The Integration of Values-Based Medical Education (VsBME) in the Education and Training Processes: A Conceptual Framework for Neurosurgical/Surgical/ Medical Education and Training

Ahmed Ammar

1 Introduction

Education and training are among the most challenging tasks in our ever-changing world. Different generations have different culture and different goals of life, aims, and understandings of the meaning of life and personal and professional priorities. These millenniums differences have to be recognized and respected in order to extend bridges with new generations. Building up a professional trust and respect and keeping and sustaining good communication between trainers and their trainees are vital to the successful training programs. The well-trained and oriented medical training instructors are the backbone of the success of the training process. The main goal of current and future training programs is to help trainees embrace learning, open their minds for future changes and challenges, and support their developing in ways that lead to happiness, meaningful life, and successful training and careers and should be clearly addressed. In order to do this, the trainers must strive to understand the trainees' personalities and respect their autonomy. They should share their trainees' ambitions, supporting their hopes and dreams. They should spare no effort in training them and sharing the experts' experiences with all trainees.

Neurosurgical training and medical education should prepare the trainees for an envisaged future. The authorities and education and healthcare stakeholders should plan for future health care services. The successful strategic plans must be designed according to the facts, needs, resources, and objectives. One of these needed information is the number of qualified high-specialized medical and surgical personnel,

A. Ammar (✉)
Department of Neurosurgery, King Fahd University Hospital, Imam Abdelrahaman Bin Faisal University, Al Khobar, Saudi Arabia
e-mail: ahmed@ahmedammar.com

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neurosurgeon, and other specialties in every country and in every region. Healthcare stakeholders' authorities are responsible for the distribution of the resources in a justified manner (equity). Lack of ambition and imagination in envisioning and planning for future needs will result in issues that may affect patient care. A new paradigm for postgraduate medical education is needed.

2 Integration of the Principles and Concept of Values-Based Medical Education (VsBME) in Medical Education and Training

Training young physicians, surgeons, and neurosurgeons has always been a complex and challenging task. Currently, information and communication technology is advancing rapidly and sometimes beyond expectation and imagination. These welcome developments have unprecedentedly challenged educators, trainers, and curriculum builders around the globe. Educators are striving to catch up with such rapid developments. In these conditions, the main goals, strategic plans, and directions of training should not be lost. The trainee is, has been, and will be always the center of the educational endeavor. The principles of VsBME ought to be integrated in all elements, facets, and aspects of the education system. The main elements of the education and training process are (1) vision, strategic plans, and policies, (2) trainees, (3) trainers, (4) curriculum, (5) logistics, facilities, and systems Table 1.

Table 1 Integration of the concept and principles of VsBME within the most important aspects of education process

	The basic foundations of medical education	VsBME integration
1	Vision and strategic plans and policies (Epagoge)	Using solid information and different skills to maximize future possibilities & potential. Induction reasoning
2	Trainees	Their upbringing, needs, holistic development, futures
3	Trainers	Metacognition, self-awareness, internal strengths, role model, high standards
4	Curriculum	The curriculum should be designed to excite curiosity, incite knowledge and skills, and promote aspirations, ambitions excellence, inspiring, challenging, motivational and empowering. It should be founded on and built-in ethos, values, vision, and mission. Curriculum should be visionary, broad, balanced, appropriate, experiential dynamic and progressive
5	Logistics, facilities, teaching and learning-virtual programs	Physical space and walls will not limit universities and training centers of the future. Open sky and cross border virtual and hybrid training is becoming facts of life

2.1 Vision, Strategic Plans

The educators, programs developers, and healthcare stakeholders should make a plan for short-term and long-term health care services in the future. The number and quality of qualified high-specialized medical and surgical neurosurgeons and other specialities in every country and in every region should be properly estimated. The national administrations and health care stakeholders are responsible to distribute resources such as hospitals, clinics, and training centers, in a justified manner (equity of distribution of resources). The technological advancement and patients' needs should dictate the future of health care. The planner of the future health care should have a great deal of imagination, foreseeing, and envisage. It is vital for the success of health care systems to accommodate all or at least most of the expected changes in medical sciences, industry, economy, community of the society and population they operate in, and social fields locally or globally. The first superficial look may suggest that preparing for the future is somehow preparing for the unknown! It is not! The future is formed today and grown up of yesterday's roots. Therefore, better knowledge about promising research, inventions, and innovations will help a lot in predicting the future. A strong strategic plan helps all levels of health care systems, no matter how large or small. The strategic plans should be based on good human values and respecting the patients' needs and trainees' dreams. The strategic plans to build an efficient health policy should develop within a mechanism to correct any violation of values and breaching ethics.

World Health Organization's (WHO) definition of health policy is: "A formal statement or procedure within institutions (notably government) which defines priorities and the parameters for action in response to health needs, available resources and other political pressures" [1].

The impact of external forces on medicine and medical education is tremendous and shapes dramatically the future education and training systems. Emerging drivers of change include (1) the economic forces and resources distributions; (2) artificial intelligence, big data, and information technology; (3) the competency-based, time-variable medical education (CBME), flexible (custom-made) curriculum and training systems; and (4) the use of new emerged methods of teaching, learning, and assessments, which include virtual learning, simulation, and surgical skills assessment, should be clearly spelled in the future designed curriculums.

It has to be very clear in our minds that the main core values of medical practice and medical training and education will always remain constant, which is serving patients and providing best possible care. Patient is the center of care, and patient's well-being is our main concern. This is the noble contract and sacred trust physicians should have with their patients. The medical educational and training at the end should meet social needs embedded with these values.

2.2 Trainees

The trainee is the center of the education process, and the trainee is the core of VsBME concept. Every generation has its own merit and characters. Today's young generation is not the same as the older generations and most probably will not be the same as future generations. Therefore, it is wise to talk to the younger generation in their own language, approaching them using the tools they master and guide them to follow the ethics and principles of values of medical practice and medical educations (VsBME) by modeling. The aim is to graduate an ethical, safe, skilful, and knowledgeable surgeon or physician with the vision to be able to deal with unknown future developments in an ethical and scientific way for patient's benefit and well-being. Every trainee wants to be successful and happy. This chapter is not discussing how to pursuit of happiness in general or even of work-life balance [2]. However, this is a discussion about happiness at work or job satisfaction and its link to success at building up a successful career as it is relevant to success of training programs. The confused question in most of the trainees' mind is which comes first happiness or success? In addition, what is the relationship between happiness and success? Is happiness a prerequisite of success? Is success a prerequisite of happiness?

Success is not prerequisites of happiness however, happiness, or at least finding joy in your job is a prerequisite of success. Happiness and satisfaction come first. Of course, achieving goals and reaching dreams are not the only benefits of being happy [3].

Happiness is not unconditional. However, it should not be contingent on work alone however, success is a matter of having vision, dreams, drive, making the right choices and decisions, setting a realistic plan, hard work, patience, perseverance, and self-reliance [4, 5].

Speaking of success, the best measurement of your success is your own personal scale. Once you understand what the true success means for you, you will be better able to set your own goals and more power to achieve it. Metacognition, self-awareness, and reflection are essential skills and value to help the trainee to develop. What do you need to find and develop within yourself to be successful? The answer comes from looking at those who have created success in a variety of fields. These traits may sound simple, but they lead to remarkable results.

Residents and trainees need help sometimes to identify their strengths and weaknesses as part of the practice-based learning and improvement competency. Metacognition skills enable performance judgments and cognitive control necessary for practice-based learning and improvement and to be a successful neurosurgeon or surgeon where these fields are full of stress and disappointment moments. Metacognitive skills are rarely and infrequently included in training programs. Therefore, it is important to train the trainees and the program instructors as well to learn and master the metacognitive skills. The techniques to enhance trainees' metacognitive skills include reflection, feedback, questioning strategies, and think-aloud [6].

2.3 The Trainers (Training and Program, Instructors/ Teachers)

Teachers, trainers, and program or training instructors have the most significant impact on the new developing physicians and surgeons and the future of medicine in next generations.

It has been debated for a long time; who should be prepared first, the trainers or trainees, in order to achieve the goals of the education process and plans? It is logical that teachers and training instructors should be prepared first and trained for the task they have to perform. *Maria Montessori* once said of teaching children before "The preparation for education is a study of one's self; and the preparation of a teacher who is to help life is ore that a mere intellectual training, it is a preparation of character, a spiritual preparation" (Montessori, M. *The Absorbent Mind 2014*) [7]. This is too true of the trainers of medical professionals. Teaching is not only transferring knowledge and teaching young neurosurgeons and other medical practitioners needed medical and surgical skills. Teaching is helping, guiding, and actively mentoring the trainees and perpetuating their enthusiasm, energy, and zest for life. Teaching, coaching, training, and monitoring are noble responsibilities, should always be based on ethics and good values. Teaching and training are difficult professions that require regular updating and mastering the new teaching techniques and information and communication technologies. Currently, as the technologies are changing very fast and beyond expectation sometimes, the teachers and training instructors are continuously challenged to have to prepare their trainees to cope and handle a technology they never have to know. Therefore, fostering a new concept and methods of teaching to teach what the trainees may face in their career and future has become mandatory. This particular task causes significant strains and worries. Neurosurgery is a difficult field of surgery, and the outcome of surgeries are sometimes unpredictable. There are always moments of chaos, frustration, and emergencies. The reaction to these situations cannot be planned nor choreographed. Observation and practicing and of ethical principles and concepts can help program directors, instructors, and teachers to become aware of their "ethical" behavior when such events [8]. Therefore, trainers, teachers, and program instructors should learn how to build their own inner strength to ease such sometime unbearable stress. The trainers, teachers, and program instructors should teach their trainees to process the giving information into knowledge. ***Teachers give information but the receivers of this information only gain knowledge when the information is processed and contextualized and used in their daily practice.***

3 Value of Metacognition

The value of use and mastering the metacognition process is to help us to understand ourselves better and make more sense of our experiences. Doing so will help us to be able to help others.

This process enables faculty staff, teachers, trainers, and instructors who have a concern for self-development to be able not only to catch up with new technological, information, and educational developments, but also to be one-step ahead to have a vision to seeing the future and prepare the trainees for that future. Understanding clearly ourselves is of a profound significance, as it affects our goals, plans, and delves into what it is to be a good human and our interactions with others. The trainees should capitalize on problem-solving, communication and teamwork skills, as well as equipping them with vision, wisdom, capabilities, and a more accurate awareness of themselves so that they can become increasingly independent, authentic, autonomous individuals, and able to handle what the future may bring [9, 10].

4 Transferring Experiences

It is possible to obtain information from books or literatures, but the individual valuable experiences of experts and faculty staffs are usually not written in books. Therefore, the best source of those valuable and unwritten experiences are the experts themselves via direct communication observation and dialogue with them in every possible occasion.

5 What Does it Mean to Be an Ethical Teacher/Trainer/Program Instructor?

It is common that some of trainees look at their teachers, trainers, and instructors as role models to follow [11]. The teachers and instructors must be aware about that fact, so they have to observe carefully the core of ethics and ethical principles relating to virtues such as care, empathy, honesty, justice, fairness, willingness to give, integrity, appreciating, courage, vision, respect, responsibility, and reliability. The teachers and instructors should be aware that their trainees unconscionably and consciously would be modeling themselves and learning from the behavior and conduct of their trainers, mentors, and role models. This fact well demonstrated and illustrated by learning theory and social power theory as one of the effective methods of human learning and gaining experiences [12]. Virtues should therefore guide conduct and interpersonal relations with trainees, students, and colleagues the training/program instructors ad trainers's knewledge, observing, practicing and implementing the ethical principles and concepts in the daily work and activities are the best ways to teach ethics and professionalism to all trainees (Role Modeling Method).

6 Professional Ethics and Professionalism

Professionalism describes an attitude and behaviors of professionals. Creuss et al. in 1999 [13] concluded that professionalism is a social contract between professionals and society. Professionals contribute professional knowledge and skill for the benefit of society in return for trust, status, and economic reward. Medical teaching and learning professionalism in this context encompass all qualities obtained and expressed to conduct or perform teaching tasks and medical duties as described by the belonging universities, institutes, colleges, and hospital and as expected by the society [14]. The professionals need to be self-regulating, accountable, and successful in delivering expected services to uphold the contract. Vice versa, society needs to respect their commitments to allow professionals to deliver their services. One of the most important steering-mechanisms for professional self-regulation is professional ethics.

7 Professional Ethics

Professional ethics is the use of knowledge and skills to teach and train medical trainees and in the same time, providing patient care governed by the ethical code of working place [15]. It is a sort of moving from abstract values to daily behavior of individuals in their workplaces or societies.

The medical professional should observe and practice the utmost level of values, ethics, and standards of medical professional in their medical societies, organizations, and [16]. The medical professional has to continuously gain and update their knowledge and skills in order to improve their career and subsequently the patient's care as the concept of Values-Based Medicine (VsBM) clearly illustrated these tasks [17]. The medical researchers strive for finding facts either in deductive or inductive ways. This research effort should be ethically and professionally performed according to the research ethical codes [18]. The ethical relativism should be respected and considered as a trainee's culture, or backgrounds may differ from cultures and background of their teachers [19]. The core of professional ethics can be described in many ways, but in this context the caring, teaching, and training trainees within the concept of Values-Based Medical Education (VsBME) are self-evident.

7.1 Curriculum

The future curriculum developers and postgraduate training instructors are floundering under the weight of trying to reflect and envisioned the ever newly emerged scientific and medical information and technologies and to graduate able the

trainees to be able to handle and face such changing medical field in order to provide the best possible medical care. The future curriculum should address all the major new or expected information, communications technologies, and the need to adapt and change with the rapid globalization of medicine, such as and for first time in history of medicine a surgeon will have the opportunity and facilities to operate remotely (robotic surgery) on a patient halfway across the world. The introducing of different applications of augmented realities, such as metaverse may change the methods and concepts of current training remarkably. The curriculum is one of the most important elements of education system. Curriculums should clearly express and address the educational and training conceptual philosophy, aims and strategies of the governing authorities, health care stakeholders and present a broad vision for the future education. Some educators consider that the curriculum is the platform to produce a contract between the trainees and their trainers and institute or university where the curriculum is used. Implementation or use a specific and detailed curriculum may be differ from place to place according to the available resources, facilities, and logistics (Fig. 1).

The future postgraduate neurosurgical/ medical curriculum should encompass several issues such as (a) learning medical and computer technologies, (b) assessment of competence, (c) the use of simulators and e-learning, (d) competency and performance-based assessment, (e) portfolios and self-assessment, (f) ethics/values and professionalism in medical education.

Training of the trainer is an essential part of the education process that keeps the trainers knowledgeable and skilled in up-to-date forms. The basic elements of a training curriculum should envision the future neurosurgeon, future facilities, and

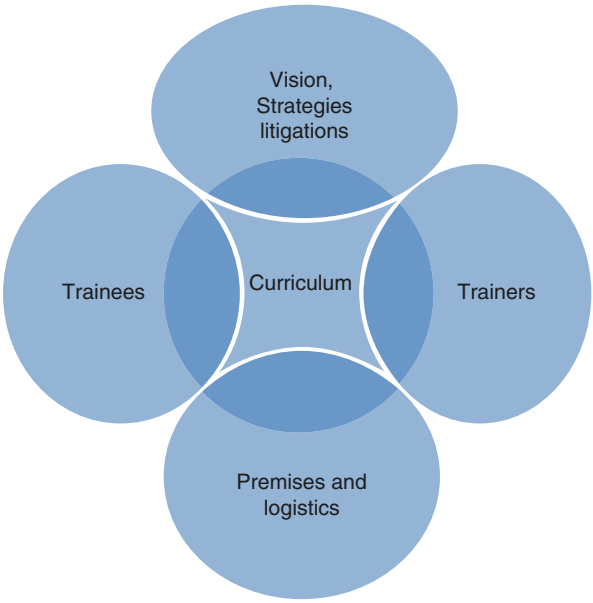

Fig. 1 The interaction between some of the most important elements of postgraduate education and training. The curriclium is the core and reflection of the education system

future technology. Emphasis on the patient's safety and well-being is the center and core of both neurosurgical education process (VsBME) and Neurosurgical practice (VsBM). The future curriculum will consider and incorporate these 11 educational, training, and medical/neurosurgical practice elements, which are:

1. Territory of the curriculum—Local or global or regional training programs

   There are very important questions which should be clearly answered before any attempts to design a curriculum, which are (1) For whom is this specific curriculum, written? (2) Is this program, developed as local program or international program? Different countries and regions have different facilities but all share the same aims and educational values. There are important logistics; economic, political forces should be involved in order to have a successful training program.
2. The future curriculum

   What does future curriculum mean? Does it mean; writing a curriculum to be used for coming 5 years, or 10 years, or 20 years? Definitely, the education and information technology will be very different after 20 years and may be beyond our current expectation. Envisioning graduate neurosurgical training programs in 2030 may be different from envisioning the graduates in 2050. The facts are facilities which will be different and technology definitely will be revolutionary developed. However, patient will always remain the one who needs care and the center of any medical and the trainees who have dreams and keen to learn will always be the core of the educational process. Trainee and trainee's benefits and dreams will always be the core and sole of the training endeavor.
3. The entry and admission to the program

   It is logical to think that new knowledge, skills, and attitude requirements are needed for whom may enter that training programs. Therefore, it may be required that the trainees should participate in different courses to gain extra curriculum skills and prove their abilities to be enrolled in the future training programs.
4. Structuring a curriculum for neurosurgery/surgical/medical training program

   The structure of the programs would be in the form of modules to accommodate different types of trainees. The program should focus on how to use and manage information obtained rather that memorizing data, for example, instead of memorizing suggested doses for various medicines learning to reliably and efficiently look up this information up and use it.

   How to use the emerged information and communication technologies as; artificial intelligence (AI), to master how to obtain the data or right information in the right time for the right patient to provide the best possible management of the medical disorder. The traditional memorizing skills of all or most of data will fade away and replaced by mastering the use of information technologies and AI in a real time. The priority of training is to focus on the process of medical problem-solving over that of acquiring knowledge, information, and changing mind set up. It is necessary to integrate different approaches of medical teaching and training.

5. The final and continues assessment

   A second look and deep thought is needed to revise the current methods of final, end of program, promotion, and progress through the program assessments [20]. Some new methods have been suggested such as longitudinal assessment of resident or trainee performance using fairly documented professional activities [21]. Ongoing assessment methods based on accumulating daily activities and achievements data through the whole years of the program, instead of one final, summative examination at the end of the program have been suggested as well [22]. The incorporation of Artificial Intelligence (AI) and other processing infrastructure to gather data can be used for fair assessment and continuous assessment [23, 24] in such programs, which incorporates different modules, the time in training is possible to be flexible to reflect the trainee's achievement of desired competency. A professional time-variable, competency-based approach will require seamless competency-based assessment portfolios that span the continuum of medical education. In surgical programs like neurosurgery training program special attention should be given to teach the trainees the fine microsurgical skills. These skills should be evaluated and examined. The continuous surgical skills assessments are mandatory and logical to guarantee and certify that the graduated neurosurgeon is a safe surgeon and has the ability to adapt and obtain new skills, regardless of how long time may take them to achieve that goal. Several new methods have been suggested in that respect [25, 26]. Ethical, professional, and attitude assessment should be included in the final assessment based on the performance and attitude through whole program.
6. The exit of the program

   The hope for the future certificate is to legalize and permit the graduate to practice locally or globally. However, several unavoidable political and economic issues should be solved before achieving that dream. The rapid changes in the technology and medical information and industry and introduction of telemedicine, tele surgery, robotic surgery, augmented reality, and metaverse in cross borders patient's managements require introducing a conditioned global licensure and frequently renew licensing and attending updating course every couple of years.
7. Researcher ad scholar

   The medical scientific research is the main factor for forming a platform of developing new future of medical practice. The future structured curriculums should give enough time for the trainees to perform scientific research.
8. CME and mentorship

   It is a fact that the graduation of the program is the only step forward of lifelong learning and training journey. Mentors will have an important role supporting and guiding the trainees. Therefore, it is necessary to integrate the mentorship in the future training program, as mentorship will continue beyond ending the basic training and obtaining a certificate of graduation. The concept to have a lifelong open curriculum and program is about to be crystalized.

9. Universal professional attitude

   Developing of a professional attitude, adherent to the medical values (VsBM and VsBME) and the realization of participation to serving societies, national and human medical services by increasing the orientation about different neurosurgical disorders and the different option of management.

10. Virtual University and virtual programs and telemedicine, telesurgery, metaverse

    It is highly probable that the virtual universities and virtual programs beyond the walls of universities and hospitals campus and crossing borders will increasingly developed and have significant roles in medical and neurosurgical training and education. The stakeholders, curriculum developers, and health care planners should be ready for what is coming and find ways to regulate the introduction of virtual training, augmented reality in medical education and medical services. The future of medicine and surgery is carrying several major changes, which will have a major impact on medical educations and medical services. Such emerged methods include the wide use of augmented reality either in operating room or in the labs and the development of educational metaverse. Telemedicine and telesurgery (robotic surgery) are successfully tested. Such technologies will keep developing. It is so important to realize that university education could be virtual programs and training could be virtual, doctors and surgeon, nurses and paramedics could be robots, but patients are very real and will remain real human being seeking help.

11. Auditing and Editing and updating the curriculum

    Regular and frequent policies for feedback and auditing of the curriculum and the training program are necessary to catch up with emerging new technologies and changing policies of education and medical practice.

7.2 Education, Training and Practice Premises, Logistic, and Litigations

The technological advancement of communication, information, and medical industry opened the sky widely, crossed borders and demolished barriers. The future modules of education and training are foreseen to be in hybrid education forms in near future. However, in relatively, far future the education and training will be mainly virtual using simulation, e-education, and e-learning. The introduction of augmented reality implanted brain microchips and metaverse will revolutionize the methods of education. These predicated moves require myriad of logistics and litigations. The aims of global education and training have to be redefined. The digitally communicated educational and training centers have to develop standards and minimum requirements for training centers wish to be included in such global projects. The entry and exit of the programs should be regulated. The curriculums have to be re-written to be able to be implemented and used in different education and training premises beyond the walls of the universities. The licensure of medical and

neurosurgical practice has to permit practice outside the license's issuing countries. Medical litigations and accountabilities for any shortcoming or unwanted outcome events should be reconsidered and carefully legally documented. The patient's safety and well-being should not be compromised by the use of any emerged new medical systems as it was expressed in the concept and principles of Values-Based Medicine (VsBM).

8 Discussion and Conclusions

The awareness regarding ethical, professional, and safe medically/neurosurgical practice and training have been globally increased. The code of ethics and patients, rights are produced in different forms and shapes, however the contents are almost the same which are protecting patient's rights and emphasizing on the necessity of patient's safety and respecting patient's autonomy and dignity [27].

Education of all values and ethics are those which guide the education processes.

It is predicted that virtual or hybrid medical education and training and virtual universities will play a significant role in the future education and training. It is possible to have robotic surgeon or neurosurgeon to operate or examine and manage case, and it is possible to have robotic nurses and paramedical. It is possible to have virtual clinics. However, patients are and will remain very much real with blood and flash seeking medical help to save their life and reduce their pain. Patients' have and will continue have rights, and the most noble duty and task of the medical profession is to serve these patients. Therefore, the values and ethics have to be integrated and guard every step of medical practice. The trainees and medical students have to learn these facts and be trained to carefully observe the values and ethics in their daily practice or research work. The Robotic or co-bot, implanted microchips introducing in medical practice is creating an ethical debate, which need to have a global consensus how ethical and professionally regulate the use of these important emerged technologies and not to hinder their development. It is necessary to ethically, professionally, and legally regulate such new tools, which may affect patient's life and well-being. The impact of external forces on medicine and medical education dramatically shaped their views. Four main drivers of change have emerged: (1) economic forces; (2) big data, artificial intelligence, and technology; (3) competency-based, time-variable medical education (CBME); and (4) teaching, learning, and assessment. The revolutionary development of information and communication technology, augmented reality, metaverse, robotic surgery, telemedicine, Machine Learning in medicine (MLm), and e-learning have seriously challenged ethicists to develop new ethical codes for medical education [28]. Brain computer interfacing and intracranial implanted microchips are not science fictions anymore, the technology exists and keeps developing and has been tried in a few humans. So far there is no ethical code for those procedures. The concepts and principles of Values-Based Medicine (VsBM) and Values-Based Medical Educations (VsBME) are introduced in order to accommodate such developed current and

future technologies which may have impact on medical practice and medical teaching and training. However, there is a great need to reach a global consensus, agreement, ethical, and professional guidelines. May be WHO or UN should carry on such important tasks.

Patients' have and will continue to have rights to be efficiently treated, and their dignity autonomy should be always respected. The most noble duty and task of the medical profession is to serve these patients. Therefore, values and ethics have to be integrated and to guard and guide every step of medical practice. Trainees and medical students have to learn the ethics of their profession. The trainers and program leaders should carefully observe the values and ethics in their daily practice or research work.

The nature of neurosurgical problems force neurosurgeons to face their patients' families in different emotional situations; frustrated expectations, disappointed with outcome, confused, denying or angry. Neurosurgeons should learn the skill to have professional and ethical relationships with patients and their families. Patient should not only be informed about the details of his illness but also should be a partner in making decision related to his case. Patient's family can be a very positive part in their loved one's management. These are necessary skills every neurosurgeon has to be trained for and master.

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