



Background

- ❖ Light is the most powerful synchronizer but, when exposure occurs at night then it disrupts the circadian rhythms.
- ❖ In night shift workers, there is misalignment between the internal circadian rhythm and the behavioural rhythm causing increased levels of stress hormone cortisol and ghrelin, decreased level of melatonin and leptin hormones.
- ❖ Night Shift may produce variable disruption in circadian pattern of cortisol and melatonin hormone, which is neuro-endocrine chronomolecule.

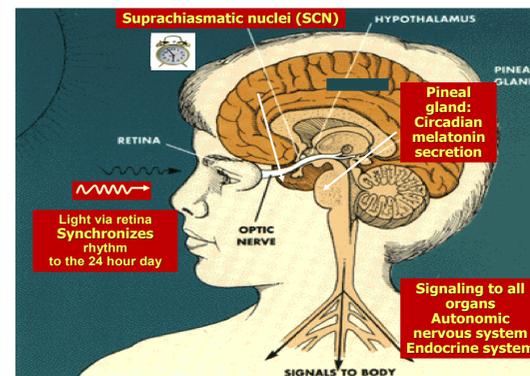
Methodology

Study Design: Case control study

- 56 healthy nursing professionals, aged 20-40 year, performing day and night shift duties were recruited from the Trauma Center, KGMU, India.
- We recruited nurses of both genders from different wards and units viz. Intensive care unit (ICU), surgical emergency, Neurosurgery, Neurotrauma, Orthopedics emergency and Medicine emergency, who worked in rotating night shift.
- 56 subjects acting as controls, performing day shift duties alone were also recruited. Saliva and urine samples were collected at eight hrs interval (evening, night and in morning time).
- Subjects with any acute/chronic illness, known patients of diabetes mellitus, other endocrinal disorders, hypertension, coronary artery disease, and chronic renal were excluded from the study.
- Salivary cortisol and 6 sulfatoxy melatonin were estimated by ELISA Kit.

Aim and Objectives

- To Study and compare the circadian pattern of salivary cortisol and urinary melatonin levels in night shift nursing professionals and in actual controls.
- To find out whether these changes in circadian pattern of cortisol and melatonin level produced by night shift are reversible or not in due course of time.



Melatonin hormone signalling pathway

Results

Statistical Analysis:

- Data was analysed by INSTAT graph pad software and groups were compared by paired t test (within one group) and impaired t-test (between two different groups) p<0.05* was considered just significant, p<0.01 **moderate/very significant and p<0.001 ***highly Significant.
- Data were summarized as Mean± SD & baseline characteristics of night shift workers and controls.

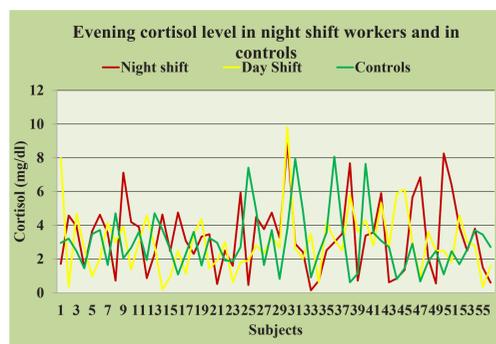


Figure 1A

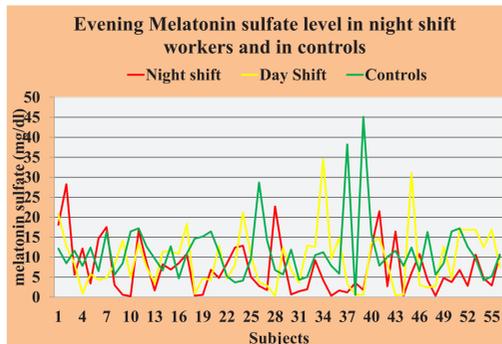


Figure 2A

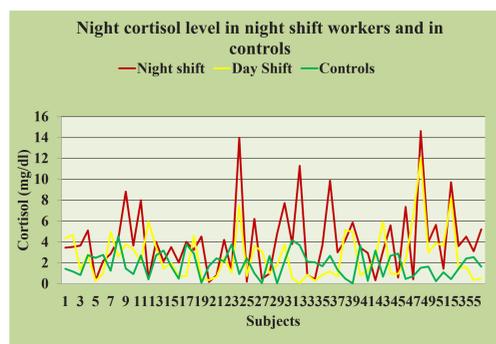


Figure 1B

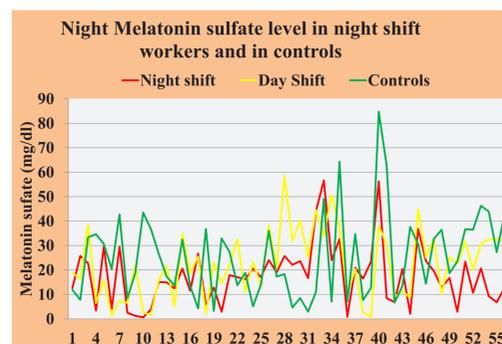


Figure 2B

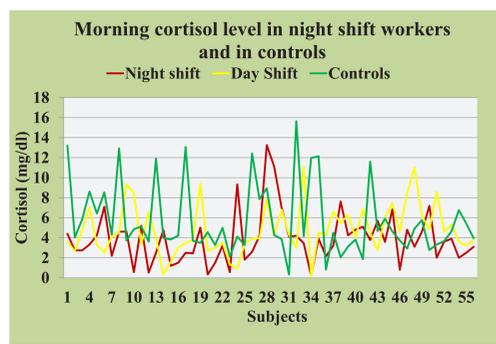


Figure 1C

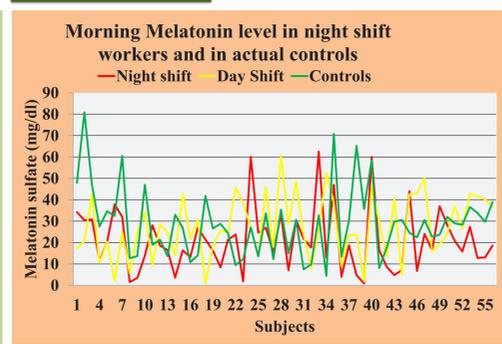


Figure 2C

Conclusion

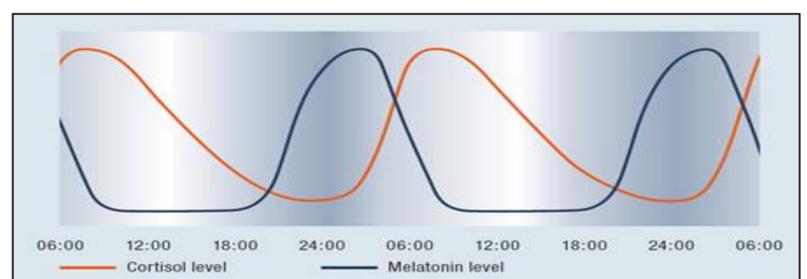
Higher cortisol and decreased melatonin at night during night shift than that of day shift. This may be due to counteracting effect of an endogenous circadian rhythm and desynchronization during night shift. The present study indicates that the desynchronization was found during night shift and entrainment of circadian rhythm occurs in the day shift. Entrainment of these physiological rhythms in day shift leads to resynchronization.

Baseline Characteristics	Night Shift Workers (n=41)	Controls (n=38)
Age	24.45 ± 3.36	28.87 ± 4.89
Weight (kg)	53.37 ± 8.60	57.31 ± 8.37
Height (cm)	160.75 ± 8.19	160.85 ± 7.40
Body mass index (BMI)	20.58 ± 2.39	23.29 ± 3.91

Circadian Variables		During night shift (n=56)	During day shift (n=56)	p values
Urinary Melatonin levels	Evening	7.17 ± 6.44	9.44 ± 7.28	0.066 ^{ns}
	Night	17.65 ± 12.20	22.41 ± 13.70	0.006*
	Morning	21.08 ± 14.50	27.36 ± 14.46	0.011*
Salivary Cortisol	Evening	3.29 ± 2.12	2.99 ± 1.83	0.384 ^{ns}
	Night	4.08 ± 3.28	2.62 ± 2.37	0.0007**
	Morning	3.88 ± 2.54	4.79 ± 2.46	0.039*

Circadian Variables		During night shift (n=56)	Actual Controls (n=56)	p values
Urinary Melatonin levels	Evening	7.17 ± 6.44	11.34 ± 7.64	0.0023**
	Night	17.65 ± 12.20	25.45 ± 17.28	0.006*
	Morning	21.08 ± 14.50	28.91 ± 16.20	0.0081*
Salivary Cortisol	Evening	3.29 ± 2.12	2.98 ± 1.73	0.39 ^{ns}
	Night	4.08 ± 3.28	1.82 ± 1.18	0.0001***
	Morning	3.88 ± 2.54	5.71 ± 3.55	0.0022**

Clinical Variables		During day shift (n=56)	Actual Controls (n=56)	p values
Urinary Melatonin levels	Evening	9.44 ± 7.28	11.34 ± 7.64	0.18**
	Night	22.41 ± 13.70	25.45 ± 17.28	0.30*
	Morning	27.36 ± 14.46	28.91 ± 16.20	0.60*
Salivary Cortisol	Evening	2.99 ± 1.83	2.98 ± 1.73	0.97 ^{ns}
	Night	2.62 ± 2.37	1.82 ± 1.18	0.03***
	Morning	4.79 ± 2.46	5.71 ± 3.55	0.11**



NORMAL CIRCADIAN FLUCTUATIONS OF CORTISOL AND MELATONIN IN 24 HRS PERIOD

