Estimation bias and agreement limits between two assessment methods of Habitual Sleep Duration in epidemiological surveys and the impact of Sleep Quality and Social Time Pressure

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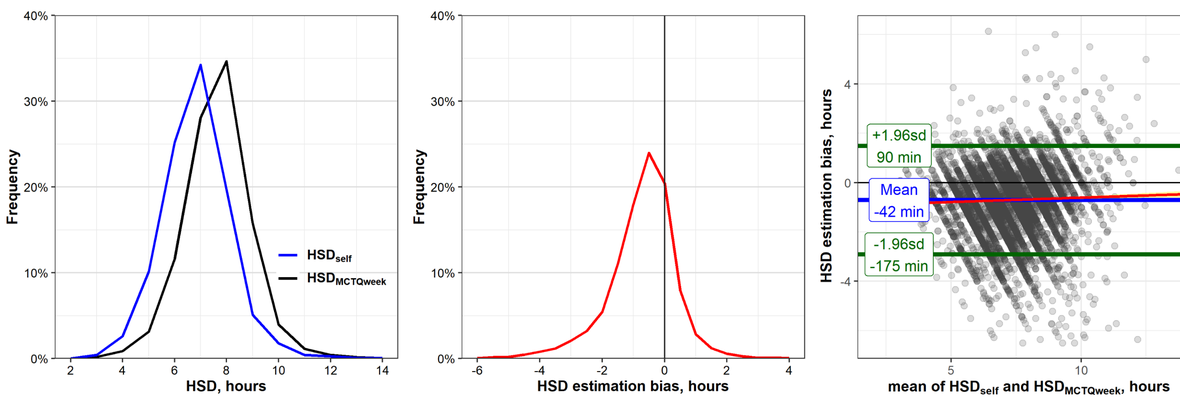
Background

Assessing habitual sleep duration (HSD) is vital for mapping sleep-health relationships. Evaluating differences between self-report methods used to measure HSD in surveys is crucial for understanding bias and influencing factors[1-3]. This study aimed to evaluate estimation bias and agreement limits between two short self-report methods for assessing HSD, considering sleep quality (SQ) and social jetlag (SJL) as potential predictors of bias.

Methods

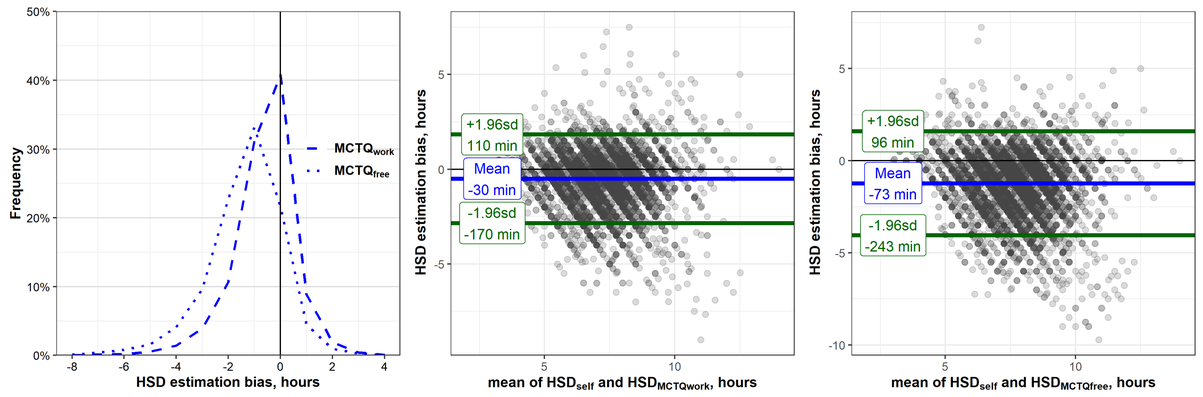
Using data from the International COVID Sleep Study-II (ICOSS-II) conducted online in 2021, we compared two self-report methods for assessing HSD in a sample of 10,268 participants. Method-Self involved a single question about average nightly sleep duration (HSD_{self}). Method-MCTQ employed questions about sleep onset and offset times on workdays and free days to calculate mean HSD during the week and on specific days ($HSD_{MCTQweek/work/free}$). SJL was determined as the difference in mid-sleep timing between workdays and free days. Sleep quality was assessed using a 5-point Likert scale.

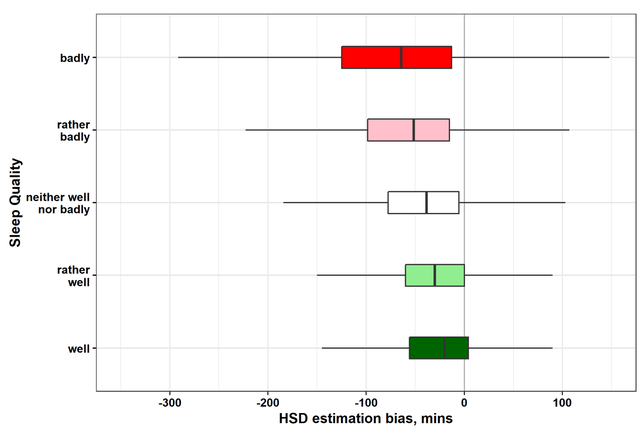
Results



The HSD_{self} consistently underestimated HSD compared to $HSD_{MCTQweek}$ (mean bias 42.41±67.42 minutes) with an agreement range within ±2.2 hours. Age did not impact the HSD bias.

$HSD_{MCTQwork}$ showed less bias and better agreement with HSD_{self} as compared to $HSD_{MCTQfree}$. Irregular sleep duration was frequent, with mean difference between free and workdays of -43.35±78.26 minutes.





The bias and agreement range between methods increased with poorer SQ (ranging from -26.69±58.10 to -79.97±97.29 minutes, good and bad quality groups, respectively).

Regressions showed that SQ was the leading predictor of different HSDs and estimation bias (with HSD_{self} demonstrating the largest dependence on it), except for $HSD_{MCTQfree}$ where SJL was the top predictor.

Conclusions

This study highlights that Method-Self and Method-MCTQ capture different aspects of HSD despite targeting the same construct. Method-MCTQ represents sleep intervals on workdays and free days without adjustments to SQ issues such as wakefulness after sleep onset, and accounts for sleep irregularity. Method-Self represents how the respondents interpret their sleep, and most likely this relates to their sleep on workdays. The magnitude of disagreement between methods is primarily driven by SQ; thus, surveys focusing on sleep-health relationships may bidirectionally adjust possible bias by including a question addressing SQ.

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