

Using Passive Sensing Data and Mobile Health to Improve Psychological Treatment for Depressed Adolescent Mothers in Rural Nepal

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Abstract

Postpartum depression disorder is the most commonly observed mental disorders in the new mothers. Appropriate and differentiating diagnosis is necessary to initiate the correct treatment. The present study uses phone based applications by the mothers for their psychological treatment after postpartum. The psychological conditions (depression) can cause great distress and affect the quality of health of both the baby and the mother. The study showed a positive response in overcoming depression using passive sensory devices in new mothers, besides small difficulties in carrying and usage of sensory devices.

Keywords: Postpartum depression • Mobile health • Suicide • Passive sensing data • Health conditions

Commentary

In Nepal, postpartum depression affects 1 out of 10 women, and suicide is the leading cause of death among women of reproductive age. Passive sensing technology is a way to collect data on the behaviors and activities of depressed mothers in order to better tailor psychological treatment and improve outcomes for postpartum depression. This study investigated (a) the feasibility and acceptability of wearable digital sensors with adolescent mothers and their families in rural Nepal and (b) the feasibility and utility of implementing this data into a phone based application used by non-specialists to provide personalized psychological treatment. This study used a mobile phone and Bluetooth device to generate passive sensing data on aspects of a mother's life, such as amount of time spent with and away from the baby, movements and activities both inside and outside of the house, social interactions experienced, and physical activity. We then interviewed both depressed and non-depressed adolescent mothers who used these wearable digital devices and analyzed the ethicality, safety, social acceptability, utility, and feasibility of these technologies. This data was then used to develop Stand Strong, a platform that collects passive sensing data to implement personalized depression treatment. Our results showed that both depressed and non-depressed mothers found it acceptable and feasible to collect passive sensing data. Depressed and non-depressed mothers expressed utility in having knowledge of their own movements and activities, as well as having information about their proximity to and

interactions with their child. The non-specialized community counselors expressed utility in using the data collected from the wearable digital sensors to encourage behavioral changes during sessions and also to track the progress of patients between sessions. Barriers to using wearable digital devices included difficulty carrying the phone around throughout the day, privacy concerns, fear of loss or damage to the device, and concern about possible adverse health effects of the device. In summary, it is feasible and acceptable to use passive sensing data to tailor psychological treatment for depressed adolescent mothers in low-resource settings. This research demonstrates the effectiveness of mobile health technology in improving treatment and outcomes for postpartum depression in rural areas.

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