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Tobacco, Marijuana, and Antidepressant Use Prior to Concussion are Associated with Increased Depression Risk in Post-Concussive Syndrome Patients

Eli Snyder^{1,2}, Ryan Nakamura^{1,2}, Miriya Ogawa¹, Kaylin Bersamin^{1,4}, Edward Weldon^{1,2}, Julia Jahansooz^{1,2}, Anson Lee^{1,2}, Kyle Ishikawa², Janette Abramowitz, MD¹, Enrique Carrazana, MD¹, Jason Viereck, MD¹, Kore Liow, MD¹

¹[Concussion and TBI Center, Hawaii Pacific Neuroscience](#), Honolulu HI

²John A. Burns School of Medicine, University of Hawaii, Honolulu, HI

⁴University of Hawaii at Manoa, Honolulu, HI

Objective: This study aims to assess alcohol, tobacco, marijuana, and antidepressant use pre- and post-mild traumatic brain injury (mTBI) as potential risk factors for depression in the context of PCS (DPCS).

Background: Post-Concussion Syndrome (PCS) describes symptoms which persist beyond the typical recovery time frame for mTBI. Although there is a confirmed correlation between mTBI and depression risk, there is a paucity of literature investigating risk factors for DPCS. Associations between tobacco or marijuana use and DPCS have not been previously demonstrated.

Design/Methods: This single-center, retrospective study included 297 patients diagnosed with PCS between January 2020 and January 2023. Data comprised Patient Health Questionnaire (PHQ)-2/PHQ-9 surveys, substance use pre- and post-PCS diagnosis, and antidepressant use pre- and post-PCS diagnosis. P-values were calculated using Fisher's exact tests and Pearson's Chi-squared tests.

Results: Of the initial 297 patients identified, 82% received depression screening, and 31% were at risk of DPCS based on PHQ-2 scores. Tobacco use pre-mTBI ($p=0.027$) and marijuana use pre- ($p=0.002$) and post-mTBI ($p=0.004$) were associated with increased risk of DPCS. Elevated DPCS risk was seen in patients who used selective serotonin reuptake inhibitors (SSRIs) ($p=0.003$), serotonin-norepinephrine reuptake inhibitors (SNRIs) ($p=0.010$), or atypical antidepressants ($p=0.032$), pre-mTBI or SNRIs ($p=0.047$) or atypical antidepressants ($p=0.003$) post-mTBI. Combining all antidepressants into one variable, the use of any antidepressant pre-mTBI was associated with increased DPCS risk ($p<0.001$). Patients who didn't use antidepressants pre or post-mTBI demonstrated lower risk of DPCS than patients who used antidepressants pre-mTBI and post-mTBI and patients who used antidepressants pre- but not post-mTBI.

Conclusions: This study highlights several risk factors for DPCS which may inform improved PCS patient management and emphasizes the need to develop standardized screening protocols for DPCS. Future prospective studies including PHQ-2/PHQ-9 scores pre- and post-mTBI may better elucidate relationships between DPCS and substance and medication use.