Relationships between depressive symptoms, pain, and physical function in older adults with HIV

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Background

Pain continues to be a problematic, under-addressed, and high-priority symptom among PLWH [1].

- More than 50% of PLWH experience pain [2], and older PLWH appear to experience pain at higher rates than those who are younger or their similarly-aged counterparts without HIV [3].

According to a global task force, understanding etiologies of pain and the contribution of psychosocial factors are key areas for advancing its science and clinical management [4].

- Depressive symptoms and chronic inflammation may contribute to pain among older PLWH [5].

In this cross-sectional analysis, we tested whether depressive symptoms and systemic inflammation were associated with bodily pain among older PLWH. Guided by the biopsychosocial model, we then explored a possible pathway linking these factors, such that depressive symptoms and inflammation may impact physical function in part through worse pain.

Methods

Older PLWH were recruited from Weill Cornell Medicine's HIV clinic as part of a larger, multi-site survey study (Research on Older Adults with HIV 2.0)

- A subset was invited to complete a sub-study, which included a biomedical research visit.

Participants reported depressive symptoms (CES-D-10) on the ROAH 2.0 survey

At a biomedical research visit, participants completed physical function assessments (4-m walk, grip strength, and surveys) and rated their past-month pain (MOS-HIV survey).

Blood samples were drawn and stored, then later assayed for cytokines (IL-6, TNF-α, IFN-γ; analyzed as a composite) and C-reactive protein.

Regression models including Hayes' PROCESS macro [6] were used to examine depressive symptoms as a contributor to pain, and exploratory mediation models were used to test links to physical function. Adjusted models included age, sex, race, BMI, smoking status, disease burden, SSRI use, opioid use, and time since HIV diagnosis as covariates.

Sample Characteristics

Table 1. Demographic and key variables for sample (N=162)

Characteristic	Mean (SD) or n (%)
Age	61.15 (5.75)
Sex, female	53 (33%)
Race	
Black	82 (52%)
White	48 (30%)
Asian or Pacific Islander	2 (1%)
Bi- or multi-racial	26 (17%)
Ethnicity, Hispanic or Latino	43 (30%)
Education level, > 12 years	108 (68%)
Viral load < 200 copies/mL	150 (93%)
Time since HIV diagnosis (yrs)	23.22 (5.79)
Disease burden (VACS Index score)	33.15 (18.21)
BMI	28.35 (7.07)
Current smoking	26 (16%)
SSRI medication use	18 (11%)
Analgesic opioid medication use	31 (19%)
Pain (MOS-HIV subscale, reverse-coded)	35.66 (24.76)
Depressive symptoms (CESD-10 scores)	10.00 (6.37)
Gait speed (best trial, m/sec)	0.91 (0.23)
Grip strength (average of 3 trials, kg)	31.68 (8.72)
Self-reported physical function (MOS-HIV subscale)	65.81 (26.74)
Fall in past 6 months	36 (22%)
Prefrail or frail status	109 (67%)

Note: % indicates percentage of those with available data for each variable. Data were missing for some participants for race (n=4), ethnicity (n=21), education (n=4), gait speed (n=1), falls (n=2), grip strength (n=5), and frailty status (n=2).

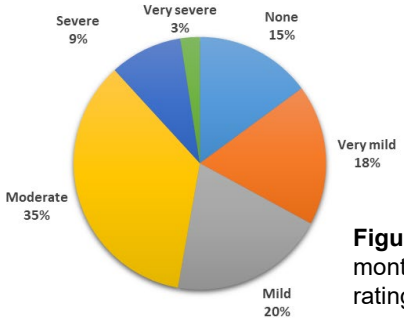

Figure 1. Past-month pain severity ratings in sample.

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Results

Those with more depressive symptoms had worse pain than those with fewer depressive symptoms (Table 2). This association remained statistically significant in the adjusted regression model (b=1.31, SE=0.28, p<0.001).

Those with higher composite cytokine levels had worse pain than those with lower cytokine levels, which remained significant in the adjusted model (b=5.70, SE=2.54, p=0.03). There were not statistically significant associations between CRP levels and pain levels.

Worse pain was related to poorer physical function indicators, including slower gait speed, weaker grip strength, recent falls, and lower self-reported physical function (Table 2). Exploratory mediation models suggested that the indirect effect of pain was significant for separate models linking depressive symptoms to gait speed (Figure 2), self-reported physical function, recent falls, and pre-frail or frail status.

Table 2. Bivariate Pearson correlations between pain, key contributors of interest, and physical function indicators

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
[1] Bodily pain subscale	--						
[2] Depressive symptoms	.33**	--					
[3] Composite cytokine levels	.25*	.24*	--				
[4] CRP (log-transformed)	.03	-.05	.40**	--			
[5] Gait speed	-.32**	-.23*	-.17*	-.13	--		
[6] Grip strength	-.25*	-.20*	-.10	-.11	.26*	--	
[7] Fall in past 6 months	.39**	.31**	.06	-.02	-.21*	.02	--
[8] Self-rated physical function	-.60**	-.35**	-.31**	-.19*	.42**	.29*	-.34*
[9] Prefrail/frail status	.44**	.43**	.18*	.02	-.40**	-.30**	.21*

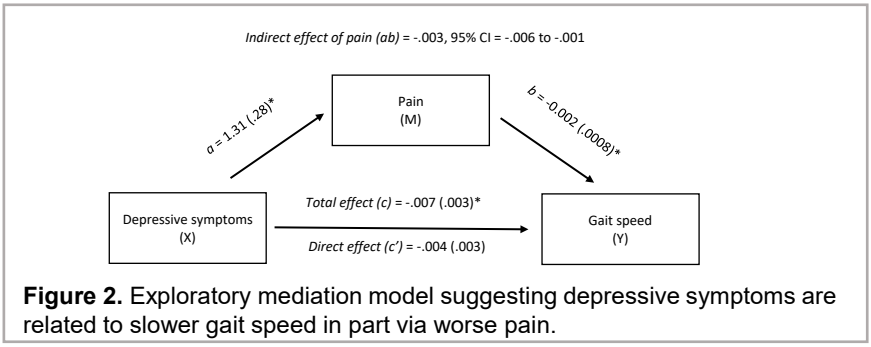

Figure 2. Exploratory mediation model suggesting depressive symptoms are related to slower gait speed in part via worse pain.

Conclusions

This study suggests that depressive symptoms and inflammation are linked to pain among older PLWH, and that these relationships likely have consequences for physical function.

- Pain is a potential underlying factor and/or pathway linking depressive symptoms and inflammation to age-related health vulnerabilities among older PLWH, and longitudinal investigation of this pattern is warranted.

PLWH with pain may benefit from multidisciplinary resources, including behavioral health and geriatric medicine approaches.

- These approaches are typically well-received by PLWH and hold promise for addressing pain and its effects among older PLWH.

References

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