The Role of Age as a Moderator in the Relationship Between HIV–related Stigma, Family Support, and Depression Among People Living with HIV in Durban, South Africa

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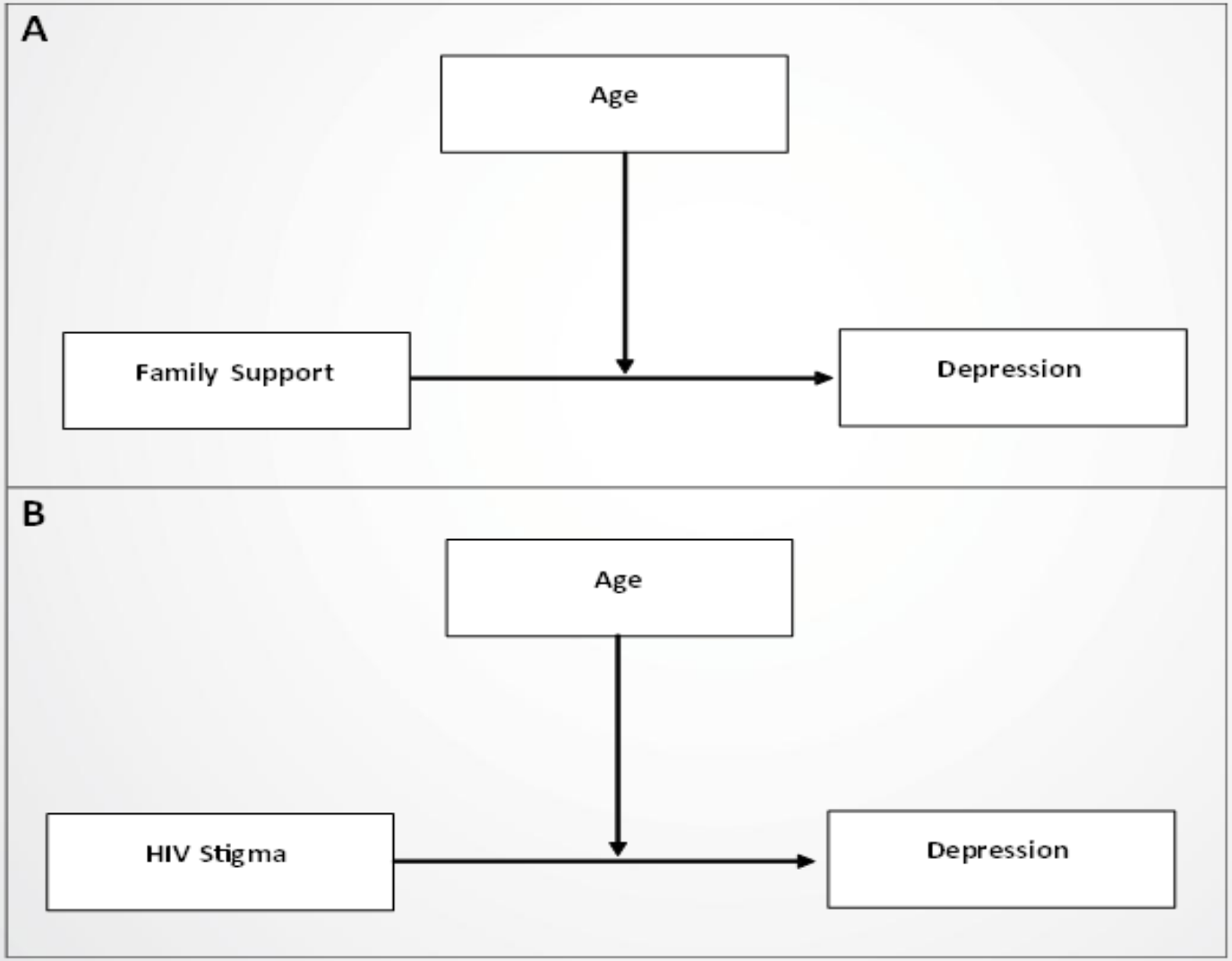
Background of the study

- HIV remains a global health challenge, affecting 39 million PLHIV worldwide [1].
- Beyond physical health, stigma contributes significantly to poor mental health outcomes among PLHIV [2–5].
- In SSA, depression prevalence among PLHIV ranges from 29% to 63% [6]. HIV stigma, family support, and age are key psychosocial factors influencing depression [6, 7].
- Young PLHIV often face high levels of stigma and depression [8, 9], while older adults show lower internalized stigma and weaker stigma–depression links [10].

Background of the study

- Family support consistently predicts better mental health outcomes [11–13].
- Adolescents and young adults face a stronger interplay between HIV-related stigma and depression [8].
- For older adults, emotional and instrumental support reduces depressive symptoms, especially among women [14, 15].
- There is a paucity of studies that have examined age as a moderator of the relationships between HIV stigma, family support, and depression among PLHIV in South Africa.

Study aim and hypotheses



Aim

This study aims to examine how age moderates the relationship between family support, HIV stigma, and depression among adults living with HIV, drawing on the Model of Family Stress and Adaptation (MFSA), Syndemic theory, and the Socio–Emotional Adaptation (SEA) framework.

Hypotheses

H1: Higher family support will be significantly associated with lower depressive symptoms.

H2: Higher HIV stigma will be significantly associated with greater depressive symptoms among PLHIV.

H3: Age will significantly moderate the effects of family support on depression.

H4: Age will significantly moderate the effects of HIV stigma on depression.

Methodology

- Quantitative cross-sectional study using probability time-location sampling (TLS) to recruit eligible participants.
- Data collected occurred at the ARV family clinic at a tertiary hospital

Sample size calculation

- Determined using a single population proportion formula at 95% CI (Z^2=1.96), 5% margin of error (d^2=0.05).
- Estimated proportion = 14.4% from pilot data [46].

$$S = \frac{Z^2\left(1 - \frac{a}{2}\right)p(1-p)}{d^2}$$

- Final sample = 201 participants (aged 18–75 years).

Methodology

Table 1. Measures and variables

Variable	Tool	Previous Reliability	Current Study Reliability	Citation
Depression	PHQ-9	α = 0.86–0.89	α = 0.79	Kroenke et al. [17]
Family Support	MSPSS (Family Subscale)	α = 0.85–0.92	α = 0.92	Zimet et al. [18]
HIV Stigma	HSS-12	α = 0.75–0.96	α = 0.87	Berger et al. [19]

- Moderator: Age (18–34 = young adults; 35+ = older adults) in line with UNAIDS, [1].
- Confounders: gender, marital status, education, employment, income.

Methodology

Ethical approval and informed consent

- Approved by University of KwaZulu-Natal IRB (HSSREC/00000607/2019).
- Written informed consent obtained; confidentiality and voluntary participation ensured.

Statistical Analytic Plan

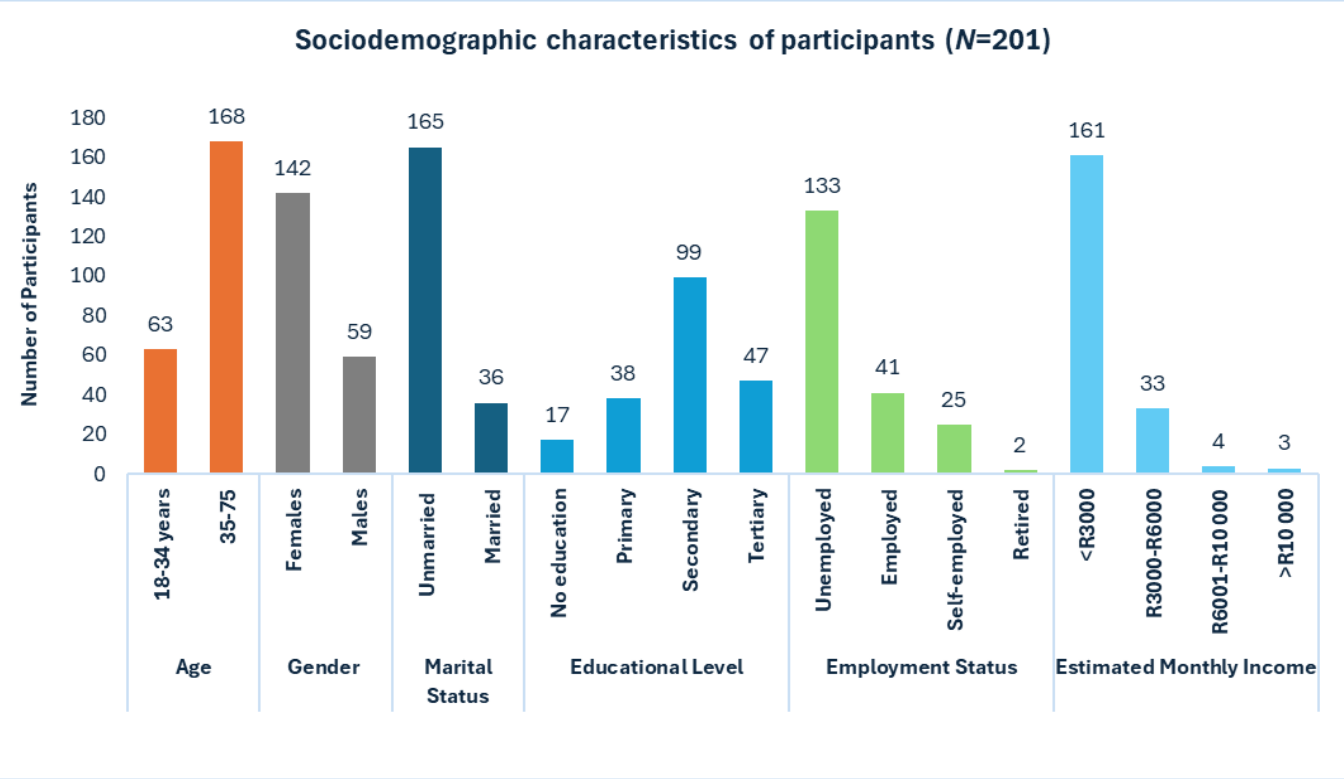
- Analyses were conducted in SPSS v.30 with moderation analyses via PROCESS macro v.4.2 beta [21].
- Data screening included checks for missing data, outliers, normality, homoscedasticity, and multicollinearity [22]. Missing data >10% were excluded; <10% handled using multiple imputations [23].

Methodology

Statistical Analytic Plan (Conti..)

- Continuous predictors (family support, HIV stigma) were mean-centered; assumptions checked (VIF < 1.5; tolerance > 0.75; skewness/kurtosis −2 to +2) [24, 25].
- Descriptive statistics and Spearman's rho correlations were computed for the correlation matrix of the central study variables.
- Moderation tested via two PROCESS models: (i) Family Support × Age, (ii) HIV Stigma × Age, with unadjusted and adjusted models (covariates: gender, education, employment, income, marital status); significance set at $p < .05$, using 5,000 bootstrap resamples [26].

Results



Socio-demographic characteristics of participants

Most participants were in the older age group (n=168; 68.7%), with the sample being mostly female (n=142; 70.6%), unmarried (n=165; 82.1%), and unemployed (n=133; 66.2%), and nearly half had secondary education (n=99; 49.3%). The majority (n=161; 80.1%) reported an estimated monthly income below R3000.

Results

Table 2. Descriptive and correlational among the central study variables

Variables	M (SD)	1	2	3	4
1. HIV Stigma	M=24.11 (SD=6.95)	_	-.232**	.367**	-.068
2. Family Support	M=22.32 (SD=6.93)		_	-.157*	.182**
3. Depression	M=7.46 (SD=5.67)			_	.037
4. Age	M=39.28 (SD=12.12)				_

Notes. *p < .05. **p < .01; M = mean, SD = standard deviation

Age ranged from 18 to 75 years (M = 39.28, SD = 12.12). Mean scores indicated moderate levels of HIV stigma (M = 24.11, SD = 6.95), family support (M = 22.32, SD = 6.93), and depression (M = 7.46, SD = 5.67).

Spearman's rho correlations indicated that HIV stigma was positively associated with depression (ρ = .367, p < .01). Family support was inversely associated with depression (ρ = −.157, p < .05), highlighting its protective role.

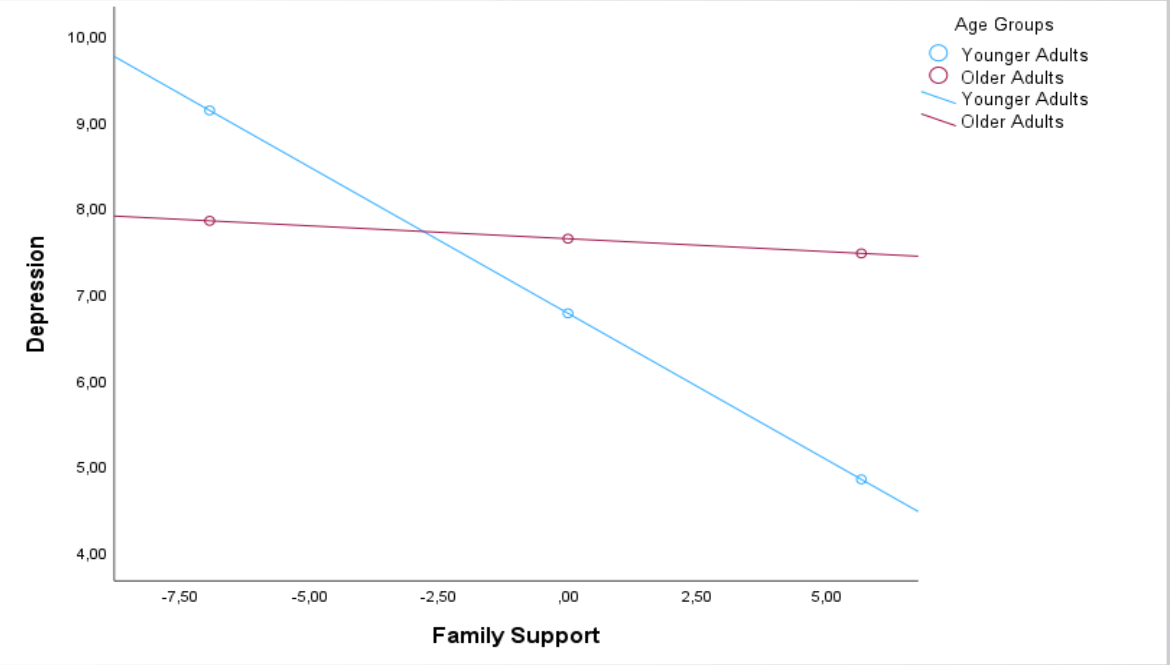
Age was not significantly correlated with depression (ρ = .037, p > .05).

Results

The moderating effect of age on the association between family support and depression

- ***H1***: Higher family support will be significantly associated with lower depressive symptoms. This hypothesis was confirmed (unadjusted: B = −0.144, p = .013; adjusted: B = −0.127, p = .026).
- ***H3***: Age will significantly moderate the effects of family support on depression.
- Interaction confirmed this hypothesis - Family support × age was significant (unadjusted: B = 0.305, p = .017; adjusted: B = 0.310, p = .017).
- Among covariates, only marital status was significant (B = −2.140, p = .045), with married participants reporting lower depression.
- The graph illustrates this interaction: a steep negative slope for younger adults (B = −0.340, p = .002) vs. a flat slope for older adults (B = −0.030, p = .658).

Figure 2: Simple slopes graph of family support on depression by age group



Results

The moderating effect of age on the relationship between HIV stigma and depression

H2: Higher HIV stigma will be significantly associated with greater depressive symptoms. This hypothesis was confirmed (unadjusted: B = 0.339, p = .001; adjusted: B = 0.315, p = .001).

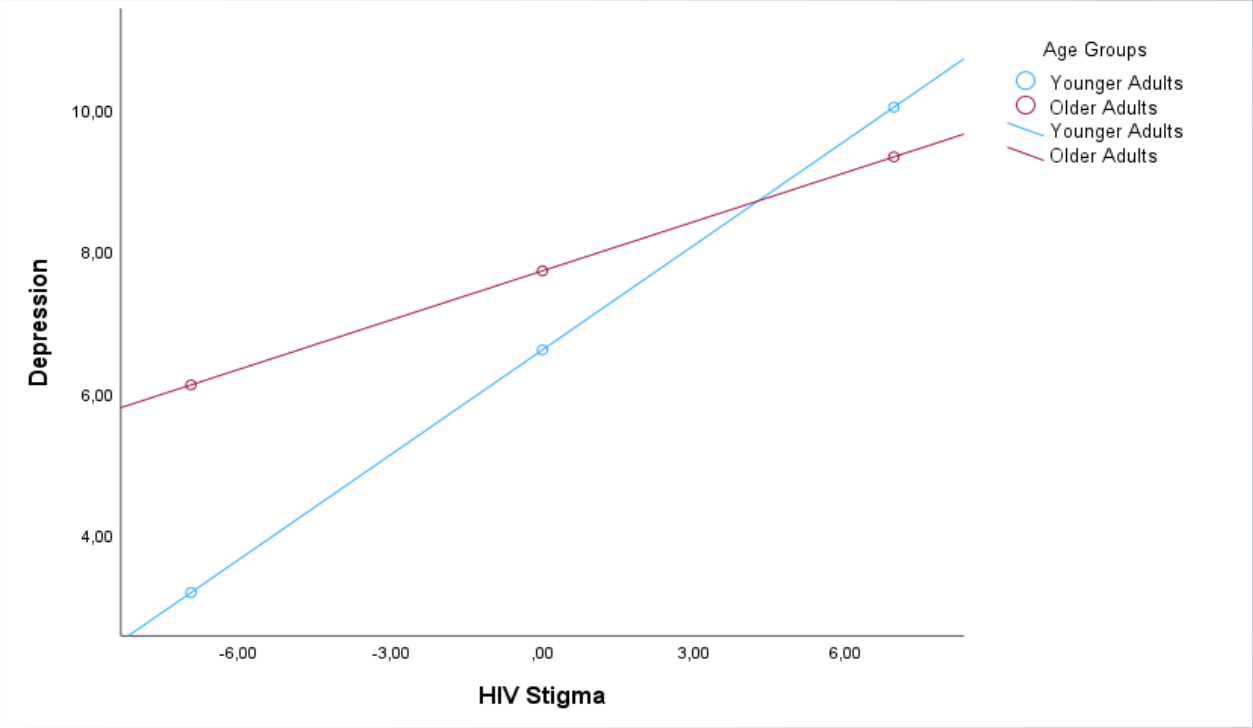
H 4: Age will significantly moderate the effects of HIV stigma on depression.

Interaction confirmed this hypothesis – HIV stigma × age was significant (unadjusted: B = −0.240, p = .028; adjusted: B = −0.262, p = .018).

Among covariates, none reached statistical significance.

The graph illustrates this interaction: a steeper positive slope for younger adults (B = 0.495, p = .001) vs. a slightly less steep but significant slope for older adults (B = 0.232, p = .001).

Figure 3: Simple Slopes Graph of HIV Stigma on Depression at Different Age Groups



Discussion

- Family support was significantly associated with lower depression, especially among young adults, consistent with findings from Nepal, Vietnam, India, and Uganda [11–13, 27].
- This protective role aligns with Cohen & Wills' [28] stress-buffering hypothesis and Socio-Emotional Adaptation theory [11], showing that lack of family support increases vulnerability to depression.
- For older adults, family support was not statistically significant, suggesting reliance on internal coping or alternative supports, as highlighted by the model of family stress and adaptation (MFSA) [12].
- HIV stigma was significantly associated with depression across all age groups, but was more pronounced among young adults, confirming syndemic theory [9] and supported by studies in SSA [20].
- Young adults appear especially vulnerable to stigma and lack of support, as shown in Uganda and Zimbabwe [29], highlighting the need for age-sensitive interventions.

Limitations

- Cross-sectional design limits causal conclusions between HIV stigma, family support, and depression.
- Self-reported measures may be influenced by social desirability or recall bias on sensitive topics.
- Generalizability is limited – future studies should use larger, diverse samples, longitudinal and qualitative approaches, and explore moderators like HIV disclosure using moderated moderation models.

Conclusions

Depression among adult PLHIV is significantly influenced by age

- Young adults are more vulnerable to HIV stigma and rely profoundly on family support.
- Older adults draw less from family and depend more on internal coping or alternative support systems.

HIV stigma has a greater negative impact on younger adults, likely due to identity and social pressures.

Findings call for age-differentiated service delivery models:

- Young adults – emotionally responsive, family–based HIV and mental health support.
- Older adults – community–based and self–management interventions.

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THANK YOU!