

Quality of Life (TBIQOL) Anxiety, Depression, and Fatigue scales.

**Results:** Overall, women with TBI (n = 68) showed greater presence and frequency of symptoms than women without TBI (n = 153), with fewer within-group differences by menopausal status. Among pre/peri-menopausal women, TBI and non-TBI groups did not significantly differ and showed small effect sizes on symptoms associated with changes in estrogen during menopause, including hot flashes, night sweats, bowel and bladder sequelae, and breast tenderness. However, pre/peri-menopausal women with TBI also endorsed body aches and headaches, as well as troubles with memory, focus, fatigue, cognitive concerns, sleep, and anxiety significantly more than their pre/peri-menopausal counterparts (all medium effect sizes). Among postmenopausal women, those with TBI had significantly greater frequency of hot flashes, crying spells, poor memory, worry, moodiness, panic attacks, sleep disturbance, and anxiety than women without TBI. Within TBI, only hot flashes and breast tenderness were greater in postmenopausal versus pre/peri-menopausal women. Within non-TBI, postmenopausal status was associated with significantly greater hot flashes, night sweats, restlessness, poor memory, irritability, sleep disturbance, and anxiety, with greater fatigue but not significantly.

**Conclusions:** The findings support a model of TBI and menopause in which symptoms most closely associated with estrogen decline in pre/peri-menopause are generally similar between women with and without TBI, and symptoms that overlap with common TBI sequelae were generally more often present and frequently experienced among women with TBI versus non-TBI. We did not observe a synergistic or potentiating effect of TBI on menopause symptoms in post-menopause. These findings offer insight that contextualizes the experience of menopause symptoms among women with TBI. Such insights are essential for the development of treatment approaches that maximize health and wellbeing during the menopause transition for women with TBI.

**Categories:** Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Adult)

**Keyword 1:** traumatic brain injury

**Keyword 2:** aging (normal)

**Correspondence:** Lisa J. Rapport, Wayne State University Department of Psychology, rapport@wayne.edu

#### 4 Women and Concussion Outcomes: What We Know and How We Can Do Better

Amy Jak<sup>1</sup>, Veronica Merritt<sup>1</sup>, Michael Thomas<sup>2</sup>, Elena Polejaeva<sup>3</sup>, IEAH Talbert<sup>4</sup>, Cody Witten<sup>5</sup>, Amma Agyemang<sup>6</sup>, Mary Jo Pugh<sup>7</sup>

<sup>1</sup>University of California San Diego, San Diego, CA, USA. <sup>2</sup>Colorado State University, Ft. Collins, CO, USA. <sup>3</sup>VA San Diego, San Diego, CA, USA.

<sup>4</sup>Brigham Young University, Provo, UT, USA. <sup>5</sup>Veterans Medical Research Foundation, San Diego, CA, USA. <sup>6</sup>Virginia Commonwealth University, Richmond, VA, USA. <sup>7</sup>University of Utah, Salt Lake City, UT, USA

<sup>5</sup>Veterans Medical Research Foundation, San Diego, CA, USA. <sup>6</sup>Virginia Commonwealth University, Richmond, VA, USA. <sup>7</sup>University of Utah, Salt Lake City, UT, USA

**Objective:** The vast majority of existing research on outcomes following concussion is androcentric with women notably understudied in all settings where concussion commonly occurs, including sport, military, and civilian domains. Clinical care for concussed women is, by extension, far less evidenced-based as it is largely extrapolated from male-dominated studies. We therefore sought to center concussion outcomes of women in big data sources in this investigation to capitalize on both sample size and breadth of setting in which concussion occurs.

**Participants and Methods:** We identified all studies with publicly released data as of 4/7/21 that included both male and female adults, enough information to determine severity of injury consistent with concussion/mild traumatic brain injury (TBI), a measure of postconcussive symptoms (PCS), and objective measures of neurocognitive functioning from the Federal Interagency Traumatic Brain Injury Research (FITBIR) Informatics System. FITBIR is a collaborative effort of the National Institutes of Health (NIH) and the Department of Defense (DoD), developed to share data across the entire TBI research community. This resulted in inclusion of six studies with a total of 9370 participants, 32% female. PCS data was drawn from the Neurobehavioral Symptom Inventory (NSI), the Rivermead Post-Concussion Symptoms Questionnaire (RPSQ), and the Sport Concussion Assessment Tool – 3rd Edition

(SCAT 3), specifically the 22-item participant symptom evaluation rated on a 7-point scale. The questionnaires were harmonized and the following symptom domains emerged: Somatic, Cognitive, and Affective. Data were analyzed using linear mixed-effects models.

**Results:** We found a small to medium sized significant effect of sex, with women reporting higher symptoms overall. Mean symptom endorsement scores were higher overall on the NSI in comparison to the RPSQ and SCAT ( $p < .001$ ). Follow-up analyses revealed sex differences were largest for cognitive symptoms, followed by somatic symptoms, then affective symptoms. We also found significant main effects of population (military>sport/civilian,  $p = .003$ ) and sex (women>males,  $p < .001$ ) on the overall composite, as well as a significant population-by-sex interaction such that female service members/veterans endorsed the highest rates of symptoms ( $p < .001$ ). Similar patterns of significance and effect sizes were observed for the somatic and affective composites. Cognitive symptom composites showed a similar pattern, but with smaller effect sizes overall. Racial and ethnic diversity was also limited in the sample.

**Conclusions:** In one of the largest samples of women to date, we found a small to medium effect of sex on symptom reporting such that women reported higher levels of postconcussive symptoms than males. Notably, however, the women in military/Veteran samples endorsed the highest levels of symptoms. Despite using a large publicly available dataset to maximize the representation of women, the current sample was still predominantly male and racial and ethnic diversity among the sample was not consistent with expected broader population demographics. Dramatically more concerted efforts need to be made to engage women in all spheres of concussion research (military, civilian, and sport). Strategies to be more inclusive in concussion research will be highlighted.

**Categories:** Concussion/Mild TBI (Adult)

**Keyword 1:** concussion/ mild traumatic brain injury

**Correspondence:** Amy Jak, University of California San Diego, [ajak@ucsd.edu](mailto:ajak@ucsd.edu)

## 5 From Advantage to Disadvantage: Women's Clinical Trajectory in Early-Stage Alzheimer's Disease

Erin E. Sundermann<sup>1</sup>, Sarah J. Banks<sup>2</sup>, Mark W. Bondi<sup>3</sup>, Anat Biegon<sup>4</sup>, Thomas Hildebrandt<sup>5</sup>

<sup>1</sup>University of California, San Diego, Department of Psychiatry, San Diego, CA, USA. <sup>2</sup>University of California, San Diego, Department of Neurosciences, San Diego, CA, USA. <sup>3</sup>VA San Diego Healthcare System, San Diego, CA, USA. <sup>4</sup>Stony Brook University, Department of Radiology, New York, NY, USA. <sup>5</sup>Mt. Sinai School of Medicine, Department of Psychiatry, New York, NY, USA

**Objective:** There are critical and perplexing sex/gender differences in Alzheimer's disease (AD). Women show a more favorable clinical profile in preclinical AD particularly with verbal memory, but a steeper decline post mild cognitive impairment (MCI) diagnosis and, ultimately, higher rates of AD. Longitudinal studies are needed to understand sex differences across the AD trajectory. Using data from the Alzheimer's Disease Neuroimaging Initiative, we identified profiles of memory trajectories among those with evidence of preclinical AD or MCI at baseline and how these trajectories differ by sex.

**Participants and Methods:** In our sample of 659 participants (age range: 55-90, mean age=72.9 [SD=7.4], 95% non-Hispanic White; mean follow-up=41.2 [SD=32.3] months), 233 were labelled "preclinical" AD (51% women) at baseline based on a cognitively normal status but positivity for either the cerebrospinal fluid p-Tau/A $\beta$ 42, Amyloid PET or Tau PET biomarkers, and 426 participants (44% women) were MCI at baseline based on Jak/Bondi criteria. We applied latent class growth curve modeling to the heterogeneous change in the Rey Auditory Verbal Learning Test (RAVLT) Immediate and Delayed Recall within preclinical and MCI groups separately. Models in MCI group included Non-Linear Spline to account for differential change rates within subgroups. Models were compared on Bayesian Information Criterion, Entropy, and Class distribution to determine a best-fitting model. Effects of sex on trajectories were the primary outcomes. All models included APOE4 carrier status and age.

**Results:** Women outperformed men on Immediate and Delayed Recall at baseline in the preclinical and MCI groups ( $p < .05$ ). Within the preclinical group, 3-class models representing stable, decline, and accelerated decline provided optimal fit for both Immediate and Delayed Recall. Whereas, on average,