

In Support of Multidimensional Frailty: A Structural Equation Model from the Canadian Positive Brain Health Now Cohort

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Background

HIV has become a chronic manageable condition and the underlying reasons for mortality in people living with HIV are no longer directly caused by the virus. Now, a larger group of people are aging with HIV and face age-related conditions such as frailty. Frailty is a multifactorial syndrome with causes originating from morbidities, genetics, lifestyle, and the environment. Consequently, frailty manifests on physical, emotional, cognitive, and social dimensions of health. The interconnectedness between frailty constructs is of interest to understand the manifestation of frailty in HIV.

- Physical Frailty is defined as diminished strength, endurance, and reduced physiologic function (doi:10.1093/gerona/gls119).
- Emotional Frailty is defined as experiencing mood disorders and loneliness (doi.org/10.1007/s11482-019-09735-y).
- Cognitive Frailty is defined as co-occurrence or incidence of physical frailty and cognitive impairment excluding dementia (doi: 10.1007/s12603-013-0367-2).
- Social Frailty is defined as a continuum of being at risk of losing, or having lost, resources that are important for fulfilling one or more basic social needs during the life span (doi: 10.1007/s10433-017-0414-7).

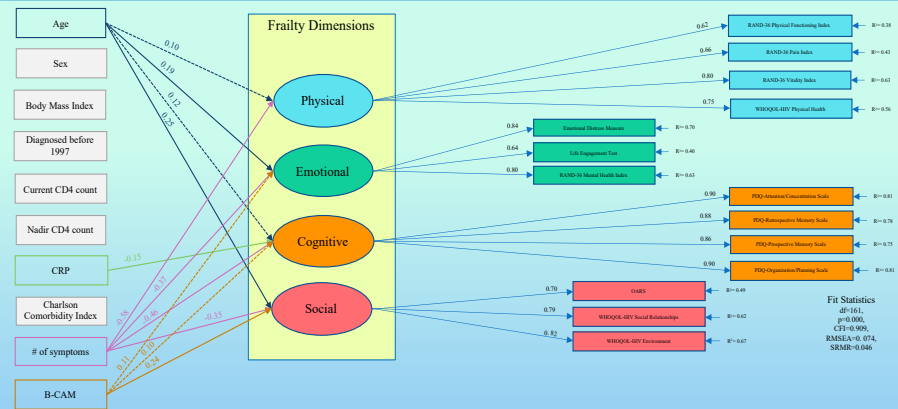
Objective & Methods

- The objective is to estimate the structure and relationships between physical, emotional, cognitive, and social frailty constructs in people living with HIV.
- We used the data from the prospective Positive BHN cohort that recruited people living with HIV since 2014 from five clinics across Canada and followed over four annual visits. A total of 856 persons' data (female=15.7%) from the first visit were analyzed. The mean age was 52.9 (8.3).
- Items covering areas that were too similar to each other's were excluded from. All scales were transformed to range from 0 to 100 and for high scores to indicate better outcomes.

Abbreviations:

CRP: C-reactive Protein; B-CAM: Brief Cognitive Ability Measure, a computerized cognitive test battery that measures cognitive ability; PDQ: Perceived Deficits Questionnaire; OARS: Older Americans Resources and Services Questionnaire

Results



- A total of 514 persons' data (female=13.4%) from the first visit with complete data were analyzed.
- The mean age was 52.3 (8.1). The hypothesized 4-factor model showed adequate model fit. Correlations among frailty subdomains ranged from 0.40 to 0.82.
- Sex, nadir CD4-count, and diagnosis before 1997 didn't predict any frailty subdomains.
- On the other hand, age (β range: 0.10-0.24), number of symptoms (β range: -0.37 to -0.59), and measured cognition (β range: 0.09 to 0.24) directly predicted all frailty subdomains.
- Current CD4 predicted only social ($\beta=0.09$) and CRP predicted only cognitive frailty ($\beta=-0.15$).

Discussion

This is the first time that a multidimensional model of frailty has been tested in HIV and a 4-factor model fit the data.

Many of the measures are connected to evidence-based interventions that could improve the lives of people living with frailty.

We found additionally:

- Cognitive performance was tested whether it was part of cognitive frailty, however it did not perform well. Therefore, cognitive performance is not part of experienced cognitive frailty.
- The Rand-36 Vitality Index would fit both under physical and emotional dimensions of frailty. In line with the definition of Fried's Frailty Phenotype (covers exhaustion as a physical parameter), we kept the Rand-36 Vitality subscale under the physical dimension.