

# BMC Public Health

## Social Support and Adherence to Anti-Retroviral Therapy among HIV Patients receiving Treatment in a Tertiary Hospital in Port-Harcourt, Nigeria

--Manuscript Draft--

<b>Manuscript Number:</b>	
<b>Full Title:</b>	Social Support and Adherence to Anti-Retroviral Therapy among HIV Patients receiving Treatment in a Tertiary Hospital in Port-Harcourt, Nigeria
<b>Article Type:</b>	Research article
<b>Section/Category:</b>	Infectious Disease Epidemiology
<b>Funding Information:</b>	Nigeria Field Epidemiology and Laboratory Training Program Dr Njideka Esther Kanu
<b>Abstract:</b>	<p><b>ABSTRACT</b></p> <p><b>Background:</b> Non-adherence to Anti-Retroviral Therapy (ART) is a major cause of HIV drug resistance and subsequent immunological and clinical failure. Stigma and discrimination are major barriers to HIV prevention and care globally, leading to isolation, loneliness and lack of interest in containing HIV/AIDS. Approximately 50% of the Nigerian population have HIV stigma. We investigated the association between social support and adherence to ART among HIV patients in Port Harcourt city.</p> <p><b>Methods:</b> An unmatched case-control study with 192 cases and 192 controls was conducted among HIV patients attending the anti-retroviral clinic of the University of Port Harcourt Teaching Hospital. A case was a patient who has taken less than 95% of prescribed dose, while a control was a patient who has taken at least 95% of prescribed dose in the 2 weeks prior to the study. Social support was measured with Medical Outcomes Study Social Support Survey instrument. Structured interviewer-administered questionnaire was used to collect data on socio-demographic characteristics and factors influencing adherence. Data was analyzed, with frequencies, chi-square and logistic regression. Level of significance was set at <math>p &lt; 0.05</math>.</p> <p><b>Results:</b> The mean age of cases and controls were <math>36.7 \pm 9.0</math> years and <math>37.5 \pm 8.6</math> years respectively. Females constituted 78.6% of cases and 75% of controls. Majority of the cases (78.1%) belonged to the upper social classes I - III, while most of the controls (66.2%) were in the lower social classes IV and V. This difference was statistically significant with <math>p &lt; 0.001</math>. Non-adherence to ART was associated with poor social support [AOR=1.81; CI=1.03 - 3.18], among patients in lower socio-economic classes IV-V. Other risk factors associated with non-adherence include poor informational/emotional support (AOR = 4.46; CI=1.98 - 10.05), poor affectionate support (AOR=1.82; CI=1.03 - 3.22). High social class [AOR=7.0; CI=4.4 - 11.0], Feeling depressed [AOR=11.58; CI=2.63 - 51.0], unacceptable clinic waiting time [AOR=1.92; CI=1.09 - 3.36] and satisfaction with support received from partner [AOR=0.1; CI=0.04 - 0.23].</p> <p><b>Conclusion:</b> Poor social support is a risk factor for non-adherence. Satisfaction with support received from one's partner is protective of non-adherence. Couple-based counseling should be incorporated into the adherence counseling sessions for HIV patients.</p>
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4 **Social Support and Adherence to Anti-Retroviral Therapy among HIV**  
5 **Patients receiving Treatment in a Tertiary Hospital in Port-Harcourt, Nigeria**  
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4 **ABSTRACT**  
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6 **Background:** Non-adherence to Anti-Retroviral Therapy (ART) is a major cause of HIV drug  
7 resistance and subsequent immunological and clinical failure. Stigma and discrimination are  
8 major barriers to HIV prevention and care globally, leading to isolation, loneliness and lack of  
9 interest in containing HIV/AIDS. Approximately 50% of the Nigerian population have HIV  
10 stigma. We investigated the association between social support and adherence to ART among  
11 HIV patients in Port Harcourt city.  
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17 **Methods:** An unmatched case-control study with 192 cases and 192 controls was conducted  
18 among HIV patients attending the anti-retroviral clinic of the University of Port Harcourt  
19 Teaching Hospital. A case was a patient who has taken less than 95% of prescribed dose, while a  
20 control was a patient who has taken at least 95% of prescribed dose in the 2 weeks prior to the  
21 study. Social support was measured with Medical Outcomes Study Social Support Survey  
22 instrument. Structured interviewer-administered questionnaire was used to collect data on socio-  
23 demographic characteristics and factors influencing adherence. Data was analyzed, with  
24 frequencies, chi-square and logistic regression. Level of significance was set at  $p < 0.05$ .  
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33 **Results:** The mean age of cases and controls were  $36.7 \pm 9.0$  years and  $37.5 \pm 8.6$  years  
34 respectively. Females constituted 78.6% of cases and 75% of controls. Majority of the cases  
35 (78.1%) belonged to the upper social classes I – III, while most of the controls (66.2%) were in  
36 the lower social classes IV and V. This difference was statistically significant with  $p < 0.001$ .  
37 Non-adherence to ART was associated with poor social support [AOR=1.81; CI=1.03 – 3.18],  
38 among patients in lower socio-economic classes IV-V. Other risk factors associated with non-  
39 adherence include poor informational/emotional support (AOR = 4.46; CI=1.98 – 10.05), poor  
40 affectionate support (AOR=1.82; CI=1.03 – 3.22). High social class [AOR=7.0; CI=4.4 – 11.0],  
41 Feeling depressed [AOR=11.58; CI=2.63 – 51.0], unacceptable clinic waiting time [AOR=1.92;  
42 CI=1.09 – 3.36] and satisfaction with support received from partner [AOR=0.1; CI=0.04 – 0.23].  
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53 **Conclusion:** Poor social support is a risk factor for non-adherence. Satisfaction with support  
54 received from one's partner is protective of non-adherence. Couple-based counseling should be  
55 incorporated into the adherence counseling sessions for HIV patients.  
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59 **Key Words:** Adherence, Social support, ART, Socio-economic status  
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4 **BACKGROUND**  
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7 HIV/AIDS is a chronic and debilitating disease of global public health concern.[1] Thirty-five  
8 years after its first appearance in 1981, HIV still remains one of the most challenging pandemic  
9 and the greatest health crisis currently facing the world. In 2015 alone, there were 36.7 million  
10 people living with HIV and 1.1 million died from AIDS related causes worldwide.[2] Sub-  
11 Saharan Africa remains the worst affected region of the world, accounting for two-thirds of the  
12 global burden of disease. Currently there are 25 million adults and children living with the virus  
13 in Sub Saharan African, accounting for nearly 70% of the global total. Nigeria bears the brunt of  
14 this epidemic with an estimated 3.2 million people living with HIV. The country ranks as one of  
15 the countries with the highest burden of HIV in the world, next only to South Africa.  
16 Statistically, the south-south zone currently has the highest rate of HIV infection at 5.5%. Rivers  
17 state with a sero prevalence of 15.2% has the highest prevalence in the country.[3]  
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28 Remarkable progress has also been made in reversing the trend of HIV/AIDS epidemic in  
29 Nigeria, in the last decade. The National AIDS and Reproductive Health Survey (NARHS)  
30 conducted in 2013 showed a national HIV prevalence of 3.4% down from a peak of 5.8% in  
31 2001[3]. Significant progress has been made in reducing the HIV disease burden and this has  
32 been made possible, mainly through the introduction of the Highly Active Anti-Retroviral  
33 Therapy (HAART) which has transformed what used to be a death sentence to a bare chronic  
34 disease.[4] The main aim of treatment with HAART is to achieve a reduction in viral load to  
35 undetectable levels. Treatment with HAART prevents episodes of opportunistic infections, and  
36 allows immune reconstitution, leading to marked clinical improvement. Adherence to HAART is  
37 crucial to achieving treatment goals of undetectable viral load, increasing CD4 cell counts and  
38 improvement in the clinical condition of people living with HIV-AIDS. However, drugs do not  
39 work in non-compliant patients and in the management of HIV/AIDS, optimum adherence to  
40 HAART is crucial to successful treatment outcome[5]. Adherence is a fundamental factor in  
41 determining the success or failure of HAART. However studies done in Nigeria have shown that  
42 about 21.7%[6] to 37.1%[7] of Nigerian patients on HAART are not adherent to their  
43 medication. If adherence of 95% and above is not achieved, treatment failure is most likely to  
44 occur. Thus, non-adherence to HAART is a major cause of HIV drug resistance and subsequent  
45 immunological and clinical failure[8].  
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4 Stigma and discrimination are major barriers to HIV prevention and care globally, leading to  
5 isolation, loneliness and lack of interest in containing HIV/AIDS. HIV/AIDS patients had  
6 repeatedly shared that they did not want to take their tablets in front of anyone including family  
7 members because of fear of stigmatization. This indicates that socio-cultural barriers may affect  
8 ART adherence.[9] Social support, on the other hand is a significant resource for individuals and  
9 family members encountering stress and is seen as one of the keys to well-being of individuals,  
10 especially for those experiencing major life transitions and crises.[7] There is paucity of  
11 literature in our environment on the influence of social support on ART adherence. This study  
12 intends to investigate the relationship between social support and ART Adherence among  
13 PLWHIV.  
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## 23 **METHODS**

### 24 **Study Area**

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26 The study was conducted in the University of Port Harcourt Teaching Hospital, a 750 bed  
27 tertiary institution owned and managed by the Federal Government of Nigeria. At present, the  
28 hospital has a data base of about 12,000 registered HIV/AIDS patients in ART. The clinic  
29 attends to an average of 60-70 HIV patients daily, and about 50% of these patients are co-  
30 infected with TB. Each clinic session starts with general health education sessions conducted by  
31 the nurses and counselors after which the clients are given the opportunity to see a doctor or  
32 simply proceed to the pharmacy for drug refills depending on their preference. New clients are  
33 seen, investigated and commenced on HAART if eligible.  
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### 43 **Study Design**

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45 The study was an un-matched case-control study in a ratio of 1 Case: 1 Control.  
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### 48 **Case Definitions**

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50 A case was defined as a patient who has taken less than 95% of prescribed dose in the 2 weeks  
51 prior to the study (ie non-adherent patient).  
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55 A control was a patient who has taken at least 95% of prescribed dose in the 2 weeks prior to the  
56 study (Adherent patient).  
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4 **Study Population**  
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7 All adult clients on ART regimen, accessing treatment at the University of Port Harcourt  
8 Teaching Hospital, Port Harcourt, in Rivers State.  
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11 **Sample Size and Sampling**  
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14 A minimum sample size of 192 per group was determined for the study, using the formula for  
15 case-control studies [10];  $n = \frac{(r+1)(p)(1-p)(Z\beta+Z\alpha)^2}{r(P_1-P_0)^2}$   
16

17 where n=minimum sample size,  $Z\beta$  = Desired power = 0.84,  $Z\alpha$  = Level of statistical significance  
18 =1.96,  $P_0$  = Percent of controls exposed ie Prevalence of social support among HIV patients from  
19 a previous study = 0.65[11],  $r$  = Ratio of Controls to Cases = 1,  $P_1$  = Proportion of cases  
20 exposed= 0.78, and  $P$  = Average proportion exposed = 0.72, and adjustment made for a non-  
21 response rate of 10%. Patients were recruited as they present and tested for adherence using self-  
22 reported adherence until 192 non-adherent cases were selected. The adherent patients were also  
23 selected consecutively, to make up the required number. Recruitment was done over an 8 weeks  
24 period.  
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33 **Data Collection Method**  
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35 A five point questionnaire was used to measure participants' knowledge of their medication and  
36 to calculate each client's self-reported adherence. Social support was measured using the  
37 Medical Outcomes Study Social Support Survey (MOSSSS). This instrument was developed for  
38 use with chronically ill patients, and designed to measure the individual's perception of the  
39 availability of support along four dimensions: emotional/informational, affectionate, tangible,  
40 and positive social interaction. The 19 items describe the different types of support, rated on a 5-  
41 point response format of how often a type of support is available if needed, with responses  
42 ranging from none of the time (1) to all of the time (5). The survey consists of four separate  
43 social support subscales and an overall functional social support index. A higher score for an  
44 individual scale or for the overall support index indicates more support.  
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53 a.) To obtain a score for each subscale, the average of the scores for each item in the  
54 subscale was calculated.  
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56 b.) An overall support index was obtained by calculating the average of (1) the scores for all  
57 18 items included in the four subscales, and (2) the score for the one additional item on  
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4 the scale.

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6 c.) To compare to published means, scale scores were transformed to a 0-100 scale using the  
7 following formula:(12)  
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$$100 \times \frac{(\text{Observed score} - \text{minimum possible score})}{(\text{maximum possible score} - \text{minimum possible score})}$$
  
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## 14 **Data Analysis**

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16 Quantitative data obtained from the study were entered and analyzed in Epi-info version 7.  
17 Univariate Analysis was expressed as frequency distribution, percentages, mean, standard  
18 deviation and adherence rates. Frequencies were presented using tables and charts. Social class  
19 was determined based on occupation. People were assigned to one of 4 classes by being allocated  
20 to an occupational group according to the kind of work they do[13]. Mann Whitney U Test was  
21 used to compare median incomes of the two groups. Independent samples t-test was used to  
22 compare mean scores of overall social support between the two groups. The score for each sub-  
23 scale was obtained by calculating the average of the scores for each item in the subscale. The  
24 maximum obtainable score for social support was 100%. The midpoint score of 50% (out of a  
25 total score of 100), was used as the cut off point for good social support. Scores below 50 were  
26 graded as poor while scores of 50 and above were graded as good social support. Chi-square test  
27 for associations was used to test for associations between social support and adherence to  
28 HAART. Odds ratios and their 95% confidence intervals were calculated. Stratified analysis was  
29 conducted to identify potential confounding variables and assess for interaction.  
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## 43 **RESULTS**

### 44 **Socio-demographic characteristics of respondents**

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46 Majority of the cases [85/192, (44.3%)] were within the age group 30 – 34 years, while most  
47 controls [78/192 (40.6%)] were within 35-44 years. The mean age of cases and controls were  
48  $36.7 \pm 9.0$  years and  $37.5 \pm 8.6$  years respectively ( $p=0.375$ ). About half of the cases 94(48.9%)  
49 and controls 97(50.5%) had secondary school education. Fifty-four (30.7%) of the cases and 68  
50 (37.5%) controls lived outside the Local Government Area. Majority (78.1%) of cases were in  
51 the social classes I – II, while most of the controls (66.2%) were in social classes III and IV. This  
52 difference was statistically significant with  $p < 0.001$ . [Table 1]  
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4 ***Social support among respondents***

5 Table 2 illustrates the difference in the mean scores of social support between cases and controls.  
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7 The overall mean social support index among respondents was 3.57 (s.d; 1.11) out of a total  
8 score of 5.0.  
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10 The highest mean score was in the dimension of Emotional/Informational support (3.8) for the  
11 controls and Tangible support (3.9) for the cases while the lowest mean score for both cases and  
12 controls was in the area of positive social interaction. There was no significant difference in the  
13 mean score between cases and controls, across the 4 dimensions of social support measured, and  
14 in the overall average social support score.  
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21 When asked about disclosure, 273 (71.1%) respondents had disclosed their HIV status to their  
22 partners, 247 (64.3%) had disclosed their status to family members and 107 (27.9%) had  
23 disclosed their status to close friends. Of those who had disclosed their status, 247 (64.4%) were  
24 satisfied with the support they were getting from their spouse, 242 (63.0%) were satisfied with  
25 support from their family members, and 103 (26.8%) were satisfied with support from friends. In  
26 addition, 221 of them (57.5%) claimed that their family/friends helped remind them to take their  
27 medications. Fewer respondents 54 (14.1%) belonged to and actively participated in support  
28 group meetings. About two thirds of those who belonged to social group 36 (66.7%) agreed that  
29 support group activities were beneficial in helping them attain and maintain adherence (n=54).  
30 The distribution of the responses across the groups was comparable. (p=0.304)  
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40 Majority of the HIV patients had disclosed their status to their spouses, family members or  
41 friends. The cases and controls did not differ in terms of disclosure of their HIV status to  
42 partners, friends and family member. However, the cases were less likely than controls to be  
43 satisfied with support received from partner [OR= 0.1, CI= 0.06 – 0.20]. Satisfaction with  
44 support received from family (p = 0.61) and friends (p = 1.12) was not significantly different  
45 between the two groups. Satisfaction with support received from partner appeared to  
46 significantly protect patients from non-adherence (p<0.001).  
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54 ***Association between social support and adherence to ART***

55 Poor social support was more prevalent among cases than controls (19.8% versus 12.0%,  
56 P=0.036). [Table 3]. The odds of having poor social support was 1.8 times higher among non-  
57 adherent patients than in patients with adherence of 95% and above.  
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4 Table 3 also shows the relationship between the different dimensions of social support and non-  
5 adherence to ART. The result showed that 25% of cases and 17% of controls had poor emotional  
6 support, while 32.8% of cases and 20% of controls had poor Affectionate support. These  
7 differences were statistically significant.  
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11 The non-adherent patients were 3.4 times more likely to lack emotional/informational support  
12 and 1.9 times more likely to have poor affectionate support than the adherent patient.  
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15 There was no significant difference between the two groups in terms of tangible support and  
16 Positive social interaction.  
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### 18 19 20 ***Stratification by Social Class***

21 Table 4 illustrates stratification of the relationship between social support and non-adherence by  
22 social class. The result of the analysis shows that there is a significant difference in the OR  
23 between the strata. Effect modification has occurred.  
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26 The relationship between poor social support and non-adherence to ART is therefore, statistically  
27 significant only among patients in lower socio-economic classes of III and IV. (p=0.007)  
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30 Among patients in higher social classes I – II, there is no significant association between poor  
31 social support and non-adherence to ART (p=0.54). Social class therefore modifies the effect of  
32 poor social support on non-adherence to ART.  
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### 35 36 37 **Other factors affecting Adherence**

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39 Multiple logistic regression analysis (Table 5), reveals that poor social support was significantly  
40 associated with non-adherence. This relationship is more pronounced in the domain of emotional  
41 and affectionate support. The result also showed that feeling of depression and unacceptable  
42 waiting times at the health facility were independent risk factors for non-adherence among HIV  
43 patients in this study. Being satisfied with support received from one's partner was significantly  
44 protective of non-adherence.  
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## 50 51 52 53 **DISCUSSION**

54  
55 Overall social support received by HIV patients in this study, was above average score. Non-  
56 adherent patients were 1.8 times more likely to lack social support, including emotional/  
57 informational and affectionate support than the adherent patients. The patients in this study had  
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4 high social support scores in informational/emotional and tangible support in both groups, and  
5 this suggests that most HIV patients have people who they can talk to and receive advice and/or  
6 information concerning their situation, people (family members and significant others) who  
7 would help them perform duties such as daily chores, and help them if they were confined to  
8 bed. A study in Uganda[14] revealed that 99% of HIV patients had close friends and/or relatives  
9 with whom they felt at ease with and with whom they talked about personal life, including health  
10 problems (positive emotional support). The non-adherents in this study, however, appeared to  
11 have poorer affectionate support, that is, people who would show them love, and make them feel  
12 wanted. A study by Taiwo et al,[15] highlighted the benefit of having active treatment supporters  
13 for patients on ART. Treatment supporters, in addition to enhancing adherence to treatment, may  
14 be helpful in offering affectionate support.  
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16 Lower scores in positive social interaction among the cases indicate that societal interconnection  
17 among HIV patients is poor. This is further buttressed by the fact that very few of the patients in  
18 this study belonged to, and participated actively in social group. A study carried out in a  
19 treatment center in south-south Nigeria, found that most of the study participants lacked the  
20 relevant social support structure, provided by belonging to a support group[16], which can  
21 facilitate treatment adherence. They concluded that the absence of such support may also be  
22 related to the reluctance of some respondents to disclose their HIV status to close family  
23 members or friends. This poor social interaction among HIV patients have been reported in other  
24 studies carried out on quality of life of HIV patients in Ibadan, Nigeria[17] and in Ethiopia[18],  
25 which found that the quality of life of HIV patients was poor in the social relationship domain.  
26 Absence of membership and inactive participation in social groups among these patients, have  
27 also been documented in other studies. For example, a Ph.D thesis in Uganda[14] demonstrated  
28 that very few patients, belonged to any formal association. This poor social support network can  
29 impact negatively on the physical and psychological health of HIV patients, as strong social  
30 support network has been shown to have positive effects on the mental and physical health of  
31 those diagnosed with HIV[19].  
32

33 The relationship between poor social support and non-adherence in this study was modified by  
34 the patient's socio-economic class. Poor Social support was found to be a risk factor for non-  
35 adherence among HIV patients in the lower social classes IV and V. These social strata comprise  
36 the semi-skilled workers and small scale traders, as well as unskilled workers and the  
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4 unemployed. This interaction is not surprising as individuals in higher social strata tend to have  
5 more friends and closer ties with family members, who cannot afford to lose them, and tend to  
6 value them more than their poorer relatives. Hence they have better support than lower class  
7 individuals. Socio-economic class was therefore an effect modifier in the relationship between  
8 social support and non-adherence to ART. This finding is in agreement with other studies. A  
9 review by Ammassari et al[20] which summarized the results of 20 studies investigating the  
10 issue of barriers to optimal HAART adherence, revealed that lack of social or family support,  
11 amongst other factors were most consistently associated with non-adherence. A prospective  
12 study in Cote d'Ivoire found low social support to be independently associated with poor  
13 adherence[21] with a relative risk of 1.8. In a regional study conducted in three African countries  
14 on challenges to ART adherence, researchers found that those with sub-optimal adherence lacked  
15 the necessary social support they needed and could not take their medications on time because  
16 they did not disclose their HIV status[22]. This underscores the important roles social support  
17 plays in the lives of people living with HIV. Successful ART programs should therefore seek to  
18 positively influence social support domains. On the other hand, results from Tanzanian study, in  
19 which social support was measured with a modified version of the Medical Outcomes Study  
20 Social Support Scale (MOSSSS), showed no association between social support and adherence  
21 to ART[23]. Social support was also not significantly associated with adherence in a study in  
22 Uganda[24]. The recruitment strategy employed in the study however, introduced the possibility  
23 of selection bias and may have under-estimated social support. Several eligible patients declined  
24 to participate because they were too busy, and they did not interview patients who missed their  
25 appointments in the four-week recruitment period. Despite finding no association, the  
26 researchers however noted that, psychosocial factors are important to address in ART programs.  
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48 About a third of the patients in this treatment centre come from either outside the state or outside  
49 the LGA. Stigma, discrimination and lack of social support system could be why some HIV  
50 positive patients prefer to access care in places far from their place of residence, they probably  
51 do not want people around them to be aware of their sero-status.[25]  
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54 Most patients in this study were satisfied with support received from family and friends. Studies  
55 have shown that family support is a major source of emotional support[26] and limited emotional  
56 support can inhibit social relationship. Satisfaction with support received from their spouses,  
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4 however, seemed poorer among the non-adherent. In the study conducted in Jos, by Sagay,[27]  
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6 although majority of the partners were supportive following disclosure, this seemed to decline  
7  
8 over the years. It appears that, as the implications of the patient's HIV positive status becomes  
9  
10 more apparent over time, the supportive attitude of partners wane giving room to more  
11  
12 quarrelsome and abusive tendencies. This trend was similar for both HIV negative and HIV  
13  
14 positive partners in the Jos study. In a study conducted in South-eastern United States,  
15  
16 satisfaction with support and coping with HIV medication were the best predictors of adherence.  
17  
18 In this study however, poor satisfaction with support received from partner seemed to be a factor  
19  
20 associated with poor adherence. This shows that, even when the patients disclose their status to  
21  
22 their partners, they still do not get satisfactory support from them, and this can lead to non-  
23  
24 adherence. In a randomized controlled trial to assess the efficacy of couple-focused adherence  
25  
26 counseling[28], intervention participants were significantly more likely than controls to achieve  
27  
28 adherence rates greater than 95%. Involvement of HIV patient's partner in adherence counseling  
29  
30 and management of the disease may, therefore, improve adherence to ART, by strengthening  
31  
32 partner support. It is not mere disclosure, but satisfaction with support received from the person  
33  
34 whom they have disclosed to, that is important to adherence to ART.

## 34 **CONCLUSION**

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37 Poor social support is a risk factor for non-adherence. Satisfaction with support received from  
38  
39 one's partner is protective of non-adherence. Couple-based counseling should be carried out by  
40  
41 health care providers in order to promote support from partners of HIV patients on ART. This  
42  
43 will not only improve the level of support received but could also promote adherence to ART.  
44  
45 Volunteers, (preferably HIV positive patients) who would act as role models and provide care  
46  
47 and support to other HIV patients should be trained. Family members of HIV patients should  
48  
49 play the role of treatment supporters and provide the much needed informational, emotional and  
50  
51 affectionate support to HIV patients.  
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4 **DECLARATIONS**

5  
6 **Ethics approval and consent to participate**

7  
8 Ethical Clearance for the study was sought from the Research and Ethics Committee of the  
9  
10 University of Port-Harcourt Teaching Hospital. Written informed consent was obtained from  
11  
12 each participant after the study must have been explicitly explained to them.  
13

14  
15 **Consent for Publication:**

16  
17 Not applicable  
18  
19

20  
21 **Availability of data and material:**

22  
23 The datasets used and/or analysed during the current study are available from the corresponding  
24  
25 author on reasonable request.  
26

27  
28 **Competing interests:**

29  
30 The authors declare that they have no competing interests.  
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32

33  
34 **Funding:**

35  
36 This research was funded by the Nigeria Field Epidemiology and Laboratory Training Program  
37  
38 (NFELTP). The organization also reviewed the manuscript for publication.  
39

40  
41 **Author's contributions**

42  
43 NEK conceived and designed the study, participated in data collection, carried out the data  
44  
45 analysis and drafted the manuscript. BA participated in data analysis, reviewed the manuscript  
46  
47 and participated in interpretation of data. MD participated in data analysis and reviewed the  
48  
49 manuscript. All authors read and approved the final manuscript.  
50

51  
52 **Acknowledgements**

53  
54 We express our gratitude to the Nigeria Field Epidemiology and Laboratory Training Program  
55  
56 for providing the logistic and financial support needed to carry out this project.  
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**TABLES**

Table 1: Socio-demographic characteristics of respondents in UPTH, 2016

Variables	Cases n = 192 (%)	Control n = 192 (%)	$\chi^2$	p - value
<b>Age group (years)</b>				
≤ 24	7 (3.7)	3 (1.6)	4.111	0.391
25 – 34	85 (44.3)	74 (38.5)		
35 – 44	64 (33.3)	78 (40.6)		
45 – 54	25 (13.0)	28 (14.6)		
≥ 55	11 (5.7)	9 (4.7)		
Mean age	36.7 ± 9.0	37.5 ± 8.6	t= 0.89	0.375*
<b>Gender</b>				
Male	41 (21.4)	48 (25)	0.717	0.397
Female	151 (78.6)	144 (75)		
<b>Marital Status</b>				
Single	65 (33.9)	63 (32.8)	0.051	0.997
Married	103 (53.7)	105 (54.7)		
Divorced / Seperated	4 (2.1)	4 (2.1)		
Widowed	20 (10.4)	20 (10.4)		
<b>Partner's HIV Status</b>				
Positive	70 (36.8)	73 (38.0)	0.592	0.744
Negative	67 (35.3)	72 (37.5)		
Unknown	53 (27.9)	47 (24.5)		
<b>Ethnicity</b>				
Igbo	78 (40.6)	88 (45.8)	4.810	0.307
Ikwerre	30 (16.5)	20 (10.6)		
Efik-Ibibio	23 (12.0)	21 (10.9)		
Ijaw	10 (5.2)	5 (2.6)		
Others (Yoruba, Hausa-fulani, Tiv, Urhobo, Anan etc)	51 (26.6)	58 (30.2)		
<b>Religion</b>				
Christianity	188 (100.0)	189 (98.9)	0.487	0.485
Islam	0 (0.0)	2 (1.1)		

Table 2: Mean scores of dimensions of MOSSS Social support scale among HIV Patients in UPTH, 2016

Dimensions	Case Mean (SD)	Control Mean (SD)	t – test	p-value
Emotional/Informational support	3.7 (1.3)	3.9 (1.0)	1.87	0.062
Tangible support	3.8 (1.2)	3.8 (1.1)	0.04	0.964
Affectionate support	3.4 (1.6)	3.7 (1.4)	1.94	0.053
Positive social interaction	3.3 (1.5)	3.2 (1.4)	0.60	0.550
Overall social support Index	3.6 (1.1)	3.7(0.9)	1.19	0.237

Table 3: Relationship between social support and adherence to ART

Dimensions of Social support		Case n (%)	Control n (%)	$\chi^2$	p-value	Odds Ratio	95% Confidence Interval
Overall Social support	Poor	38 (19.8)	23 (12.0)	4.385	<b>0.036</b>	1.81	<b>1.03 – 3.18</b>
	Good	154 (80.2)	169 (88.0)				
Emotional/Informational support	Poor	48 (25.0)	17 (8.9)	16.67	<b>&lt;0.001</b>	3.43	<b>1.89 – 6.22</b>
	Good	144 (75.0)	175 (91.1)				
Tangible support	Poor	22 (11.5)	21 (10.9)	0.0003	0.985	1.06	0.56 – 1.99
	Good	169 (88.5)	171 (89.1)				
Affectionate support	Poor	63 (32.8)	40 (20.8)	6.42	<b>0.011</b>	1.86	<b>1.17 – 2.94</b>
	Good	129 (67.2)	152 (79.2)				
Positive social interaction	Poor	52 (27.1)	52 (27.1)	0.01	0.909	1.00	0.63 – 1.57
	Good	140 (50.0)	140 (50.0)				

Significant p-values and confidence intervals in bold

Table 4: Stratified Analysis of the relationship between Adherence and Social support among HIV Patients in UPTH, 2016; by Social class

Social Class I - II

	Case	Control	Odds Ratio	95% Confidence Interval	$\chi^2$	p-value
Poor Social Support	25 (16.7%)	8 (12.3)	1.43	0.61 – 3.35	0.370	0.543
Good Social Support	125 (83.3)	57 (87.7)				
Total	150 (100.0)	56 (100.0)				

Social Class III - IV

	Case	Control	Odds Ratio	95% Confidence Interval	p-value	MH Odds Ratio	MH $\chi^2$ corrected (p-value)
Poor Social Support	13 (31.0%)	15 (11.8)	<b>3.34</b>	<b>1.43 – 7.81</b>	<b>0.007</b>	<b>2.11</b>	<b>5.483 (0.019)</b>
Good Social Support	29 (69.1%)	112 (88.2)					
Total	42 (100.0)	127 (100.0)					

Table 5: Predictors of Non-Adherence to ART, Port Harcourt, Nigeria, 2016

Factors	Adjusted Odds Ratio	95% Confidence Interval
Poor Social Support	<b>1.81</b>	<b>1.03 – 3.18</b>
High Social class	<b>7.0</b>	<b>4.4 – 11.0</b>
Reside Outside the LGA	0.75	0.47 – 1.21
Poor Affectionate support	<b>1.82</b>	<b>1.03 – 3.22</b>
Poor Emotional Support	<b>4.46</b>	<b>1.98 – 10.05</b>
Satisfaction with support from partner	<b>0.10</b>	<b>0.04 – 0.23</b>
Alcohol Use	1.41	0.86 – 2.34
Smoke Marijuana	2.34	0.77 – 7.12
Feel depressed/unhappy/overwhelmed	<b>11.58</b>	<b>2.63 – 51.00</b>
Unacceptable waiting time	<b>1.92</b>	<b>1.09 – 3.36</b>