Innovative Solar-Powered Incubator to Prevent Preterm Neonatal Mortality

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In resource-limited environments, most premature births take place far from traditional hospitals. The shortage of proper neonatal care facilities has led to high mortality rates of infants due to hypothermia. Also, erratic and persistent power failures have crippled the functionality of modern incubators. The overall objective of my research project was to design and construct a working solar-powered incubator to prevent preterm neonatal mortality in resource-limited environments. This prototype of a solar-powered preterm neonatal incubator features improvements over the original design. This prototype was constructed using a plastic bin with a clear drop down door to provide an easy access for placing an infant mannequin. A thermal regulated environment inside the neonatal incubator was attained with the aid of aluminum pans that were strategically placed under and on top of a silicone rubber heater for heat transfer. To minimize or prevent the loss of heat from inside the neonatal incubator, a polystyrene sheathing was utilized for insulation. The temperature of the rubber heater/aluminum pan and the ambient air inside the neonatal incubator were monitored using temperature data loggers. Thermal regulation inside the incubator was maintained for a longer duration when insulation was installed. FLIR (Forward-Looking Infrared) scanner was used to visualize the temperature distribution of surfaces and thermal environment of the neonatal incubator. The solar-powered incubator developed can provide immediate thermal care for preterm neonates. It will prevent high mortality rates of infants due to hypothermia. It will save lives.

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