

Solar-powered device affordable, reliable tool to measure blood pressure

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A new solar-powered device to measure blood pressure may help slow the worldwide increase in cardiovascular disease by providing affordable and reliable blood pressure testing in low income countries, according to research published in *Hypertension: Journal of the American Heart Association*.

The solar powered device — 94 percent in agreement with the standard blood pressure testing method for systolic blood pressure — is in field testing in Uganda and Zambia, Africa.

"The incidence of [hypertension](#) is rising dramatically in these countries," said Eoin O'Brien, M.D., lead author of the study and professor in Conway Institute of Biomolecular and Biomedical Research at the University College Dublin in Belfield, Dublin, Ireland. "Hypertension leads to stroke and heart attack as the major cause of death around the world. It is greater than malnutrition, cancer and AIDS."

Many low-income countries have a short supply of trained medical personnel, he said. "We have been able to provide an accurate, robust and inexpensive device to diagnose high blood pressure. It's a start. If we can't measure blood pressure, we certainly can't begin to treat hypertension."

The World Health Organization asked multiple companies to devise a blood pressure measuring device that was accurate, easy to use and solar powered. One device met their criteria. After initial testing showed the

accuracy of the selected device, it was used in two centers in Uganda and one center in Zambia. Staff, trained on the fully automated device in about 15 minutes, took blood pressure readings on about 716 participants, using the new device and a standard one. They repeated the effort one month later. Both patients and healthcare professionals preferred the new device:

- Eighty-five percent of healthcare professionals rated the solar device as good or very good primarily because of ease of use (88 percent) and the automated features (85 percent).
- Seventy-nine percent considered the solar device an advantage over the standard device.
- The majority of healthcare providers rated it best for its comfort, clearly legible readings, the cuff and the on/off switch.
- After the first and final visit a month later for patient blood pressure readings, 97 percent of healthcare professionals favored the new device and would recommend its use.

"Solar energy eliminates the need for expensive rechargeable batteries in remote areas where electricity and the availability of batteries might be scarce, but sunlight is plentiful," O'Brien said. "It can be run on batteries, but it can also be left in the sunlight to charge, making it ideal for rural areas and use out in the bush."

The device costs about \$32 (25 Euro), with significant savings from not having to provide and use batteries regularly, he said.

While the device initially fulfilled accuracy criteria for the European Society of Hypertension, it had less accuracy for diastolic blood pressure

(the pressure when the heart relaxes) on a second testing and in the study. But it wouldn't be difficult for manufacturers to correct the device, O'Brien said. Moreover, systolic blood pressure (the pressure when the heart contracts) is the major contributor to cardiovascular events. "Systolic blood pressure is the [blood pressure](#) reading on which most decisions are made," O'Brien said.

Manufacturers of other devices, such as those used to record or measure blood sugar, cholesterol and electrocardiograms (ECG), might also be encouraged to fulfill the requirements of low income countries, he said. "We now hope to use the solar device to diagnose hypertension in pregnancy as a step towards reducing the very high maternal death rates from this illness in low income countries."

Provided by American Heart Association

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