

4.40 CLINICAL IMPACT OF REMINDER-FOCUSED, POSITIVE PSYCHIATRY BODY MIND ON NEUROMUSCULAR PERFORMANCE IN PTSD

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Objectives: PTSD is a prevalent neuropsychiatric disorder that is associated with reduced neuromuscular performance, increased neurovascular inflammation, suicidality, and major adverse events.

Methods: Fourteen individuals (60% female, ages 14 ± 4 years), who met the DSM-5 diagnostic criteria for PTSD, underwent one session of Reminder-Focused, Positive Psychiatry Body Mind (RFPP-BM). RFPP-BM consists of: 1) 15 minutes of enhanced recognition of and coping with physiological and psychological reactions to trauma/loss reminders (RTL) through self-compassion, self-regulation flexibility, and gratitude exercises; and 2) 30 minutes of physical and emotional resilience building by high-intensity intermittent functional training (HIFT). Before and after RFPP-BM, all participants completed the UCLA PTSD Reaction Index for DSM-5 (RI), the Connor-Davidson Resilience Scale (CD-RISC), an operator-independent Audio-Visual Artificial Intelligence (AVAI) for PTSD, markerless vision-based neuromuscular performance, video electroencephalography (vEEG), autonomous nervous system (ANS) reactivity and reactive hyperemia procedure for cardiovascular function, and positive psychiatry batteries.

Results: All participants completed RFPP-BM with a satisfaction rate of 4.9 out of 5. Compared to the baseline, a 55% increase in ANS and cardiovascular function, a 70% increase in neuromuscular performance, a 70% increase in CD-RISC score, and a 60% increase in Positive Emotions, Engagement, Relationships, Meaning, and Achievement (PERMA) score were noted ($p < .05$). A 50% reduction in E/I ratio in orbitofrontal cortex, 25% reduction in the RI total score and a 45% reduction in the reactivity to trauma reminder (RTR) after RFPP-BM was noted ($p < .05$). A direct link between an increase in neuromuscular function, an increase in ANS, and a reduction in RTL was noted ($R = 0.8$, $p = .001$).

Conclusions: RFPP-BM is a feasible trauma-informed body-mind intervention and is associated with an improvement in PTSD symptoms, an improvement in neural activities, neuromuscular performance, ANS and cardiovascular function improvements, and an increase in well-being. This highlights the impact of RFPP-BM in enhancing self-regulation flexibility, body-mind connectedness, and improvement of ANS and neuromuscular performance, which is linked to reduction of reactivity to traumatic stress reminders of PTSD.

PTSD, NI, PSP

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4.41 HEART RATE VARIABILITY IN RESPONSE TO ENVIRONMENTAL CONDITIONS IN ASD

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Objectives: ASD is a neurodevelopmental condition characterized by social communication difficulties and restricted repetitive behaviors. Recent research suggests that autonomic nervous system (ANS) dysregulation may be a physiological correlate of ASD, with heart rate variability (HRV) emerging as a biomarker of autonomic function. HRV reflects the balance between sympathetic and parasympathetic activity. Reduced HRV suggests decreased vagal tone and increased stress response. Given the role of the ANS in emotional and social regulation, HRV provides valuable insight into physiological responses during social interactions. This study compares HRV responses between children with ASD and typically developing children (TDC) during different environmental conditions.

Methods: In this study, HRV was measured in 20 children with ASD (aged 6–11) and 20 age- and gender-matched TDC across various conditions: baseline, engagement with a stranger, separation from a parent, re-engagement with a parent, and exposure to a sound stimulus. Data were collected using a wearable heart rate monitor.

Results: Results indicated that HRV increased ($p = .04$) during the sound stimulus period in the ASD group but not in the TDC group. During separation from a parent, HRV decreased in the TDC group ($p = .03$) but remained

unchanged in the ASD group. Additionally, a negative correlation ($p = .03$) was found between baseline HRV and anxiety/depression scores (as measured by the Child Behavior Checklist) in the TDC group, but no correlation was found in the ASD group.

Conclusions: These findings reveal different HRV response patterns in children with ASD compared to typically developing peers. Separation from a parent is generally considered a stress-inducing factor. In the ASD group, no observable signs of stress are observed during separation from a parent, whereas reduced HRV indicates an increased stress state in the TDC group. Moreover, the association between HRV and affective symptoms in TDC underscores HRV's potential as a physiological marker for emotional regulation. Understanding HRV profiles in ASD may enhance diagnostic precision and inform personalized intervention strategies targeting autonomic regulation.

ASD, CVF, ND

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4.42 MOLECULAR DYSREGULATION OF GLUCOCORTICOID RECEPTOR PATHWAYS IN TEENAGE SUICIDE COMPLETERS

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Objectives: Dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, a stress-response system regulated by the glucocorticoid receptor (GR), has been linked to suicide, yet few molecular studies focus on adolescents. This study compared: 1) messenger-ribonucleic acid (RNA) expression of GR chaperones (FKBP4, FKBP5, HSP90, p23, BAG1); and 2) GR-regulated genes (P11, GPR158, SKA2) in the prefrontal cortex (Brodmann Area 9; BA9) and hippocampus of teenage suicide deaths (TSD) vs matched controls (C), predicting region-specific up-regulation of chaperones, down-regulation of BAG1 and P11, and overall evidence of impaired GR transcription.

Methods: First, brain tissue was obtained postmortem from 24 TSD and 24 C subjects matched for age, sex, postmortem interval, pH, and RNA integrity. Second, quantitative real-time polymerase chain reaction (PCR) measured target-gene expression, normalized to the geometric mean of 3 house-keeping genes ($\Delta\Delta Ct$). Third, multivariate ANCOVA (MANCOVA) followed by individual ANCOVAs tested group effects; the covariates were age, sex, pH, postmortem interval, RNA integrity, and antidepressant exposure. Finally, fold-change ($FC = 2^{\Delta\Delta Ct}$) and Benjamini-Hochberg-adjusted $p < .05$ defined significance.

Results: In BA9, FKBP4 and HSP90 were up-regulated ($FC \approx 1.4$), BAG1 was down-regulated ($FC \approx 0.8$), and P11 was reduced ($FC \approx .8$); GPR158 was elevated ($FC \approx 1.5$). In the hippocampus, FKBP4 and p23 were increased ($FC \approx 1.4$), while BAG1 and P11 were unchanged; GPR158 remained elevated ($FC \approx 1.6$). SKA2 showed a nonsignificant upward trend in BA9.

Conclusions: Teenage suicide completers exhibit region-specific GR dysregulation: increased FKBP4/HSP90 and decreased BAG1/P11 in BA9, plus increased FKBP4/p23 in the hippocampus. Up-regulation of GPR158 across regions suggests prolonged cortisol exposure or faulty feedback. These molecular alterations may weaken stress-response control, amplifying suicide risk in adolescence, and identify FKBP5, BAG1, and P11 as potential biomarkers for early detection and intervention.

S, R, DAM

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4.43 INTEGRATED FRAMEWORK OF BODY, MOTOR, AND BRAIN DEVELOPMENT RELATED TO ATTENTION PROBLEMS

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Objectives: This study aimed to investigate a multilevel neurobehavioral pathway related to ADHD-associated attention problems, integrating brain

structure, motor control, and physical development. We focused on identifying neural correlates of attention impairment, determining which motor patterns predict these brain features and exploring how body composition may contribute to this pathway.

Methods: We analyzed multimodal data from 42 typically developing children (mean age = 10.6 years, SD = 2.3; 45% female). Brain features were extracted from T1-weighted MRI, focusing on cortical thickness and gray matter volume. Motor function was assessed using data from a pressure-sensitive platform, including weight distribution and center-of-pressure metrics. Body composition was evaluated via bioelectrical impedance analysis and summarized into latent factors for muscle, fat, and metabolism. ADHD-related impairment was assessed using the Child Behavior Checklist (CBCL) attention problem scale. Stepwise regression identified brain regions associated with attention problems, motor variables predicting those regions, and body factors influencing motor function. Overlapping brain regions were examined to explore a potential pathway.

Results: Cortical regions in the frontal and parietal lobes, characterized by altered thickness and gray matter volume, were significantly associated with attention problems (mean $p = .02$). These regions were also predicted by specific motor indicators derived from static balance tasks, particularly mediolateral weight distribution and anterior-posterior center-of-pressure movement (mean $p = .03$). Among body composition factors, metabolism—reflected in basal metabolic rate and segmental lean mass—showed the strongest association with motor function ($p = .02$).

Conclusions: This study offers preliminary evidence for an integrated neurobehavioral pathway linking body composition, motor function, and brain structure to attention-related impairments. Although prior studies have examined these domains in isolation, this work uniquely maps the sequence from body to brain to behavior within a single framework. Understanding motor and brain development jointly may enhance insight into neurodevelopmental conditions such as ADHD and inform early detection and intervention strategies.

DEV, NEURODEV, ADHD

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4.44 DO CHARACTERISTICS OF FATHERS ADD TO A PREDICTION MODEL FOR THE SHAKING OF VERY YOUNG CHILDREN?



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Objectives: Shaking of very young children is an important risk factor for abusive head trauma. The influence of fathers may be important, but little is known about the relations between shaking and paternal characteristics, especially in low- and middle-income countries. This study determined to what extent paternal characteristics explained variance in shaking in Pakistan beyond that accounted for by child, maternal, and household characteristics.

Methods: Data from standardized questionnaires from cross-sectional, representative household surveys (Multiple Indicator Cluster Surveys) conducted in 4 provinces in Pakistan (Sindh, Punjab, Baluchistan, and Khyber Pakhtunkhwa [KPK]) in 2018-2019 were used. Shaking was based on a yes/no response by an adult caregiver in the home to a question as to whether the child had been shaken in the last month. The sample for this study was restricted to children aged 12-23 months (of note, the question was not asked for children <12 months). Logistic regression analyses with backward elimination were used to identify independent predictors of shaking in a model with and without the inclusion of paternal variables (age, education, measure of happiness, and beliefs about hitting/beat one's wife).

Results: Prevalence of reported shaking ranged from 18.3%-41.6% across the 4 provinces, based on a total combined sample of 5660 households. Variables significantly and independently associated with shaking included exposure to other physical punishments, child stunting, lower maternal education, if the mother wanted her last pregnancy, maternal and paternal beliefs on hitting/beat one's wife, rural vs urban residence, province of residence, and the child's age. The models' pseudo R^2 values were 0.230 and 0.232 without and with the paternal variables, respectively.

Conclusions: Shaking of very young children is common in Pakistan, although with substantial regional variation. A modest amount of the variance was explained by child, maternal, and household characteristics, with little additional variance explained by paternal characteristics. However, the dataset did not include some paternal characteristics that may need to be further considered (eg, substance use). Additionally, further examination of shaking's particularly strong relation with other physical punishments is warranted.

CAN, EPI, EC

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4.45 HOW DOES CHILD EXPOSURE TO PHYSICAL PUNISHMENTS DIFFER BETWEEN CUBA AND THE DOMINICAN REPUBLIC?



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Objectives: Despite many similarities between Cuba and the Dominican Republic (DR), there is some evidence that child-rearing practices may differ between these 2 Caribbean countries. This study aimed to determine whether the prevalence of exposure to different physical punishments is lower for children in Cuba vs the DR and whether country is a predictor of different physical punishments after adjusting for covariates.

Methods: The study used data from the 2019 Multiple Indicator Cluster Surveys (MICS) for both countries. MICS are surveys conducted on nationally representative household samples facilitated by UNICEF. A standardized set of questions about child discipline are embedded in a questionnaire in these surveys that asks an adult in the household (typically the mother) about exposure of a randomly selected child to 6 different physical punishments. Given sampling differences, analyses were conducted separately for 1-4- and 5-14-year-olds and consequently allowed for examination of robustness of patterns across age groups. The Complex Sampling Plan within SPSS statistical software was used for analysis.

Results: The dataset on 1-4-year-olds was composed of 3922 Cuban and 5277 Dominican children, and the dataset on 5-14-year-olds was composed of 3452 Cuban and 9495 Dominican children. More Dominican children were exposed to 3 of 6 physical punishments across both age groups compared to Cuban children (spanked with hand, hit with an object, hit on head), whereas more Cuban children were exposed to 1 of 6 (hit on limb). Inconsistent patterns across ages were found for being shook and beat up. Within binary logistic regression models adjusted for covariates, country was a predictor of individual physical punishment exposure, with a pattern similar to that of the prevalence results. The largest ORs were seen for Dominican children's exposure to being hit with an object compared to Cuban children, 8.38 (95% CI, 5.62-12.51) and 5.12 (95% CI, 4.03-6.50), for 1-4- and 5-14-year-olds, respectively.

Conclusions: Further study of these country differences is warranted to advance understanding of the factors underpinning the use of different physical punishments, including the potential role of emerging legislation differences between the 2 countries regarding physical punishment of children.

CAN, EPI, PAT

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4.46 DO DISCIPLINARY PRACTICES VARY BY PARENT RELIGION IN RELIGIOUSLY DIVERSE TRINIDAD AND TOBAGO?



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Objectives: Findings that more children may be exposed to physical punishment in Conservative Protestant households compared to other religious and nonreligious groups are based solely on studies in Western countries, especially the United States. Furthermore, they do not consider non-Christian religious groups. This study examined whether child exposure to certain disciplinary practices is related to a caregiver's religious affiliation in religiously diverse Trinidad and Tobago.