Research

Ts. Dr. Mohd Azrul Hisham creates a tool to monitor physiological parameters of baby's health

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GAMBANG, 2 August 2021 - A researcher and Senior Lecturer from College of Engineering (KKEJ), Universiti Malaysia Pahang (UMP), Ts. Dr. Mohd Azrul Hisham Mohd Adib, 38, invented a device to monitor the physiological parameters of a baby's health or known as the InfaWrap Device.

According to the Taiping, Perak native, the product is intended to measure newborns' heart rate, oxygen level (SpO2), and body temperature.

The study titled InfaWrap Device for Neonatal started in mid-2017 and the first prototype was successfully completed in 2018.

A test on the level of reading accuracy and neatness of the InfaWrap Device design was conducted, considering the comments and opinions from users and advice from clinical experts.

Several improvements to product design and functionality from the previous three prototypes resulted in the 4th prototype in January 2020.

He said the initial idea to conduct research in the field of paediatric engineering technology was due to the concern when seeing doctors and nurses struggling to handle newborns in their care, especially when getting the reading of vital signs accurately using available medical devices.

Usually, babies are moving, making it difficult for doctors and nurses to get the readings of heart rate, oxygen level, and body temperature consistently.

"Therefore, as an initiative to overcome the constraints, I tried to invent a paediatric device to help them.

"This InfaWrap Device was invented with the help of my master's degree student, Mohd Hanafi Abdul Rahim, under the Medical Engineering & Health Intervention Team (MedEHiT), Department of Mechanical Engineering, College of Engineering, UMP," he said.

In addition, he said, this project was also assisted by Dr. Mohammad Zairi Baharom from Human Engineering Group (HEG), Faculty of Mechanical and Automotive Engineering Technology (FTKMA), UMP.

He added that this InfaWrap Device has three main components, namely an oximeter sensor, screen display and Android app.

This InfaWrap Device consists of software and hardware that is easy to use and is equipped with three main functions to measure a baby's heart rate, oxygen level, and body temperature.

This device is also equipped with an easy and quick charging battery, Bluetooth connection, adjustable strap and ON/OFF button.

InfaWrap Device is very easy to operate because it comes with an Android app MyI-Wrap and it can be downloaded directly from Google Play Store.

“Patient’s details and records can also be stored in the Android app. Doctors or nurses only need to strap this device to the baby’s feet and they can access all parameters through their smartphones,” he said.

In addition to its lightweight feature of less than 200 g, easy to use and flexible, a screen display is also available on this device if they do not have a smartphone.

The InfaWrap Device can also be used by parents to monitor or observe their baby’s health anywhere without going to a clinic or hospital. It is the first self-monitoring tool for babies in Malaysia.

He explained that MedEHiT (KKEJ) and HEG (FTKMA) hope that exploration in the field of paediatric technology through the development of InfaWrap Device can be beneficial in addressing various barriers to treatment of diseases among newborns in particular and also the well-being of all parties, including doctors, nurses, patients and the country.

It is very important for us to identify and propose new relevant solutions towards paediatric medical device technology to improve child health care.

“In the future, I plan to improve the existing prototype, especially in terms of aesthetic value and function.

“Perhaps the addition of functions such as measuring blood pressure and also monitoring the respiratory rate is very important for babies to help doctors expedite the determination of treatment that should be given to the baby,” he said.

In addition, he also intends to add other functions such as a baby observation screen using a small portable camera.

“Through this camera, doctors or nurses can observe the baby’s movements more easily.

“I also intend to commercialise this product to make it more accessible for paediatric experts in Malaysia.

“However, collaboration from the industry or medical agencies is highly recommended, especially from hospitals, clinics and also private paediatric centres in Malaysia.

“Clinical trials with them are also very much needed,” he said, who has expertise in biomechanics, biomedical engineering, medical devices, medical imaging, biomodelling and simulation, rehabilitation and paediatric technology.

The project also receives collaboration from family health doctors and paediatricians such as Dr. Nur Hazreen Mohd Hasni from the Family Health Unit, Pahang State Health Department, Dr. Taufiq Hidayat Hasan, Dr. Syed Abdul Khaliq dan Dr. Muhd Alwi Muhd Helmi from the Department of Paediatric, Sultan Ahmad Shah Medical Centre (SASMEC), Kuantan, Pahang.

Ts. Dr. Mohd Azrul Hisham said he had also signed a letter of intent (LOI) with both organisations.

“This project was also funded via the UMP Product Development Grant (PDU, PDU203205) with the amount of RM36,000.

“Currently, we have not yet identified the cost estimate for the production of this device.

“However, we can expect that it is cheaper than the market price of similar products,” he said.

For the record, InfaWrap Device won several awards such as a gold medal and special award for the Medical, Pharmaceutical & Health category in Industry Networking & Business Pitching (eREKA 2018) and gold medals for two consecutive years in the Creation, Innovation, Technology & Research Exposition (CITREx 2019 & 2020).

Most recently, InfaWrap Device won a gold medal in the Malaysian Technology Expo (MTE 2021) for the Healthcare, Personal Care Technology and Life Sciences category.

He also hoped that this device could be introduced to relevant agencies and industries such as the Ministry of Health Malaysia (MOH), hospitals, government clinics and even the private sector.

“Apart from the InfaWrap Device, we are serious about exploring the field of paediatric engineering technology by developing several other products such as SpiroLuMe (children’s breathing training aid), BiliDice (bilirubin or jaundice measurement device in infants) and Integrated Vaccine System (IVS), a vaccination-related system for infants and children.

“Everything is still in the research and development stage.

“We also published our first book in the field of Paediatric Engineering Technology titled Paediatrics Technology in Biomedical Engineering Application: Part 1 through UMP Press.

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