Psychosocial support and adherence counseling among persons living with HIV/AIDS in Manya Krobo: Do housing and housing conditions matter?

Eric Y Tenkorang, PhD[1]
Adobea Y Owusu, PhD[2]
Amos K Laar, PhD[3]

[1] Department of Sociology, Memorial University of Newfoundland, St. John's, NL A1C 5S7. Email: ytenko@yahoo.com; eytenkorang@mun.ca

[2] Institute of Statistical, Social and Economic Research (ISSER), University of Ghana.

[3] School of Public Health, University of Ghana

Abstract

As part of providing comprehensive HIV/AIDS services, the National AIDS Control Programme (NACP) and Ministry of Health (MOH) in Ghana recommend that HIV/AIDS patients receive psychosocial support and follow-up visits that ensures medical and drug adherence assistance. However, the successful implementation of these support services requires that patients have stable and quality housing. Yet, studies that examine associations between housing, psychosocial support, and adherence/treatment counseling among HIV/AIDS patients in Ghana and sub-Saharan Africa are limited. We use data collected from 605 HIV positive persons attending check-p and receiving anti-retroviral therapy from both Atua Government Hospital and St. Martin's de Porres Hospital, located in the Manya Krobo district, to examine these important links. Results show that respondents with stable homes, and quality housing structure and environment were significantly more likely to receive these support services compared to those without stable and quality housing. Policy makers need to consider housing as an important element of HIV prevention and care.

Keywords: HIV; Psychosocial support; adherence counseling; Lower Manya Krobo; Housing

Introduction

With prevalence of more than 1% in the general population, Ghana's AIDS situation has been described as generalized over the years, yet stable. This stability has been achieved through an improved and well-coordinated national response plan—one that emphasizes comprehensive HIV prevention, treatment, care and the provision of social support services to patients (Ghana AIDS Commission 2015). The comprehensive approach to HIV prevention in Ghana has also meant focusing on providing psychosocial support and adherence counseling as important elements in the management of HIV/AIDS, and ensuring that persons living with the condition cope well. Providing psychosocial support and adherence counseling is consistent with the WHO's recommendations that such services be included in the national guidelines and training curriculum for healthcare workers in the management of HIV/AIDS for member countries (WHO 2015).

According to the WHO, psychosocial support helps address the psychological and social stressors associated with living with HIV/AIDS, and the likely implications for families of infected persons, their partners, and caregivers (WHO 2015). Providing psychosocial support is often considered part of care at both institutional and community levels offered to persons living with HIV/AIDS (PLWHAs). There is evidence that persons diagnosed with HIV and those living with AIDS have higher prevalence of mental health ailments, and that psychological interventions aimed at improving their mental health make a significant difference in helping them manage and cope, including adhering to treatment (National AIDS Trust 2010; Kagee 2012; WHO 2008; Freeman et al. 2005; Baingana et al. 2005). Regarding treatment, it has been noted that similar to ensuring that continuous supply of drugs is crucial to maintaining care, adherence to the drugs is also required for effective treatment in the long run (Schaecher 2013;

Turner 2002; UNAIDS 2015). Thus, adherence counseling which involves the training of either medical or non-medical staff to counsel PLWHAs on care, treatment and support options is required as part of the continuum of delivering effective healthcare. In Ghana, adherence counsellors are trained to perform a host of functions including pre-treatment counseling, home visits to verify the residential address of patients, and most importantly following up to ensure that patients comply with their prescriptions (Felling et al. 2003).

Effective provision of both psychosocial and adherence counseling support services require a strong human resource and infrastructural base. Ideally, nurses and other medical staff are trained to take on these responsibilities (Do et al. 2010; Parry et al. 2005; Pradier et al. 2003). However, in resource constrained settings such as Ghana, where nurses and other trained medical staff are in short supply and it is expensive employing the services of psychologists, social workers etc., non-medical staff (lay counsellors), who are mostly volunteers from the community, are trained to play the role of adherence counselors and provide psychosocial support for patients (WHO 2015; Felling et al. 2003). It is also the norm that peer counselors (others living with HIV/AIDS) are used to deliver these services. Peer counsellors suffering from HIV are useful in sharing their own experiences with newly diagnosed patients, answering their questions and directing them to where help can be sought and received. In addition, peer counsellors can be effective in reducing anxiety and isolation, and motivating patients to live healthier lifestyles (CSH 2013). As counsellors are sometimes required to make personal contacts with patients in their homes, housing stability, and the social conditions existing within the homes of patients become extremely crucial for the successful delivery of these important support services. Despite the role housing plays in delivering psychosocial and adherence counseling to PLWHAs, very few studies, mostly from western advanced countries have

examined these links (Kagee 2012; Augustine 2002; Wilton & Broeckaert 2013). Our search

indicates that to date, no study in sub-Saharan Africa including Ghana has examined housing

stability, access and housing quality on the likelihood of patients accessing these important

support services. This is problematic especially given that the majority of HIV positive persons

live in sub-Saharan Africa and that governments in these parts of the world are the worst

violators of housing rights. Our study fills this important research gap.

Housing and access to counseling services

Housing is an important social good, one that brings stability, financial and psychological

benefits to its owners. It is therefore not surprising that the extant literature associates unstable

and poor housing conditions with poor physical and health outcomes (Thompson et al 2001;

Matte & Jacobs 2000; Barton & Coley 2007; Dales et al. 2008; Vasconcelos et al. 2011; Jacobs

2011). While the literature on housing quality and social support services, including counselling,

is emerging, and largely underdeveloped, anecdotal evidence suggests that a theoretical link

exists between the two. For instance, the majority of evidence from western advanced countries

suggests that stable and supportive housing are crucial to maintaining care, adhering to medical

regimens and providing relevant psychosocial services to PLWHAs (Kagee 2012; Augustine

2002; Wilton & Broeckaert 2013; UNAIDS 2001; UNAIDS 2014). Recognizing that housing

can serve as a barrier to receiving psychosocial support and maintaining HIV care and treatment,

specific programs both from governmental and non-governmental sectors have aimed at

improving the housing conditions and circumstances of PLWHAs in the majority of

industrialized countries. For instance, in Canada, the La Corporation Félix Hubert d'Hérelle in

Montreal and the SHARP foundation in Calgary offer affordable housing and housing assistance

to PLWHAS (Wilton & Broeckaert 2013). In the United States, there is the Housing

Opportunities for Persons Living with AIDS (HOPWA), a federal program aimed at meeting and improving the housing needs of PLWHAs (Perl 2013; Bernstine 2015).

Currently, there is no housing policy for HIV positive persons in Ghana, unlike some developed countries. Although Ghana's housing policy has focused on providing affordable housing to low and middle income earners who are considered vulnerable (CHF International 2004; The Africa Report 2013), there is no specific reference to PLWHAs in this policy, in spite of the higher levels of vulnerability. The lack of policy direction deeply reflects the paucity of research in this area. By examining links between housing and access to counseling services among PLWHAs in Ghana, this study not only fills an important gap in the literature but also draws the attention of policy makers to an important yet neglected issue in Ghana with implications and lessons for sub-Saharan Africa.

Data & Methods
Study setting and context
The study was conducted in the Manya Krobo (a farming and fishing community) district located in the Eastern Region of Ghana. Manya Krobo is one of 21 districts/municipal administrative demarcations in the Eastern Region of Ghana. Results from HIV prevalence tracking sites in Ghana shows that for all the times since the first HIV case was found in the country in 1986, the Manya Krobo District has always had the highest HIV rates. HIV prevalence was estimated at 13% in 1999, four times higher than the national average of 3% at the time. Although the recent national HIV sentinel survey indicates reductions in prevalence to 10.1% (see NACP, 2003; Ghanaweb, 2013). Two major hospitals that serve the district, Atua Government Hospital (located in a major city called Atua) and St. Martins de Porres Hospital (located in Agormanya) were selected for the study. Both hospitals were chosen as pilot cases by the Ghana Ministry of Health and the Family Health International (FH1) as 'learning centres' for

the provision of comprehensive HIV/AIDS-related services for PLWHAs in the Lower Manya Krobo district (Addo-Atuah et al. 2012; Ritzenthaler 2005; Felling et al. 2003). HIV/AIDS services provided by the hospitals include VCT, PMTCT, clinical care for PLWHA including ART and home-based care (Addo-Atuah et al. 2012; Ritzenthaler 2005). The district serves a population of close to 90,000 people in the catchment area (Ministry of Health 2010; Addo-Atuah et al. 2012).

Data collection Protocols

Data for this study were collected from a cross-section of 605 HIV positive persons aged 18-50 years and above who visited the two hospitals on clinic days running Mondays to Thursdays weekly. Recruitment of participants for the surveys began in June to August 2015. As part of the community entry processes, the research team sought permission from the regional Directorate for Health Services in Koforidua—the Eastern regional capital that oversees the activities of the study sites. Per the customs and traditions of Ghanaians and specifically the Krobo people, the research team upon recommendation from the matrons of the two hospitals employed for this study, sought permission from the 'Konor'—the paramount chief and the overlord of the Manya-Krobo traditional area. The first two authors together with six research assistants participated in the data collection process. Prior to data collection, several training sessions were held for all research assistants (RAs) at the Institute of Statistical, Social and Economic Research (ISSER) where the second author is a senior research fellow. The majority of research assistants were native Krobos and could speak and comprehend the language fluently, even those who did not hail from the region had working knowledge of the Krobo language and other Ghanaian languages. Also, all RAs had participated in similar work in the past, and had the experience, cultural and language skills required for interacting with potential respondents. Before data collection, questionnaires and interview guides were pretested with

respondents constituting about 10% of the sample and further modified. Respondents used at the

pre-testing phase did not participate in the original study. Respondents were selected from those

who had shown up at the Voluntary Counseling and Testing (VCT) centres for both hospitals. An

average of about 30 HIV+ persons showed up for VCT services daily at each hospital. Thus, on a

daily basis they were handed unique code numbers and simple random sampling was used to

select 32 respondents (16 each for both hospitals). The assignment of unique code numbers

meant we are able to track all respondents who were used as part of the random selection process

so they are not included in the same process the next day or not used twice in the study.

Face-to-face interviews were used given the sensitive nature of the topic and the fact that the

majority of respondents were not very literate to fill out a questionnaire. The sample size was

limited to 550 respondents who gave complete information on their housing situation and

psychosocial support.

Ethical considerations
Ethics clearance was received from the Interdisciplinary Committee on Ethics in Human

Research (ICEHR) at Memorial University of Newfoundland (where the first author is

affiliated), the Ethics Committee for Humanities (ECH) at the University of Ghana (where the

second author is affiliated), and the Ghana Health Service (GHS) operating under the Ministry of

Health (MOH). Additional respondent protection and quality data were ensured through training

of the interviewers, pretesting, and ensuring that no identifiable markers were used for the

respondents. Respondents had to also give a written or verbal consent.

Measures
        Two main outcomes were employed for analyses given the focus of this study.

Respondents were specifically asked if they received *psychosocial support counselling*

(individual and group support by peers (PLWHAs) and other non-clinical staff) and

*treatment/adherence counselling (*someone to help them understand their medications and

doctor's instructions, and strategies to keep with their prescribed medication schedule). Both

variables are dichotomous coded (no=0, yes=1).

Our focal independent variables measured the housing situation, housing access, and

conditions of survey respondents. For instance, several questions were asked about the quality of

their houses/homes. Specifically, they were asked to rank on a scale of 1 to 5 (with 1 being very

poor and 5 being excellent), the perceptions of their current housing conditions. These include:

the quality of their current house/dwelling; satisfaction level of their current house/dwelling;

thermal comfort (Indoor temperatures); natural lighting and view; indoor air quality (ventilation

system); amount of space in room/house; safety and security of building; noise exposure and

sleep; sanitary installations (bathrooms and toilets); exposure to infestations such as mice, flies,

cockroaches etc; level of privacy in your current house/dwelling; Cleanliness and tidiness of the

surroundings; and traffic intensity (Vehicular/human). Principal Component Analysis (PCA) was

employed as the first seven indicators loaded on a single underlying latent construct called

housing structure and last six on another latent construct called *housing environment.* Reliability

coefficients (Cronbach's Alpha) estimated for both scales are 0.912 and 0.827. Coding suggests

that higher (positive) values on the scale indicate quality housing structure and environment,

while lower values (negative) indicate poorer housing structure and environment. *Housing*

conditions were measured with five dummy-coded variables asking respondents about

ventilation, overcrowding, lighting, damp and mold, and noise. *Housing access and barriers* was

measured with three dummy-coded variables asking respondents to describe their housing

situation, if they have been ever harassed by their landlords/family due to their HIV status and if

they have ever been evicted. *Housing type and arrangement* was also measured with two polytomous variables that asked respondents the type of house/dwelling (traditional, compound, detached/semidetached etc.) they lived in and housing arrangement (own house, rented house, family house etc.). The socio-economic (education, occupation, income) and demographic (age, gender, residential status, marital status, ethnicity) characteristics of respondents were controlled, including the hospitals from where data were collected.

Analytical approach

The dichotomous nature of the outcomes variables suggests we use logit models for analysis. Logit models are appropriate when the response or outcome variable takes one of two outcomes and the underlying structure of the data follows a binomial or benoulli distribution (Skrondal & Rabe-Hesketh 2003). The model estimates its parameters using the maximum likelihood function, which gets interpreted as probabilities or odds. We employ both descriptive (univariate and bivariate statistics) and multivariate techniques to explain the underlying patterns for our data. Two separate multivariate models were built for each outcome. The first examined the relationship between housing variables and psychosocial and adherence counseling, and the second, added the socio-economic and demographic characteristics of respondents including hospitals from where data were collected. Results are interpreted in terms of odds and adjusted odds ratios. Odds ratios greater In than one will mean respondents are more likely to experience psychosocial or adherence support, while those less than one means respondents are less likely to receive such support.

Results

Table 1 shows univariate distributions of selected dependent and independent variables employed for analysis. The majority of respondents indicated having received adherence counseling while only half had received psychosocial support counseling. Median scores on both

housing structure and *housing environment* indicate that respondents had 'good' to 'excellent' perceptions of their housing situation. Variables that tap housing conditions show that the majority of respondents had good ventilation, lighting and lived in houses with no overcrowding, damp and mould and noise. Also, respondents experienced limited barriers to accessing housing as the majority reported they had stable housing, had never been harassed by their landlords due to their HIV serostatus, and had never been evicted from their homes. The majority of respondents lived in compound and family houses. On the average, respondents were about 46 years old, the majority were females, identified as Ga Adangbe and had less than high school education.

Table 2 examined bivariate associations between housing variables and receiving psychosocial support and adherence counselling. Results show significant relationships between housing and these outcomes. Respondents who perceived their *housing environment* and *structure* as excellent were significantly more likely to receive psychosocial support counseling but not adherence/treatment counseling. Housing conditions were associated with both psychosocial support counseling and adherence counseling. For instance, we found that respondents with no overcrowding and damp and mold in their homes were significantly less likely to receive psychosocial and adherence counseling, compared to those with no such conditions in their homes. While respondents in compound houses were significantly more likely to receive both psychosocial and adherence treatment/counseling compared to those in Traditional/Hut houses, respondents in detached/semi-detached houses were rather less likely to receive such support. Also, those in family houses were significantly less likely to receive both psychosocial and adherence counseling compared to respondents in their own homes.

The multivariate tables shown in Table 3 examined if the effects of housing remained after controlling for the demographic and socio-economic characteristics of respondents. Thus, in model 1 we consider only housing variables, but control for the demographic and socio-economic predictors in model 2. Results show that housing variables are significantly associated with receiving psychosocial support counseling but bot so much for adherence counseling. Consistent with our bivariate results, we find respondents who perceived the quality of their housing as excellent as more likely to receive psychosocial support. Also, compared to those whose homes were not overcrowded, respondents with overcrowded homes were more likely to receive psychosocial support counseling. It was interesting to find that respondents who had ever been discriminated against by their landlords/families were less likely to receive adherence counseling compared to those without such experience. Compared to those with stable housing, respondents without stable housing were significantly less likely to receive adherence counseling but these affects were lost after controlling for the demographic and socio-economic characteristics of the respondents. While respondents living in compound and detached houses were significantly less likely to receive psychosocial support compared to those in Hut/Traditional homes, respondents in rented houses were rather more likely to receive such support compared to those with their own houses. Consistently, respondents from St. Martin's hospital were significantly less likely to receive both counseling services compared to from Atua Government hospital.

Discussions

Psychosocial support and adherence counseling are considered extremely important in the provision of comprehensive care and treatment for HIV positive persons globally. Several studies show that such counseling and support services help PLWHAs not only overcome

psychological and emotional barriers, but also adhere to their treatment regimen (Aslanyan 2005; Kagee 2012; Kaliakbarova et al. 2013; Asante 2012). In other related studies, it was discovered that failure to cater to the psychological needs of PLWHAs often resulted in absenteeism, depression, suicidal risks and poor adherence to anti-retroviral therapy (ART) leading to disease progression and increased mortality risks (Kagee 2012; Asante 2012).

In Ghana, Psychosocial support services including adherence counseling are offered as part of a continuum of care for PLWHAs (Felling et al. 2003; Ministry of Health 2010). While often the case that such services are provided in the health facility, it is preferred that patients maintain strong links with other providers of care not only within the health facility but also outside of it (preferably their homes) to ensure continuous and effective management of their medical condition (Ministry of Health 2010). Thus, it becomes extremely crucial that PLWHAs maintain a healthy relationship with their immediate social environment beginning from where they live and call their homes. Several research, mostly from western advanced countries have demonstrated housing as crucial to ensuring comprehensive care for PLWHAs, especially in providing psychosocial support and counseling (Augustine 2002; Wilton & Broeckaert 2013; UNAIDS 2001; UNAIDS 2014). However, to date, very few studies have documented relationships between housing and psychosocial support counseling, including adherence counseling in sub-Saharan Africa. By examining this relationship, this study becomes one of the few if not the foremost to determine the independent effects of housing on psychosocial and adherence counseling among PLWHAs in Ghana. Respondents who perceived the structure of their homes and housing environment as excellent were significantly more likely to receive psychosocial support counseling, but not adherence counseling. In fact, it was clear that housing quality and some housing variables were associated with psychosocial support counseling, and

not adherence counseling. We found however that respondents were less likely to have received adherence counseling when faced with housing barriers such as being discriminated against by their landlords/family members.

Taken together, the above results suggest that for psychosocial support counseling that require not only health professionals, but also peers, friends, families, religious bodies and the broader community participating, housing and housing quality become relevant, especially as sometimes these support services require visits to the homes of patients. On the contrary, the limited relevance of housing quality to adherence counseling may reflect the possibility that such services are more likely to be provided within the health care setting by trained medical personnel unlike psychosocial support counseling that is more community-oriented. Previous literature show that in Ghana, adherence counseling is a prerequisite for administering ART, and that patients go through at least two of such sessions in the pre-treatment phase before beginning ART (Ohene & Forson 2009; Ministry of Health 2010). It is important to note that the use of adherence monitors who mostly follow up with patients to assess adherence to therapy is highly promoted in Ghana (Ohene & Forson 2009). Although lay persons may be used for following up patients, real monitoring and any advice provided on therapy occurs within the health care setting (Ministry of Health 2010).

The finding that respondents in less overcrowded homes had lower odds of receiving psychosocial support was counterintuitive but not entirely surprising especially in a context where the majority of respondents live in compound and family houses. A compound house in Ghana is one that has different families either renting or not, but living in the same residence, sharing basic amenities such as bathrooms, kitchens etc. (Ghana Statistical Service, 2008). It is mostly the case that compound houses are overcrowded, although the dynamics in such homes is

very communal, one that promotes a high sense of belonging. It is possible that respondents living in such homes may be benefitting from the 'sense of community' present in these homes especially in situations where members of the household are unaware of the HIV serostatus of respondents leading to stigma. Against this backdrop, it is not also too surprising that those living in detached/semi-detached homes had lower odds of receiving psychosocial support counseling.

Although not the focus of the paper, the finding that significant differences exist between the two hospitals regarding psychosocial and adherence counseling is worth mentioning. Compared to those from Atua Government hospital, respondents from St. Martin's de Porres were significantly less likely to receive psychosocial and adherence counseling. This finding may be linked to the availability of resources offered to PLWHAs in both hospitals. It is well documented that the two hospitals were the first to provide VCT and ART services in Ghana. Atua Government Hospital is a 122-bed district hospital serving both the Manya and Yilo Krobo districts (Addo-Atuah et al. 2012). The hospital provides a wide range of healthcare services including comprehensive HIV care and treatment for PLWHAs (Felling et al. 2003; Addo-Atuah et al. 2012). St. Martin's de Porres, a 68-bed mission hospital and a National Catholic Health Service facility is situated in Agormanya in the Yilo Krobo district. Similar to Atua, St. Martins de Porres provides a wide range of health services for its constituents and was designated as one of the learning centres for providing VCT services and comprehensive HIV care and treatment (Felling et al. 2003; Addo-Atuah et al. 2012; Ministry of Health 2010). The difference however is that Atua serves as the referral health facility for all public and private health facilities within the district implying that it is better resourced regarding infrastructure and personnel.

Our findings have several implications for policy makers. The results suggest that it is important to consider housing as relevant to delivering quality and comprehensive care for PLWHAs in Ghana as exists in the US, Canada and United Kingdom. As mentioned earlier, Ghana's housing policy which aims at providing affordable housing for the economically vulnerable is silent on specific interventions for PLWHAs. This is unfortunate especially for a group that needs stable, affordable and quality housing to receive care and treatment.

While findings are useful, several limitations are worth noting. First, we do not draw 'causal' connections between housing and outcome variables given the cross-sectional nature of our design. Second, data were collected from patients attending check-up and receiving ART in the hospital setting and does not capture PLWHAs who do not receive care and may not have visited the hospital within the study period. Besides, data are self-reported may be subject to report bias as mostly occurs with self-report data elsewhere. Notwithstanding, this study provides the first documented evidence of the links between housing and psychosocial support counseling in Ghana with implications for other countries in sub-Saharan Africa.

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Table 1a: Distribution of selected dependent and independent variables		Table 1b. A univariate analysis of school/community level variables	
Received Psychosocial support/Counseling	**%/Median (N=550)**	**Socio-economic/demographic**	
No	50.0	Mean age of respondents	45.7
Yes	50.0	*Gender*	
Received Adherence Counseling		Male	24.5
No	27.5	Female	74.5
Yes	72.5	*Marital status*	
Received Medication Program		Married	28.8
No	32.9	Never married/single	10.1
Yes	67.1	Separated/Divorced	26.3
Housing variables		Widowed	25.6
Housing structure	.022	Cohabiting	9.3
Housing environment	.034	*Ethnicity*	
Housing Conditions		Ga Adangbe	78.5
Ventilation		Akan	10.1
Poor ventilation	30.2	Ewe	11.4
Good ventilation	69.8	*Hospital data collected from*	
Overcrowding		Atua	52.2
Overcrowded	23.6	St. Martins	47.8
Not overcrowded	76.4	*Education of respondents*	
Lighting		No education	32.3
Poor lighting	24.5	Primary education	18.5
Good lighting	76.5	Junior high school	35.6
Damp and Mold		Senior high school/higher	13.7
Has damp and mold	8.4	*Income of respondents*	
No damp and mold	91.6	More than 250 Ghana Cedis	17.7
Noise		Less than 250 Ghana Cedis	52.3
Noisy	29.9	No income	30.0
No noise	70.1	*Employment*	

Housing access & Barriers

Ever been harassed by landlord due to HIV?

No	98.2
Yes	1.8

Ever been evicted?

No	85.1
Yes	14.9

Housing stability

Stable Housing	91.4
Unstable Housing	8.6

Type of Housing/arrangements

Type of House

Hut/Traditional house	34.3
Compound house	48.2
Detached/Semi-detached house	12.1
Other	5.5

Housing arrangement

Own house	20.6
Rented house	27.9
Family house	48.5
Other	3.0

No	23.4
Yes	76.6

Residence

Rural	54.6
Urban	45.4

Table 3: Bivariate models of psychosocial and adherence counseling among HIV+ persons in the LMKD, Ghana, 2015

Housing variables	Psychosocial	Adherence
Housing structure	1.23 (.104)***	.987 (.094)
Housing environment	1.22 (.104)***	1.03 (.098)
Housing Conditions		
Ventilation		
Poor ventilation	1.00	1.00
Good ventilation	1.09 (.195)	.906 (.183)
Overcrowding		
Overcrowded	1.00	1.00
Not overcrowded	.463 (.092)***	.634 (.146)**
Lighting		
Poor lighting	1.00	1.00
Good lighting	1.19 (.227)	1.18 (.246)
Damp and Mold		
Has damp and mold	1.00	1.00
No damp and mold	.386 (.319)***	.267 (.127)***
Noise		
Noisy	1.00	1.00
No noise	.826 (.147)	.889 (.180)
Housing access & Barriers		
Ever been harassed by landlord due to HIV?		
No	1.00	1.00
Yes	.923 (.393)	.588 (.257)
Ever been evicted?		
No	1.00	1.00
Yes	.827 (.192)	.862 (.217)
Housing stability		
Stable Housing	1.00	1.00

Unstable Housing	.709 (.208)	.611 (.186)
Type of Housing/arrangements		
Type of House		
Hut/Traditional house	1.00	1.00
Compound house	1.70 (.314)***	2.66 (.557)***
Detached/Semi-detached house	.436 (.130)***	.891 (.253)
Other	.752 (.288)	2.21 (.991)
Housing arrangement		
Own house	1.00	1.00
Rented house	1.05 (.250)	.796 (.226)
Family house	.574 (.123)***	.581 (.148)**
Other	.611 (.310)	.531 (.289)
Socio-economic/demographic		
Age of respondents	1.04 (.007)	1.03 (.008)
Gender		
Male	1.00	1.00
Female	.849 (.162)	.695 (.157)
Marital status		
Married	1.00	1.00
Never married/single	1.27 (.381)	1.42 (.494)
Separated/Divorced	.687 (.153)	1.07 (.257)
Widowed	1.55 (.348)**	1.22 (.299)
Cohabiting	.964 (.297)	1.94 (.752)
Ethnicity		
Ga Adangbe	1.00	1.00
Akan	1.37 (.377)	.883 (.264)
Ewe	1.07 (.277)	.887 (.253)
Residence		
Rural	1.00	1.00
Urban	1.97 (.329)***	1.92 (.366)***
Hospital data collected from		

Atua	1.00	1.00
St. Martins	.099 (.019)***	.037 (.012)***
Education of respondents		
No education	1.00	1.00
Primary education	1.43 (.342)	1.88 (.562)**
Junior high school	1.21 (.240)	.987 (.217)
Senior high school/higher	.674 (.182)	.774 (.219)
Income of respondents		
More than 250 Ghana Cedis	1.00	1.00
Less than 250 Ghana Cedis	.964 (.221)	1.64 (.400)**
No income	.697 (.170)	2.10 (.564)***
Employment		
No	1.00	1.00
Yes	.916 (.177)	.904 (.199)

Note; *p<.1; **p<.05; ***p<.01

Table 3: Multivariate models of accessing psychosocial and adherence counseling among HIV+ persons in the LMKD, Ghana, 2015

Variables	Psychosocial		Adherence	
Housing variables	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Housing structure	1.39 (.146)***	1.70 (.231)***	.943 (.104)	1.09 (.135)
Housing environment	1.54 (.159)***	1.89 (.262)***	1.05 (.114)	1.10 (.137)
Housing Conditions				
Ventilation				
Poor ventilation	1.00	1.00	1.00	1.00
Good	1.48 (.399)	1.41 (.501)	.982 (.275)	.793 (.261)
Overcrowding				
Overcrowded	1.00	1.00	1.00	1.00
Not overcrowded	.255 (.074)***	.333 (.130)***	.611 (.186)	1.19 (.457)
Lighting				
Poor lighting	1.00	1.00	1.00	1.00
Good lighting	1.65 (.437)	1.77 (.649)	1.61 (.438)	1.34 (.427)
Damp and Mold				
Has damp and mold	1.00	1.00	1.00	1.00
No damp and mold	.267 (.073)***	.454 (.239)	.134 (.086)***	.274 (.204)
Noise				
Noisy	1.00	1.00	1.00	1.00
No noise	.859 (.190)	.606 (.181)	.929 (.229)	1.08 (.325)
Housing access & Barriers				
Ever been harassed by landlord due to HIV?				
No	1.00	1.00	1.00	1.00
Yes	.891 (.461)	1.05 (.743)	.407 (.201)*	.254 (.170)**
Ever been evicted?				
No	1.00	1.00	1.00	1.00
Yes	1.09 (.298)	1.16 (.422)	1.21 (.357)	1.39 (.493)
Housing stability				
Stable Housing	1.00	1.00	1.00	1.00
Unstable Housing	.567 (.218)	1.02 (.518)	.416 (.164)**	.742 (.372)

Type of Housing/arrangements

Type of House

Hut/Traditional house	1.00	1.00	1.00	1.00
Compound house	1.35 (.288)	.777 (.239)	2.82 (.665)***	1.56 (.480)
Detached/Semi-detached house	.252 (.093)***	.232 (.114)***	1.07 (.359)	1.39 (.551)
Other	.384 (.175)**	.149 (.094)***	2.51 (1.28)	1.29 (.867)

Housing arrangement

Own house	1.00	1.00	1.00	1.00
Rented house	1.35 (.381)	2.49 (.966)***	.695 (.221)	1.11 (.474)
Family house	.639 (.161)	1.42 (.508)	.671 (.191)	1.41 (.546)
Other	1.41 (.781)	2.77 (1.95)	.795 (.476)	.991 (.746)

Socio-economic/demographic

Age of respondents		.997 (.012)		1.01 (.765)

Gender

Male		1.00		1.00
Female		1.55 (.500)		.699 (.245)

Marital status

Married		1.00		1.00
Never married/single		2.04 (.911)		2.13 (.993)
Separated/Divorced		.844 (.295)		1.38 (.483)
Widowed		1.59 (.592)		1.30 (.489)
Cohabiting		.736 (.370)		2.02 (1.08)

Ethnicity

Ga Adangbe		1.00		1.00
Akan		1.37 (.589)		.656 (.293)
Ewe		1.28 (.534)		1.11 (.444)

Residence

Rural		1.00		1.00
Urban		.956 (.253)		.803 (.225)

Hospital data collected from

Atua		1.00		1.00

St. Martins		.034 (.011)***		.031 (.013)***
Education of respondents				
No education		1.00		1.00
Primary education		1.15 (.436)		2.50 (1.06)**
Junior high school		1.55 (.499)		1.30 (.404)
Senior high school/higher		.635 (.279)		.759 (.329)
Income of respondents				
More than 250 Ghana Cedis		1.00		1.00
Less than 250 Ghana Cedis		.738 (.268)		2.05 (.730)**
No income		.035 (.019)***		1.05 (.731)
Employment				
No		1.00		1.00
Yes		.069 (.034)***		.482 (.329)
Pseudo R-squared	.1304	.4041	.0847	.3305
Model significance	101.36 (12)***	299.50 (32)***	54.95 (16)***	204.27 (32)***