Roles and functions of social networks among men who use drugs in ART initiation in Vietnam

Carl A. Latkin[a], **M. Kumi Smith**[b], **Tran Viet Ha**[c], **Tran Thi Mo**[d], **Carla Zelaya**[e], **Teerada Sripaipan**[f], **Nguyen Le Minh**[g], **Vu Minh Quan**[h], and **Vivian F. Go**[i]

Carl A. Latkin: clatkin@jhsph.edu; M. Kumi Smith: kumi.smith@jhu.edu; Tran Viet Ha: vietha@live.unc.edu; Tran Thi Mo: mott79@live.unc.edu; Carla Zelaya: czelaya1@jhu.edu; Teerada Sripaipan: teerada@email.unc.edu; Vu Minh Quan: vquan1@jhu.edu; Vivian F. Go: vgo@live.unc.edu

[a]Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway Baltimore, MD 21205, United States of America,410-955-3972

[b]Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States of America

[c]Department of Health Behavior, University of North Carolina Gillings School of Global Public Health, Chapel Hill, North Carolina, United States of America

[d]Department of Health Behavior, University of North Carolina Gillings School of Global Public Health, Chapel Hill, North Carolina, United States of America

[e]Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States of America

[f]Department of Health Behavior, University of North Carolina Gillings School of Global Public Health, Chapel Hill, North Carolina, United States of America

[g]Department of Health Behavior, University of North Carolina Gillings School of Global Public Health, Chapel Hill, North Carolina, United States of America

[h]Thai Nguyen Center for Preventive Medicine, Thai Nguyen, Vietnam

[i]Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States of America

[j]Department of Health Behavior, University of North Carolina Gillings School of Global Public Health, Chapel Hill, North Carolina, United States of America

Abstract

Support from social network members may help to facilitate access to HIV medical care, especially in low resourced communities. As part of a randomized clinical trial of a community-level stigma and risk reduction intervention in Thai Nguyen, Vietnam for people living with HIV who inject drugs (PWID), 341 participants were administered a baseline social network inventory.

Network predictors of antiretroviral therapy (ART) initiation at the six-month follow-up were assessed. The social networks of PWID were sparse. Few participants who reported injectors in their networks also reported family members, whereas those who did not have injectors were more likely to report family members and network members providing emotional support and medical advice. In multivariate models, having at least one network member who provided medical advice predicted ART initiation at six months (OR=2.74, CI=1.20–6.28). These results suggest the importance of functional social support and network support mobilization for ART initiation among PWID.

Keywords

Social networks; antiretroviral therapy; social support; people who inject drugs; Vietnam

In Vietnam, injection drug use, primarily heroin, has historically been the primary mode of HIV transmission. There are approximately 225,000 people living with HIV (PLH) but this number is likely to be an underestimate.(1) To combat the epidemic, HIV treatment centers have been established, many with support from international donors. In 2014, there were 332 ART clinics treating 92,000 patients.

People who inject drugs (PWID) are less likely than others to receive ART and report greater barriers to accessing HIV medical care and medication adherence (2). In addition to HIV stigma, stigma toward drug users poses additional barriers for HIV treatment among PWID (3, 4). There are several unique barriers to ART in Vietnam. Historically, drug users were classified as a "social evil."(5) ART enrollment requires residency documentation, a supporter for registration at the ART clinic, and CD4 and other lab tests.(6) Payment for laboratory tests may be required if clinic funds are depleted. Social network members such as friends and family may help PLH navigate through these clinic requirements and other barriers, but they may also pose barriers to HIV care.

Social network factors have been found to be associated with a range of health outcomes (7, 8). Social network members can influence HIV health behaviors through providing material resources, buffering or exacerbating stress and stigma, modeling and rewarding health behaviors, and influencing social norms about HIV health care behaviors and the acceptability of discussing HIV-related health topics(9, 10). Substance use by network members may also impede HIV care by taking resources, increasing stress, and prompting social norms that do not prioritize health.

The link between social network factors and HIV-related health outcomes is often complex. For example, having a source of informal care has been found to correlate with increased HIV medication adherence for men (11) whereas greater emotional support from a sexual partner has been documented to be associated with decreased HIV medication adherence for women (12). Living alone and lacking informal care within one's social network have also been found to be associated with increased viral load (13). Among PLH with a history of drug use, larger size of drug network has been linked to suboptimal use of HIV medical care (14). Social network analyses have also been used to study HIV disclosure, which may be critical for mobilizing support for health care. A social network study in China reported that

the majority of PLH had disclosed their HIV status to spouses and family members (11). However, disclosure was highly selective and a function of both the PLH and the network members' characteristics.

General measures of social support have been consistently found to be positively associated with HIV medication adherence (15, 16) and lack of social support has been associated with lower ART initiation rates (17). One drawback of general measures of social support is that they may not provide guidance on intervention development. For example, an association between social support and adherence does not indicate whether it is important that specific individuals, such as spouses or kin, provide the support; or if certain types of support, such as discussion of HIV care or providing transportation to medical care is most strongly associated with medication adherence. For intervention development it is important to understand who provides support and what types of support they provide.

Conceptually, social networks can be viewed as sources of functional social support, such as material and emotional social support (18). From a social capital perspective, networks and their members can be conceptualized as resources and network structures may promote or impede the flow of resources to individuals. Social networks can also be viewed from the perspective of role relationships, such as family, friends, and co-workers (19). Some relationships, such as a drug user in the network, can be viewed as a type of material social support (i.e. a source of drugs), or as a social role relationship. Drug users in the social network may provide material support for obtaining drugs and promote syringe sharing, but impede access to other resources such as drug treatment. Not all network ties are positive. Negative ties, such as network members who are a source of conflict, may have a detrimental impact on health and well-being.(20) Drug users within a network may provide material resources and be considered as negative social ties. Social networks may be especially important among disadvantaged populations with limited material resources who must rely on their networks for instrumental support such as food and shelter (21–23).

This paper describes PWID's social networks in Thai Nguyen, Vietnam and examines the network's role in access to HIV medical care. The study offered an ideal opportunity to prospectively examine the potential for network factors to facilitate access to HIV medical care. The parent study was an intervention focused on reducing individual and community level stigma and sexual and injecting risk among HIV positive PWID and members of their community (20). HIV infected PWID provided information on their social networks at baseline, which were examined as predictors of ART initiation at the 6 month follow-up. Most (78%) of study participants became aware of their HIV positive status upon study enrollment; hence the study design helped to establish a temporal association between PWID's existing social networks and the subsequent ART initiation. Specifically, we were interested in whether functional social support and role relationships were associated with subsequent ART initiation. It was anticipated that social networks with family members and those with medical/health support would be linked to ART initiation.

Methods

The site of this study was the northern province of Thai Nguyen, which is approximately 50 miles from Hanoi, with an estimated population of 1,173,000. Thai Nguyen is close to the China border and has had a high level of opiate use. Heroin is the predominate drug used in Thai Nguyen with an estimated 5,208 PWID. According to national sentinel HIV surveillance data in 2013, the HIV prevalence among PWID in Thai Nguyen was 34%.

The parent study was a four arm intervention: Arm 1 - the standard of care (HIV testing and counseling); Arm 2 - a structural-level community stigma reduction intervention; Arm 3 - a individual-level posttest counseling, augmented by skill-building support groups; and Arm 4 which included the components from Arms 2 and 3. Baseline assessments occurred before random assignment. The focus of the intervention was on HIV prevention through risk reduction and reducing stigma in the community. It was not on improving HIV medical care. Study details are provided elsewhere (24). The study was approved by the IRBs at the Johns Hopkins Bloomberg School of Public Health and the Thai Nguyen Center for Preventive Medicine. For each study visit participants were reimbursed 50,000 Vietnamese Dong (~ $3 USD).

Participants

HIV positive male PWID were enrolled between July 2009 and January 2011 in Thai Nguyen province in northern Vietnam. Participants were recruited through snowball sampling and by recruiters, who were typically former drug users. The inclusion criteria for the participants were: 1) HIV infection confirmed through two rapid HIV tests (Determine: Abbott Laboratories, Abbott Park, IL; Bioline: SD, Toronto, Canada); 2) ability and willingness to recruit an injecting network member for screening; 3) male, 4) at least 18 years old; 5) sexually active in the past 6 months; 6) injected drugs in the past 6 months; and 7) planned to live in Thai Nguyen for the next 2 years. HIV-infected participants also underwent CD4 testing and a physical exam administered by a study physician. Participants who might be eligible for ART treatment were provided a direct referral to a nearby HIV clinic.

For the current analyses we excluded individuals who were missing information on ART status at 6 month follow-up, those who reported ART use in spite of indicating that they believed themselves to be HIV negative (n=15), and those with a CD4 cell count above 250 cells/μl (which would make them ineligible for ART initiation under the national guidelines at the time of study). Hence of the baseline 341 HIV positive participants were enrolled in the study, 249 were eligible for ART. There was missing data on 71 for ART status at the 6 month follow-up, which left a final follow-up sample size of 178. ART initiation was operationalized as first report of ART use at the 6 month follow-up documented by a study physician. With 20.2% of the participants, the physician report was missing and hence self-reported ART use was utilized.

Assessments

At the baseline assessment, participants provided information on previous HIV testing, knowledge of their HIV status, feeling stigmatized by their community because of drug use, and prior use of ART. Participants also reported demographic factors, injection and sexual risk behaviors, and a social network inventory. The social network name generator questions began with the following prompt: "I want you to think about your past drug use and the types of relationships you had with people over the past 3 months. The relationships I want you to think about can involve family, friends, and sexual relationships. Now thinking about the past 3 months, can you give me the name or nickname of the person or persons." If a participant gave more than 6 names per category, they were asked to list 6 people with whom they interact the most for that category. The network name generators included "(a) Who could you (or did) you ask for advice about health care or medical services?; (b) Who have you talked to about personal or private matters; (c) Who have you talked to about HIV/AIDS, and (d) Who have you injected drugs with?" Participants who knew their HIV status were asked the name generating question of whom they had disclosed their HIV status to. Characteristics of network members, as reported by the study participants, were assessed and included gender, age, relationship, education, frequency of interaction, and injection risk behaviors such as needle sharing.

Analyses

We first compared demographic and behavioral characteristics across sizes of social networks reported at the baseline visit, using chi-square tests for categorical variables and Wilcoxon rank sum tests for continuous variables. In the exploratory analyses we found that the name generating question of "whom they had disclosed their HIV status to" produced the names of only two new networks members. All the other names had been previously listed from the prior four name generators. In all of the analytic models we found that excluding these two network members did not yield any meaningful differences; hence, we kept them in the analyses.

In the second analyses we examined the relationship between role type by social network function. We then compared networks of those individuals who reported at least one drug user in their network to those who did not report any drug users in their networks. The next social network analyses used chi-square to compare the role relationships and social support functions of participants who were on ART by the 6-month follow-up visit with those who were not on ART. Fisher's exact tests were used in cases with low cell frequencies. The final multivariate logistic regression models assess the association of social network characteristics on ART initiation by the 6 month follow-up visit. In developing the models we examined potential interactions and collinearity. Our choice of covariates for inclusion in the adjusted model were informed by directed acyclic graph and the literature.(25) We also constructed models restricting the data to those participants who reported that they were unaware of their HIV status at baseline and found no meaningful differences in the results. All analyses were conducted using SAS 9.3 statistical software.

Results

Demographics

At the baseline assessment the median age of the men was 35.0 (IQR, 30–39; Table 1). About half (48.7%) were married. Most (87.4%) were employed (full or part time), and 65.1% lived in a rural area. The sample in general was of low social economic status. The median income was 2 million Dong per month (~90 USD) and 8 years of education. Among the sample, 32.8% had ever been arrested and 26.4% in prison, 25.4% had been in drug treatment, and 11.4% had spent at least one night in the prior 3 months on the street, a park, alley, or abandoned building. Slightly less than half (44.0%) reported daily injection, and the majority (74.8%) reported feeling stigmatized by their community because of their drug use. Most had low CD4 counts, with 37.1% less than 200 cells/μl. Only 20.8% reported that they were aware of their HIV positive status at baseline, and hence could disclose their HIV positive status. By the 6 month follow-up 30.2% reported initiating ART.

Social networks

The reported social networks sizes were relatively small. The mean size of network members was 2.9 (range 0 to 11). As seen in Table 1, those who were more educated tended to have larger networks. Almost all of those who were married reported that they had a network of one or more members and daily injectors reported larger networks. Of the 341 participants 1000 network members were listed. Due to the low number of reported girlfriends (N=16) this category was collapsed with wives (N=51). Fathers were also collapsed with mothers, and categorized as 'parent' due to the small sample size (N=14). The largest share of network members listed were drug network members (46.0%), most of whom were identified as friends (88.6%). There was little overlap of family and those listed as members of the drug network (0.6%). There was little family support in the networks: 11.1% listed a parent, 30.8% reported at least one family member, 19.6% reported a girlfriend or wife, but only 3 individuals reported both a spouse/girlfriend and a parent.

In general, there was minimal overlap among network members listed by the four name generation questions. The greatest overlap was between the name generators "Talk to about private matters" (B) and "Talk to about HIV" (C), which was 11%. The overlap between C and "Inject together" (D) was the second highest with 8.3%. The lowest overlap, less than 2%, was between "Provide medical advice" (A) and the other three name generators. The largest overlap between 3 roles was 6% for B, C, and D. Four percent of the network members were listed by all four name generators. Table 2 presents the relationship between social network roles and social support function, which showed that almost all (99.4%) participants reported at least one friend in their network.

There was a stark difference in the networks of those who reported at least one drug user in their networks compared to those who had no drug users (Table 3a). Those who did not report drug users in their networks were much more likely to report family members, spouses, sexual partners and network members who provided emotional (talked to about personal or private matters) and informational support for medical care. Participants who

reported drug users in their networks infrequently reported family members or sex partners in their networks. Most reported acquaintances (91%), who were most often drug users.

In the bivariate analyses, two of the baseline network factors were revealed to be associated with ART initiation by the 6 month follow-up. Having at least one network member who they could talk to about medical advice, as compared to not having any of this type of network member, was positively associated with ART initiation and having at least one network member with whom they injected was negatively associated with ART initiation (Table 3b). In the multivariate model adjusting for intervention arm, age, education, reported injecting in the last three months at follow-up, and knowing HIV positive status at baseline, the network characteristic of providing health/medical advice continued to be statically significantly associated with ART initiation (OR=2.74; 95% CI=1.20–6.28, Table 4). The variable of having at least one network member with whom one injected did not retain statistical significance, albeit the odds of initiating ART changed only slightly (Table 4). We also examined a multivariate model that included total network size as a covariate. The inclusion of this covariate did not appreciably change the results.

Discussion

The study results suggest that the network support function of medical/health advice is associated with ART initiation among PLH and PWID in Thai Nguyen, Vietnam. Role relationships, such as parent or spouse, in the social network were not associated with ART initiation by the 6-month follow-up. If there was a least one injection drug user in the network the odds of ART initiation significantly decreased but this association was attenuated in the multivariate analyses.

We do not know precisely why having at least one network member providing medical/ health advice at baseline was associated with ART initiation at the 6 month follow-up. Possible mechanisms for this association include greater disclosure of HIV status to this network member and hence subsequent support for obtaining ART, norms of promoting health care by the health advice network member, obtaining relevant information about ART from health advice network member, and/or health advice network member being willing and able to accompany the PLH to the ART clinic. One of the requirements for ART enrollment is having a supporter attend an appointment at the HIV clinic. It is possible that the network members who provided health advice were those who were often the supporters needed for enrollment in ART.

The significant finding in the bivariate analysis - which was reduced in the multivariate model - that a network member who is an injector is associated with a lower likelihood of ART initiation is not surprising. Prior studies of drug users have found that a greater number of drug users in the social network is associated with lower frequency of entry into drug treatment and suboptimal health service utilization (14, 15). In addition to the predictors of ART, these analyses of social network data suggest that the social networks of PLH are sparse. Although there were four name generating questions, the majority of network members listed were drug users. Only 100 (29%) participants reported one nuclear family member, 5 (1%) listed more than one family member, and 67 (20%) listed a spouse or

girlfriend. Those who reported injectors in their networks were much less likely to report a family member. The low level of family support may be due in part to the high level of stigmatization of drug users in Vietnam.

A study of PLH in Guangxi province, China found that 147 respondents nominated a total of 940 network members who would provide social support for an average support network size of 6.4 (16). In contrast, 341 participants in our study reported 1000 network members. The networks in Thai Nguyen were much smaller than those reported in Guangxi, China. We do not know if the reports of sparse support networks are due to an issue of measurement or actual difference in size of social networks. The Chinese study also included a proportion (29.9%) of female drug users. The small networks in the current study suggest that PLH may need to mobilize social support for their health care and psychological well-being. It may be useful to develop programs to reestablish rapport with family members and other supporters. For those who do not have the potential to reestablish supportive relationships, as well as for those who may benefit from additional support, support groups may be highly beneficial for emotional support but may not be sufficient for providing instrumental support, such as informal caregiving when PLH are sick or impaired. In Vietnam, support groups for PLH have been established, yet many of these programs have been financially supported by international donors, which may make them less sustainable than locally or nationally supported programs. Programs that reduce HIV and injection drug use stigma may also reduce barriers to care as well as help PWID and PLH access HIV related social support.

Several study limitations should be noted. The small reported network may be due in part to participants' reluctance to list network members. As drug use is illegal, they may fear that their network members could get into trouble if they were listed on the inventory. The sampling was also not random as participants were recruited for an intervention. Some individuals may have not enrolled in the study due to concerns about disclosure of their drug use or other concerns. The intervention was also limited to men. Although the social support functions and network roles were assessed, there may be other key support functions, such as provision of food, that were not assessed. Moreover, the quality of these network relationships were not assessed in detail. Finally, the referrals and assistance provided by the study staff for enrolling in HIV medical care may have helped participants overcome certain barriers and hence obscured both the social network barriers and the facilitators to ART initiation.

Some of the strengths of the study were that it had a verified outcome of ART initiation for most participants, it was longitudinal, and most participants learned of their HIV positive status after the baseline. Consequently, it is unlikely that knowledge of HIV positive status influenced the composition of their social networks. Future network studies should examine social factors that help facilitate ART initiation as well as ART adherence, continuity of HIV medical care, and psychological well-being among PLH and their supporters.

It is likely that other factors besides social network factors were barriers and facilitators to ART initiation among PWID in Vietnam. These factors may include structural factors of community level stigma toward HIV and drug use and ART enrollment criteria. Transportation to HIV clinics, current substance abuse, mental health as well as economic

factors and transportation may have also impeded ART initiation. It should be noted that ART initiation does not necessitate HIV medication adherence and hence viral suppression. However, without ART initiation, as the majority of participants had low CD4 count, mortality is likely to be high. Urgent efforts are needed to promote ART initiation among PWID in Thai Nguyen, Vietnam. Interventions are needed to remove barriers to HIV care and facilitate access to HIV medications as well as promote ART adherence. Given the stigma of drug abuse and HIV, the dearth of strong network support, and low economic resources it is imperative to develop and implement powerful, low cost, and sustainable HIV medical care programs for PWID in Vietnam.

Conclusions

The small social networks reported by PWID living with HIV in Vietnam suggest that many have insufficient material and emotional support to help them with HIV medical care and other health and social needs. Community level stigma reduction programs may help to foster more supportive relationships for PWID PLH. Interventions to improve support for PLH may include working with families and other traditional supporters and establishing new supporters through face-to-face and online support groups. Moreover, employment programs for PWID PLH may increase both their material resources and social support as well as improve their status in the community.

Acknowledgments

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Table 1

Demographic and behavioral characteristics of 341 PWID who took part in the baseline survey.

	No members N	No members (%)	1 member N	1 member (%)	2–3 members N	2–3 members (%)	More than 4 members N	More than 4 members (%)	Total N	Total (%)	p-value*
Overall	12	(3.5)	60	(17.6)	162	(47.5)	107	(31.4)	341	(100.0)	**<.0001**
Age, in years (median, IQR)	34.5	(30.0–38.0)	37.0	(32.0–42.0)	35.0	(31.0–40.0)	34.0	(30.0–39.0)	35.0	(30.0–39.0)	0.131
Years of education (median, IQR)	6	(6–7.5)	7.0	(7.0–10.5)	8.0	(7.0–11.0)	9.0	(7–11)	8.0	(7–11)	**0.036**
Married	2	(16.7)	37	(61.7)	72	(44.4)	55	(51.4)	166	(48.7)	**0.015**
Employed*	7	(58.3)	54	(90.0)	142	(87.7)	95	(88.8)	298	(87.4)	**0.021**
Income per month in millions of dong (median, IQR)	1.38	(0.7–1.8)	2.0	(1.2–3.0)	1.8	(1.0–2.5)	2.0	(1.1–3.0)	2.0	(1.0–2.7)	0.199
Rural resident: %	9	(75.0)	42	(70.0)	112	(69.1)	59	(55.1)	222	(65.1)	**0.078**
Spent a night in street, in a park, alley, or abandoned building in last 3 months	0	0.0	4	(6.7)	24	(14.8)	14	(13.1)	42	(12.3)	0.264
Feels stigmatized by community because of drug use	7	(58.3)	38	(63.3)	126	(77.8)	84	(78.5)	255	(74.8)	0.071
Injected daily, past 3 months	3	(25.0)	16	(26.7)	78	(48.1)	53	(49.5)	150	(44.0)	**0.008**
Ever in drug treatment	4	(33.3)	10	(16.7)	49	(30.2)	29	(27.1)	92	(27.0)	0.201
Ever overdosed on drugs	4	(33.3)	5	(8.3)	26	(16.0)	10	(9.3)	45	(13.2)	0.124
Ever arrested	3	(25.0)	17	(28.3)	64	(39.5)	28	(26.2)	112	(32.8)	0.104
Ever in prison	3	(25.0)	14	(23.3)	53	(32.7)	20	(18.7)	90	(26.4)	0.072
Knew HIV positive status at baseline	4	(33.3)	8	(13.3)	32	(19.8)	27	(25.2)	71	(20.8)	0.400
CD4 cell count (median, IQR)	300	(154–399)	234	(154–399)	253	(131–379)	235	(124–384)	247	(134–381)	0.887
Started ART by 6 month follow-up	4	(33.3)	17	(28.3)	52	(32.1)	30	(28.0)	103	(30.2)	0.879
Had any unprotected sex, past 3 months	2	(16.7)	28	(46.7)	96	(59.3)	64	(59.8)	190	(55.7)	**0.012**

*
P-values were calculated using Wilcoxin rank sum tests for continuous variables and chi-square tests for categorical variables. Fisher's exact tests were used in cases with low cell frequencies

*
Employment either full or part time

Table 2

Counts and proportions of the 341 participants who reported receiving five types of functional social support by social role (parent, partner, family member, or friend, other). Percentages indicate any functional support provided for the specific domain by role type.

	Could get medical advice	Talk to about private matters	Talk to about HIV	Inject together	Other	Total (%)
Parent	13 (3.8)	17 (5.0)	22 (6.5)	0 (0)	8 (2.3)	60 (17.6)
Partner	8 (2.3)	8 (2.3)	42 (12.3)	0 (0)	2 (0.6)	60 (17.6)
Family	25 (7.3)	69 (20.2)	63 (18.5)	2 (0.6)	13 (3.8)	172 (50.4)
Friend	22 (6.5)	58 (17.0)	75 (22.0)	178 (52.2)	6 (1.8)	339 (99.4)

*
Either or both parents

**
Partners include wives and girlfriends.

Table 3a

Proportions of the 341 participants with at least one type of network member reported in their baseline network, stratified by presence of an injecting partner in the network.

Types of friends reported	% with member type in baseline network		
	Injector in network (N=157)	No injector in network (N=184)	p-value
At least one parent	0.6	20.1	<.0001
At least one sibling	2.5	7.6	0.079
Wife	0.6	27.2	<.0001
Sexual partner	0.6	35.9	<.0001
Any nuclear family	3.8	53.8	<.0001
Any relatives	3.2	9.2	0.042
Any acquaintances	91.1	37.5	<.0001
At least one in following roles:			
Provides medical advice	7.0	29.3	<.0001
Talk to about private matters	22.3	39.7	0.005
Talk to about HIV	29.3	46.7	0.376

[*] P-values were calculated using chi-square tests or Fisher's exact tests in cases with low cell frequencies.

Table 3b

Proportions of the 178 participants who were ART eligible between baseline and 6 month follow-up, with at least one type of network member reported in their baseline network, stratified by ART initiation status at 6 months.

Types of friends reported	% with member type in baseline network		
	ART at 6 months (N= 76)	No ART at 6 months (N=102)	p-value*
At least one parent	15.8	9.8	0.349
At least one sibling	5.3	5.9	0.488
Wife	14.5	19.6	0.428
Sexual partner	17.1	22.5	0.452
Any nuclear family	34.2	34.3	0.821
Any relatives	9.2	4.9	0.366
Any acquaintances	55.3	66.7	0.015
At least one in following roles:			
Provides medical advice	26.3	12.7	0.031
Talk to about private matters	36.8	44.1	0.358
Talk to about HIV	42.1	38.2	0.644
Inject together	44.7	52.0	0.366

*
P-values were calculated using chi-square tests or Fisher's exact tests in cases with low cell frequencies.

Table 4

Results of bivariate and multivariable regression results for the association between having at least one of each type of function role played by a network member on the odds of initiation ART by the 6 month follow-up visit. (For the N=178 participants who were CD4 below 250 and ART naïve at baseline).

Had at least one network member fulfill role of:	OR (95% CI)	aOR (95% CI)[*]
Provides medical advice	2.38 (1.09–5.17)	2.74 (1.20–6.28)
Talk to about private matters	0.66 (0.36–1.21)	0.60 (0.31–1.16)
Talk to about HIV	0.95 (0.52–1.75)	0.79 (0.41–1.53)
Inject together	0.53 (0.28–0.99)	0.57 (0.30–1.11)

[*] Multivariable model adjusts for study arm, age, awareness of HIV status, education level, and any drug injection in the past 3 months.