accordingly.

Apart from competency based education, evidence based approach, inter professional education and the technology reforms explained above, the American Association of dental schools has recommended few other perspectives for reforms[9] that include to decompress the curriculum by eliminating the outdated material; redirect basic science course work to pathophysiology and oral medicine through problem based techniques; clinical exposure to students from beginning to end of course; clinical group practice in teams; more chairside teaching; community based and comprehensive care training.

Reforms aiming future

Inter professional education - The dental core competencies as explained by Spielman et al[10], is in 25% overlap with medical and 38% overlap with nursing curriculum. Such overlap in core competencies can be best utilized for inter professional education. The joint clinical training experiences demands effort from faculty to design it in an effective way. Connecting education in health professions is multidimensional.[11] It helps in achieving the clinical collaborative practice that hallmarks the future health care delivery system with improved quality and efficiency. It also assists in effective deployment of faculty across the professions.

Integrated curriculum – Integration in curriculum breaks the partition between the basic and clinical sciences that leads to better understanding and application of knowledge. Horizontal integration represents integration within the basic or within the clinical sciences. This helps to eliminate the redundancy in curriculum and saves lot of time for other active teaching learning methods. Vertical integration represents integration between the basic and clinical sciences. This helps in perfect timely amalgamation of knowledge and application and enhances their retention by graduates in future. Utilizing both horizontal and vertical integration in a curriculum is represented by Spiral curriculum which is the need of the hour. Faculty cooperation across the specialty and proper planning and implementation of the teaching learning methods are essential for success of integrated curriculum[12].

Professionalism and communication skills –

Commitment to high standards of practice demands working out of ethical and moral behaviour. Professionalism aims to altruism, duty, excellence, service, accountability, honour, integrity and respect for others. Teaching of professionalism happens mainly through observation during apprenticeship training. Instead the faculty should take up teaching professionalism and assess the students based on it to make it more effective. The students should have a broad knowledge on dental ethics, management of dento-legal issues and also to use proper referral when in need, instead of practicing cases in which they are incompetent.[13] The students should also be taught in communicating effectively with the patients, colleagues and the supporting staff. Interpersonal communication skill training sensitive to cultural differences is essential in future.

Technology in dental education - Use of Information and Communication Technology (ICT) will be the key of success for dental institutions in future.[14] ICT doesn't mean only the use of power point lectures or going paperless. The broader aspect focuses on how it can be utilized in education, clinical care and research focusing more on informatics than on information technology. In clinical care, Electronic dental records can be used beyond replacing papers to connect the information on oral and systemic health, to facilitate tele-dentistry and to apply evidence based dentistry and preventive management strategies. In education, high end simulations providing virtual reality, haptic trainers, 3D atlas, E textbooks, Learning management systems and student response systems can be used effectively. For research, reuse of clinical data, advance computational methods and application of general research tools in dentistry are possible with use of ICT. The gap between the IT professionals and dentists has to be bridged to make it more successful. Dental informaticians can do the integration and provide strategic guidance for the same.

Practice Management - The students graduating now have opportunity to practice for next forty years. Within forty years, there is a great scope for evidence based practice to improve thanks to the scientific advances. Hence the dental curriculum needs to focus on developing the graduates into lifelong learners, critical thinkers and problem solvers, who can do reflective practice.[15] The current dental education is good in handling 'how and what of dentistry' by preclinical and clinical exercises, whereas 'why and when of dentistry' needs to be taught to make the emerging graduates as lifelong learners and to ensure integration of knowledge, skills and values.

The graduates should be trained to decide treatment plan in concordance with the patient attendees and the patients. They should be able to provide multiple treatment options based on the clinical features to the patient. They should be able to follow Least Expensive Alternative Treatment (LEAT) approach treatment plans though if it is not the best possible treatment plan.[16] The patient will be responsible for paying the difference in costs if he chooses a treatment option that may better suit his individual needs and his long-term oral health needs.

Research - To stay up to date of the emerging health care, the dental colleges should prepare the dental graduates in research. They should be equipped with tools to evaluate the literature and scientific innovations. Research should be considered as a part of experiential learning. It can be inserted in curricula by forming regional research consortia, developing collaborative training and mentoring programs for faculty members, and converting the clinical environment into practice-based networks.[17]

***Choice Based Credit System (CBCS*) –** The University Grants Commission has already made choice based credit system mandatory for all professions except for health professions education. The modification of dental syllabus to suit CBCS as discussed by Shivasakthy et al[18,19] makes the Indian dental education system to match the global scenario. The provision of electives, self-paced learning and possibility of credit transfer makes the curriculum more learner centred. In a way it adds to the motivation of the students thereby resulting better outcomes. Most of the objectives including Professionalism, communication skills, ICT knowledge, research, practice management training can be well accommodated in Choice Based Credit System rather than the annual based curriculum.

Assessment methods - Use of newer assessment methods like Work Place Based Assessment (WPBA), Objective Structured Clinical Examination (OSCE),

Objective Structured Practical Examination (OSPE), Triple Jump Examinations (TJE) and Portfolios should be encouraged to be adapted in dental education. Critical thinking, problem solving skills and ability to reflect will be honed by the students in following such assessment methods that help them follow best professional practices and face the challenges in future.

Quality improvement

Quality improvement is a way of approaching change in healthcare that focuses on self-reflection, assessing needs and gaps, and considering how to improve in a multifaceted manner. It aims to provide practitioners and managers with the skills and knowledge needed to assess the performance of healthcare, individual and population needs. It also aims to understand the gaps between current activities and best practice and to have the tools and confidence to develop activities to reduce these gaps.

Quality improvement can be approached in two stages.[20] Short term improvement can be done in undergraduate dental education by using ICT based technologies in teaching, sharing of resources between colleges, providing constructive and timely feedback to the students and proper integration between and within basic science and clinical science subject classes. Long term improvements can be done in increasing the clinical exposure to the students, faculty development programs and also providing an option to the postgraduates to pursue clinical academic stream based on their choice.

Faculty development - Total Quality Improvement (TQM) is a term of Training and Monitoring in human resources development. Felder and Brent applied the concepts of TQM to improve quality of teaching. According to them, writing instructional objectives, use of active learning principles, use of cooperative learning methods, assessment of teaching quality and longitudinal study of instructional methods seem to improve the quality of teaching.[20]

The modern education system demands a need for capacity building in existing faculty, for they are the builders of the future dentists. The faculty should become lifelong learners for them to apply evidence based methods in their teaching approaches and should exhibit open minded behaviors to participate in collaborative training.[21] They need to train the students to develop core competencies in integrated manner and in training and end training certification exams should be targeting those competencies.

Summary:

Jackson Brown and Kent D. Nash have predicted that the scope of the dental profession is to move more towards inter professional education in future. The possibility of interaction of the member of a dental team to other health professionals would increase to help them manage their patients through better coordination of oral health services along with the management of relevant medical co-morbities.[22] Dental education focusing on faculty development and recharging strategies and training of graduate students to meet the demands of the future with improved quality in all aspects is the need of the hour.

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