

Multidimensional Characterization of a Large Cohort of Trauma Survivors May Improve Trauma Survivor Phenotyping.

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Background: Traditional posttraumatic syndromes (e.g., post-concussive, stress, pain, depression) artificially fragment the experience of trauma survivors, who experience symptoms across multiple syndrome domains. Common posttraumatic outcomes also share overlapping biology and can be mutually reinforcing. Multidimensional phenotypes that cluster patients across common symptom outcomes may have greater utility (e.g., descriptive, treatment selection) than traditional syndromes.

Methods: Prospective longitudinal data across 10 symptom groups (pain, loss, somatic, concentration/thinking, sleep, nightmares, avoidance, re-experiencing, anxiety, hyperarousal) are assessed via brief serial smartphone-based surveys (Mindstrong Health App) in trauma survivors recruited from the emergency department as part of the AURORA study. Measurement models for each symptom group were developed, and cross-sectional multidimensional clustering performed for each month after trauma and symptom group. Final clusters at each timepoint were based on stability and validity indices and clinical experience.

Results: Measurement models developed from cohort data ($n > 2000$) had good fit to the data (e.g., 2 month CFI = .98 for pain, .98 for loss). Optimal cluster number across months after trauma generally ranged from 5 to 7, with $\geq 10\%$ of the cohort in each cluster. Clusters typically consisted of a recovered group, a small cohort with uniformly severe symptoms, and clusters between these extremes with symptom variation across outcome. Consistent with shared biologic/mechanisms, broadly speaking clusters shared symptom severity across outcomes.

Conclusions: Multidimensional characterization of trauma survivors is possible and may have clinical utility.

Key words: Trauma, RDoC, Outcomes, Multidimensional