



The impact of shift work on paramedics' sleepiness and teamwork: A novel simulation-based study

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Introduction

Most paramedics work on a rotating shift schedule involving a combination of day and night shifts₁. Despite the known impact of shift work on sleep loss, and resultant performance and physiological impairments₂, few studies have examined the impact of rotating shift work on paramedics.

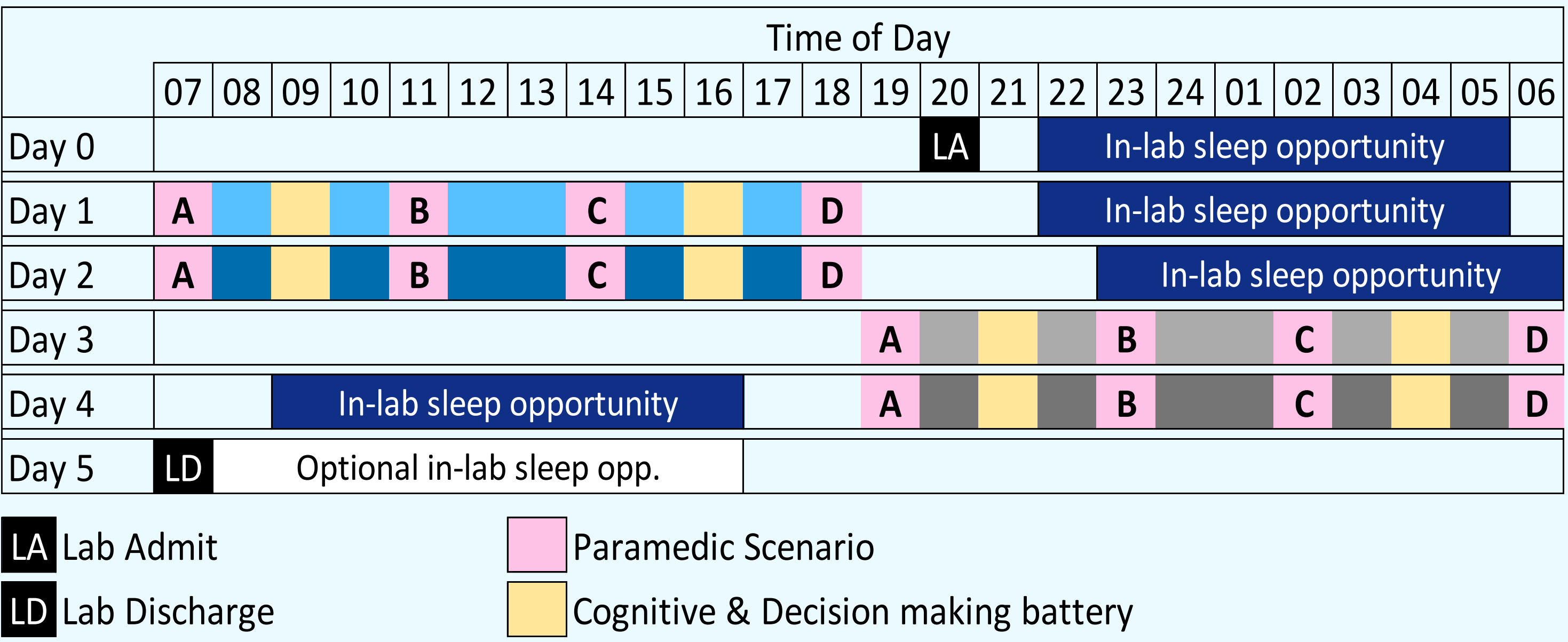
Aims

This study uses a simulated work rotation to explore the impact of rotating shift work and clinical work on paramedics' sleepiness and perceptions of teamwork.

Methods

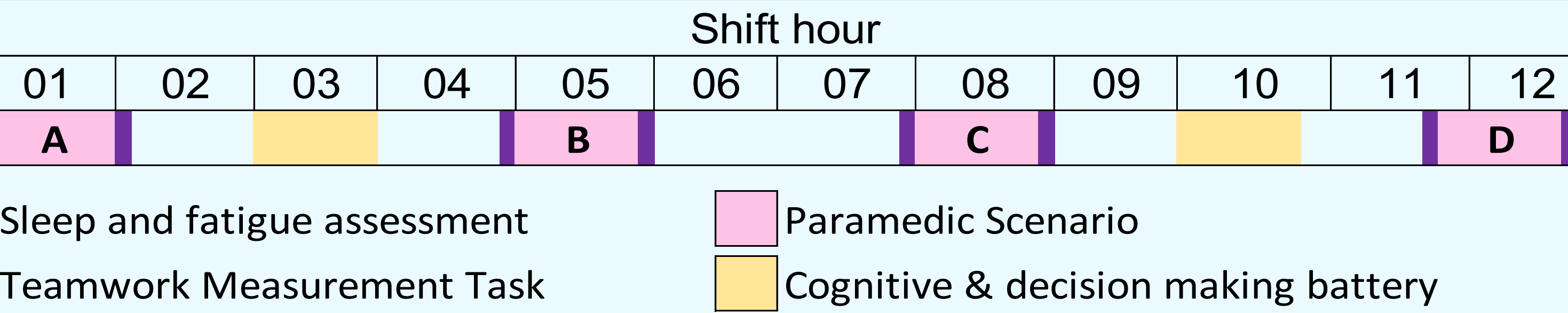
In pairs, Australian paramedics completed a two 12-hour day shift, two 12-hour night shift simulated work rotation (Fig 1). Simulated paramedic shifts include four paramedic clinical scenarios throughout each shift (Fig 1).

Fig 1. Simulated shift rotation



Before and after each paramedic scenario, subjective sleepiness was assessed via the Karolinska Sleepiness Scale (KSS; Fig 2)₃. After each shift, participants completed the teamwork measurement task (TMT)₄ that evaluates their perceptions of team functioning (Fig 2). Data was analysed via linear mixed models to compare within and between shift changes in sleepiness and team functioning, as well as the interaction of shift and sleepiness on teamwork.

Fig 2. Simulated shift schedule



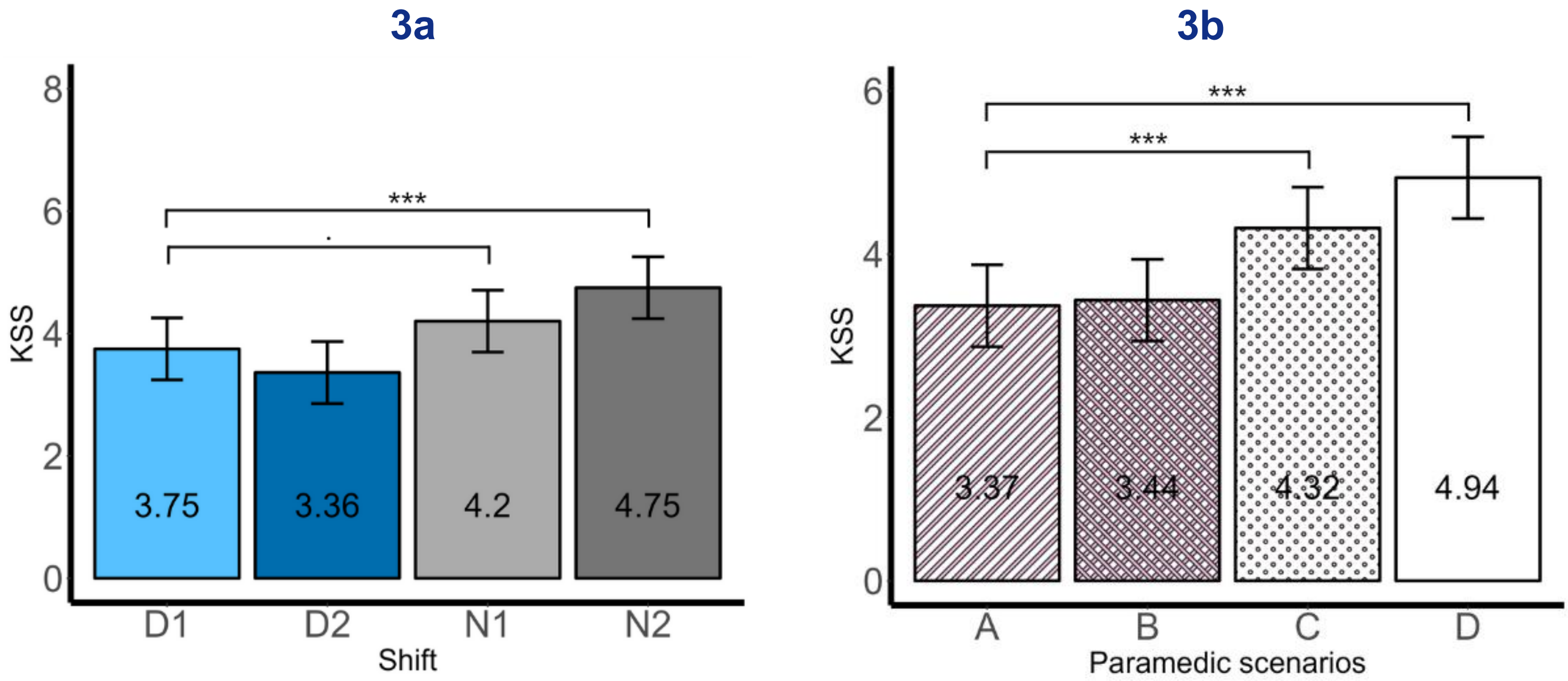
Results

A total of 16 participants (69% female, mean age=33.7±8.0 years) have completed the simulated shift work rotation. Mean KSS scores increased between the first day shift (3.75) and the first (4.2, $p<0.1$) and second night shifts (4.75, $p<0.05$; Fig 3a). Mean KSS scores also increased as shifts progressed, increasing from 3.36 for the first clinical scenario of the shift to 4.32 ($p<0.001$) for the third scenario and 4.94 ($p<0.001$) for the last scenario (Fig 3b).

Acknowledgements

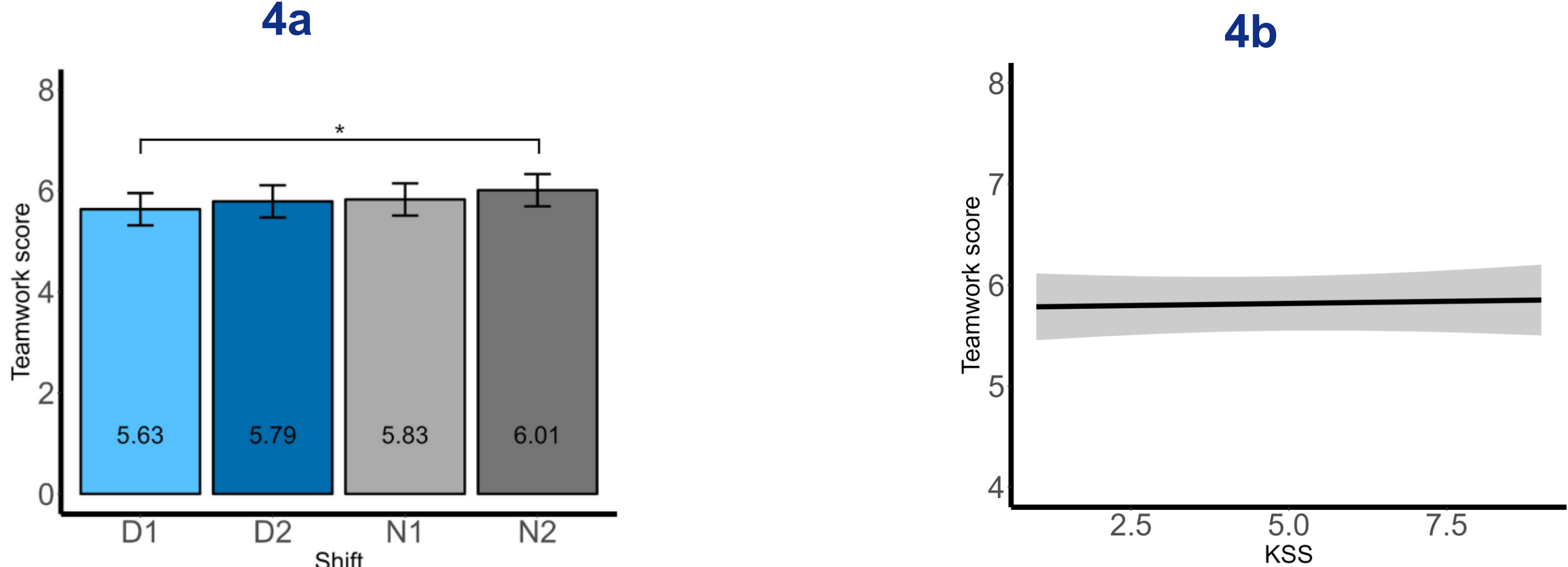
Monash Paramedicine Simulation Centre; Monash Sleep and Circadian Rhythm Laboratory; Project ASAP Research Assistant team

Fig 3. KSS by shift and paramedic scenario



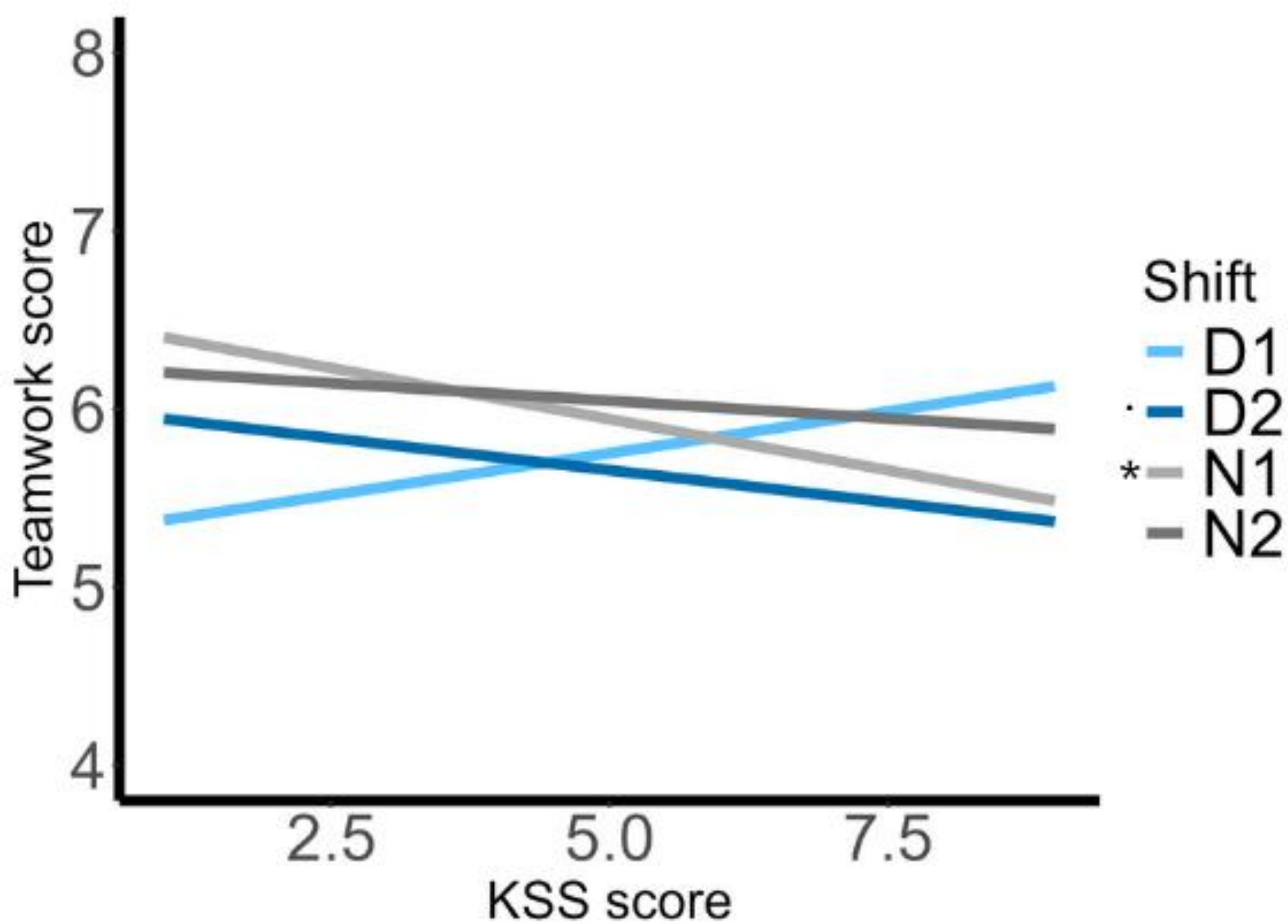
TMT scores increased from the first day shift (5.63) to the last night shift (6.01, $p < 0.01$; Fig 4a). There was no relationship between TWT scores and KSS (Fig 4b).

Fig 4. Teamwork scores by shift and KSS



A two-way interaction effect of shift by KSS for teamwork scores indicates increasing TMT scores on D1 when KSS increased. Conversely, on D2, N1 and N2, the interaction demonstrated decreasing TMT scores when KSS scores increased, indicating increased sleepiness is related to poorer perception of teamwork..

Fig 5. Interaction of shift and KSS on Teamwork scores



Conclusions

Preliminary findings demonstrate that participants experienced increased sleepiness within shifts and throughout the rotation, and that sleepiness and shift impact perceptions of teamwork. These findings provide novel insights into the negative impact of sleepiness on teamwork in personnel who regularly engage in shift work and perform clinical work.

References

- Government, A. (2019). Paramedics. D. o. Health.
- Costa, G. (2010). "Shift work and health: current problems and preventive actions." Saf Health Work 1(2): 112-123.
- Kaida, K., et al. (2006). "Validation of the Karolinska sleepiness scale against performance and EEG variables." Clinical Neurophysiology 117(7): 1574-1581.
- Weller, J., et al. (2013). "Validation of a measurement tool for self-assessment of teamwork in intensive care." British Journal of Anaesthesia 111(3): 460-467.