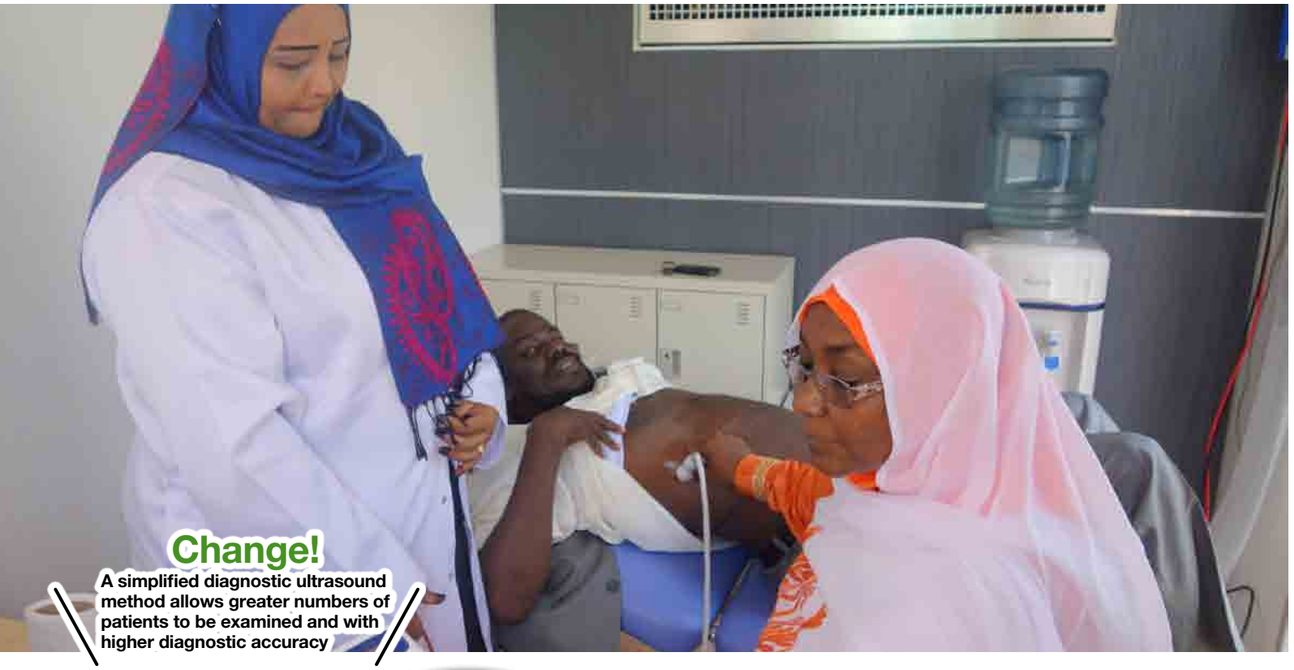
Changing Lives through Innovation

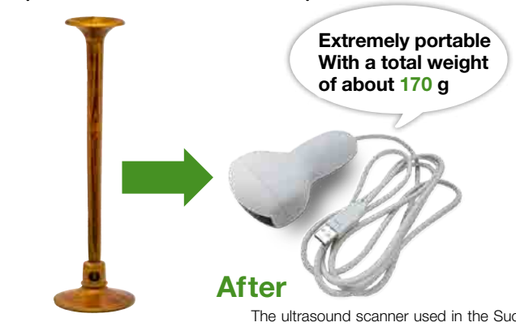
Ultrasonic Scanners are Changing Health Services

A Japanese company is endeavoring to promote the use of ultrasonic scanners that can be used by any trained medical professional to help ensure pregnant mothers have a safe delivery. Using their experience in project-based training for their devices in Sudan, Lequio Power Technology Corp. is now working to create a new paradigm in health systems for developing countries.

The Republic of the Sudan

Name: The Republic of the Sudan
Capital: Khartoum
Currency: Sudanese pound
Population: 40.53 million (2017, World Bank)
Languages: Arabic, English, Sudanese Arabic





Traube's stethoscope by Altosvic via Shutterstock.com

Before

Until now, a Traube's stethoscope was generally used to carry out prenatal tests. This was greatly dependent on the experience and intuition of medical staff as diagnosis was made on the basis of listening to heart sounds.

After

The ultrasound scanner used in the Sudan program. As it is powered via USB, it simply needs to connect to a computer. Ultrasound devices in Japan have many functions and are expensive, ranging in price from JPY 5 million; but as the scanner has only simple functions, unit price ranges from JPY 200,000 to JPY 300,000.

Midwives can better understand the condition of pregnant women and their unborn children by learning how to use ultrasonography. Furthermore, ultrasound can be used not only in prenatal examinations but also for diagnosing other diseases of the liver, pancreas, and kidneys in both men and women.

Ultrasound Examination by Midwives Saves the Lives of Pregnant Women

In Sudan, the mortality rate for pregnant women and newborns is much higher than the average for the rest of the world. It is a country with extremely few doctors, with one for every several tens of thousands of people, and even in terms of just medical examinations, there are not enough doctors to meet demand. Wanting to address this situation, Tetsu Kawamura, president and CEO of Japanese company Lequio Power Technology, created a low-cost ultrasonic scanner for use in developing countries that only has basic functions, and can be easily used with appropriate training. Ultrasound examinations are used to monitor the state of health of pregnant women and their unborn children. In Japan this is standard practice, but in Sudan it is rare, meaning that it has been difficult to detect abnormalities during pregnancy. Joining JICA's Partnership program with the private sector, Mr. Kawamura carried out a trial of the ultrasonic scanners they developed in Sudan between November 2015 and May 2018.

Seeing the ultrasound image on a computer screen makes it possible to easily check conditions such as the unborn child's heart movement, the position of the placenta, and the amount of amniotic fluid. More than 80% of midwives in Sudan are now able to make a diagnosis using the scanner.

45 midwives participated in the trial. Learning diagnostic ultrasound techniques gave them the ability to carry out more accurate examinations.

"Dr. Car" (Mobile Clinic) Project

Mr. Kawamura first visited Sudan in 2012, when he joined a mobile clinic traveling around rural areas where there were no doctors. This experience led him to see the need for ultrasonography in prenatal examinations.

The aim of the trial was to have midwives learn how to operate ultrasonic scanners so that pregnant women can safely give birth, even if they live in areas where there are no doctors. Midwives, who have traditionally used palpation and a unique instrument called a Traube's stethoscope to carry out examinations, were surprised to see the form of an unborn child displayed on a computer screen during training, and were eager to improve their level of skill.

"Ultrasound images are a powerful tool to use when explaining the condition of the unborn child to mothers, and in many cases we see that women can relax and look forward to the birth," says Mr. Kawamura.

During the trial, diagnostic ultrasound was carried out for a total of 5,572 women by 45 midwives, with suspected abnormalities detected in 1,408 cases. Additionally, pregnant women who were at risk from natural birth were able to be referred to well-equipped hospitals where it would be possible, if necessary, to carry out a caesarian section.

"As acknowledged by the Sudanese government, training midwives in the use of the ultrasound device has greatly helped in reducing the maternal and neonatal mortality rates."

Although the use of diagnostic ultrasound by midwives has yet to be legalized, on receiving the results of this trial carried out under temporary approval, the government is now preparing legislation for official approval.

Ultrasound's Cloud-based Service Future

Mr. Kawamura is presently engaged in using the knowledge and experience gained in Sudan to spread the use of ultrasound to 50 other countries. One of his goals is to develop a cloud-based Ultrasound Training Support Service that can be provided free of charge.

"For example, a doctor with little experience in a settlement somewhere in rural Africa can carry out an examination using ultrasound, and then upload the images and any questions to the cloud. With this system, doctors with a high level of expertise in ultrasonography can look at the scans and send back advice. This is the kind of cloud-based medical training platform that I'm aiming to develop—an infrastructure that can be freely used by participants."

By learning from the many examples of conditions that are shared as a database, it will be possible to improve the capabilities of doctors working even in remote areas. A project scheduled to start this year aims to see the popularization of this system, and JICA has agreed to also work together on this next step.

Furthermore, the use of cloud services will not be limited to developing countries; it is expected to be introduced among the more health-conscious generation in newly industrializing economies and developed countries, and in households carrying out home-based care. It will also be possible for people to receive cloud-based training so that they can use ultrasonography to examine themselves, and to have access to databases so that they can compare their own images with examples of various conditions. The long-term plan is to use the fees generated to create a financially sustainable business.

"We want to use the profits obtained to increase production of ultrasound scanners, and reduce the cost so that we can provide affordable products to developing countries. In time, cloud services will most likely come to include AI-based education and status observation," elaborates Kawamura enthusiastically. With JICA's help, he is seeking to use information and communications technology (ICT) to bring new changes to the future of medicine.

Mr. Tetsu Kawamura
President of Lequio Power Technology Corp.

Joined Sumitomo Bakelite Co., Ltd in 1997. Worked as an engineer in the development of high-performance resins for electrical/electronic components. Joined Dream Incubator, Inc. in 2005 as a management consultant involved in the formulation of technology-related business strategies. Founded Lequio Power Technology Corp. in 2011 and was selected to participate in "J-Startup," a startup support program sponsored by the Ministry of Economy, Trade and Industry in 2018.