

## **Circadian rhythm and its association with birth and infant outcomes: research protocol of a prospective cohort study**

### **ABSTRACT**

**Background:** Circadian rhythm plays an important role as our internal body's clock that synchronizes behavior and physiology according to the external 24-h light-dark cycle. Past studies have associated disrupted circadian rhythm with higher risk of miscarriages, preterm birth and low birth weights. This paper described the protocol of a prospective cohort study which aims to determine the circadian rhythm in pregnant women, identify its association with maternal factors during pregnancy, gestational weight gain, birth and infant outcomes. **Methods:** Ten government maternal and child health clinics in Kuala Lumpur, Malaysia will be randomly selected. Sample size of 438 first-trimester pregnant women will be followed-up until the birth of their infant. Salivary melatonin and cortisol concentration among subsample will be determined using enzyme-linked immunosorbent assay. Data on sleep quality, psychological distress and morningness/eveningness chronotype of pregnant women will be collected using validated questionnaires. Pedometer will be used to measure 5-day physical activity data. Total gestational weight gain will be determined at the end of pregnancy. Utilization of 3-day food record is to capture meal timing and nutrient intake. All measurements will be done in 2nd and 3rd trimester. Birth outcomes will be collected through clinic records and Centers for Disease Control and Prevention (CDC) Neonatal questionnaire. Infants will be followed-up at 6 and 12 months old to obtain anthropometric measurements. **Discussion:** There is a growing recognition of the role of maternal circadian rhythm, which entrains fetal circadian rhythms that may subsequently have long-term health consequences. The present study will identify the effect of circadian rhythm on pregnancy outcomes and infant growth in the first year of life.

**Keyword:** Circadian system; Pregnancy; Chrononutrition; Infant growth; Melatonin; Cortiso