Analyzing sleep pattern of shift workers via Phillips-Chen-Robinson model (PCR model)

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ABSTRACT

Increment of the around-the-clock service in modern society yield the increment of shift work. As a result, nowadays more than 20% of population in the world work shift. As shift work schedule inevitably has increased, the risk of shift work is also presented including the increment of risk for disease, such as cardiovascular-disease and cancer. There has been several approaches to analyze effect of shift work through mathematical modeling, however few studies have been applied mathematical model to actual data. Here, we applied the Phillips-Chen-Robinson model (PCR model), one of the human sleep process model, to analyze actual data of nurses who work in Samsung-hospital. We modify the PCR model with light actography of nurses who work shift to fit the irregular and personal sleep/wake timing. As a result we find a critical factor which has strong correlation with sleep quality. By using this factor we find a new sleep model which provides best sleep time when the best sleep quality can achieve.