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Factors associated with psychological distress among members of HIV discordant couples in western Kenya: the role of adverse childhood experiences

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Background The relationship between measures of psychological distress and factors such as adverse childhood experiences (ACE) and HIV infection have not been well studied among members of HIV discordant couples living in Kenya.

Methods A structured questionnaire, which included the non-specific psychological distress Kessler 6 (NPD K6) scale, was administered to members of HIV discordant couples using a computer-assisted personal interview in two Kenyan communities.

Results Among the 202 participants who completed the survey (52% women and 48% men), the median NPD K6 score was equal for men and women (median=4; maximum=24). Participants did not report high levels of distress. For women, factors associated with a higher or more distressed NPD K6 score were a higher ACE score, religious affiliation, and perception of not being treated with respect by family members and partners. For men, factors associated with a higher NPD K6 score were HIV-positive status and higher ACE score.

Conclusions It is important to assess NPD and ACE in members of discordant couples, and if needed, assist them in identifying psychological counselling and support activities. By being better equipped to deal with the stressors associated with not only HIV, but also the discrimination and stigma associated with the disease, members of discordant couples may be more inclined to consider the importance of treatment and prevention.

The relationships among biological mechanisms, stress, and physical and mental health outcomes are still not well understood. In early work assessing the relationships between the mind and body connection, research focused on assessing the "fight or flight" response both in humans and animal models (*1-4*). Previous research has demonstrated that the fight-or-flight stress response is often biologically adaptive in terms of responses to brief stressful situations,

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but chronic exposure to stressful life events can place individuals at risk for developing a wide range of both physical and mental health outcomes (*5*). This relationship between chronic stress and the onset of illness has been a growing area of interest (*6*-*10*).

Members of HIV-discordant couples can experience non-specific psychological distress (NPD) from their own diagnosis, from knowing their partner is HIV-infected, or from the burden either circumstance places on a relationship in terms of stigma and trust. A qualitative study based in three countries, showed that stigma-influenced experiences were reported by discordant couples and included gossip, rumors, and name calling by family members, co-workers, and health workers (*11*). Another study showed that positive HIV status was associated with the breakup of the marriage, and being neglected or disowned by family (*12*). A number of studies have used the NPD Kessler 6 (K6) scale (*13*-*15*) to assess psychological distress. The NPD K6 scale has been designated by the World Health Organization (WHO) as the primary instrument in the WHO World Mental Health Survey (*16*). Components of the NPD K6 can also be used to define measures of anxiety and depression (*13*, *17*, *18*). In a United States (U.S.) non-institutionalized sample of individuals, the NPD K6 score was associated with both risky behaviors and health outcomes such as cigarette use, obesity, heart disease, and diabetes (*19*, *20*).

The long-term effects of stressful life events on health are often more severe if they are associated with trauma experienced during early childhood or during adolescence. This relationship has been explained by intense or chronic stress (toxic stress) (*21*), and physiologic adaptations to stress (allostatic load) (*22*). The consequences of toxic stress through over-activation of stress hormones are numerous, including damage to the cardiovascular and nervous systems (*23*). In particular, a weakened nervous system can compromise the functioning of areas of the brain responsible for planning, problem solving, and self-regulation of behavior and management of emotions. In cases of prolonged childhood neglect, cognitive impairments, such as attention problems, language deficits, academic difficulties, withdrawn behavior, and problems with peer interaction, can be more severe than physical trauma experiences (*24*).

A growing body of research demonstrating the influence that childhood sexual, physical, and emotional trauma have on subsequent health problems has emerged in recent years. One of the largest epidemiological studies conducted in the U.S., the Centers for Disease Control and Prevention (CDC) - Kaiser - Adverse Childhood Experience (ACE) Study, assessed the association of various forms of childhood abuse and household dysfunction with subsequent health-related outcomes occurring in adolescent to adulthood years. Findings from this study supported the significant relationship between the ACE score (based on a series of questions) and health and social negative after-effects such as smoking (*25*), unintended pregnancies (*26*), sexually transmitted diseases (*27*), male involvement in teen pregnancy (*28*), adult alcohol problems (*29*, *30*), and attempted suicides (*31*). Based on the results of these studies, the U.S. CDC designed a survey, referred to as the CDC ACE questionnaire, using a subset of the items from the previous study (*6*). The CDC has also confirmed these survey instruments in terms of reliability, validity, and measurement characteristics. Studies have additionally shown an increased prevalence of psychiatric disorders among individuals who experienced abuse and trauma in childhood compared to same age-peers who did not have these experiences (*32*, *33*). A study among members of a primary care health maintenance organization found that childhood emotional abuse increased the risk for lifetime depressive disorders (*34*). Research studies in African settings are fewer, however a large study of persons in five African countries showed a significant dose-response relationship between physical and sexual violence and risk behaviors such as smoking, alcohol abuse, unsafe sex, and suicidal thoughts (*35*).

To our knowledge, no studies assessing both the influence of psychological distress and childhood trauma among adult members of HIV discordant couples have been undertaken. Thus, the purpose of the present study was to 1) compare participants' NPD K6 scores and ACE scores by gender and 2) determine the factors associated with the NPD K6 score, by gender, among members of HIV discordant couples living in Asembo and Karemo regions of Siaya County, Kenya.

METHODS

Participants

A survey study occurred during 2016 in Asembo and Karemo, Kenya. A purposive convenience sampling method was used to recruit study participants. First, former participants from the HIV Prevention Trials Network (HPTN) 052 trial (a clinical trial whose primary objective was to compare the rates of HIV infection among partners of HIV-infected participants (*36*)), were contacted directly through the community staff who conducted follow-up and referral activities for the clinical trial. HPTN 052 participants had provided written consent to be contacted for future studies. Second, persons in a discordant relationship who had not participated in the HPTN 052 clinical trial were recruited from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR)-funded HIV care clinic support groups. After we provided details on the survey to the HIV care clinic staff, they helped facilitate recruitment by connecting our research staff with support group leaders. The support group leaders were then asked to arrange a time and place to meet the group members. At the meeting with the support group members, the research staff informed them about the study and asked those interested in participating if they would answer two screening questions (age and residence). If eligible, the research staff arranged interviews.

Inclusion and exclusion criteria

To be eligible for the study, participants had to be ≥18 years of age, in an HIV discordant relationship, a resident of Asembo or Karemo, and willing to give informed consent. It is important to note that the research staff were not always able to interview both members of a discordant couple; interviews were conducted with men and women in a discordant relationship irrespective of whether their corresponding partners agreed to be interviewed. Data on the identity of the participant's partner were not collected. Participants were stratified on gender to obtain an approximate 1:1 ratio.

Survey

A structured questionnaire was administered to participants using computer-assisted personal interviewing (CAPI) at a convenient study-designated community location for the participant (eg, health facilities, schools, churches, participant home, under a tree). Interviewers were trained to be attentive to maintaining privacy during interviews.

NPD K6

The NPD K6 scale was used to assess each participant's level of psychological distress (*13*, *37*). This instrument consists of six items in which participants were asked to rate how they have been feeling during the past 30 days (nervous, hopeless, restless or fidgety, so depressed that nothing could cheer you up, that everything was an effort, worthless) using the following five-point Likert scale: All of the time, Most of the time, Some of the time, A little of the time, and None of the time. The scale was assigned a numeric value ranging from 0-4 with 0 corresponding to *None of the time* and 4 indicating *All of the time*. Responses to each item were then summed to create a composite measure of NPD (highest possible score was 24). A score of ≥5 has been defined as moderate mental distress (*38*). In addition to this overall score, the NPD K6 was separated into two subscales measuring the individual's anxiety (nervous, restless) and depression (hopeless, depressed, effort, worthless) levels (*18*) with valid scores ranging from 0-8 and 0-16, respectively. Higher scores are indicative of experiencing greater levels of distress.

Perceived respect

Participants were asked whether they agreed or disagreed with statements related to perceived treatment of respect by community, family, partner, and healthcare workers (eg, discordant couples are treated with respect).

Adverse childhood experiences (ACEs)

To assess childhood exposure to adverse or traumatic experiences, participants were asked to report on exposure to the types of ACEs: childhood abuse (emotional, physical, and sexual), neglect (emotional and physical), and family household dysfunction (witnessing domestic violence, parental marital discord, and living with substance abusing, mentally ill, or criminal household members). Responses were coded such that an affirmative response to the question was assigned a value of 1. Affirmative responses were then summed to obtain an overall measure where higher scores indicated greater childhood adversity. Scores on this measure can range from 0 to 10. The questions in this scale have been used in other international settings (*39*, *40*).

HIV status

Previous participants in the HPTN 052 clinical trial were known to be members of an HIV discordant couple through laboratory testing during the clinical trial. Non-HPTN 052 participants were determined to be members of a discordant couple by their participation in a clinic-based support group. HIV status was determined through self-report.

Other covariates

Sociodemographic data including sex, age, income, highest educational attainment, and religion, as well as the individual's participation in the HPTN 052 clinical trial, were collected.

Ethics

All persons received information about the objectives of the study, and were informed that the information they provided would be kept private, that they could choose not to participate, and that they would not be identified when the information was reported. Verbal informed consent was obtained, and a copy of the consent was offered to all participants. Survey participants were reimbursed KSH 500, equivalent to $5, for their transportation, and given a bar of soap as a token of appreciation for their participation. The study protocol, consent forms, and data collection instruments were reviewed and approved by the Kenya Medical Research Institute (KEMRI) local and National Ethical Review Committees, and the U.S. Centers for Disease Control and Prevention.

Statistical analysis

Frequency counts and percentages for sociodemographic variables, NPD K6 levels, and ACE scores were calculated. In addition, medians (MED) and interquartile ranges (IQR) were computed for NPD K6 and ACE scores. As descriptive data were stratified by gender, statistical differences by gender were not evaluated. Correlations were computed for the NPD K6 scores and each of the other remaining measures described previously to determine if statistically significant bivariate relationships existed among them (all data not shown). Finally, multiple regression models examined the association between NPD K6 and the variables found to be statistically significant ($P<0.05$) in the bivariate analysis. Stratifying by gender we estimated these models using the overall NPD K6 and the two subscales (depression and anxiety) separately as the outcomes of interest. Analysis were completed using SAS version 9.4 (SAS Institute Inc, Cary, North Carolina, USA).

RESULTS

Of the 202 participants, 52% were female and most had a primary school level of education (66.3%). Fifty-four percent (100/185) of persons with data on their HIV status reported being HIV-positive. Other participant characteristics can be found in Table 1. Data were missing for the following categories: HIV status - 9 females (n=96) and 8 males (n=89); age - 2 females; income - 1 male; perception questions - 17 individuals for community question, 8 for family question, 7 for partner question, and 3 for healthcare workers question.

Table 1. Characteristics of participants in HIV-discordant relationships, Asembo and Karemo, Kenya, 2016*

	TOTAL, N (%)	WOMEN, N (%)	MEN, N (%)
Total	**202 (100)**	**105 (52.0)**	**97 (48.0)**
HIV status (positive)	**100 (54.1)**	**43 (44.8)**	**57 (64.0)**
Age (years):			
17-29	38 (19.0)	31 (29.8)	7 (7.3)
30-39	56 (28.0)	31 (29.8)	25 (26.0)
40-49	54 (27.0)	27 (26.0)	27 (28.1)
50+	52 (26.0)	15 (14.4)	37 (38.5)
Highest level of education:			
None	13 (6.4)	7 (6.7)	6 (6.2)
Primary	134 (66.3)	80 (76.2)	54 (55.7)
Secondary	45 (22.3)	14 (13.3)	31 (32.0)
College/University	10 (5.0)	4 (3.8)	6 (6.2)
Income:			
Less than or equal to 1000 KSH	64 (31.8)	42 (40.4)	22 (22.7)
1001-5000 KSH	97 (48.3)	51 (49.0)	46 (47.4)
5001-10000 KSH	27 (13.4)	7 (6.7)	20 (20.6)
>10000 KSH	13 (6.5)	4 (3.9)	9 (9.3)
Currently working	**112 (55.5)**	**58 (55.2)**	**54 (55.7)**
Marital status:			
Married/Cohabitating	190 (94.1)	99 (94.3)	91 (93.8)
Single/Never married	5 (2.5)	0	5 (5.2)
Other	7 (3.5)	6 (5.7)	1 (1.0)
Religion:			
Catholic	52 (25.7)	27 (25.7)	25 (25.8)
Other	23 (11.4)	6 (5.7)	17 (17.5)
Protestant	127 (62.9)	72 (68.6)	55 (56.7)
HPTN 052† participant perception that discordant couples are treated with respect by:	70 (34.7)	33 (31.4)	37 (38.1)
Community	98 (48.5)	55 (52.4)	43 (44.3)
Family	160 (79.2)	85 (81.0)	75 (77.3)
Partner	177 (87.6)	94 (89.5)	83 (85.6)
Healthcare workers	188 (93.1)	99 (94.3)	89 (91.8)

KSH – Kenya shillings, HPTN 052 – HIV Prevention Trials Network 052 status (positive), 9 females (n=96) and 8 males (n=89); age, 2 females; income, 1 male; perception questions, 17 individuals for community question, 8, family question, 7, partner question, and 3, healthcare workers question.
† HIV Prevention Trials Network 052 is a clinical trial whose primary objective was to compare the rates of HIV infection among partners of HIV-infected participants (*36*).

NPD K6 scores

The median NPD K6 scores for women and men were found to be within normal limits (median MED=4.0, interquartile range IQR=7.0; and MED=4.0, IQR=6.0, respectively) (maximum=24). Participants, in general, did not report high levels of distress. A slightly lower percentage of women (18.1%) reported having no distress compared to men (20.6%). The median score for the anxiety subscale was 1.0 (IQR=3.0) for women and 1.0 (IQR=3.0) for men (maximum=8), and the median score for depression was 3.0 (IQR=5.0) for women and 2.0 (IQR=5.0) for men (maximum=16) (Table 2).

ACE scores

In a descriptive analysis, the median ACE score for women was lower (2.0, IQR=3.0) than for men (4.0, IQR=4.0) (Table 3). The most common ACE was living with a problem drinker or alcoholic or someone who used illicit drugs (women: 44.8%; men: 58.8%) and the second most common was being physically assaulted by a parent or other adult in the household (women: 37.1%; men: 56.7%).

Table 2. Anxiety and depression NPD K6 subscale scores by gender, Asembo and Karemo, Kenya, 2016.

	WOMEN (N=105)			MEN (N=97)		
NPD K6 CATEGORIES	ANXIETY	DEPRESSION	OVERALL	ANXIETY	DEPRESSION	OVERALL
Median	1.0	3.0	4.0	1.0	2.0	4.0
IQR	3.0	5.0	7.0	3.0	5.0	6.0
Range (max possible)	0-7 (8)	0-15 (16)	0-22 (24)	0-7 (8)	0-12 (16)	0-15 (24)
% not distressed	36.2%	23.8%	18.1%	43.3%	27.8%	20.6%

IQR – Interquartile range, NPD K6 – Non psychological distress Kessler-6 scale

Table 3. Affirmative responses to ACE questions by gender, Asembo and Karemo, Kenya, 2016*

ITEM	CONTENT	WOMEN, N=105 (%)	MEN, N=97 (%)
1.	Did a parent or other adult in the household often ...Swear at you, insult you, put you down, or humiliate you? Or Act in a way that made you afraid that you might be physically hurt?	38 (36.2)	50 (52.1)
2.	Did a parent or other adult in the household often ...Push, grab, slap, or throw something at you? Or ever hit you so hard that you had marks or were injured?	39 (37.1)	55 (56.7)
3.	Did an adult or person at least 5 years older than you ever...Touch or fondle you or have you touch their body in a sexual way? Or try to or actually have oral, anal, or vaginal sex with you?	18 (17.1)	17 (17.5)
4.	Did you often feel that ...No one in your family loved you or thought you were important or special? Or your family didn't look out for each other, feel close to each other, or support each other?	24 (23.1)	36 (37.1)
5.	Did you often feel that ...You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? Or your parents were too drunk or high to take care of you or take you to the doctor if you needed it?	36 (34.3)	50 (51.6)
6.	Were your parents ever separated or divorced?	18 (17.1)	14 (14.4)
7.	Was your mother or stepmother: Often pushed, grabbed, slapped, or had something thrown at her? Or sometimes or often kicked, bitten, hit with a fist, or hit with something hard? Or Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?	39 (37.1)	48 (49.5)
8.	Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?	47 (44.8)	57 (58.8)
9.	Was a household member depressed or mentally ill or did a household member attempt suicide?	13 (12.4)	20 (20.8)
10.	Did a household member go to prison?	25 (23.8)	27 (27.8)
	ACE Score:		
	Median	2	4
	Interquartile Range	3.0	4.0
	Range	0-8	0-9

ACE – adverse childhood experiences
*Denominator varies due to missing data.

Factors associated with NPD K6 scores for women

Bivariate analyses

Among women, a higher ACE score (P=0.0007), young age group (17-29 years compared to 50 years and older) (P=0.025), participating in the HPTN 052 study (P=0.005), perceived respect by community (P=0.022), perceived respect by family (P<0.0001), and perceived respect by partner (P=0.015) were significantly associated with NPD K6 score (complete data not shown).

Regression analysis

A higher ACE score was significantly associated with an increase in the overall NPD K6 and depression subscale scores (Table 4a). Among women, ACE scores were not found to be related to the anxiety subscale when adjusting for the other factors, while perceived respect by their family members and their partners was significantly associated with lower NPD K6 and depression subscale scores. The model showed that women in the "Other" religious category (n=6: Nomiya, n=3; Roho Mowar, n=3) had NPD K6 scores that were lower than Protestants (P=0.01). Similarly, women in the "Other" religious category were found to have significantly lower anxiety and depression subscale scores compared to Protestants (Table 4). Neither the HPTN 052 participation variable nor the age group variable improved the fit of the final linear regression models, thus both were removed.

Table 4. Summary of regression analyses for factors associated with non-specific psychological distress (NPD) K6 scores among women (n=82), Asembo and Karemo, Kenya, 2016

	OVERALL NPD K6 SCORE			NPD K6 ANXIETY SCORE			NPD K6 DEPRESSION SCORE		
Factor	b	SE b	P	b	SE b	P	b	SE b	P
ACE scores	0.71	0.21	<0.01	0.07	0.09	0.40	0.64	0.15	<0.0001
HIV Status (positive)	1.56	0.99	0.12	0.62	0.42	0.14	0.94	0.70	0.18
Religion:									
Catholic	-0.49	1.10	0.66	-0.05	0.47	0.91	-0.44	0.78	0.57
Other	-6.54	2.03	<0.01	-2.00	0.86	0.02	-4.54	1.42	<0.01
Protestant	Ref			ref					
Perception that discordant couples are treated with respect by:									
Community	-0.92	1.11	0.39	-0.47	0.47	0.32	-0.48	0.78	0.54
Family	-5.47	1.63	<0.01	-1.21	0.69	0.08	-4.26	1.15	<0.01
Partner	-4.29	1.98	0.03	-1.38	0.83	0.10	-2.91	1.39	0.04
R^2		0.38			0.18			0.42	
Adj R^2		0.33			0.11			0.37	
F value		6.41 (*P*<0.001)			2.33 (*P*=0.03)			7.62 (*P*<0.001)	

b – unstandardized regression coefficient, SE – standard error, ACE – adverse childhood experiences, NPD K6 – non psychological distress Kessler-6 scale

Factors associated with NPD K6 score for men

Bivariate analyses

Among men, a higher ACE score (*P*<0.001), participating in the HPTN 052 study (*P*=0.023), and perceived respect by family (*P*=0.011) were significantly associated with overall NPD K6 scores (complete data not shown).

Regression analyses

A higher ACE score and HIV positive status were significantly related to higher levels of NPD K6 and the anxiety and depression subscales (Table 5). The model showed that men in the "Catholic" religious category had lower anxiety scores than Protestants (*P*=0.047). Neither the HPTN 052 participation variable nor the age group variable improved the fit of the final linear regression models, thus both were removed.

Table 5. Summary of regression analyses for factors associated with non-specific psychological distress (NPD) K6 scores among men (n=76), Asembo and Karemo, Kenya, 2016

	OVERALL NPD K6 SCORE			NPD K6 ANXIETY SCORE			NPD K6 DEPRESSION SCORE		
Variable	b	SE b	P	b	SE b	P	b	SE b	P
ACE scores	0.79	1.91	<0.01	0.29	0.08	<0.01	0.50	0.14	<0.01
HIV status (positive)	2.54	0.89	<0.01	0.87	0.38	0.02	1.67	0.63	0.01
Religion:									
Catholic	-1.09	1.00	0.28	-0.87	0.43	0.05*	-0.23	0.71	0.75
Other	-1.39	1.21	0.26	-0.76	0.52	0.15	-0.63	0.86	0.47
Protestant	Ref			ref					
Perception that discordant couples are treated with respect by:									
Community	0.27	0.91	0.77	0.27	0.39	0.49	0.004	0.65	0.99
Family	-0.30	1.25	0.81	-0.41	0.53	0.45	0.11	0.89	0.90
Partner	-1.35	1.29	0.30	-0.38	0.55	0.49	-0.97	0.91	0.29
R^2		0.31			0.29			0.26	
Adj R^2		0.26			0.23			0.19	
F value		4.47 (*P*<0.01)			3.94 (*P*<0.01)			3.35 (*P*<0.01)	

b – unstandardized regression coefficient, SE – standard error, ACE – adverse childhood experiences, NPD K6 – non psychological distress Kessler-6 scale
**P* value of 0.047 was rounded to 0.05.

DISCUSSION

HIV takes a toll on both the member of the couple with the infection and their partner. While professional HIV counselling can provide solutions to challenges encountered by members of a discordant couple (eg, conception), for some, challenges and stresses remain. Among persons who were members of an HIV discordant couple from two regions in western Kenya, the median NPD K6 score was the same for women and men, though a slightly larger percent of men (20.6%) reported no distress compared to women (18.1%).

Our results showed that men had a higher median ACE score than women. While in low income rural areas women have more cultural disadvantages than men, including less opportunity for secondary school attendance, more household responsibilities, and more often forced into early marriage (*41*), boys are frequently treated roughly by patriarchal leaders of their households and communities with the intention of teaching them responsibility. In the Luo culture, male children learn their traditional sex roles by following their fathers and other male family members (*42*) when they are adolescents. In a comparison of corporal punishment in nine countries, the use of and belief in the necessity of using corporal punishment was highest in Kenya. Kenyan fathers reported using corporal punishment less frequently with daughters than with sons (*43*).

For women in our study, factors associated with a higher NPD K6 score included a higher ACE score and religion. While these findings need to be interpreted cautiously, there is an increasing literature showing that more traumatic experiences in childhood (ACE score) are associated with poorer mental health conditions later in life. In a study among mothers in semi-rural Kenya, perceived stress was shown to be related to emotional abuse during childhood (*44*). Compared to women who reported their religion as Protestant, NPD K6 scores were lower among women who reported their religion as "Other". The "Other" category, comprised of two African independent churches, Nomiya and Roho, are based in Christianity but have broken off with other Christian or Protestant denominations. They tend be more tolerant of cultural practices and incorporate ancestral spirits and the holy spirit and provide support through promises of mental and physical healing (*45*, *46*). This may help explain the lower NPD K6 scores among women who practice these religions given that social support has been shown to be more important to women than men (*47*). It is of note that in our study, HIV positive status was not a factor significantly associated with higher NPD K6 scores for women. While HIV is a devastating and potentially stigmatizing disease, it may be possible that women have developed skills for coping with psychological stress. A qualitative study carried out in Kenya found that some women reported that they found support from other women living with HIV as a way to mitigate stigma surrounding HIV (*48*). They sought out and supported other HIV-positive women emotionally, and even physically, when they were too sick to work (*48*). When the NPD K6 scores were broken down into anxiety and depression subscales, results were similar. Finally, the anxiety subscale did not show that being treated with respect by their family and being treated with respect by their partner was associated with improved scores. This highlights the important role that social support can play in mediating depression (*47, 49*), but not necessarily anxiety.

For men, factors associated with a higher NPD K6 score included HIV-positive status and higher ACE scores. Research suggests that men may react differently to receiving a positive HIV test result than women, possibly due to their cultural roles. Men's belief in the patriarchal society and hegemonic masculinity before their HIV test has been shown to negatively affect their ability to cope with an HIV diagnosis, seek help, and learn to live with HIV post-diagnosis (*50*). A qualitative study of men living with HIV in South Africa found that men saw an HIV diagnosis as a loss, and evidence of their failure as a man (*50*). Being sick challenged their ability to accomplish expectations leading them to feel powerless, worthless, and distressed (*50*). In another study of men living with HIV in South Africa, some men worried about the difficulties their illness would cause their relatives (*51*). Religion was not significantly associated with the overall NPD K6 scores. However, when the NPD K6 scores were broken down into anxiety and depression subscales, religion was associated with anxiety in that Catholic men had lower anxiety scores compared to Protestant men. One possi-

ble explanation is that the Catholic mandatory sacrament of confession, where a person is absolved of their sins by a priest, reduces anxiety for men of this faith compared to men of the Protestant faith where confession is to God, directly (*52*).

Our study had several limitations. First, our analysis was cross-sectional, so the direction of associations cannot be determined. Second, due to participant time constraints, the questionnaire needed to be relatively short, and additional variables could not be collected (eg, frequency and duration of psychological distress, family history of psychological distress, nutrition, number of children, current sexual behaviors, HIV medication adherence, oral pre-exposure prophylaxis (PrEP) use, and partner support). Third, we did not use the international version of the ACE questionnaire, which asked the same questions as in the original version that we used plus other questions on, for instance, demographics and exposure to violence. Fourth, we were not able to link participants by marriage or cohabitation. Finally, there may have been social desirability bias or stigma around mental health that could have influenced underreporting of psychological distress. Similarly, ACEs may have been underreported. A strength of our study is the compelling nature of the findings. In the original study evaluating the reliability and validity of the NPD K-6, the authors (*37*) determined that the mean and standard deviation for the instrument was 5.93 and 4.26, respectively. This suggests that the approximate 0.75 regression coefficient that we found using the ACE score to predict the K-6 score for both sexes represents about 18% of a standard deviation change in the K-6 score. An approximate one point difference in the K-6 score also represents a substantial change for population-based studies carried out using the Behavioral Risk Factor Surveillance System (BRFSS) in the U.S. (*14*). Another strength of our study is that it reports on psychological distress and ACE scores in an area of Kenya with the highest HIV prevalence in the country.

CONCLUSIONS

This study found that among members of HIV discordant couples, the median NPD K6 score was equal for women and for men. In addition, childhood trauma was found to affect NPD K6 scores for both men and women. Finally, an individual's perceptions of respect by their partner and their family impacted the overall NPD K6 score, and the depression subscale, in women but not in men. Earlier studies have found that women have larger and more multifunctional support networks than men (*53*). These findings support initiatives to assess childhood trauma and psychological distress in discordant couples, and to assist them in finding appropriate psychological services and social support. Moreover, it may be prudent to include education on self-care and wellness (eg, nutrition, exercise, deep breathing, social support) and to address economic stressors. By doing so, members of discordant couples may be better equipped to deal with the stressors associated with not only the disease, but also the discrimination and stigma associated with HIV. What is more, they may be more inclined to consider the importance of treatment and preventions.

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