

# Response to the Letter to the Editor Regarding Wilson et al., “A Position Modification Device for the Prevention of Supine Sleep During Pregnancy: A Randomised Crossover Trial” Published in the British Journal of Obstetrics & Gynaecology

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Reply to the Letter to the Editor by Kember et al, Regarding Wilson et al., “A Position Modification Device for the Prevention of Supine Sleep During Pregnancy: A Randomised Crossover Trial” Published in the British Journal of Obstetrics & Gynaecology on 16 September 2024.

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Dear Prof. Aris Papageorghiou,

We thank Dr. Kember and his colleagues<sup>1</sup> for their interest in our recently published article<sup>2</sup>. Firstly, we acknowledge the recent publication by Coleman et al<sup>3</sup> regarding the benefits of the Prenabelt on foetal growth, as revealed through re-analysis of their data using Bayesian methods. Unfortunately, this paper<sup>3</sup> was published after our initial submission. Interestingly, while the frequentist analysis approach just fell short of significance, a Bayesian approach shows promise for supine sleep position interventions, by throwing an interesting light on the likelihood of a benefit depending on prior clinical beliefs. It remains that the mechanisms of action need further exploration however, given that supplemental data from the original publication<sup>4</sup> suggests that objectively measured supine sleep in a subset of women did not differ between those using Prenabelt v sham.

Secondly, we recognise our study was constrained by the measurement device used. The Night Shift Sleep Positioner (Night Shift) with neck placement was initially chosen, however, during our study a chest belt was

introduced by the manufacturer. We performed a sub-study with N=20 of the participants wearing the device at both neck and abdominal placements for one night. An epoch-by-epoch comparison revealed substantial agreement between the two devices for all sleep positions with 88% concordance overall (unweighted  $\kappa = .797$  [SE .006],  $p < .001$ ). Regrettably, we neglected to include these data within the original publication.

Despite the limitations of our measurement device, we believe that distinguishing between neck and pelvic position would not have substantially impacted our conclusions, given the high concordance between neck and abdominal devices revealed above, and particularly given that the intervention showed a nonsignificant *increase* in the proportion of supine sleep overnight. As Dr. Kember’s team have demonstrated, sleep positions where the thorax and pelvis are discordant (e.g., supine thorax with left pelvis tilt) are infrequent, occurring in less than 6% of “real-world” sleeping positions during pregnancy.<sup>5</sup>

We agree that the Night Shift lacked sufficient resolution to fully appreciate the complex interplay between maternal positioning and foetal haemodynamics, as mentioned in the limitations section of our paper. Indeed, measurement limitations persist with all position sensing methodologies including infra-red video monitoring, with Dr. Kember’s recent paper<sup>5</sup> demonstrating that while the most commonly occurring sleeping positions (left-lateral, right-lateral and supine) were well-recognised by modelling, the twisted/hybrid positions had intermediate performance, with the modelling particularly challenged by left or right tilted positions. To address the limitations of the Night Shift, we have recently completed data collection on a subsequent study using tri-axial accelerometry at abdominal level to characterise maternal sleep position in degrees of roll around the axial plane, with an aim to capture the subtleties of maternal position on uteroplacental haemodynamics and foetal growth.

As mentioned, this is an understudied area. Dr. Kember and his team share our drive to gather objective evidence of a causal pathway between supine sleep position and foetal wellbeing, which we believe is particularly important given current guidelines regarding safe sleeping position in late pregnancy are based on retrospective cohort studies of self-reported “going-to-sleep” position. Our team congratulates Dr. Kember and his colleagues for their excellent work in the sleep position during pregnancy space, and we look forward to the outcomes from their upcoming DOSAGE Study.

Disclosure of Interests:

The authors have no financial disclosures or conflicts of interest.

Contributions of Authorship:

Dr. Wilson, Prof. Walker and Prof. Howard drafted and revised the manuscript, Ms. Whenn and Dr. Barnes critically revised the manuscript.

Details of Ethics Approval:

Additional analyses comparing device location were approved under an amendment to the original approval by the Mercy Hospital for Women Human Research Ethics Committee project number 2020-015, on 3<sup>rd</sup> June 2021.

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