

ADVANCED BIO MEDICAL INSTRUMENTATION

LECTURE 09: PHOTOTHERAPY

Phototherapy (light treatment) is the process of using light to eliminate bilirubin in the blood. In the standard form of phototherapy, the baby lies in a bassinet or enclosed plastic crib (incubator) and is exposed to a type of fluorescent light that is absorbed by the baby's skin. During this process, the bilirubin in the baby's body is changed into another form that can be more easily excreted in the stool and urine. The light is administered for a prescribed amount of time and, in some cases, at a specific time of day.

During this type of phototherapy:

- The baby is undressed so that as much of the skin as possible is exposed to the light.
- The baby's eyes are covered to protect the nerve layer at the back of the eye (retina) from the bright light.
- The bilirubin level is measured at least once a day.

Another type of phototherapy is a fiber-optic blanket or a band. These devices wrap around a baby and can be used at home. Although fiber-optic phototherapy has been shown to reduce bilirubin levels, it takes longer than conventional phototherapy done in a hospital setting. It can be a good alternative for babies with mild jaundice who are otherwise healthy.

Potential problems that may occur during this standard form of phototherapy include:

- Skin rash.
- Damage to the nerve layer at the back of the eye (retina), if the eyes are not properly protected.
- Dehydration, if the infant does not receive adequate fluids when feeding.
- Difficulty in maintaining the proper body temperature.

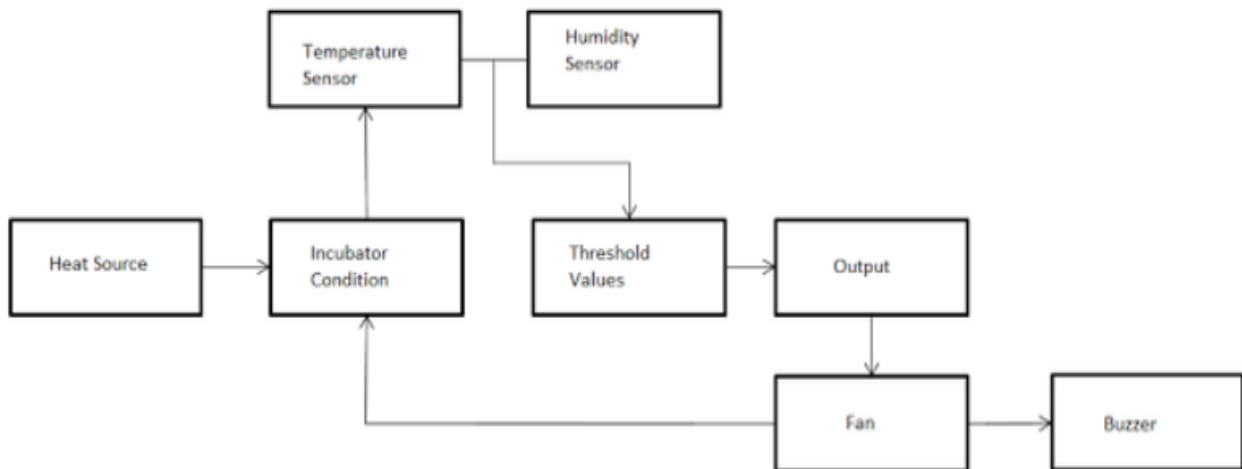
RADIANT WARMER

Radiant Warmer, is a body warming device to provide heat to the body. This device helps to maintain the body temperature of the baby and limit the metabolism rate. Heat has a tendency to

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flow in the heat gradient direction that is from high temperature to low temperature. The heat loss in some newborn babies is rapid; hence body warmers provide an artificial support to keep the body temperature constant. In certain areas with very cold climate, babies are kept on Radiant Warmer for couple of hours immediately after birth to ensure the baby is stabilized after birth.

Radiant Warmers consists of an open tray (where the baby is kept) and the artificial heating is provided by a heating mechanism mounted overhead. The heating mechanism consists of quartz which produces the desired heat and a reflecting mechanism to divert the heat at the baby tray. The skin temperature of the baby can be monitored by a temperature measuring knob that is kept continuously attached to the body. The variation in the skin temperature can be seen on a small LCD panel which continuously shows the body temperature. Radiant warmers are equipped with alarm to indicate the change in temperature and hence attract attention of medical professional attending the baby. The heat generated can be controlled manually by a knob as well as automatically depending on the Radiant Heat Warmer.



Radiant Warmers can be manual or automatic (servo system – heater output is determined automatically based on skin temperature. The skin temperature is set at 36.5 degree Celsius) depending on the mechanism that the manufacturer employs for temperature control. The heat generated and the temperature of the skin can be individually seen but the basic difference

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between these two models will be the regulation of temperature. The automatic model increases the heat output in small predetermined steps to reach at the desired temperature of the body. The device may seem simple to handle, but it is always recommended to have a proper training and read the manufacturers guidelines for person handling this equipments. It is necessary to regularly clean and disinfect the instrument.