

# National board governed post-graduate curriculum: Strengths and scope

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## ABSTRACT

The National Board of Examinations was established to boost the quality of medical education by laying down exclusive norms, uniform standards and a national level evaluation for the postgraduate medical courses. The content and context of the training curriculum is well updated as per advances in the field and current requirements. Diplomate of National Board (DNB) courses are considered to be at par with the postgraduate and post doctorate degrees for all intents and purposes. The introduction of a formative assessment with objective evaluation pattern has improved the scope of the board. Moving on to a competency-based training with emphasis on novel research can maximise the quality of training to international standards. Training DNB teachers and assessors in the newer teaching and assessment methods can improve the calibre of residents. Stringent monitoring and review of the training can increase the credibility of the courses and the board can be expected to cater for students abroad.

**Key words:** Competency-based education, curriculum, medical education, medical specialities

## INTRODUCTION

The regulation of medical education and health professionals is an important aspect of the governance of health systems.<sup>[1]</sup> The various postgraduate courses in medical colleges affiliated to concerned universities and other institutions were conducted based on the curriculum and guidelines directed by Medical Council of India (MCI). This was replaced recently by the National Medical Commission (NMC). However, the proficiency and standards of evaluation were considerably variable in these institutions.<sup>[2]</sup> The National Board of Examinations (NBE) was aimed to boost the quality of medical education by laying down exclusive norms and standards for postgraduate medical examinations across the country. The advantage of such norms was to possess uniform standards and mechanisms for evaluation of the PG medical courses.<sup>[2]</sup> The NBE awards a postgraduate degree, 'Diplomate of National Board (DNB)' in Anaesthesiology, through well-structured training and assessment methods. The process of DNB examination has evolved over the years and has many inherent strengths.<sup>[3]</sup> However,

as medical science is developing at a very fast pace, scope of improvement to incorporate newer methods is essential. This article presents an overview of these strengths and the scope of improvement.

## HISTORY AND EVOLUTION

'National Academy of Medical Sciences' formerly 'Indian Academy of Medical Sciences' was established way back in the year 1961. An idea was then proposed for the development of a high-level postgraduate examination, at the national level, in various disciplines of medical sciences.<sup>[4]</sup> The NBE was later established in the year 1975 under the Ministry of Health and Family Welfare (MoHFW). This was the first of its

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kind national level exit examination, in the history of medical education in India. Initially, the qualifications were named as Membership of the National Academy of Medical Science (MNAMS). Although a shortage of qualified medical specialists fostered the inception of the board, NBE has diversified into training resident doctors in various super and sub-specialities revolutionising post-graduate education. Since 1982, NBE became an independent body and harboured the power of accreditation of hospitals for training postgraduate medical students. The qualifications granted since 30 August 1982, were named as DNB and recognised by the MoHFW, and for all purposes, considered equivalent to Doctor of Medicine (MD) due to similarities in tenure period, academic and clinical activities, and research exposure and exit examination.<sup>[5]</sup>

The board was renamed as National Board of Examination for Medical Sciences (NBEMS) following approval by the ministry in 1990. Initially, to encourage the enrolment of candidates, the selection process was based on walk-in interviews. However, candidate enrolments were constrained and students continued to prefer MD over DNB due to poor pass percentages in the exit examinations. With the establishment of a single National Eligibility Cum Entrance Examination (NEET), currently the difference between the structure of the two courses is barely identifiable. Additionally, the board also conducts entrance examination for Doctorate of Medicine (DM) and Master of Chirurgiae (MCh) courses along with Doctorate of National board (DrNB) and post-doctoral fellowship in national board (FNB -PD), for super and sub-specialities. In spite of apparent similarities, the National Medical Commission bill, recently introduced to overhaul the process of medical education, failed to include a clause on single PG board. However, in the lines of NMC, NBEMS has launched Post MBBS two-year Diploma courses in the broad specialities since 2020.<sup>[6]</sup> Additionally, DNB degree is recognised as an eligibility criterion for super speciality degrees (DM and MCh) making the distinction between the boards more fluid.

The discrimination of DNB graduates goes a long way since 1994 with purported inequalities in teaching experience. Since a couple of decades, India has seen a rapid growth in the number of medical colleges due to increased governmental spending on health infrastructure. Additionally, numerous private institutions have also been established which still

contribute to the majority of the undergraduates in the country.<sup>[7]</sup> This has not only widened the gap between undergraduate and post-graduate seats but also led to the gross shortage of qualified medical teachers, which is roughly estimated to be at 40%.<sup>[8]</sup> The acceptance of DNB graduates as PG teachers has additionally minimised the dearth of educators in postgraduate education.

## GOALS AND OBJECTIVES

The goal of the DNB programme is to impart theoretical knowledge, training in suitable skills and procedures, development of communication and counselling techniques, and research in the field of anaesthesiology and allied subspecialities. During the DNB course, students perform a large array of clinical work, emergency duties and are also expected to keep records. They are normally posted in various locations and are required to participate in academic meetings, present case studies, and conduct reviews and seminars. Throughout the course, their skills and competence are constantly evaluated on the premise of a set standard format. On completion of training, a post-graduate in anaesthesiology should be ready as a specialist, medical teacher and researcher in anaesthesiology and the related fields of medicine.<sup>[3]</sup> However, the training requirements need to emphasise on the positive aspects and scope of the speciality outside the operating room like trauma, critical care and pain management.<sup>[9]</sup>

## CURRICULUM CONTENTS

The DNB anaesthesiology curriculum of NBE is vast and inclusive of all necessary expertise which are required for a practising anaesthesiologist. The syllabus has been delineated between the various stages in training, which is divided into first, second and third years.<sup>[3]</sup> During the first year, the main focus is on the basic sciences and basics in anaesthesiology which includes pre and postoperative care, equipment and monitoring. Resuscitation and critical care are also included in the initial stages of the residency. The overarching curriculum designates use of ultrasound in anaesthesia and resuscitation in a comprehensive manner. The second-year involves competency in advanced monitoring, management of emergency surgeries, paediatric anaesthesia, other broad specialities and difficult airway management. Certain distinct areas such as geriatric anaesthesia, rural anaesthesia for camp surgeries, blood product

management and role of anaesthesiologist in the pandemic have been initiated this year. It is apt to mention here that the curriculum in the United Kingdom has stressed competence in obstetric anaesthesia as a discrete and critical progression point in the second stage of training and it is assessed exclusively before the candidate advances to the next stage.<sup>[10]</sup> The third year includes the super-specialities, bariatric surgery, neonatal surgery and critical care, pain management, human resource management and medical audit in the curriculum.

Departmental rotation has been segregated into core areas and accessory areas and duration ranging from 1 to 6 months have been allotted for 17 different areas/departments. Externship is recommended to ensure all the areas are adequately covered within the duration of rotation. Although the guidelines have been laid in with extensive detailing, the enforcement of these guidelines are rarely monitored or reviewed. Often the postgraduate residents are posted based on the need of the hour basis, in various departments, irrespective of the year or stage of training.<sup>[3]</sup>

Various procedural skills are described in the curriculum and the minimum required number to attain proficiency is also specified for each procedure. The domains of curriculum are comprehensive; however, they are not as extensive as practised in the developed world.<sup>[10]</sup> In the west, they have been typically classified under generic and speciality specific categories. Among the generic domains of learning, team working, safety and quality improvement require a special mention.

The DNB curriculum is a time-based model. The assumption that 36 months is a satisfactory period to achieve all the skills of anaesthesia lacks solid evidence. The structured curriculum hopes to serve its purpose. All over the world, many training curricula in anaesthesiology exist with substantial variability.<sup>[11]</sup> In India, as DNB residents join from various socio-economic and academic backgrounds, the time taken to acquire certain skills may vary.<sup>[12]</sup> Therefore, a competency-based curriculum devised on set milestones, which are attained independent of the time, could be a better alternative method.<sup>[13]</sup>

## TEACHING AND LEARNING METHODS

The DNB follows a traditional teaching method which involves the conduct of seminar, case presentation,

grand rounds, faculty lecture and clinical audits. However, to increase the involvement of trainees in the didactic lectures, 'Flipped classrooms' have been introduced in western curriculum.<sup>[14]</sup> It offers a pedagogical style of learning experience where residents are required to complete their study before attending the lecture and the class time is spent on problem-solving and discussion. This provides a learner-centred model offering exploration of topics in greater depth and creates meaningful learning opportunities. Teaching also includes morbidity, mortality and clinical audits. Mortality and morbidity data, and presentations of rare and interesting cases, can offer newer insights on how to foresee, prevent and manage unexpected complications and avoid unforced errors.<sup>[15]</sup>

Scientific research is subjected to extensive scrutiny before translating it into practice. Identifying, analysing and criticising research are essential for improving and updating the existing knowledge. These are facilitated by the conduct of journal clubs. It also helps to identify quality research and encourages its utilisation and incorporation into practice.<sup>[16]</sup> Skills in super-specialities like cardiac and neuro anaesthesia are achieved by in-house rotational posting. However, when facilities are not available in-house, external postings to other institutions are done to fulfill all aspects of the curriculum. Additionally, observer-ship to regional centres of advanced learning and visiting faculty sessions can be organised.

Training needs are variable and cannot be grouped as good or bad practices. Some countries have highly structured training programmes with multiple national requirements and training principally carried out at the parent institute. Other countries have a more decentralised and unregulated approach with fewer (if any) specific case or rotation requirements, where the trainee creates his/her own customised training to meet broad objectives and goals.<sup>[11]</sup>

A study done in Kerala to evaluate the post-graduate clinical learning environment showed significant differences in several areas amongst the residents doing MD and DNB. The DNB students gave higher scores to social environment, supervision and feedback, while MD students gave higher scores for the domain of learning opportunities.<sup>[17]</sup> Moreover, faculty lectures are not commonly undertaken in accredited hospitals and DNB trainees register for various Continuing Medical Education programmes

and online updates organised by the Indian Society of Anaesthesiologists through its various chapters. Monitoring and enforcement of the curriculum and training pattern has not been an objective of the board. However, the board has an online portal for students to submit their grievances and feedback and NBEMS tracks the query and complaints effectively. Nonetheless, majority of NBE accredited hospitals fared better than government institutions in terms of state of art technology and advanced treatment facilities providing comprehensive learning opportunities for the students. NBE accredited hospitals have come together and formed an association – Association of National Board Accredited Institutions (ANBAI). This forum encourages innovative ideas in postgraduate medical teaching to enhance the standards of students. It also conducts annual conferences and confers awards to outstanding teachers in these hospitals.<sup>[18]</sup> Despite DNB having a great scope in our country, concern still remains regarding paucity in super-speciality training.<sup>[19]</sup> DNB super-speciality and 6 year DNB courses have been recently renamed as DrNB and District DrNB and FNB -PD programmes at state government-owned district/general/civil hospitals have been introduced by the board to address these concerns.

Learning by audio-visual media, simulation aids and skill laboratories is emphasised by the NBE in the DNB anaesthesiology curriculum. Audio-visual aids improve learning ability. Videos from routine clinical practice can orient the postgraduate towards a better grasp of skills. In skill laboratories, residents can experience real-time physiological changes and potential complications. This builds the residents' familiarity, confidence with procedures and exposure to the management of life-threatening complications.<sup>[20]</sup> Availability of NBE webinars and online question paper bank are very progressive steps taken up by the NBE for the improvement of training.

## ASSESSMENT METHODS

As a professional activity, academic achievement assessment carries special implications and significance. Evidence is beginning to accrue that performance assessments indeed provide the means for improving teaching and learning.<sup>[21]</sup> The main drawback of the traditional examination is the subjective nature of assessment. According to the Miller's pyramid of professional competence,<sup>[22]</sup> the routine summative end of training exams may test the

'knows' and 'knows how' component of the competency testing. The 'shows' and 'does' components which are at the top of the pyramid are usually assessed during workplace-based informal assessment. The procedural skills are documented in a logbook along with the number and level of supervision. Fairness, validity and reliability of these records are inadequate, and they are not subjected to monitoring and review by the NBE. This warrants a newer means of logging in routine work and procedures for assessment of adequate clinical skills acquisition.

Internal assessment in the form of theory and practical examinations is conducted every 6 months. The NBE has set guidelines for the conduct of internal examinations and appraisal during the training period. The purpose of the examination is not only to motivate the trainees but also to obtain feedback on an individual basis and to improve the training for the students and help them focus in the deficient areas. These guidelines can be improved to assign specific areas of competency assessment in the internal assessment, based on the level of training.

There are several methods of workplace-based assessment (WPBA) such as Anaesthesia Clinical evaluation exercise (A-CEX), Direct observation of procedural skills (DOPS), Anaesthetic list management assessment tool (ALMAT) etc. Mini -CEX has been evaluated and found to be an effective work place-based assessment tool.<sup>[23]</sup> These types of assessment have been used for surgical specialties and nonsurgical specialties which involve attaining procedural skills.<sup>[24]</sup> In a study done to evaluate resident's feedback on assessment methods, DOPS emerged as an effective teaching-learning tool, a motivational exercise that helped them improve their procedural skills and put forth their views.<sup>[25]</sup> These can be included by the board. Training of the assessors could overcome the drawbacks like student-teacher friction and demoralisation, which are seen in WPBAs.

## ASSESSMENT PATTERN

The DNB candidates are eventually evaluated through theoretical examinations, practical examinations and through completion of a thesis (research project). Grading systems are used to evaluate and certify the candidate's knowledge, skills and competence.

Assessment of post-graduate students in DNB has evolved from a summative assessment to a formative

assessment method.<sup>[24,26,27]</sup> Formative Assessment Test (FAT) has been introduced in the evaluation of performance of the trainees in DNB since the last decade and these tests are conducted every year for theory and practical assessment. Unlike the internal assessment and appraisal, these examinations are not conducted in-house and follow a uniform central question paper pattern for theory and also include external examiners for practical evaluation. The primary distinction in the assessment lies in the fact that the trainees get appraised about the performance in the examinations. The theory answer papers evaluated externally are returned to the trainees through the departmental head and each one of them is counselled based on the performance. The goal of FAT is to monitor the progress, with the aim of improving performance and building a foundation for learning more advanced skills.<sup>[28]</sup> The attendance to FAT exam is mandatory. Unfortunately, apart from moral obligations, the results are seen as inconsequential by the students. Inclusion of scores from these examinations in the final assessment may prevent students from discrediting the annual exam.

Though the conduct of such centralised examination in a large scale annually is laudable, the formative method of assessment is not justified enough in this examination. The syllabus for the examinations is not different from the summative assessment during final examinations. The critical progression of the trainees is not assessed; instead, an overarching assessment of competency is done. Although an external examination has more validity, the actual advantage lies in following a universal structured pattern of evaluation. Nevertheless, these exams do serve the purpose of feedback and induce a proactive behaviour among the trainees to improve their knowledge.<sup>[29]</sup> Many universities under the NMC have split the qualifying examination into two parts with part-1 comprising basic sciences, being held at the end of the first year of residency. This encourages reading and lays the foundation of basic sciences and helps with better understanding for further clinical exposure.

A standardised patient or clinical material and an independent impartial examiner are key components for an appropriate unbiased examination. Objective structured clinical examination (OSCE) is a precedent examination followed in many international centres across various health science examinations.<sup>[30]</sup> There are various stations that can be tailored to be specific and are assigned to test all the necessary areas of competency and follow a prescribed marking scheme.

These are helpful in assessing unique domains such as professionalism, communication and procedural skills. Use of simulation of different levels of fidelity can be helpful in creating real-life emergency situations which are usually impractical to assess in a routine examination. OSCE component added recently by National board has over 25 stations in a specified time period targeting concise answers. The uniformity across all centres is maintained as they are virtually run from the NBE command centre simultaneously.

Additionally, the performance in DNB can be appraised in a centralised manner with inclusion of certain more objective methods including multiple true/false and single best answer as a part of the examination. These help in assessment of the breadth of knowledge and its application.<sup>[31]</sup> They are better in quantifying the performance across many centres at a regional level and assess the quality of the trainees at the national level annually.

In the DNB curriculum, the importance of research is emphasised by incorporating thesis as a mandatory criterion for qualifying the final examinations. This inculcates an attitude to carry out the designing of a study, review of literature, methodology, data collection and application of valid statistical tests to arrive at a conclusion. It also encourages the trainees to write a scientific paper and publish the research findings in various journals. Although thesis serves the main objective of familiarising the practice of research methodology, the topics submitted for review are often less than ordinary. While the NMC promotes original research in medical colleges by coupling publications with promotions, it is not the same with NBE. The burden of novel scientific research in these hospitals lies in the hands of devout students and teachers who are eager to allocate their time in conducting original research.

The evaluation of the answer papers of DNB theory examination is subjective. Whilst the question papers are set by experts in the field with years of experience, the valuation of the answers are done by assessors with varying levels of experience. The model answer paper is set by the examiner and not by the person who sets the question paper. The questions are set with an idea to cover all the domains of competency mentioned in the curriculum. On the contrary, the evaluation entirely depends on the assessor stringency, subjectivity and experience. The results of the recent

DNB theory examinations saw a dip in pass percentage. NBE has encouraged concise, point-wise answering to the questions. Thereby the answering scripts were limited to facilitate answering all questions, in the specified duration of time to assess the candidate's ability to present only relevant essential points.

Last but not the least, success at workplace depends on presence of the appropriate aptitude necessary for the speciality. Certain non-technical skills are required to improve the performance of anaesthesia practice. These are not assessed in the examinations. The major skill sets are situation awareness, teamwork, communication and task management. One has to be able to perform all these while coping with pressure. A prototype Anaesthetists' Non-Technical Skills (ANTS) system was found to have a satisfactory level of validity, reliability and usability in an experimental setting. Guidelines should be developed for its integration into the anaesthesia curriculum and its assessment.<sup>[32]</sup>

## SUMMARY

DNB anaesthesiology is aimed at producing competent anaesthesiologists and future teachers. The content and context of training curriculum is well updated as per advances in the field and current requirements. DNB courses at present are considered to be at par with the postgraduate and post doctorate degrees for all intents and purposes including employment opportunities in India and abroad. The introduction of a formative assessment with objective evaluation pattern has improved the scope of the board. Moving on to a competency-based curriculum with shift of focus on practical rather than theoretical skills can maximise the quality of training to international standards. Inclusion of newer workplace-based assessment methods and assessment of non-technical skills can exemplify the calibre of the residents. Training DNB teachers and assessors in the newer teaching and assessment methods can improve the performance of trainees. Stringent monitoring and review of the training can increase the credibility of the courses and eventually, the board can be expected to cater to anaesthesiology trainees not only in India but other South-East Asian Nations.

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