

# Sleep quality in two populations exposed to toxic substances in Brazil

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## CONTEXT

- ❖ Inadequate sleep has been linked to impairments in bodily functions
- ❖ Ambient chemical exposure can impact sleep quality significantly
- ❖ Objective: to analyze sleep quality across three populations exposed to chemicals according to health parameters.

## MATERIALS AND METHODS

- ❖ A cross-sectional study
- ❖ 189 residents in Volta Redonda, RJ (Study 1) and 66 endemic workers (Study 2)
- ❖ Health, work, Pittsburgh Sleep Quality Index (PSQI), clinical tests were performed
- ❖ Sleep quality was evaluated using ActTrust for ten consecutive days
- ❖ Cd, Pb, Ni, Mn, Benzene and Toluene concentrations in blood and urine were determined by GFAAS and GCMS
- ❖ genotyping was carried out using PCR

## RESULTS, STUDY 1

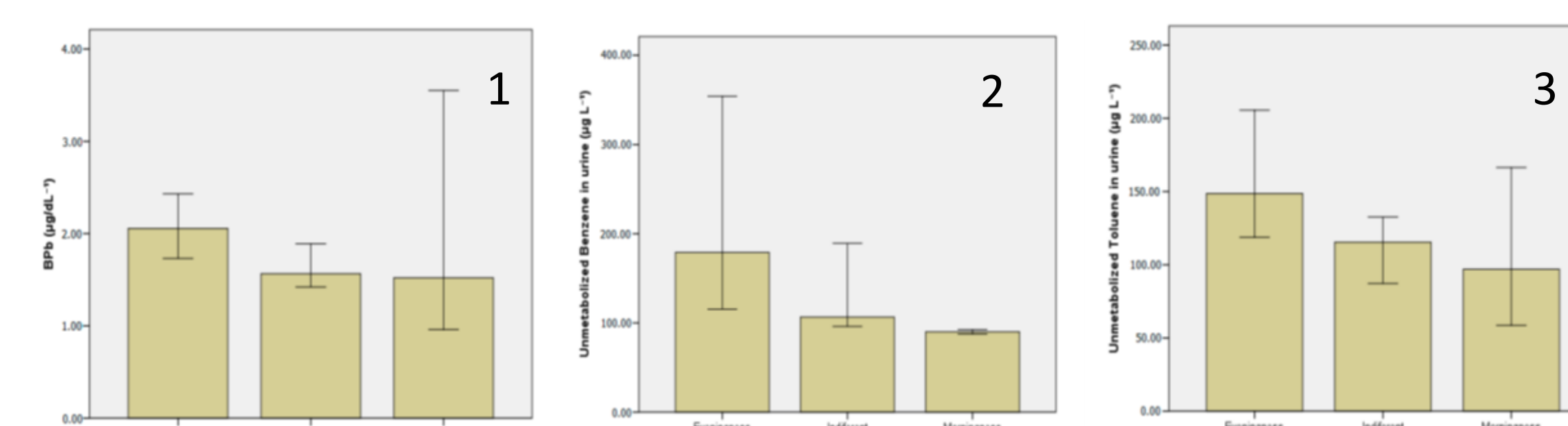
- ❖ 47% of the participants were afternoon chronotype, 42% were indifferent, and 11% were morning chronotype.
- ❖ Higher urinary Mn levels were associated with the morning chronotype,
- ❖ The evening chronotype was associated with poorer sleep quality, higher Pb-B, Benzene-U and Toluene-U in non-occupationally exposed.
- ❖ 57% of participants reported poor sleep quality, and higher Cd levels in urine in residents with higher scores for daytime dysfunction and sleep disturbance; Mn and Ni, for sleep disturbance; and Toluene for sleep duration.



Sleep variables	♂	♀	p
Quality	1,82	1,51	<0,01
Latency	1,72	1,55	0,10
Duration	1,52	1,23	<0,01
Efficiency	1,04	0,73	<0,01
Sleeping medication	0,76	0,38	<0,01
Daytime dysfunction	1,25	0,87	n.s.
PSQI score	8,12	6,31	n.s.

## RESULTS, STUDY 2

- ❖ The average score of sleep quality was 7.8 points in the PSQI score,
- ❖ 60% of the population was classified as having unhealthy sleep (PSQI > 5).
- ❖ A total sleep time between 5 and 6 hours, the efficiency of that sleep time was 80%, and the WASO was approximately 60 minutes.
- ❖ Stability and variability were 0.48 and 0.80 respectively,
- ❖ Positive correlation observed between the hormone Free T4 and total sleep time (p <0.05). It is also found that intraday variability had a negative correlation with hormone levels.



1) Lead-B; 2) Benzene-U; 3) Toluene-U according to *PER3* gene VNTR polymorphism.



Electrophoresis gel of PCR products corresponding to *PER3* 4/4 (evening), *PER3* 5/5 (morning), and *PER3* 4/5 (intermediate) chronotypes.

## CONCLUSIONS

- ❖ Exposure to contaminants influenced sleep patterns and the different chronotypes in the population exposed to toxic substances,
- ❖ These contaminants potentially act as activators of the neural circadian system, affecting sleep quality.