



## MIRT 2014 ABSTRACTS

### **Reliability of Oscillometric Central Blood Pressure and Wave Reflection Readings: Effects of Posture and Fasting**

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**Background:** Oscillometric pulse wave analysis devices have recently emerged, presenting ecological options for investigating central hemodynamic properties in clinical practice.

**Objective:** To facilitate guidelines for optimal use, this study sought to examine whether POSTURE and FASTED state affect the between-day reliability of central systolic blood pressure and systemic arterial wave reflection (augmentation index) recordings.

**Methods:** Twenty healthy adults (50% F, 27.9 y, 24.2 kg/m<sup>2</sup>) were tested on six different mornings: three days fasted, three days non-fasted. On each occasion the participant was tested supine and seated.

**Results:** Repeated measures analysis of variance indicated no interaction effect for any central hemodynamic variable. For central systolic pressure there was no main effect for FASTED but there was a large effect for POSTURE ( $\eta^2p = 0.40$ ). Conversely, for augmentation index there was no main effect for POSTURE but there was a large main effect for FASTED ( $\eta^2p = 0.22$ ). The criterion intra-class correlation coefficient value of 0.75 was exceeded for both variables when supine-fasted. For central systolic blood pressure the reliability coefficient was lowest (best) under the supine-fasted condition (6.8 mm Hg) and greatest (worst) for the seated-non-fasted

condition (8.6 mm Hg). For augmentation index, the reliability coefficient was higher (worse) for seated (14.0 – 15.2 %) compared to supine (11.4 – 11.7 %)

**Conclusion:** Findings from this study suggest that oscillometric assessments of central hemodynamic variables: (i) exceed the criterion for acceptable reliability, (ii) are most reliable when recorded supine-fasted.

## Central Hemodynamic Responses to an Orthostatic Challenge

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**Background:** Monitoring central hemodynamic responses to an orthostatic challenge may provide important insight into autonomic nervous system function. Oscillometric pulse wave analysis devices have recently emerged, presenting clinically viable options for investigating central hemodynamic properties.

**Objective:** The purpose of the current study was to determine whether oscillometric pulse wave analysis can be used to reliably assess central blood pressure and central pressure augmentation (augmentation index) responses to a 5 min orthostatic challenge (modified tilt-table).

**Methods:** Twenty healthy adults (26.4 y (SD 5.2), 55% F, 24.7 kg/m<sup>2</sup> (SD 3.8)) were tested on 3 different mornings in the fasted state, separated by a maximum of 7 days. Central hemodynamic variables were assessed on the left arm using an oscillometric device.

**Results:** Repeated measures analysis of variance indicated a significant main effect of the modified tilt-table for all central hemodynamic variables ( $P < 0.001$ ). In response to the tilt, central diastolic pressure increased by 4.5 mmHg (CI: 2.6, 6.4), central systolic blood pressure increased by 2.3 (CI: 4.4, 0.16) mmHg, and augmentation index decreased by an absolute - 5.3 %, (CI: -2.7, -7.9 %) %. The intra-class correlation coefficient values for central diastolic pressure (0.86-0.86), central systolic blood pressure (0.80-0.87) and A1x (0.79-0.82) were above the 0.75 criterion in both the supine and tilted positions, indicating excellent between-day reliability.

**Conclusion:** In summary, central hemodynamic responses to an orthostatic challenge can be reliably assessed using oscillometric pulse wave analysis.

## High Risk for Obstructive Sleep Apnea and Other Sleep Disorders among Overweight and Obese Pregnant Women

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**Background:** Obstructive sleep apnea (OSA), a common and serious disorder in which breathing repeatedly stops during sleep, is associated with excess weight and obesity. Little is known about the co-occurrence of OSA among pregnant women from low and middle-income women.

**Objective:** We examined the extent to which maternal pre-pregnancy overweight or obesity status are associated with high risk for OSA, poor sleep quality, and excessive daytime sleepiness in 1,032 pregnant women in Lima, Peru.

**Methods:** The Berlin questionnaire was used to identify women at high risk for OSA. The Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS) were used to examine sleep quality and excessive daytime sleepiness, respectively. Multinomial logistic regression procedures were employed to estimate odds ratios (OR) and 95% confidence intervals (CI) adjusted for putative confounding factors.

**Results:** Compared with lean women (< 25 kg/m<sup>2</sup>), overweight women (25-29.9 kg/m<sup>2</sup>) had 3.69-fold higher odds of high risk for OSA (95% CI 1.82-7.50). The corresponding OR for obese women (≥30 kg/m<sup>2</sup>) was 13.23 (95% CI: 6.25-28.01). Obese women, as compared with their lean counterparts had a 1.61-fold higher odds of poor sleep quality (95% CI: 1.00-2.63).

**Conclusion:** Overweight or obese pregnant women have increased odds of sleep disorders, particularly OSA. OSA screening and risk management may be indicated among pregnant women in low and middle income countries, particularly those undergoing rapid epidemiologic transitions characterized by increased prevalence of excessive adult weight gain.

## **Association of Decreased Early Pregnancy Serum Brain-Derived Neurotrophic Factor (BDNF) Concentrations with Antepartum Depression**

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**Background:** Antepartum depression is one of the leading causes of maternal morbidity and mortality in the prenatal period. There is accumulating evidence for the role of brain-derived neurotrophic factor (BDNF) in the pathophysiology of depression.

**Hypothesis:** The present study examines the extent to which maternal early pregnancy serum BDNF concentrations are associated with antepartum depression.

**Methods:** A total of 968 women were recruited and interviewed in early pregnancy. Antepartum depression prevalence and symptom severity were assessed using the Patient Health Questionnaire-9 (PHQ-9) scale. Maternal serum BDNF concentrations were measured using a competitive enzyme-linked immunosorbent assay. Logistic regression procedures were performed to estimate odds ratios and 95% confidence intervals (95% CI) adjusted for confounders.

**Results:** Maternal early pregnancy serum BDNF concentrations were significantly lower in women with antepartum depression compared to women without depression (mean  $\pm$  standard error [SE]: 20.78 $\pm$ 5.97 vs. 21.85 $\pm$ 6.42 ng/ml,  $p=0.024$ ). Lower BDNF concentrations were associated with increased odds of maternal antepartum depression. After adjusting for confounding, women whose serum BDNF levels were in the lowest three quartiles (<17.32 ng/ml) had 1.61-fold increased odds (OR=1.61, 95%CI: 1.13, 2.30) of antepartum depression as compared with women whose BDNF levels were in the highest quartile (> 25.31 ng/ml). There was no evidence of an association of BDNF concentrations with depression symptom severity.

**Conclusions:** Lower maternal serum BDNF concentrations in early pregnancy are associated with antepartum depression. These findings may point toward new therapeutic opportunities and improved biomarkers for risk prediction and monitoring response to treatment for antepartum depression.

## Poor Sleep Quality and Other Sleep Disturbances among Pregnant Migraineurs in Lima, Peru

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**Background:** Studies, primarily conducted among men and non-pregnant women, have shown that migraine and sleep disorders are highly prevalent and co-morbid.

**Objective:** We conducted this study to examine the extent to which migraine is associated with poor sleep quality and other sleep disturbances during pregnancy.

**Methods:** A cohort of 1,032 women attending antenatal care in a major hospital in Lima, Peru was included in the study. Structured interviews were used to collect information about participants' socio-demographic characteristics, sleep habits, and migraine history. Migraine diagnoses were based on the International Classification of Headache Disorders-II criteria. Sleep quality, excessive daytime sleepiness, and stress induced sleep disturbance were evaluated using the Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), and Ford Insomnia to Stress Test (FIRST), respectively. The Berlin questionnaire was used to assess high risk for obstructive sleep apnea. Logistic regression procedures were used to estimate adjusted odds ratios (AORs) and 95% confidence intervals (CI) of sleep variables in relation to migraine status.

**Results:** Migraineurs were more likely than non-migraineurs to report sleep disorders. Compared with non-migraineurs, migraineurs had 1.87-fold increased odds of poor quality (PSQI>5) (AOR=1.87; 95%CI: 1.31-2.67), 2.88-fold increased odds of excessive daytime sleepiness (ESS ≥10) (AOR=2.88; 95%CI: 1.93- 4.30) and 2.74-fold increased odds of stress induced sleep disturbance (AOR=2.74; 95%CI: 1.50-5.03).

**Conclusion:** Pregnant migraineurs were more likely to experience sleep disorders as compared with non-migraineurs. The findings of our study and those of others underscore the comorbidity of migraine and sleep disorders and suggest the need for increased vigilance for screening managing sleep disorders among pregnant women with a history of migraine.

## **Sleep Disturbances and Quality of Life in Sub-Saharan African Migraineurs**

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**Background:** Although in the past decade occidental countries have increasingly recognized the personal and societal burden of migraine, it remains poorly understood in Africa. No study has evaluated the impact of sleep disturbances and the quality of life in sub-Saharan Africans with migraine.

**Objective:** To evaluate sleep quality and quality of life in Ethiopian migraineurs.

**Methods:** This was a cross-sectional epidemiologic study evaluating adults,  $\geq 18$  years of age, attending outpatient clinics in Ethiopia. Standardized questionnaires were utilized to collect demographic, headache, sleep, lifestyle, and quality of life characteristics in all participants. Migraine classification was based on International Classification of Headache Disorders (ICHD)-II criteria. The Pittsburgh Sleep Quality Index and the World Health Organization Quality of Life (WHOQOL-BREF) questionnaires were utilized to assess quality of life and sleep quality characteristics, respectively. Multivariable logistic regression models were fit to estimate adjusted odds ratio (OR) and 95% confidence intervals.

**Results:** Of 1,060 participants, 145 (14%) met ICHD-II criteria for migraine. Approximately three-fifth of the study participants (60.5%) were found to have poor sleep quality. After adjustments, migraineurs had over a two-fold increased odds (OR=2.24, 95%CI 1.49-3.38) of overall poor sleep quality (PSQI global score  $>5$ ) as compared with non-migraineurs. Compared with non-migraineurs, migraineurs were also more likely to experience short sleep duration ( $\leq 7$  hours) (OR=2.07, 95%CI 1.43-3.00), long sleep latency ( $\geq 30$  min) (OR=1.97, 95%CI 1.36-2.85), daytime dysfunction due to sleepiness (OR=1.51, 95%CI 1.12-2.02), and poor sleep efficiency ( $<85\%$ ) (OR=1.93, 95%CI 1.31-2.88). Similar to occidental countries, Ethiopian migraineurs reported a reduced quality of life as compared to non-migraineurs. Specifically Ethiopian migraineurs were more likely to experience poor physical (OR=1.56, 95% CI 1.08-2.25) and psychological health

(OR=1.75, 95% CI 1.20-2.56), as well as poor social relationships (OR=1.56, 95% CI 1.08-2.25), and living environments (OR=1.41, 95%CI 0.97-2.05) as compared to those without migraine.

**Conclusion:** Migraine is highly prevalent and associated with poor sleep quality and a lower quality of life in Ethiopians. These findings support the need for physicians and policy makers to take action to improve the quality of headache care and access to treatment in Ethiopia.

## **Risk of Common Mental Disorders in Relation to High Risk for Obstructive Sleep Apnea and Other Sleep Disorders among College Students**

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**Background:** Obstructive sleep apnea syndrome (OSAS) is a common but often unrecognized cause of morbidity and mortality. Although polysomnography is the gold standard for diagnosing OSAS, it is expensive and time-consuming. The Berlin and Epworth Sleepiness Scale (ESS) are simple, validated, and widely used questionnaires to assess symptoms of OSAS.

**Objective:** This observational study examined the extent to which symptoms of OSAS are associated with the risk of common mental disorders (CMDs).

**Methods:** A cross-sectional study was conducted among 2,639 Ethiopian college students. Information about demographics, lifestyle characteristics and sleep habits were collected using self-administered questionnaires. The General Health Questionnaire (GHQ-12) was used to evaluate the presence of CMDs while the Berlin and ESS were used to assess high risk for obstructive sleep apnea (OSA) and excessive daytime sleepiness, respectively. Logistic regression procedures were used to derive odds ratios (OR) and 95 % confidence intervals (CI) assessing the independent and joint associations of high risk for OSA (Berlin questionnaire) and excessive daytime sleepiness (ESS) with the risk of CMDs.

**Results:** Approximately 19% of students had high risk for OSA while 26.4% had excessive daytime sleepiness. Compared to students without high risk for OSA and without excessive daytime sleepiness (referent group), students with high risk for OSA only (OR=2.79; 95%CI 1.89-4.14) and excessive daytime sleepiness only (OR=2.07; 95%CI 1.66- 2.56) had increased odds of CMDs. Those students with both high risk for OSA and excessive daytime sleepiness, compared to the referent group, had the highest odds of CMDs (OR=3.58; 95%CI: 2.27-5.62).

**Conclusions:** Symptoms of OSAS (as assessed using high risk for OSA and excessive daytime sleepiness) are associated with increased risk of CMDs. These findings emphasize the

comorbidity of sleep disorders and CMDs and suggest that there may be benefits to investing in educational programs that extend the knowledge of sleep disorders in young adults.