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**Predictors of Non-adherence to HIV Medications:
Implications for Multi-Tiered Interventions
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I. Introduction and Background

Combination drug therapy is highly effective but may be difficult to adhere to. Effective combination therapy:

- Often requires a complicated and demanding treatment regimen including dietary restrictions and multiple doses per day.
- Requires maintaining continuous therapeutic levels in order to be effective.
- May cause severe side effects.

Consequences of non-adherence to combination drug therapy:

- Drug resistance develops rapidly with non-adherence to prescribed dosing regimens.
- A high level of cross-resistance to HIV medications may develop and result in limited treatment options.
- Increase in HIV viral load.
- Decline in health status.
- Rapid disease progression.
- Transmission of a resistant strain of the virus.

II. Research Significance

Many studies have examined non-adherence in controlled clinical trials. This study was undertaken with a non-patient population.

Study population comprised of clients of the world's largest AIDS social service non-government organization (NGO). Sample size is large (N=1,610)

This study examines associations between non-adherence to HIV medications and variables in the following domains: demographic, quality of life, health status, virological indicators, drug and alcohol use, tobacco use, and sexual risk behavior

III. Objective

To identify virological, health status, psychosocial, and behavioral factors that predict non-adherence to HIV therapies.

IV. Study Design

Cross-sectional, mail administered survey. The sample was drawn from clients of an urban NGO. The outcome variable for the study was non-adherence to prescribed HIV medications. Non-adherence was assigned if subjects reported not taking their medications exactly as prescribed in the past 7 days. Multiple logistic regression was used to identify factors predictive of non-adherence at a significance level of $p < .05$.

V. The 1999 AIDS Project Los Angeles (APLA) Client Survey

Survey mailed to 4,666 registered clients
Study population represents 60% of all APLA clients
1,610 clients returned completed surveys
Returned surveys comprise a 34.5% response rate
Survey respondents represent 21% of all APLA clients

VI. Characteristics of Clients

Figure 1: Gender Composition of Survey Respondents

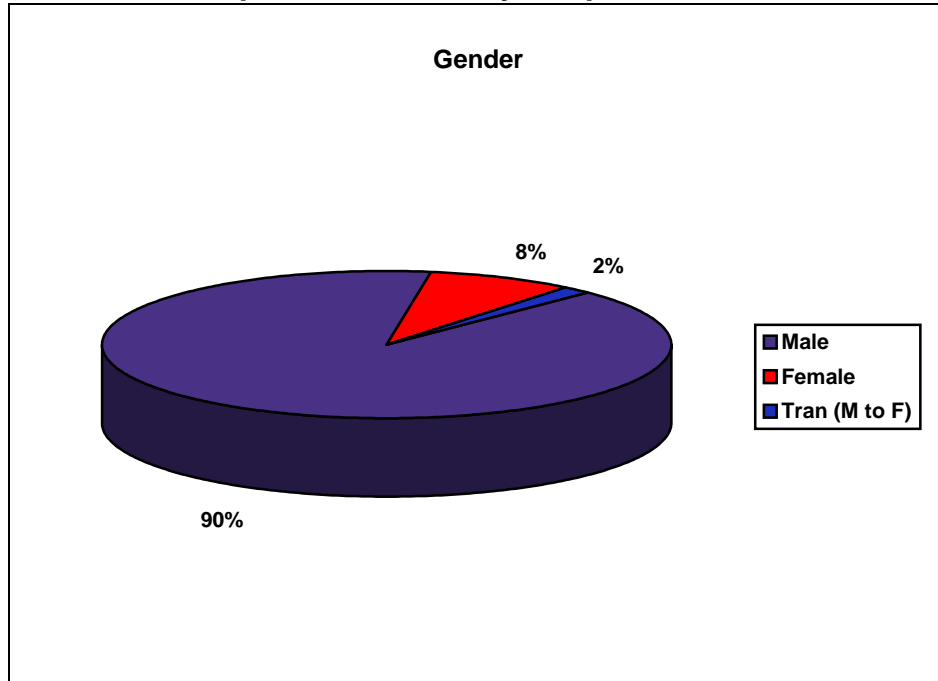


Figure 2: Racial/Ethnic Composition of Survey Respondents

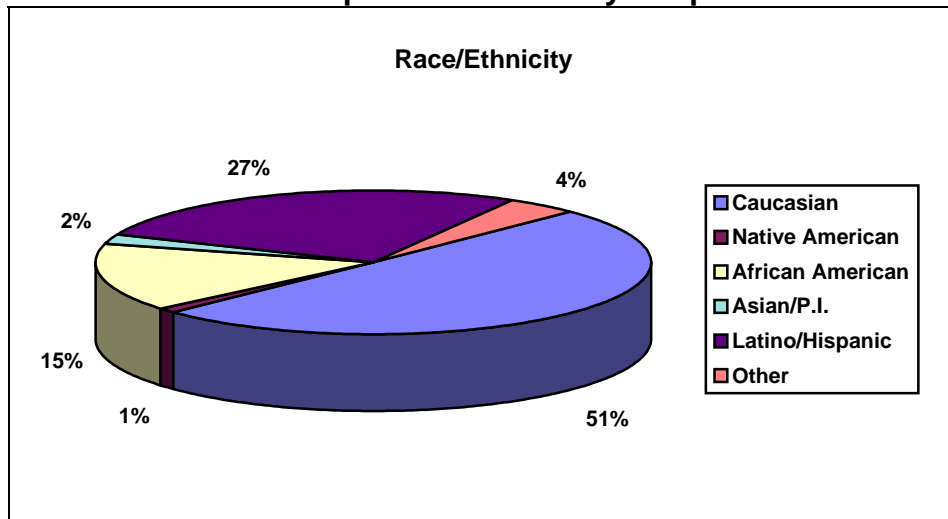


Figure 3: HIV/AIDS Status of Survey Respondents

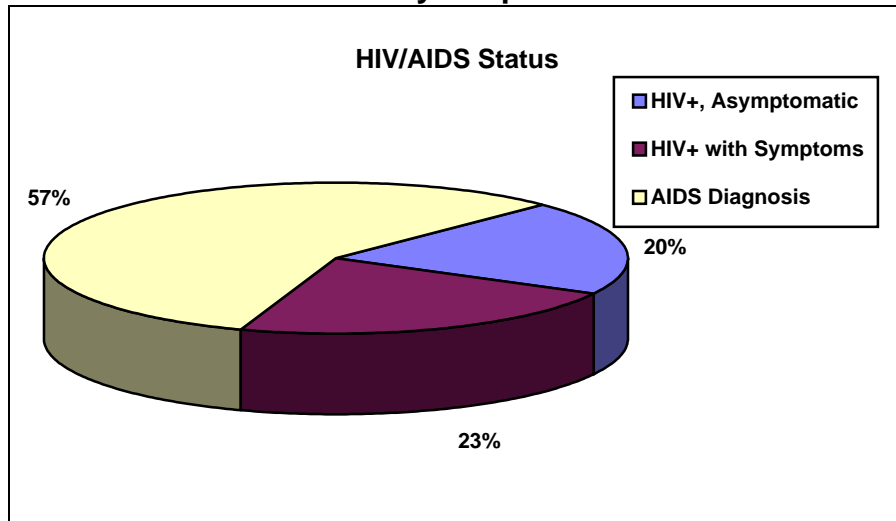


Figure 4: Prevalence of Non-adherence/Adherence to HIV Medications

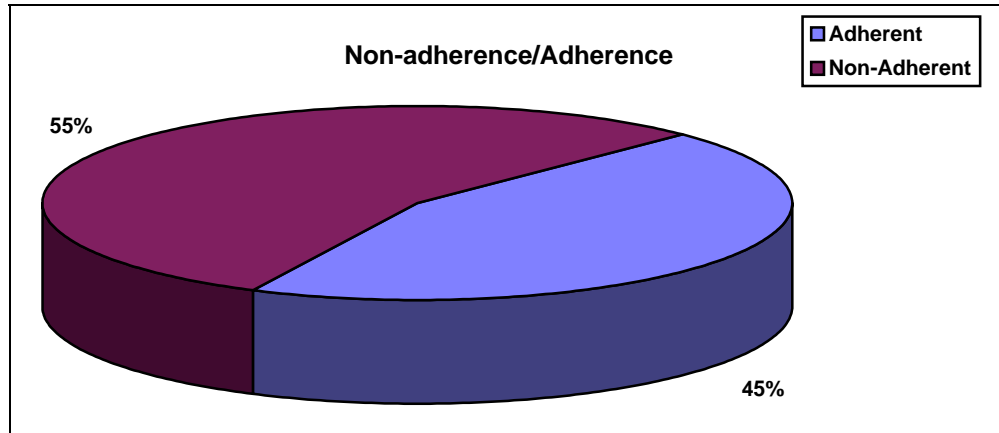


Table 1: Non-adherence to HIV Medications by Indicator

Missed or forgot HIV medication in past 7 days	42.9%
Did not take HIV medication as Dr. prescribed	47.7%
Either of the above indicators is true	55.4%

VII. Three key Areas Analyzed Relating to Non-adherence/Adherence

Table 2: Social Demographic Characteristics and Non-adherence/Adherence

Client Characteristics	Non-Adherence**	Adherence
<u>Age Category*</u>		
19-29	64.5%	35.5%
30-39	59.1%	40.9%
40-49	54.7%	45.3%
50-59	54.2%	45.2%
60 and over	56.4%	43.6%
<u>Homeless Status*</u>		
Homeless	75.6%	24.4%
Not Homeless	54.0%	46.0%
<u>Gender</u>		
Male	54.4%	45.6%
Female	55.9%	44.1%
<u>Language</u>		
English	54.7%	45.3%
Bilingual	55.1%	44.9%
Spanish	52.7%	47.3%
<u>Ethnicity</u>		
Caucasian	52.5%	47.5%
African American	61.1%	38.9%
Latino/Hispanic	56.4%	43.6%
<u>Sexual Orientation</u>		
Gay Male	55.8%	44.2%
Bisexual	50.0%	50.0%
Heterosexual	55.0%	45.0%
<u>Education Category</u>		
High School or Less		
Some	58.5%	41.5%
College/Vocational	56.8%	43.2%
College Degree	50.6%	49.4%
Graduate Work/Degree	51.0%	49.0%
<u>Income Category</u>		
Less Than \$8,240	56.4%	43.6%
\$8,241-16,700	54.0%	46.0%
\$16,701-30,000	58.4%	41.6%
\$30,001 and Above	50.0%	50.0%

*Note: Significant at p value <.05.

**Adherence was assigned if clients reported having taken medications every day in the past seven days exactly as their Physician prescribed them. Non-adherence was assigned if clients reported missing their medications at all in the past seven days and/or if they reported not following their Physician's instructions for taking HIV medications exactly.

Table 3: Quality of Life Indicators/Health Status and Non-adherence/Adherence to HIV Medications

Indicator	Non-Adherence**	Adherence
<u>Viral Load Status*</u>		
Detectable	57.8%	42.2%
Undetectable (Less than 400 copies/ml.)	50.4%	49.6%
<u>General Health*</u>		
Excellent	41.3%	58.7%
Very Good	53.8%	46.2%
Good	56.6%	43.4%
Fair	56.4%	43.6%
Poor	51.6%	48.4%
<u>Treatment Side Effects</u>		
Mild to Severe	54.7%	45.3%
No Side Effects	48.3%	51.7%
<u>HIV Status</u>		
HIV+, Asymptomatic	51.5%	48.5%
HIV+ with Symptoms	59.0%	41.0%
AIDS Diagnosis	54.3%	45.7%

*Note: Significant at p value <.05.

**Adherence was assigned if clients reported having taken medications every day in the past seven days exactly as their Physician prescribed them. Non-adherence was assigned if clients reported missing their medications at all in the past seven days and/or if they reported not following their Physician's instructions for taking HIV medications exactly.

Table 4: Sexual Risk and Recreational Drug/Alcohol Use and Non-adherence/Adherence to HIV Medications*

Behavior	Non-Adherence***	Adherence
<u>Sexual Risk**</u>		
Unprotected Anal or Vaginal Sex	63.0%	37.0%
No Unprotected Anal or Vaginal Sex	46.9%	53.1%
<u>Disclosure**</u>		
Always Disclosed HIV Status to Sexual Partners	52.8%	47.2%
Did Not Always Disclose	63.9%	36.1%
<u>Alcohol Use**</u>		
Any Alcohol Use	57.7%	42.3%
No Alcohol Use	48.4%	51.6%
<u>Heavy-Frequent Alcohol Use**</u>		
5+ Drinks 5+ Times	71.0%	29.0%
No Heavy-Frequent Use	53.4%	46.6%
<u>Drug or Alcohol Use**</u>		
Any Drug or Alcohol Use	57.8%	42.2%
No Drug or Alcohol use	45.2%	54.8%
<u>Drug Use**</u>		
Any Drug Use	62.0%	38.0%
No Drug Use	47.4%	52.6%
<u>Tobacco Use**</u>		
Used Tobacco	58.7%	41.3%
Did Not Use Tobacco	51.3%	48.7%

*Sexual risk and recreational drug use (cocaine, crystal, crack, marijuana, inhalants, hallucinogens, or heroin) data are based on self-reported activities within the previous 6 months.

**Note: Significant at p value <.05.

***Adherence was assigned if clients reported having taken medications every day in the past seven days exactly as their Physician prescribed them. Non-adherence was assigned if clients reported missing their medications at all in the past seven days and/or if they reported not following their Physician's instructions for taking HIV medications exactly.

VIII. Predictors of Non-adherence to HIV Medications

Table 5: Predictors of Non-adherence to HIV Medications

Predictor Variables*	Odds Ratio (95% CI)
<u>General Health</u>	
Excellent General Health	0.36 (0.17-0.78)
Less Than Excellent General Health	1 referent
<u>HIV Status</u>	
AIDS Diagnosis	0.59 (0.38-0.94)
HIV+ Without an AIDS Diagnosis	1 referent
<u>Heavy-Frequent Alcohol Use</u>	
5+ Drinks on 5+ Occasions	2.41 (1.16-4.99)
No Heavy-Frequent Alcohol Use	1 referent
<u>Crack Use</u>	
Reported Use of Crack	4.54 (1.24-16.59)
No Reported Use of Crack	1 referent
<u>Sexual Risk Behavior</u>	
Any Unprotected Anal or Vaginal Sex	2.51 (1.19-5.32)
No Unprotected Anal or Vaginal Sex	1 referent

*Note: Predictor variables tested at the P <.05 level of significance.

IX. Reasons for Non-adherence to HIV Medications

Table 6: Top 3 Reasons for Non-Adherence to HIV Medications

Reason	
I Forgot	33%
I Slept Through the Dose Time	19%
I Felt Depressed	19%

X. Summary

Despite the potential damaging or life threatening consequences of non-adherence to HIV combination therapy:

More than half of the clients who responded to the 1999 APLA Client Survey reported non-adherence to HIV medications.

Younger clients and homeless clients were more likely not to adhere to their HIV medications. There were no statistically significant differences in adherence to HIV medications by gender, language, ethnicity, sexual orientation, education category, or income category.

Clients who reported undetectable viral load status were less likely to report being non-adherent to their HIV medications. Excellent general health was negatively associated with non-adherence to HIV medications. The existence of side effects to treatments was not significantly associated with adherence to HIV medications.

Clients who reported sexual risk behaviors were more likely not to adhere to their HIV medications. Always disclosing HIV status was also positively associated with HIV medication non-adherence. The use of alcohol, recreational drugs, and tobacco were positively associated with HIV non-adherence.

In multiple logistic regression analyses, poorer general health and not having an AIDS diagnosis predicted non-adherence to HIV medications. Reporting heavy-frequent alcohol use, crack use, and sexual risk behaviors also predicted non-adherence to HIV medications.

The top three reasons cited for non-adherence were: I forgot, I slept through the dose time, and I was depressed.

XI. Implications for HIV Medication Therapy Adherence Interventions

Interventions targeting at-risk populations and addressing problems with medications may be more suitable for a community-based setting.

Programs to increase adherence to HIV combination therapies among persons with HIV/AIDS need to address multiple health status, social service, behavioral, and psychosocial factors predictive of non-adherence to HIV medications. Adherence programs are best conducted in the context of NGOs where the range of service needs can be supported and should incorporate adherence strategies into existing services such as:

- Treatment advocacy and education
- Educational forums
- Mental health services
- Drug, alcohol, and tobacco treatment programs
- HIV transmission prevention for positives services
- Targeted case management services

Community-based settings offer greater opportunities for individualized attention to dealing with adherence issues.

Community-based interventions can complement/supplement information provided by medical providers.