

# Ultrasound Education and Research in Developing Countries

Syed Amir Gilani

Director, IAN Donald Interuniversity School Pakistani Branch at Afro-Asian Institute of Medical Sciences  
Head, Department of Radiological Sciences and Medical Imaging, The University of Lahore, Lahore, Pakistan

**Correspondence:** Syed Amir Gilani, Director, Afro-Asian Institute of Radiological Sciences and Medical Imaging 626 Shadman-1, Lahore, Pakistan, e-mail: profgilani@gmail.com

## ABSTRACT

This experience based study was done to share the experience with the readers of this article as well as with the leaders of the modality in these countries and throughout the world of ultrasound. The need of adequate education and training in ultrasound exists in both industrialized and developing countries. In this study educational and training standards in twenty countries is discussed and it is recommended to start proper programs with global guidelines.

**Keywords:** Ultrasound, Education, Research, Developing countries.

## INTRODUCTION

Diagnostic ultrasound is an emerging imaging technology which is widely used in both industrialized as well as developing countries.

Ultrasound has found widespread application in anatomical imaging, blood-flow measurement and evaluation of physiology in almost all aspects of medicine.

## DISCLAIMER

This discussion is based on my personal experience after visiting 64 countries of the world in last 12 years. I have selected 20 countries from developing world including all regions of the world, regardless of their regional or religious origins.

I hereby declare that I do not have any objective to degrade or insult any country or its experts in ultrasound, rather I wish to see them better so their nation and ultimately the humanity can get better standards of sonographic diagnosis leading to best health care.

## OBJECTIVE

The main objective of this experience-based discussion is to share my experiences with the reader of this article; and the authorities in ultrasound.

I hope the deficiencies pointed out shall be taken positively to upgrade the knowledge of ultrasound in these countries.

## BACKGROUND

A WHO study group on training in diagnostic ultrasound, essentials, principles and standards met in Philadelphia, PA, USA, from 22 to 25th March 1999, to consider methods of improving the performance of physicians and allied health professionals who use ultrasound for diagnostic applications.<sup>1,2</sup>

## TRAINING IN DEVELOPING COUNTRIES

The need for adequate education and training in ultrasonography exists in both industrialized and developing countries. Moreover, the challenge of providing adequate training in ultrasonography is made more difficult by the diversity of its utilization, since no single medical specialty has a monopoly on its use.

### Current Ultrasonography Training

There are no detailed international recommendations or guidance for training those who are using or wish to use this imaging technique.

It was partly for these reasons that WHO prepared the manual of diagnostic ultrasound which provides guidance on the ultrasound diagnosis of a wide variety of common conditions at the primary and first-referral levels of health care.

Worldwide, it is likely that much of the ultrasound currently performed is carried out by individuals with in fact little or no formal training.

Further, the need for basic training is greater in developing than in developed countries.<sup>1-3</sup>

### Variations in Training and Practice

After completion of specialized training, many radiologists in the United States continue for an additional year of advanced ultrasound training.

In other countries, ultrasound training requirements may be more (e.g. Israel) or less demanding (e.g. Turkey). In nonimaging specialties, training requirements also vary. Scandinavian countries require courses of 30 hours of ultrasound training for obstetrics, 20 hours for cardiology and 24 hours for gastroenterology.<sup>3</sup>

Ultrasound training for German physicians forms part of their internship, and consists of theory and practice components, often directed towards the specialty they will practice.

Post-training evaluation is rare, but the organization of training programs is well established. In Japan, the Japanese Society of Ultrasound Medicine has formed a group of teacher/physicians responsible for the training of doctors and other health professionals applying for accreditation in ultrasonography. This accreditation has not yet been accorded an official status.

In Australia and New Zealand, the Australasian Society for Ultrasound in Medicine (ASUM) in 1970 formally recognized the need for comprehensive education to ensure high-quality practice in ultrasound.

In addition, radiologists are trained only at centers accredited by the Royal College of Radiologists, which is also responsible for continuing medical education in the field.

Joint programs with other Royal Colleges, such as the Royal College of Obstetricians and Gynecologists, are also being organized to provide advanced training in ultrasound.<sup>3</sup>

In Latin America, several different approaches to training exist. In some countries, ultrasound is taught during specialized medical training and consequently reaches only newly qualified physicians. In China, training schemes for both general and advanced ultrasound exist, and can be attended at various stages of the medical career (e.g. postgraduate, fellowship).

Continuing education programs are currently being established.

In the rest of the developing world, however, the situation is quite different. Diagnostic ultrasound services are often not available at all, or only at an inadequate level. Many individuals are misusing it.

The equipment is often old or inadequate because of lack of funds. Consequently, it can be technically out of date, or suffer from poor maintenance and unavailability of spare parts.

There are very few formal training programs in ultrasound with the exception of some centers where radiologists are trained at university hospitals. Radiological societies may organize short refresher courses, but in much of the developing world adequate ultrasound training or services are lacking.

The accreditation of users and the control of quality are also rare. There are two names which can be mentioned for their international setups and collaborations for continuous medical education in medical diagnostic ultrasound.<sup>4</sup>

1. Professor Asim Kurjak
2. Professor Barry B Goldberg.

## THIS STUDY

- It is based on critical analysis of different aspects like standards of clinical ultrasound in different hospitals of a country. Educational setups in universities and hospitals of that country. Role of health ministries in upgradation of standards of ultrasound.
- CME programs

- National society/association
- Radiologist vs nonradiologist controversies
- Private sector
- Ultrasound education setups
- Guidelines and protocols.

## The 20 Countries included in this Survey are

1. Afghanistan
  - Clinical Ultrasound—generally very poor
  - No teaching setup in governmental and private sector
  - One private hospital arranged a meeting few years back
  - Circumstances are not favorable for teaching
  - No radiology/ultrasound society exists.
2. Bahrain: Salmaniya Hospital, Manama, Bahrain
  - Police hospital, Bahrain
  - Standards of clinical ultrasound are variable
  - Generally are not very satisfactory for a rich country
  - Government spends money on training and CME programs but most of the physicians least bother about learning
  - Radiologists have influence therefore sonographers and sonologists do not have much chances for upgradation of their skills.
3. Bangladesh
  - Clinical ultrasound—generally below satisfactory level, few individuals meet international standards else are very poor
  - No teaching setup on governmental sector whereas there are three to four institute in private sector most of which are mishandled and disorganized
  - One training institute offers few programs of better standards in Dhaka city
  - Ultrasound society is one man show for last 15 to 20 years.
4. Brunei Darul Salam
  - Clinical ultrasound—generally good
  - No teaching setup in governmental and private sector
  - Most of the good sonologists and sonographers are foreigners
  - Circumstances are favorable for teaching but lack of interest is noticed in most of the departments of radiology
  - No radiology/ultrasound society exists.
5. Egypt
  - Clinical ultrasound—generally very poor
  - Few teaching setups in governmental and private sector
  - Circumstances are favorable for teaching but again few people have control
  - Radiology and ultrasound society exist and are improving the standards of ultrasound in the country.
6. Georgia
  - Clinical ultrasound—generally poor
  - Few teaching setups in governmental but no setup in private sector
  - Circumstances are favorable for teaching

- There is radiology society which also deals with ultrasound
  - Most of the people who scan are radiologists.
7. Ghana
    - Clinical ultrasound—generally very poor
    - No teaching setup on governmental and private sector
    - Circumstances are not favorable for teaching in most of the areas
    - A medical society deals with radiology and ultrasound.
  8. Macedonia
    - Clinical ultrasound—generally good
    - There are few teaching setup in governmental sector which are of good standards like in Skopje
    - Circumstances are favorable for teaching
    - A radiology society exists (Fig. 1).
  9. Republic of Kosovo
    - Clinical ultrasound—generally very good. Physicians are keen to learn
    - No proper teaching setup on governmental and private sector
    - Ultrasound society was very active for 5 years due to personal efforts of one of the sonologists who was trained by Professor Asim kurjak
    - Circumstances are very much favorable for teaching.
  10. India
    - Clinical ultrasound—generally good
    - There are multiple teaching setups in governmental and private sector
    - The Indian federation of ultrasound is very active and well disciplined
    - Many courses/seminars and workshops are arranged on district and national levels. Few individuals are extraordinary in skills of ultrasonography
    - Circumstances are very much favorable for teaching (Fig. 2).
  11. Pakistan
    - Clinical ultrasound—generally good
    - Multiple teaching setup in governmental and private sector
    - Circumstances are very much favorable for teaching
    - Ultrasound society of Pakistan exists but is just one man show and is not serving the ultrasound community appropriately
    - Few individuals are of international fame
    - There is no authority to regulate the things relevant to ultrasound (Figs 3 to 5).
  12. Nepal
    - Clinical ultrasound—generally satisfactory
    - There are teaching setups in governmental sector but not on private sector
    - Circumstances are not favorable for teaching
    - Radiology society of Nepal is dealing with ultrasound too.
  13. Iran
    - Clinical ultrasound—extraordinary
    - There are teaching setups in governmental sector only



Fig. 1: Mus workshop in Ohrid Macedonia



Fig. 2: Conference in Lucknow, India



Fig. 3: Demo on patient, Pakistan



Fig. 4: Female patient in waiting area, Pakistan

- Many private hospitals arrange meetings for CME in ultrasound
- Only radiologists are allowed to scan
- Radiology society exists and is very active (Fig. 6).

14. Malaysia

- Clinical ultrasound—generally satisfactory
- There are few teaching setups in governmental sector but just one in private sector working with collaboration of ASUM
- Some private hospital occasionally arrange meetings on ultrasound
- Circumstances are favorable for teaching
- There is radiology society and an ultrasound society but not very active.

15. Sudan

- Clinical ultrasound—generally poor
- There are many teaching setups in governmental and private sectors
- One private setup is working on international standards
- Some gynecologists like Professor Abdel Latif Ashmaig are working hard to established high standards of ObGyn ultrasound in the country
- Circumstances are very much favorable for teaching
- There is a radiology society but no ultrasound society exists (Figs 7 and 8).

16. Nigeria

- Clinical ultrasound—generally poor
- There are few teaching setup on governmental and just one private setup which is struggling for standards
- One private hospital arranged few ultrasound CME meetings in last few years
- Late Dr Iseko Lee was one of my friends in Abuja who established a recognized training institute at Limi hospital. Otherwise standards are variable
- Circumstances are very much favorable for teaching
- A radiology society exists.

17. Kingdom of Saudi Arabia

- Clinical ultrasound—generally satisfactory but variable due to different type of foreign trained sonographers,

sonologists and radiologists having different training and educational backgrounds

- The general impression is good but when we deal with individual centers the situation is very bad, most of the people working in ultrasound are least bothered to train



Fig. 6: Seminar in Shiraz, Iran, 2004



Fig. 7: Hands on session in Sudan



Fig. 5: Participants of seminar in Pakistan



Fig. 8: Seminar in Sudan, 2003

others and most of the local physicians are not interested to learn. No teaching setup in governmental and private sector

- One private hospital arranged a meeting few years back
- Circumstances are not favorable for teaching as their hospitals and ministries arrange CME programs
- There is radiology society which has good standards as it mostly depends on foreigners working in the kingdom or coming as visiting lecturers.

#### 18. Oman

- Clinical ultrasound—generally very good
- There is proper training and CME setup for locals and foreigners working in the state which is providing an ideal situation for the sonologists, sonographers and radiologists
- The atmosphere among these radiologists, sonologists and sonographers is ideal. I visited Sultan Qaboos University, Muscat, Oman to conduct a one week workshop on vascular ultrasound. I was impressed by their standards and working relations. I did not find any society of radiologists or sonologists
- Circumstances are very much favorable for teaching but in governmental sector.

#### 19. UAE

- Clinical ultrasound—generally satisfactory but variable due to different type of foreign trained sonographers, sonologists and radiologists having different training and educational backgrounds
- The general impression is good but when we deal with individual centers the situation is not satisfactory
- Most of the people working in ultrasound are least bothered to train others and most of the local physicians are not interested to learn. No teaching setup in governmental and private sector
- Circumstances are not favorable for teaching as their hospitals and ministries arrange CME programs. And if any foreign society arranges any CME people are not mostly attracted
- No radiology/ultrasound society exists.

#### 20. Yemen

- Clinical ultrasound—generally very poor. No teaching setup in governmental and private sector. Circumstances are not favorable for teaching. No radiology/ultrasound society exists
- We conducted three annual courses in 2004 to 2006 at Thora Hospital and Military Hospital Sana'a, Yemen and found physicians to be interested in learning but the teaching atmosphere was not comfortable.

## The Need of Training Programs

The development and implementation of intensive training programs specifically for ultrasound instructors is desirable and has been established practice for many years in some countries (e.g. Germany).

Models of such programs have been developed at the Jefferson Ultrasound Research and Education Institute in the United States.

## Licensing and Accreditation

Licensing and accreditation of ultrasound practitioners and teachers are the responsibility of local, national or regional governmental authorities, professional societies, or other recognized organizations.

## Continuing Education

Regardless of the level of expertise acquired, all instructors and practitioners of ultrasonography should pursue continuing education through “refresher” courses and conferences as well as those offering updates on new technology and practice.

## Regional (International) Centers

Regional centers should be established with the collaboration of all countries in a region, and preferably with the assistance of international professional organizations.

## Equipment

Training centers should have adequate equipment and should be responsible for the implementation of educational programs.

## Access to Patients

Training centers should have access to patients presenting a range of conditions appropriate for the areas taught.

## CONCLUSION

It's the time when ultrasound has proved that it is one of the major diagnostic tools in almost all modalities of medical sciences, we must work hard to recognize it as a separate imaging specialty—not a part or subspecialty of radiology. We do not have any objection on radiologist, they can use ultrasound but after proper training programs during their radiology educational or residency programs. I have come to conclusion that just less than 10 to 15% of radiologists are good in ultrasound and the reason is that they have special interest in it or are pushed by the department to perform ultrasound. Whereas most of the best ultrasound specialists are sonologists (physicians who can perform ultrasound). I can prove it in any country, in any system and at any platform. All societies of ultrasound around the world have to take it seriously. Anyone, radiologists or nonradiologists, must have proper ultrasound training under supervision of qualified and registered senior people in ultrasound. For instance, in developing countries, most of radiologists are DMRD diploma holder and they are not taught ultrasound properly whereas those radiologists who hold degrees of MD Radiology and FCPS/FRCR or diplomat of American board of radiology are better. Therefore, those having DMRD must have at least 6 month full time training in ultrasound. Similarly those who did their diplomat American

board or fellowship in radiology till 1985 must have CMES or at least 3 months training in ultrasound. Whereas a nonradiologist physician must have at least one year full time training in ultrasound relevant to his/her specialty, regardless of the diploma/degree he/she gets after one year. There must be a specialty of ultrasound recognized by concerned authorities like Pakistan Medical and Dental Council in my country and similarly by authorities of all countries. Otherwise a separate council/committee must be established to register and accredit the sonologists followed by sonographers if they are not ARDMS certified.

Its time to start working on this project. Make a system in which all physicians can use ultrasound, but after proper training, and they can be assisted by sonographers, who are again creating problems in the system by writing reports which obviously doubts the accuracy of ultrasound.

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