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Main partner factors associated with worse adherence to HAART among women in Baltimore, U.S.: A preliminary study

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Abstract

U.S. women have worse HAART and HIV health outcomes compared to U.S. men. The study examined main partner factors associated with women's HAART adherence. The community sample comprised 85% African Americans; 63% had a main partner and 32% relied on their partner for emotional support. Adherence was highest (92%) among those without a main partner, and lowest (57%) among those with an HIV seropositive main partner. In adjusted analysis, adherence was 75% less likely among women with an HIV seropositive main partner, and 78% less likely among those relying on their partner for emotional support. Furthermore, HIV seropositive versus other serostatus main partners were most likely to provide medication taking assistance and to be preferred in helping participants deal with HIV, yet were no more likely to be nominated as the most helpful to them. Findings reveal women's perceived unmet support needs from HIV seropositive main partners in this population, and the need for interventions to promote their HAART adherence. Seroconcordant couples-focused intervention that enhances mutual support of HAART adherence may be an effective approach to improving women's HAART adherence and reducing US gender disparities in HIV health outcomes.

Keywords

HIV/AIDS; highly active antiretroviral therapy (HAART); adherence; women; main partners; couples

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INTRODUCTION

In the U.S., women compared to men have worse health outcomes of highly active antiretroviral therapy (HAART), contributing to their more rapid HIV progression (Losina, Schackman, Sadownik, Gebo et al., 2009). Research suggests that even among patients in HIV medical care, U.S. women compared to men tend to have lower access to HAART and are more likely to discontinue HAART use (Gebo, Fleishman, Conviser, Reilly, et al., 2005; Losina et al., 2009). Study results from other industrialized countries suggest that U.S. sex disparities in HAART outcomes are not explained by differences in treatment efficacy (Perez-Hoyos, Rodriguez-Arenas, Garcia, Iribarren, et al., 2007; Tedaldi, Absalon, Thomas, Shlay, & Berg-Wolf, 2008).

While previous literature has focused on individual-level factors affecting HAART outcomes, studies indicate that as with other chronic conditions, social support and social environmental factors (such as marital, or main partner, status) play an important role in HAART adherence and HIV health outcomes (Knowlton, Arnsten, Gourevitch, Eldred, et al., 2007; Di Matteo, 2004; Persson, Ostergren, Hanson, Lindgren, & Naucner, 2002). Indeed, main partners (inclusive of spouses) play an important role in health outcomes among chronically ill adults, and are often their major sources of social support (Johnson, Backlund, Sorlie, & Loveless, 2000; Molloy, Stamatakis, Randall, & Hamer, 2009). Furthermore, the literature indicates that women as compared to men tend to gain less health benefits of having a main partner (Kiecolt-Glaser & Newton, 2001; Molloy et al., 2009). However, few studies have found evidence of behavioral mechanisms to explain partner effects on women's health outcomes (Molloy, et al., 2008).

Prior HIV studies have found conflicting results regarding associations between main partners and HAART adherence. In some studies, main partner support has been found to be positively associated with HAART adherence and outcomes (Andersen, Bozzette, Shapiro, St Clair, et al., 2000; Protopopescu, Raffi, Roux, Reynes et al., 2009), whereas other study results, including a U.S. representative sample of persons in HIV medical care, indicate that having a main partner is negatively associated with HAART adherence (Johnson, Catz, Remien, Rotherman-Borus, et al., 2003).

Differences in social contexts of study populations, such as types and qualities of relationships and support provided, may help explain discrepancies in prior findings. This study examined associations of partners and other social factors with HAART adherence among women in a U.S. HIV epicenter. Results will inform the development of interventions to reduce gender disparities in HAART, and contribute to theoretical understandings of social contextual influences on women's health.

Individual-level factors

HIV seropositive women compared to men in the U.S. tend to be disproportionately poor, racial minorities, and living in communities with high prevalence of substance abuse and chronic illness (Bozzette, Berry, Duan, Frankel, et al., 1998; Centers for Disease Control and Prevention [CDC], 2005). African Americans account for 66% of AIDS cases among women, yet comprise only 12% of U.S. women (CDC, 2008).

Substance use and depressive symptoms are highly prevalent among women with AIDS, and are negatively associated with HAART adherence, as is African American race in some studies (Johnson et al., 2003; Carrieri, Chesney, Spire, Loundou, et al., 2003; Pence, Miller, Gaynes, & Eron, Jr., 2007). In a multi-site study, depression and illicit drug use were found to interactively affect women's HAART use (Cook, Grey, Burke-Miller, Cohen, et al.,

2007). Positive attitudes about HAART are consistently associated with HAART adherence (Arnsten, Mizuno, Knowlton, Gourevitch, et al., 2007).

Cognitive impairment is not uncommon among persons living with HIV/AIDS, and evidence suggests even mild forms may have adverse effects on HAART adherence (Hinkin, Castellon, Durvasula, Hardy, et al., 2002; Sacktor, McDermott, Marder, Schifitto, et al., 2002). Some studies suggest women's greater risk for or more rapid progression of AIDS-related cognitive impairment, yet few studies have examined the role of cognitive impairment in women's HAART adherence (Stern, McDermott, Albert, Palumbo, et al., 2001).

Social factors: Social support, informal caregiving, and privacy

Social support, including emotional support, is one of the most consistent predictors of medical adherence across a range of chronic conditions (Di Matteo, 2004). Social support has been found to be associated with HAART adherence among low income drug using populations, and to predict their virologic outcomes of HAART (Knowlton, et al., 2007). While evidence suggests that some low income HIV seropositive substance users are able to mobilize social support (Knowlton, Hua, & Latkin, 2004), little attention has been given to their main partners. Studies have found that partner support of chronically ill individuals may be ineffective in some contexts (Bolger, Foster, Vinokur, & Ng, 1996; Northouse, Templin, Mood, & Oberst, 1998).

Poverty and drug use may engender interpersonal conflict, impeding availability of social support to US HIV seropositive women, and adversely affecting their partners' supportive functioning (Serk, 1999). Partner conflict, in turn, has been found to be positively associated with depressive symptoms and medication non-adherence among the chronically ill (Molloy, Perkins-Porras, Strike, & Steptoe, 2008).

Privacy concerns in taking HAART, which may be indicative of perceived HIV stigma, have also been associated with non-adherence to HAART (Golin, Isasi, Bontempi, & Eng, 2002). In a multisite sample of drug-using, primarily African American, individuals, feeling comfortable taking HAART in the presence of others was associated with HAART adherence and viral suppression (Knowlton et al., 2007). In men in Baltimore, the study site, feeling comfortable taking HAART in the presence of close friends was associated with HAART adherence (Knowlton, Yang, Bohnert, Wissow, et al., 2010).

HIV seropositive and African American women are highly involved in caregiving for children and persons with HIV/AIDS (Turner, Catania, & Gagnon, 1994; Schuster, Kanouse, Morton, Bozette, et al., 2000). Evidence suggests their caregiving roles may interfere with their medical adherence (Stein, Crystal, Cunningham, Ananthanarayanan, et al., 2000). HIV seropositive custodial parents of young children have been found to have worse medical adherence as compared to noncustodial parents or adults without children (Goldstein, Johnson, Rotheram-Borus, Kirshenbaum, et al., 2005).

The aim of the present study was to examine main partner factors, above and beyond individual level factors, associated with women's HAART adherence. We expected that similar to having custodial children, women's having an HIV seropositive partner would be indicative of caregiving for the partner, which would have negatively associated with HAART adherence.

METHODS

Sample selection

Baltimore has the second highest AIDS case rate of U.S. metropolitan areas (CDC, 2005), the vast majority of those with HIV/AIDS (89%) are African American; 38% are female, (Maryland AIDS Administration, 2008). HIV exposure among Baltimore females is primarily from heterosexual activity (47%) and injection drug use (32%) (Maryland AIDS Administration, 2008).

Data were from the ARK Study (n=462; 2002-2005) (Knowlton et al., 2010). Participants were recruited by street outreach and advertisement at local health and other service agencies. Surveys were administered by computer-assisted personal interviewing. Participants were compensated \$25 for their time. Study approval was obtained from the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Measures

The outcome measure was 7-day recall of HAART adherence (defined as $\geq 90\%$ mean overall adherence of doses) which a prior study indicated was highly associated with medication event monitoring system (MEMS) assessed adherence and with viral load among substance users (Arnsten, Demas, Farzadegan, Grant, et al., 2001; Arnsten, et al., 2007).

Independent variables included a 6-item attitudes toward HAART scale (Cronbach's $\alpha=0.77$) (Arsten, et al., 2007), and depressive symptoms as assessed by the Centers for Epidemiological Studies Depression (CES-D) scale, using a cut-off score of 20 (Cronbach's $\alpha=0.91$) (Radloff, 1977). Subjective cognitive impairment was measured by three items based on the Brief Symptoms Inventory (Derogatis & Spencer, 1982): frequency of having "had to do things very slowly to make sure you were doing them right," "had trouble following or keeping up with a conversation," and "had your mind go blank." Scores were skewed so dichotomized about the median. Current drug use was defined as use of any of a list of drugs in the prior three months, excluding marijuana; and problem alcohol use as daily or binge drinking.

Main partner status was assessed by currently have a main partner, i.e., boy/girlfriend or spouse, and main partner's HIV serostatus, recoded as 1=have an HIV seropositive main partner versus 0=do not have a main partner or partner is HIV seronegative or of unknown serostatus. Partner characteristics assessed by participant report included history of heroin or cocaine use, closeness (rated on a 10-point scale), coresidence with the participant, and interpersonal conflict based on seven items of the revised Conflict Tactics Scale (Straus, Hamby, Boney-McCoy, & Sugarman, 1996) indicating interpersonal violence or threat of violence perpetrated by the participant or her partner (Cronbach's $\alpha=0.72$).

A network inventory elicited names of perceived support network members, that is, those whom the participant could rely on for various forms of support. Items elicited names of perceived sources of emotional support (Who could you talk to about something personal or private?), health advice (Tardy, 1985; Barrera, 1980); and help received with getting medical care and taking medications. Prior research indicates good concurrent and predictive validity (Latkin, Mandell, & Vlahov, 1996). Dummy variables were created indicating whether main partners were nominated for each type of support. Additional name generating questions asked, "Who is the most helpful person to you in dealing with HIV?" and, "Who would you most prefer to help you with HIV?"

Data analysis

Chi-square tests, t-tests of continuous variables, and ANOVA were used to calculate unadjusted associations between adherence and independent variables. Variables chosen for inclusion in the simultaneous entry logistic regression analysis were education level and those significant at $p < 0.10$ in bivariate analysis. Final model results are reported in adjusted odds ratios and 95% confidence intervals. Based on prior research (Cook et al., 2007), potential interactive effects between main partner status or participant drug use, and depressive symptoms on adherence were examined. To aid in interpretation of regression models, additional unadjusted analysis compared characteristics of HIV seropositive versus other status partners.

RESULTS

Sample description

Of ARK participants, 104 were women currently taking HAART, of whom, 23% reported HAART non-adherence. Most were low educated African Americans who had a main partner; almost half reported current drug use (Table 1). Of main partners, the vast majority were male, had used hard drugs, over a quarter were HIV seropositive, and almost all knew the participant's HIV seropositive status. Participants reported a high level of closeness to their partner, and half lived together; yet only two-fifths of those with a main partner nominated their partner as someone they could rely on for emotional support, and approximately a quarter reported major conflict in the relationship.

Unadjusted and adjusted analyses

Unadjusted analysis indicated that non-adherence was significantly associated with having an HIV seropositive main partner (versus no main partner or an other serostatus main partner) and perceived emotional support from the main sex partner (Table 1). Cognitive impairment and negative attitudes about HAART were also significant. A linear association between partner status and adherence was found, with adherence among those with no main partner (92%) being higher than those with an HIV seronegative or unknown status partner (76%), and lowest among those with an HIV seropositive partner (57%) ($p < .001$, Mantel-Haenszel [M-H] chi-square).

Adjusted analysis indicated that HAART adherence was negatively associated with having an HIV seropositive main partner (versus no partner or other status partner), having a sex partner as a perceived source of emotional support, and high subjective cognitive impairment (Table 2), even after adjusting for education and positive attitudes toward HAART. No interactive effects were found.

Additional analysis revealed that HIV seropositive versus other status main partners were more likely to live with participants, to be perceived as a source of health advice, and to assist with medication taking (Table 3). And while HIV seropositive partners were more likely to be nominated as the person most preferred for HIV-related help, they were no more likely than other status partners to be nominated as the most helpful person to them in dealing with HIV.

DISCUSSION

The study findings suggest that main partners played a role in HAART non-adherence among a sample of US women. Study results indicated a strong linear association between partner status and adherence, with adherence among those with no main partner being higher than those with an HIV seronegative or unknown status partner, which in turn was higher

than those with an HIV seropositive main partner. Adjusted analysis indicated adherence was 75% less likely among women with an HIV seropositive versus no or other status main partner, 78% less likely among those whose partner was perceived a main source of emotional support, and 83% less likely among those reporting high cognitive impairment.

The study findings contribute to theoretical understandings of mechanisms through which main partners may influence health. This study represents one of the few to link main partner factors with medical adherence behaviors (Molloy, et al., 2008).

The finding on self-reported cognitive impairment indicates the need for greater attention to its assessment and to adherence intervention for those so impaired.

Relationship qualities and adherence

Study participants reported a high level of closeness, though two-fifths reported conflict, with their main partners. Interestingly, higher quality of the main partner relationship, as indicated by perceived emotional support from one's main partner, was associated with worse adherence. While it is possible that the findings were confounded by conflictive relationships or chaotic lifestyles, there was no evidence of that; no associations were found between partner serostatus and relationship conflict, partners' drug use, or relationship closeness. Further research is needed to examine additional contextual factors of women, their partners, and their relationships that may help explain study findings. It is plausible that greater perceived emotional support from partners among non-adherent participants is an artifact of their poorer health status and greater normative expectation of emotional support from partners, especially those living with them.

The findings also underscore the need for greater understanding of ways in which interpersonal support transactions may affect HAART adherence (Wrubel, Stumbo, & Johnson, 2008). Evidence suggests that social support of HIV medical adherence comprises a wide range of interpersonal behaviors (Wrubel et al., 2008), and that the manner in which support is offered affects its impact on health outcomes. Support that is ambiguous, inadequate, offered in a controlling or harassing manner, or mismatched relative to need or expectation may invoke stress that counteracts its potential health benefits (Newsom, Rook, Nishishiba, Sorkin, & Mahan, 2005).

Gender roles and unmet support needs

Gender roles and gender role conflicts may also help explain study findings. Women's caregiving roles, and competing priorities they engender, may impede their ability to management their illness or to obtain social support important to medical adherence. As a consequence, women may be more attentive to their partner's health needs than their own. Results of a national study suggest that caring for children is associated with women's delaying HIV medical care (Stein, et al., 2000). African American women compared to men and other racial groups provide disproportionately high levels of informal caregiving, including for HIV/AIDS (Turner, et al., 1994; Knowlton, 2003). The present study findings are consistent with prior evidence suggesting informal HIV caregiving exacts considerable costs on caregivers' physical health, and other resources, particularly for caregivers living with HIV/AIDS (Leblanc, London, & Aneshensel, 1997; Kipp, Tindyebwa, Rubaale, Karamagi, & Bajenja, 2007).

The study results suggest that direct assistance with HIV medication taking is not highly normative in the study population, and for women is offered primarily within main partner relationships. Only 36% of the sample reported receiving such assistance from partners, friends, or family in the prior year. However, over half (53%) of those with a main partner, and 68% among those with an HIV seropositive partner, reported medication taking

assistance. It is plausible that HIV seropositive partners' greater provision of adherence assistance is explained by their better understanding of the importance of or concern about adherence; yet the assistance appears to be ineffective in optimizing adherence.

The findings indicate women's unmet expectations of HIV support and caregiving from their main partners. Of those with a main partner, while 53% said they most preferred their partner provide them HIV-related support, only 35% reported their partner actually was the main person providing them HIV support. This difference was even greater among those with an HIV seropositive partner (68% and 32%, respectively). Also of note, only about half of women with a main partner perceived their partner as a source of emotional support. The findings are consistent with results of a prior national study of gender and racial differences in perceived availability of informal care among middle aged and older adults, and thus may reflect cultural norms. In that study, main partners were the most likely perceived informal caregivers for all groups except for African American women, who reported their daughters were (or were most likely to be) their caregivers (Roth, Haley, Wadley, Clay, & Howard, 2007). The high expectation of partner support in the present study may be indicative of lack of availability of alternative sources of support or care in the study population.

Gender differences in partner factors associated with HAART adherence

Further research is needed to examine gender differences in support networks and functioning and its relation to HAART adherence (Lingler, Sherwood, Crighton, Song, & Happ, 2008; Mitrani, Weiss-Laxer, Ow, Burns, et al., 2009). In a study of HAART adherence among Baltimore men, having informal care was strongly positively associated with having a main partner and with HAART adherence (Knowlton et al., 2010). The findings are consistent with results of an Italian study indicating the gender differences in relationship orientation were differentially associated with HAART adherence (Ubbiali, Donati, Chiorri, Bregani, et al., 2008). These results add to the extensive literature indicating men's as compared to women's greater health benefits of having a main partner (Kiecolt-Glaser, 2001), and suggest that gender differences in partner support and caregiving effects on medical adherence may help explain these differential health benefits of partners.

Study limitations

Limitations of the study include the exclusive use of self-report data, which is associated with recall bias and socially desirable responding, and the cross-sectional study design which impedes an ability to infer causal directions of associations. The study is also limited by potential selection bias and a limited sample size. The sample was comprised of women in Baltimore who reported taking HAART. Women with challenges accessing and continuing HAART, which contribute to U.S. women's HIV health disparities, were under-represented in the sample.

Implications to intervention

Main partner relationships of HIV seropositive persons have gained attention regarding their role in HIV prevention (El-Bassel, Jemmott, Landis, Pequegnat, et al., 2010). The study findings reveal the role of main partners in (African American) women's HAART adherence as well. The results suggest that partner-focused intervention, particularly targeting HIV seroconcordant main partners and those experiencing cognitive impairment, to facilitate effective HIV support may be important for improving women's HAART adherence (Lewis, McBride, Pollack, Puleo, et al., 2006; Remien, Stirratt, Dolezal, Dognin, et al., 2005). Promoting effective HIV support from male partners not traditionally involved in informal caregiving may have implications to U.S. gender disparities in HIV health outcomes.

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Table 1

Characteristics of women taking highly active antiretroviral therapy (HAART), and unadjusted associations with their HAART adherence (ARK study, Baltimore, MD, 2003-05).

	Full sample (n=104) N (%)	Adherent ($\geq 90\%$) to HAART (N=80) N (%)	Non-adherent (<90%) to HAART (N=24) N (%)
Age: mean (SD)	43.1 (6.0)	43.1 (5.9)	42.9 (6.4)
Race/ethnicity: African American	88 (85)	66 (84)	22 (92)
Education: ≥ 12 th grade	51 (49)	42 (53)	9 (38)
Current drug use [#]	48 (46)	38 (48)	10 (42)
Cognitive impairment, subjective	57 (55)	38 (48)	19 (79) **
Attitudes about HAART: mean (SD)	17.06 (3.8)	17.86 (3.4)	14.38 (4.0) ***
Depressive symptoms: high (CES-D>20)	53 (51)	38 (48)	15 (63)
Comfortable taking HAART in the presence of close friends or family	75 (72)	59 (74)	16 (67)
Raising children <18 years	16 (15)	11 (14)	5 (21)
Has a main partner	66 (63)	45 (56)	21 (88) ***
Has an HIV+ main partner	28 (27)	16 (20)	12 (50) **
Conflict with main partner: prior year ^{\$}	27 (26)	21 (26)	6 (25)
Emotional support from partner: yes ^{\$}	33 (32)	19 (24)	14 (58) ***

[#] In the prior 6 months

^{\$} Includes only those who reported having a main partner

**
p<.01

p<.001

Table 2

Adjusted odds of better adherence ($\geq 90\%$) to HAART among women in the ARK study, Baltimore, MD, 2003-05 (n = 104).

Independent variables	Adjusted odds ratios	95% confidence intervals
Education: $\geq 12^{\text{th}}$ grade	1.81	0.55, 6.02
Attitudes toward HAART: positive	1.39*	1.12, 1.72
Cognitive impairment, subjective: high	0.17*	0.04, 0.74
Has an HIV+ main partner [#]	0.25*	0.07, 0.94
Emotional support from sex partner: yes	0.12*	0.03, 0.49

*
< 0.05

[#] Compared to women who did not have a main partner or whose main partner was HIV seronegative or of unknown serostatus.

Table 3

Unadjusted comparisons of characteristics of HIV seropositive main partners versus HIV seronegative or serostatus unknown main partners of women taking HAART in the ARK study (n=66; Baltimore, MD, 2003-05).

	Full sample of women with main partners (n=66) N (%)	HIV+ partner (n=28) N (%)	HIV- or unknown status partner (n=38) N (%)
Partner ever used heroin or cocaine	46 (70)	21 (75)	25 (66)
Partner lives with participant	33 (50)	20 (71)	13 (34) **
Partner knows participant's HIV+ serostatus	63 (95)	27 (96)	36 (95)
Closeness to partner (1-10; 10=very close): Mean (SD)	9.56 (1.29)	9.71 (0.85)	9.45 (1.54)
Partner gives health advice	16 (24)	13 (46)	3 (8) ***
Partner helps participant with medical care	32 (48)	17 (61)	15 (39) +
Partner helps participant with medication taking	35 (53)	19 (68)	16 (42) *
Partner is most helpful for participant's dealing with HIV	23 (35)	7 (25)	16 (42)
Partner is person participant prefers to get HIV help from	35 (53)	19 (68)	16 (42) *

+
p<.10

*
p<.05

**
p<.01

p<.001