

Baby's mp3 heart monitor

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A new type of fetal heart monitor could save the lives of unborn infants in complicated pregnancies, according to a study published in the *International Journal of Engineering Systems Modelling and Simulation*.

A.K. Mitra of the Department of Electronics Engineering, at the Manoharbhair Patel Institute of Engineering & Technology, in Gondia, India, and colleagues have developed a simple device based on a two-microphone system that can monitor fetal [heart rate](#) during the mother's rest times and sleep and send an alert to the woman and her physician.

During those complex pregnancies that end in preterm labor, miscarriage, or fetal death, problems usually do not appear suddenly but occur over periods of days. Regular ultrasound monitoring of fetal development can spot some problems, but too frequent ultrasound monitoring is associated with its own health risks. Moreover, it cannot continually assess fetal heart rate.

However, disturbances in fetal heart rate, particularly regular sudden drops in rate for up to one minute, can occur long before an underlying problem is reflected in the form of other symptoms. A serious drop in fetal heart rate is most likely to occur at night just before the pregnant woman lies down to sleep. At this time, she is most relaxed and her own heart rate drops, which leads to a lowering of her blood pressure, and in a susceptible fetus a problematic drop in its heart rate.

"Monitoring FHR during a woman's most restful hours at home and providing urgent medical assistance in case of abnormality will prove to

be very effective in the prevention of stillbirth and other prenatal complexities," the researchers say.

They have now developed a device based on two small acoustic sensors that can easily monitor fetal heart rate and feed the information to a wave analyzer in a bedside personal computer connected to the internet. The first microphone is attached to the mother's abdomen to pick up the sound of the fetus' heartbeat, the second is attached at a reasonable distance to pick up ambient and bodily noise.

Computer software can then subtract the "noise" channel from the fetal sound to produce a "wav" file that can be further analyzed for medical anomalies. Should a problem be detected the wav file might be compressed to the mp3 file format for rapid upload via the internet to the physician's computer or to trigger a gentle warning to seek medical assistance.

The team points out that they have successfully tested their monitoring system on several women at various stages of [pregnancy](#). They also emphasize that the system is a passive one, in which no energy penetrates the mother's womb at any point. The technique is also inexpensive, although it does rely on the mother having access to a personal computer and an internet connection.

More information: "System simulation for a novel fetal monitoring methodology" in *Int. J. Engineering Systems Modelling and Simulation*, 2009, 1, 92-100

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