ULTRASOUND EDUCATION AND TRAINING IN INDIA-HOW WE SEE IT

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ABSTRACT

The status of standard of ultrasound in India is at par with rest of the world. Routine specialized or interventions anything you name it is done here. Here are many associations which conduct regular conferences, workshops, symposiums etc. We are here to share our views and will try to put few inputs for the betterment of the present scenario. Methods: There are four major players for the proper functioning (1) Radiologist & Sonologists (2) Hospital / clinics / referring doctors (3) Equipment industry (4) Government. We will discuss their roles. Conclusion: Keeping this in mind we are here with our way of seeing the scenario by thinking of the situation in 360°.

KEYWORDS

Ultrasound, Radiologist, Sonologist.

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INTRODUCTION

The status of standard of ultrasound (US) in India is at par with rest of the world. Routine specialized or interventions anything you name it is done here. Here are many associations which conduct regular conferences, workshops, symposiums etc. We are here to share our views and will try to put few inputs for the betterment of the present scenario.

There are four major players for the proper functioning - (1) Radiologist & Sonologists (2) Hospital / clinics / referring doctors (3) Equipment industry (4) Government. We will discuss their roles. Government is having major role as it is the one whose guidelines and official procedure we follow.

The most common mistake is to over promise and under deliver. We inflate patient’s expectations through exaggerated claims and testimonials, at the same time we do not invest in improving quality of delivery.

This results in negative experience of patient. If hospital keeps the patient first, the staff is inspired to be proactive and serve the patient well. It generates locality in patients, making the hospital their preferred choice for all their healthcare needs. Patients experience is synonymous with transparency, value, ethics, trust & empathy. Good marketing helps bringing patients to hospital first time, after this is over to healthcare delivery & the experience to ensure patient’s satisfaction.

Patient’s preference to hospital is due to clinical quality and care they receive. Ensure that patient feels wanted. Encouraging patients to give feedback & providing the proper guidance helps create a positive impression. Post visit communication and feedback from patient should be done and use this to improve quality of healthcare delivery. We should also look for bedside manners with patient like friendly employees, physical space & positive atmosphere. Strong first impressions & take care of attention to details when communicating with patient for the first time. Shorter waiting time is to be managed to start with and tell in advance about estimated time to see doctor, their turn & when reports will be ready. We should stick to these with every patient. Basic quality of care & the experience should be so compelling & comforting that the patient should not feel like going anywhere else.

Indian healthcare system is not good due to low gross domestic product (GDP) 0.9 % on healthcare which is expected to be about 2.5% in next five year plan. Primary Health Care (PHC) system is also not functioning as it should be. Doctor & population ratio is poor with lack of proper regulatory mechanism.

Healthcare infrastructure & other indices are showing poor performance. To change the healthcare system this is drawing much inspiration & respect. Despite global recognition of our doctors & nursing care, boom of hospitals and high tech equipment & increased awareness about quality & accreditation.

Pre hospital care i.e. Emergency care should be available & affordable. There is 1 trauma related death every 1.9 min. About 30% patients’ loose lives on site and 80% succumb to injuries within the first hour i.e. “GOLDEN HOUR”. Pre hospital round the clock emergency care requires coordination between General Practitioner (GP) & hospital, Road Traffic Accidents (RTA) emergency care if timely given prevents complications, disabilities & death. Our mission is to make quality healthcare affordable and accessible.

In spite of all said Indian healthcare system is very unique and different from other countries in the world. Here patient pay for healthcare system and therefore demand the best at the lowest possible costs. However in other countries the government pays for the healthcare system and are somewhat disconnected with the doctor and the patient. In India the patient knows, doctor knows and the proceedings...
demand transparency. Any healthcare system with the patient at the centre or at the most important factor is a good healthcare system. India does have the world’s most affordable healthcare system with many medical procedures done at par with international standards and at a comparatively low cost. We have to innovate newer technologies, and solutions like mobile technology, telemedicine etc. to ensure people in smaller towns and villages get the same quality as in urban areas.

Low cost, high-end-technologies that ensure mobility & access. Government role in healthcare is of utmost importance. The government can pair with manufacturer or become a provider of healthcare facilities itself. The most successful model world-wide is the one where the government partners with the manufacturer and healthcare providers to extend healthcare facilities to more and more citizens under their control. Government is doing a lot to help improve the situation in villages and small towns. There are projects undertaken to encourage women towards approaching quality maternity care (MC) for safe delivery. National Rural HealthCare Program has undertaken a number of measures to improve healthcare in villages.

Public Private Partnership (PPP) is good way to provide advanced technology accessible to more people than out rightly investing in them. The Indian healthcare industry is blessed with a handful of dynamic professionals, who go beyond their purview of professional work towards augmenting and redefining archaic industry standards and regulations, thus giving a new thrust and momentum. Novel efforts require innovative thinking and learning from the success of others, and that’s what we are doing.

While on topic of innovation, a novel concept of group practice is seen an emerging trend in the industry and it holds the promise of enhanced patient care. In this doctor utilize collective skills and experience to handle complex cases. It also enhances patient confidence. It gives patients the opportunity of a second opinion and mutual consultation as a group.

It utilizes collective skills and experiences to handle difficult and complex cases. It also enhances patient’s confidence. Health & hygiene are a clear priority for the healthcare sector, but it’s also important to create a comfortable environment for patient, good working conditions for staff. It should be forthright and non-tolerance for non-compliance. Short term plans, medium term plans for next two years and long term plans.

**MATERIAL & METHODS**

There are certain things that don’t need to be reinvented like the wheel. But once in a while someone transforms an everyday object no one thought could be improved. We are here thinking in all directions to understand US training in India. We consider it as it is 360⁰ thinking with 4 equal quarters which are helping each other’s for caring of a large population of our country. These are (1) Government (2) Radiologist or Sonologist (3) Hospital, clinic & doctors (4) Manufacturers of ultrasound.

1. **Government** – Plays a crucial role in formulating some rules and regulations which are to be followed by other quarters. It says for registration of our degrees, clinic, hospital and licenses for the industry etc. It plays the major role in primary health care (PHC) to owing and using an US machine.

2. **Radiologist or Sonologist** – There are various centers in India who are involved in US education and training. Since we are associated with medical colleges where we have learned and are educating others it is the best place. In medical colleges we get chance to learn well due to constant supervision of seniors, variety and large number of patients. When we started every patient is an experience to us.

We show each & every case to our senior faculty. Every time we exchange knowledge with seniors. Daily we do read books about the proper methodology starting from anatomy to diseases. During this time regular seminars & journal clubs help in understanding. We are also supposed to show live demonstrations of US procedures to our faculty. We are also doing grand rounds. We do portable ultrasound & some interventional procedures. During those days we attend a number of academic activities, workshops, symposiums & national and state level conferences which widens our horizon. PGs are attending monthly meetings of the city branch of radiology. They are presenting paper & posters in local, state or national conferences.

They do start writing papers for publications. Daily we have morning and noon sessions for discussions of cases. Initial step for the beginner is to understand basics of the US, transducers, physics and knoology and observation only. Regularly we have sessions with histopathology & forensic departments. Follow up of cases with obstetrics & gynaecology (OBG) and other departments including post-operative findings. US related programs like spotters, quiz, and grand rounds, case of the day or week and panel discussions. Immediate follow up of our case if computed tomography (CT) and magnetic resonance (MR) is done can make us understand our diagnosis. Regular weekly and monthly programs held in our department like live demonstration, seminars or journal clubs. We maintain a departmental museum of cases.

We have a good library where number of books, journals & e books are utilized. We are in constant touch with updates due to internet facility. Mentors are there every month on rotation basis to guide postgraduates. All are encouraged for attending regular continuing medical educations (CME), workshops, conferences and various refreshers courses organized by us or elsewhere. Pre exam- tests at medical colleges or any other institutes or centres (Table -1). Visit to any other centre of excellence like neurology, infertility, cancer etc dedicated for learning programs. Tele radiology is very much utilized in our city and our postgraduates are also taught about it. Interventions procedures are done in our department by seniors and latter by PGs under supervision.

Patients are seen and reviewed afterwards in wards. We come across few problems like clinical information from the clinicians about the patient. Other good thing is when we learn radiology and ultrasound in diagnosis disease. Knowledge of radiology and ultrasound helps us in understanding CT and MRI. Now we start thinking in all directions about patient’s problems & confirm diagnosis. US is tough that is why it is operator dependant. Newer diseases like computer and mobile phone related Repetitive Stress Injuries (RSI) & Text Message Injuries (TMI) are making us more aware. We also notice that other than radiologist other specialty physicians are not aware except some orthopaedicians.
The referring doctors and sonologist also keep update in their respective fields. They are encouraged for attending various training programmes. Training programme for hospital staff & its impact are on job training and coaching on understanding the method. Job rotation, lectures, programmed learning, AV based training, simulated training, computer based training & electronic performance support system. The first step towards cure is to know what the disease is. With whole new ideas & innovations, the medical fraternity is doing regular knowledge sharing by attending many a medical conferences.

Majority of conferences spend a considerable time finding new avenues of hopes, solving many emergency challenges, opening new windows of practical wisdom & of course, making steps to induct those values into our profession as well as personal life at different levels.

(4) Manufacturers - They do good work and come out regularly with new models and upgraded technology. Many international companies have manufacturing and research units in India. Majority has good maintenance and spare part services. Some parts of our country mobile vans are fitted with US and they go to even small villages in remote areas. Trade exhibitions are regular features and are having large number of people visiting to see newer models of various companies.

**DISCUSSION**

We are here with our way of seeing the scenario by thinking of the situation in 360°(Table-2). Diagnostic imaging is a long standing & successful area of innovation & certainly a mainstay for improving diagnosis and therapy. This way ultrasound (US) is safe, better and gives optimum deliverance. Ultrasound machines are ubiquitous and are commonly found in medical establishments of surgeons, obstetrician & cardiologist. Demand for ultrasound is spurred by expanding clinical utility, availability of high quality solution, prompt maintenance & repair services. Innovations in ultrasound machine continued ceaselessly, driven largely by increased demand for advanced high-end ultrasound equipment from hospital care facilities. Compact ultrasound machines and handheld systems are recording rapid growth.

Four major components we shall be talking about based on our experiences—

(1) Government is the backbone of anything healthcare related done in our country. In spite of whatever people say they are the one taking health care from grass root to corporate level. Health care with time and due to technology have tremendously changed the milieu of medical imaging. It has transformed the way how medical illnesses are measured, managed, diagnosed & treated. Time has arrived when the healthcare has progressed both in quality & efficiency. Make quality health care affordable & accessible. As emergency cases are raising due to epidemiological and other reasons ambulances are accorded a high priority by health care providers. It is required to increase their numbers, impart proper training to man power & incorporate technical advanced devices in ambulances.

This will take care of “The Golden Hour” & “Platinum Ten Minutes” which typify the importance of EMS (Emergency Medical Services) all around the world. PHC is a person’s first point of contact with the healthcare system. It comprises 3 aspects of basic healthcare i.e. Preventive, Promotive & Curative. Good primary care with a comprehensive preventive strategy clearly leads to better healthcare outcomes with lower costs. In India there is 17% shortfall in healthcare subcentres and 18 % shortfalls in PHCs. Government doctors 76 % in PHCs & Community Health Care (CHC). There are much less specialist’s doctors than needed. There is considerable dearth of qualified PHC physicians. It puts us well behind other developed nations. PHC is quite fragmented across the length & breadth of the country, with urban areas doing slightly better than rural belts.

Villages are either deprived of basic care or have poor quality services. New Health Care (HC) programme stick at the root. India is slowly waking up to end the need for preventive healthcare. Future of our health sector largely depends on success of our Primary Health Care (PHC) program. The primary prescription is the only way to improve country’s health woes is through Public Private Participation (PPP) for offering healthcare at the grassroots. A nation’s scale of development is not measured by its GDP but by it’s literacy level and its citizen’s access to basic healthcare. Well developed and thriving PHCs are the biggest indicator of a nation’s overall social & economic wellbeing. There is involvement of government in all issues be it industry, hospital, clinic, training.

There are various issues for them we do not want to comment. What we can say that government can utilize services of all doctors irrespective of their age in PHC. This will help the doctor, pt & govt. There should be proper salary; respect & it should be near to their respective town. The duration can be 1-2-3 years.

(2) Radiologist & Sonologist - Radiologist or sonologist are doing US in India. Sonographer’s role in this country’s scene is non-existent. If patient needs other invest like CT or MR or to perform any emergency intervention radiologist can handle better. When we started ultrasound it was about three decades ago. We were told that sonologist is a person who has done nothing else but ultrasound for three years, but we still feel it holds good rather correct. It was not easy to learn then.

Now if we look it has grown in all directions. With advancement in technology & its varied indications it has penetrated more than x-rays. If you have a transducer in hand you can do justice. If you are watching others doing scan it will not give you that feel. So that is the reason ultrasound is operator dependant and omnipresent like mobile phones. Regular training programs for all helps in unlocking people’s potential by attending or organizing such events. After that a more satisfied and productive staff improves patient care levels, thus generating higher patient scores, decreased patient’s length of stay and improving self-performance. Hospital expects its staff to be self-motivated, take initiative, show willingness to work long hours & be service oriented. The first step towards cure is to know what the disease is.

With whole new ideas & innovations, the medical fraternity is busy in knowledge sharing as many conferences are organized which are US related. Majority of them spend a considerable time finding new avenues of hopes, solving many emergency challenges, opening new windows of practical wisdom & of course, making steps to induct those values into our profession as well as personal life at different levels. When we are in doubt, the exam begins. Academic conferences are one of those platforms to cross examine our knowledge base,
Besides open up our minds to mainly previously uncharted doubts as a result of exposing ourselves into new realms of practical & academic wisdom. We know knowledge can only alleviate uncertainty over any topic. Every annual conference to keep abreast of your changing tastes.

Once we are out of medical college after 2-3 gruelling years. You are confident as you had 360° exposure. You also come to know other imaging modalities during these years like CT or MR you are more confident & can take up challenges independently. You can face the world better than non-radiologist without hands on experience. We start as fresh in clinics or hospital; we have to continue seeing patients and keep learning to get expertise. Once again we get interaction with different physicians & this time we start thinking of doing either selective ultrasound like OBG, MSK etc. or all of them subject to the place of work. Ergonomics is little taught but we need to know ergonomic designs pertaining to height adjustable and our right posture in doing US or using computers. Ergonomics helps to reduce Repetitive Stress Injuries (RSI) & Text Message Injuries (TMI) among operators.

Since we do lot of cases of these newer diseases we are able to explain precautions to avoid suffering and future debilitating results. We also tell to patients about this so that they can get better of pain and will not go for useless investigations as majority of physicians or sonologists are not aware of this. Telemedicine or to be specific teleradiology is upcoming information & communication technology. It has started well by few centres and is increasing its horizon. It is useful for healthcare delivery to rural & remote areas. It is helping in education, training & management in healthcare sector. Indian Space Research Organization (ISRO) is providing help by geostationary satellites. Foetal sex determination has been related with our nation’s people’s mind whether educated or uneducated.

Large numbers of Indians are abroad and those country’s statistics also suggest that Indian patients go for more sex determination & abortion than other nationalities. As we do not practice this thing but it is done in our country is against law. The problem can be solved by government or doctors? No, we feel it is more to do with our population’s mind. We hope time will come but is not seen in near future. Risk to benefit ratio of US with multiple probe options has greater versatility. Low cost and ease to access has allowed unqualified people to use. Such use cause incorrect diagnosis & increased burden of investigation. Waiting time for patients is very disconforting. Best way which we follow that is as soon as patient comes to reception. We tell them about instructions and also about waiting time, it avoids a lot of problems.

We do take-up every patient as per number. When we are in doubt the exam begins. Academic conferences are one of those platforms to cross examine our knowledge base, besides open up our minds to mainly previously uncharted doubts as a result of exposing ourselves into new realms of practical & academic wisdom. We know knowledge can only alleviate uncertainty over any topic. Every annual conference to keep abreast of your changing tastes. Some US training centres in first 6 months teaches registration, anatomy, forensic and observer ship for 2 months on grey scale. Next 2 months hands on training in grey scale US. Next 6 months on rotation basis abdomen, pelvis, obstetrics & Doppler is taught.

There is examination after 18 months which involves spotters, anatomy & hands on.

(3) Hospital, clinics & physicians - Patient’s experience with hospital depends on few factors. Most important is physician’s good & caring attitude which should be in the form of short waiting time & convenience. The cost of procedure should be opaque, no waste of time and transparency from start. In considerable attitude of staff, doctor, facilities should be avoided. Lessons in innovations are like thinking simple. Change with time is very important often we come across senior physicians who simply lose touch with the changing times when they scale up or reach high volumes.

We should think like an outsider also to understand the situation and there are immense opportunities to learn from others. We should explain and understand the problem not simply suggesting solutions. In learning and progress we have sacrificed innovations to maintain status quo, what organization need is to take a lead and create such a culture so any new innovations will follow. We should focus on our core segment and ideas will flow. We should observe around us 360° don’t just see and keen observations help. Learning from our mistakes and failures is to be taken sportingly. We should get patients as our customers to participate by telling positives and negatives of our setup. We should look beyond and have a plan for the next 1-3-5 years in place to progress covering all aspects i.e. 360°

Our staff should be empowered to understand what is in our mind to have full devotion for the future development. We should look beyond medics as doctors are the stars of the hospital, but the support staffs too are critical to his success. Team approach in care delivery in an institution set up to ensure a congenial work environment. Health care delivery system in our country is still individual driven rather than system driven. Employee satisfies measurements which are set by the setup. There should not be punishment for errors. We must adopt the policy of constant and regular communication openness. This can be done by open house forums which will serve as a platform for staff to directly share their concerns and issues with management.

Employee recognition policies should be in place by encouraging team work with healthy environment. Incentives for our staff and families should be there. They should relax in between after a busy schedule. Doctors in majority comprises general practitioners of allopathic system and others like Homeopathy, Ayurvedic & Unani etc. also forms a large segment. Majority of them have no knowledge of US however they ask for the procedure without clinical info and diagnosis. We have given lectures in their associations to make them understand and asked them to come forward to discuss with us on case to case basis so that we can do justice to patient that is our main aim. Majority of them asks for this test for marketing or monetary gains only. Many specialists are also asking the US without relevant indication.

Some of doctors who are doing scans are mainly obstetrics & gynaecology (OBG) specialists or short term trained sonologists. Since they do for their patients themselves is not a problem. There are many OBG consultants who are not doing themselves refer to sonologist and this lot is more knowledgeable about the procedure. Other lot is of cardiologists who are doing echocardiography regularly and are well versed in their work. Since US is continuously advancing to be abreast with latest is also not easy for all. Here every sonologist is doing day to day work whichever is
assigned. Majority are having only selected segment for US like abdomen-pelvis & OBG.

Most important thing here is that proper guidelines are not there to know who is senior or junior. In our set up a person who passes today is also consultant & who has 35 years’ experience is also. There should be cadre like in other countries where it can be seen as specialist, junior consultant, consultant and senior consultant. Ego is very much rampant in our minds, many of us think that we know all & a junior does know nothing. This reflects amongst GPs, consultants of various specialities & it includes our community. This is a cricket loving country where a sportmanship can be seen. So we think that by being sport, keep cool, keep feet firmly grounded will help ourselves and this will certainly be reflecting on caring of our patient. We can have a very congenial atmosphere with our staff, nurses & technicians.

Once we are relaxed & happy we can do wonders. They give no clinical info but want us to make a detailed report. Over all we feel there is over use of ultrasound. The physicians are not giving any details but want from us a detailed report of US. (4) Manufacturer – Have many challenges and number of opportunities in India. Biggest is acceptability of an Indian product by the government & corporate hospitals. Standard of Indian product with international products is different. Reliable and prompt after sales service is also an added advantage with Indian product. Furthermore after a technology has been shown to be clinically useful the extent to which it is adopted into clinical practice relies on several other issues, such as cost, reimbursement, ease of use, availability of training, and inter observer agreement & procedure duration.

They are more centred towards the people and hospitals where they get more contracts for instruments. For their improvement they do not consider any suggestions from majority of centres. There is no coordination, for feedback they do not come. They design new item well with pomp and show launch. For upgrading US technology advancement to be told to all concerned centres. All transducers of different companies should have same socket. Transducers we feel should be interchangeable. It can be used by any other make so sockets same in all. Convex 3.5 MHz (Mega Hertz) in all as the cost is less. What about doppler cost should be less. Company’s communication with all doctors is very limited. The need for any opinion for improvement in any component is non-existent.

Imaging does unimaginable things like advances in technology helped shifting healthcare from hospital to your home, it can improve preventive detection & treatment. Newer point of care ultrasound shows that it is easier to bring imaging to the patient instead of bringing the patient to the imaging. Future trends are having more memory for storing data. Transducer smaller and more insert able probe. For internal organs 3D needs further development & be more popular. Virtual real type display will improve. Amalgamation of medical science with latest in information technology (IT) has emerged as game changer. Hospitals across the country are trying to harness the power of technology.

Way forward medical electronics is paved with technologies that allow portability, connectivity & data security. System will be moving quickly from hospital environment to home environment. More demand for wireless connectivity, mobile health becoming benchmark. Changing scenario will improve image quality, easy operability and optimization in performance. Other desirable features of US should show reliability, good after sales service, low price of the instrument & multiple application features. Technology should help in diagnosis of disease and as Indian market dynamics is reaching new dimension we need day to day solutions by taking continuous inputs & help from other 3 quarters which we have mentioned. When cancer doesn’t discriminate between people, why should technology from us other 3 quarters. Newer US should become more accessible & affordable. US technology is a journey of discoveries, here if all quarters join hands more miracles will happen. Advantages of ultrasound portability are its ease of access to patient. In poor centred areas it becomes 1st line sometimes only investigation in peripheral remote areas.

In conclusion we would like to say that we have attempted to illustrate the various quarters which are actively involved in ultrasound learning process in our country. The manifestations of various diseases by our diagnostic model i.e. ultrasound is far superior to our therapeutic modalities and clinician judgments. Nevertheless we are bound by our ideals and the honour of our profession to use little knowledge we possess for the maximum benefit of the patients entrusted to our care. Once diagnosis is known treatment may have a sound & rational basis. Emergence of unlimited medical applications of ultrasound trends are changing with every season.

The way forward is a truly convenient system that provides information from wherever patient may be to a clinic wherever the clinic may be. You can continue learning with day to day experiences. US is a never ending story if we keep challenging success, it is forever evolving. Journey starts afresh again so keep exploring angles that others cannot with thinking on all quarters i.e. 360°.

"Excellence in doing a common thing in an uncommon way“ – Albert Einstein.

![Table 1: One way of ultrasound training in India](image)
Table 2: A wheel showing 360° ultrasound in India.