

## Application of the Best Technique for Estimating the Rest-Activity Rhythm Period in Shift Workers

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**Abstract :** Under free living conditions, human biological clocks show a periodicity of 24 hour for numerous physiological, behavioral and biochemical variables. However, this period is not the original period; rather it merely exhibits synchronization with the solar clock. It is, therefore, most important to investigate characteristics of human circadian clock, essentially in shift workers, who normally confront with contrasting social clocks. Aim of the present study was to investigate rest-activity rhythm and to vouch for the best technique for the computation of periods in this rhythm in subjects randomly selected from different groups of shift workers. The rest-activity rhythm was studied in forty-eight shift workers from three different organizations, namely Newspaper Printing Press (NPP), Chhattisgarh State Electricity Board (CSEB) and Raipur Alloys (RA). Shift workers of NPP (N = 20) were working on a permanent night shift schedule (NS; 20:00-04:00). However, in CSEB (N = 14) and RA (N = 14), shift workers were working in a 3-shift system comprising of rotations from night (NS; 22:00-06:00) to afternoon (AS; 14:00-22:00) and to morning shift (MS; 06:00-14:00). Each subject wore an Actiwatch (AW64, Mini Mitter Co. Inc., USA) for 7 and/or 21 consecutive days, only after furnishing a certificate of consent. One-minute epoch length was chosen for the collection of wrist activity data. Period was determined by using Actiware sleep software (Periodogram), Lomb-Scargle Periodogram (LSP) and Spectral analysis software (Spectre). Other statistical techniques, such as ANOVA and Duncan's multiple-range test were also used whenever required. A statistically significant circadian rhythm in rest-activity, gauged by cosinor, was documented in all shift workers, irrespective of shift work. Results indicate that the efficiency of the technique to determine the period ( $\tau$ ) depended upon the clipping limits of the  $\tau$ s. It appears that the technique of spectre is more reliable.

**Keywords :** biological clock, rest activity rhythm, spectre, periodogram

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