Health problem addressed
Neonatal jaundice (hyperbilirubinemia) is a frequent issue in newborns. Approximately 60% of newborns become clinically jaundiced. It is a clinical condition generally benign and reversible if properly treated, but its exacerbated intensification may generate serious sequela into the central nervous system, which may lead patient to death.

Product description
Phototherapy is an efficient mean to treat hyperbilirubinemia. By emitting blue light over the patient’s skin, it converts toxic bilirubin molecules in the blood into less toxic isomeric forms, by photo-oxidation and photoisomerization. The device uses high power LEDs for a high efficiency treatment and negligible emission of UV / IR radiation.

Product functionality
The phototherapy uses a set of 5 high power LEDs, positioned 30 cm above the patient. The treatment is efficient due to high radiation emitted at the blue range of the spectrum, from 400 to 550 nm (the most recommended for jaundice treatment). The device also provides extra functions, such as integrated radiometer and treatment time counter.

Developer’s claims of product benefits
Traditional devices use fluorescent or halogen lamps, or many conventional LEDs. Lamps may require filters to attenuate UV / IR rays and have a low life expectancy (around 2,000h). Conventional LEDs are low power devices. To work effectively, hundreds of LEDs must be used, making the phototherapy complex and prone to failure. The proposed technology uses only 5 high power LEDs, which is equivalent to more than 250 conventional LEDs. The result is a compact, highly efficient, long life time (20,000 h) and low cost phototherapy. It provides new resources: output radiation level adjustment, embedded radiometer and irradiance measurement reports. In addition it is compact, saving space in the intensive care unit.

Operating steps
Place the device over the newborn, 30 cm away. Turn it on and press ‘Menu’ to go to the irradiance level screen. Set the irradiance using the ‘up’/’down’ keys and press ‘Enter’ to confirm. Be sure the newborn is exposed to the light at the chest and abdomen area. Protect the newborn’s eyes.

Development stage
The product is being manufactured and commercialized. It has been fully validated and clinically tested. Studies verify that the blue high power LEDs are more efficient for jaundice treatment. The market confirms those studies. It has the Brazilian ANVISA regulatory approval, the CE marking and it is currently obtaining the UL recognition approval.

Future work and challenges
Promoting the technology’s easy–of-use, efficient treatment system and affordable cost in low and middle income countries is the greatest challenge. Assistance herein is required, e.g. through workshops by professionals to explain the importance and advantages and to make users familiar with new functions that improve the treatment quality, like the embedded radiometer and the timer.

Use and maintenance
User: Nurse, physician
Training: Concept presentation (2 hours training).
Maintenance: Technician

Environment of use
Setting: Secondary and tertiary hospitals.
Requirements: Power supply (100 to 240 Vac), 50 or 60Hz; ambient temperature between 18°C and 28°C; air humidity between 10% and 95%; eye protection for the patient.

Product specifications
Dimensions (mm): 230 x 116 x 50
Weight (kg): 1
Consumables: Eye protector
Other features: Portable and reusable. It utilizes software.
Year of commercialization: 2005

Currently sold in: Algeria, Australia, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Spain, Finland, France, Indonesia, Iran, Iraq, Jamaica, Lithuania, Malaysia, Mexico, Nicaragua, Paraguay, Peru, Poland, Portugal, Russia, Syria, Sudan, Sweden, Uruguay, Venezuela, Vietnam, Yemen.
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