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The value of pharmacy-based adherence measurement in predicting virologic outcomes among HIV infected adults in Jos, North Central Nigeria

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Background

- Accurate assessment of adherence to combination antiretroviral therapy (cART) is critical to maximizing clinical efficacy and minimizing the risks associated with drug resistance.
- Routine monitoring of adherence is challenging, especially in low resource settings.
- Very few studies have evaluated the virologic outcomes of drug pick up adherence in sub-Saharan Africa.

Aim

- We examined the association between on-time drug refill visits and both virologic and immunologic outcomes among adult patients enrolled for care at the Jos University Teaching Hospital, Jos, Nigeria.

Method

- Prospective cohort study
- Conducted at the AIDS Prevention Initiative in Nigeria Plus/Harvard PEPFAR supported antiretroviral clinic, Jos University Teaching Hospital (JUTH), Jos.
- Participants (588)
 - HIV infected adults (age \geq 15years),
 - cART naïve
 - Initiated first line ART (NNRTI-based), between 2009 and 2010
- Follow up through December 2011

Data

- Drug pick up adherence
 - Monthly drug pick captured in an electronic Pharmacy Database
 - Drug refill appointment automatically generated based on 28 days
- Laboratory follow up
 - Base line, 6 and 12 months
 - Plasma Viral load (VL) (Amplicor HIV-1 Monitor v1.5, lower detection limit <400 copies/mL; Roche Diagnostics, Branchburg, NJ)
 - CD4 cell count (CYFLOW[®] (Partec, Munster, Germany)

Definition

- Drug pick up adherence (%) =
[(scheduled date-last dispense date)/ Dispense interval] x 100
- Incomplete versus complete adherence was defined as a cumulative adherence to drug refill visits of < and $\geq 95\%$ respectively
- Virologic failure was defined as failure to achieve undetectable viral load (HIV RNA <400 copies/ml) after a median duration of 12 months on ART
- Immunologic failure was defined according to the WHO guidelines

Statistical analysis

- Basic descriptive statistics
 - Included population
 - Outcomes
- Sub-group comparison
 - Pearson chi square
 - Fisher's exact test
- Multivariate logistic regression was used to assess predictors of virologic failure
- SPSS version 20 was used for the analysis

Socio-demographic characteristics of

Median age, years(IQR)	34 (29-41)
Female n(%)	392(67)
Employment Status n(%)	
Employed	118 (20)
Unemployed	470 (80)
Marital Status n (%)	
Single	143 (24.3)
Divorced/Separated	59 (10)
Widowed	82 (13.9)
Married	304 (51.7)
Transmission risk n (%)	
Missing data	8 (1.4)
Heterosexual	575 (97.8)
Transfusion	1 (0.2)
Heterosexual/Transfusion	4 (0.6)
Education n (%)	
Missing data	13 (2.2)
No formal Education	96 (16.3)
Primary	112 (19)
Secondary	184 (31.3)
Tertiary	183 (31.1)

No socio-demographic variable was significantly associated with drug pick up adherence and virologic failure

Baseline clinical characteristics

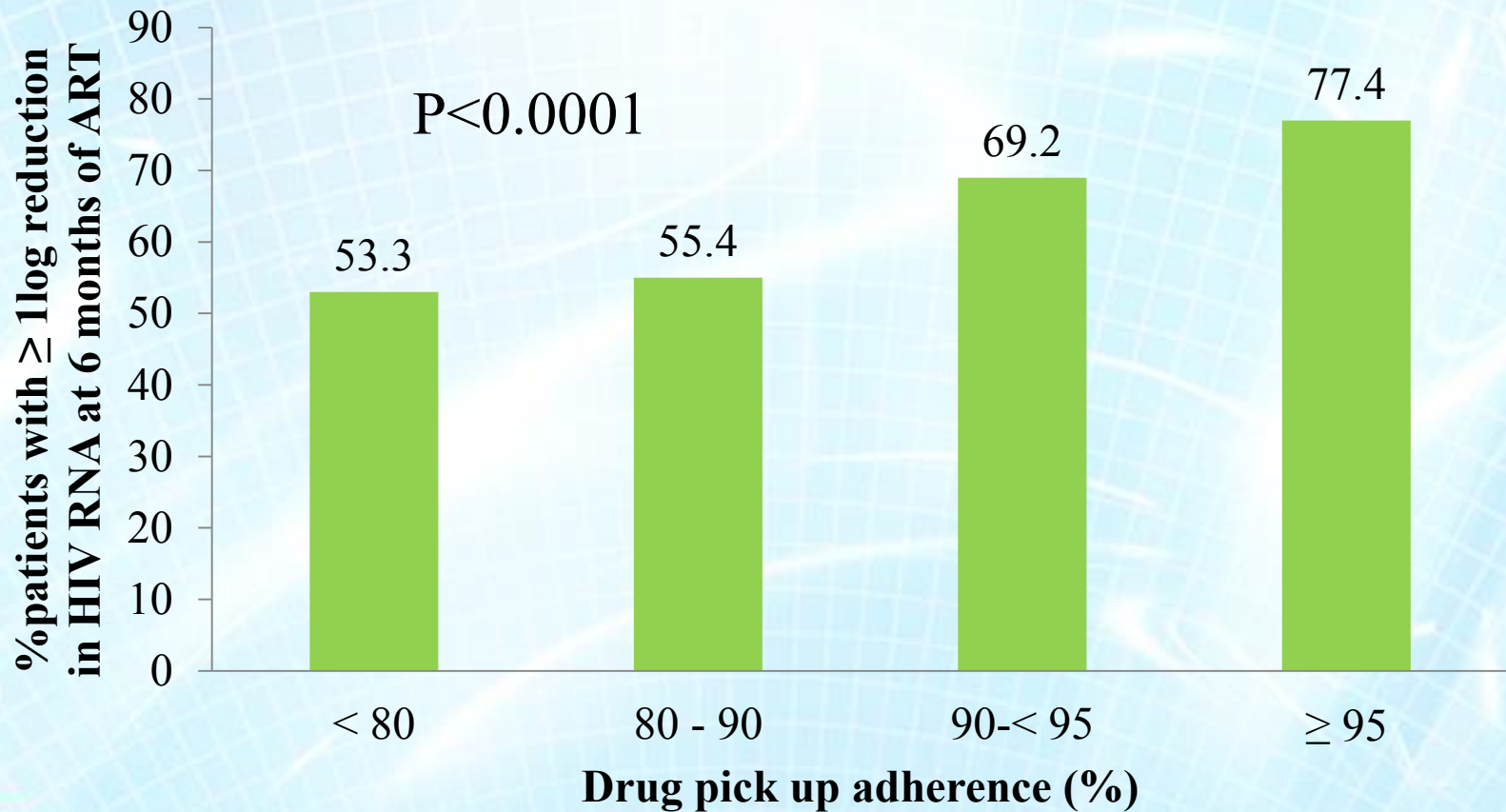
CD4 cell count (cells/mm³)	n (%)
≤50	71 (12.1)
51-100	101 (17.2)
101-249	246 (41.8)
≥250	170 (28.9)
HIV- RNA (copies/ml)	
< 5000	99 (16.8)
5000 - < 30,000	168 (28.6)
30,000 - < 100,000	121 (20.6)
≥100,000	200 (34)
WHO Disease classification	
1	216 (36.7)
2	102 (17.3)
3	233 (39.6)
4	29 (4.9)
Missing data	8 (1.4)

No disease specific factors were associated with virologic failure

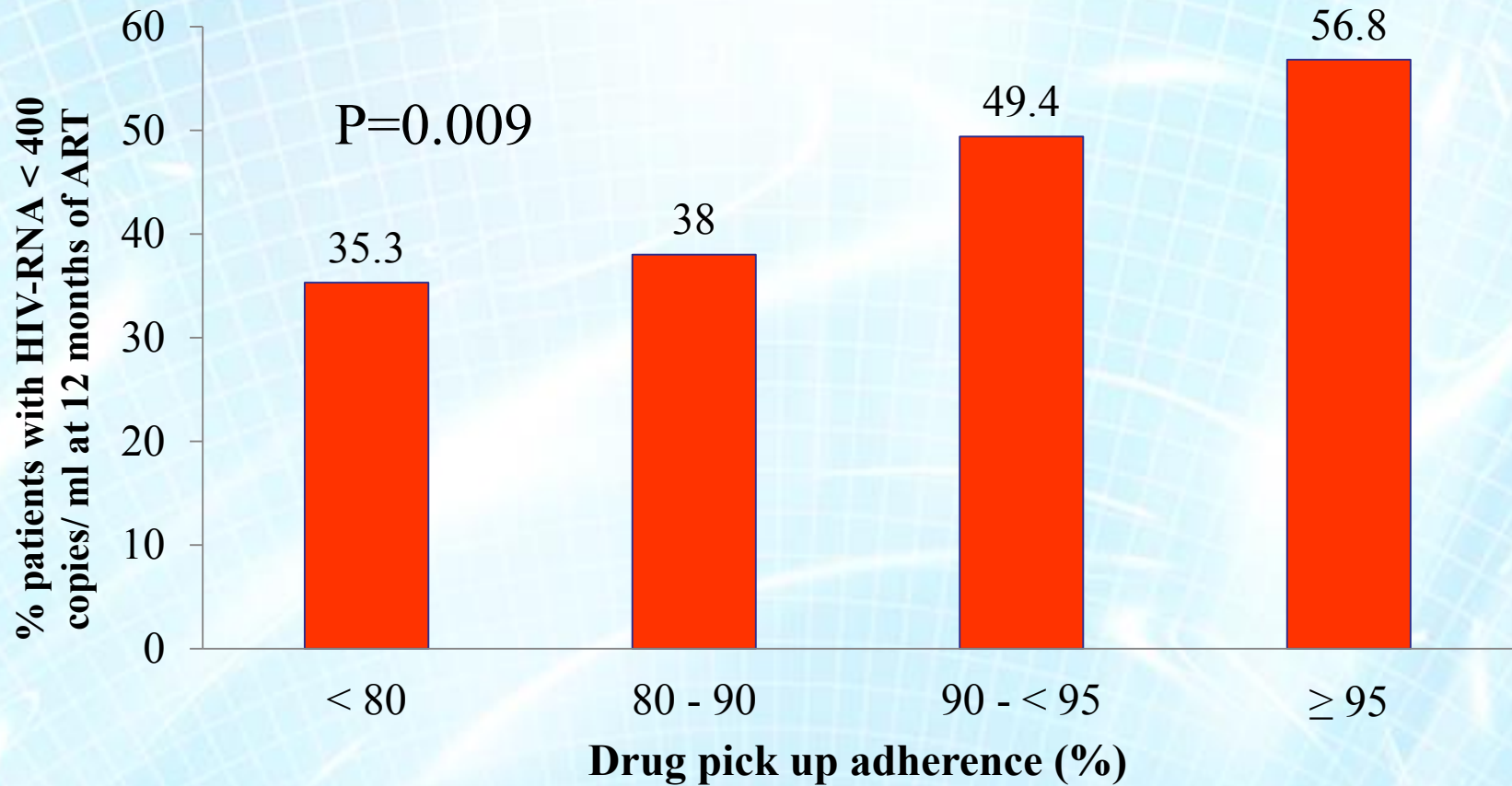
outcomes

N=588	
Median (IQR) months of follow up	12 (9-12)
Number (%) patient with Cumulative drug pick adherence	
< 95%	250 (42.5)
≥95%	338 (57.5)
Number (%) patients with Viral RNA > 400 copies/ml	284 (48.3)
Number (%) patients with immunological failure	99 (16.8)

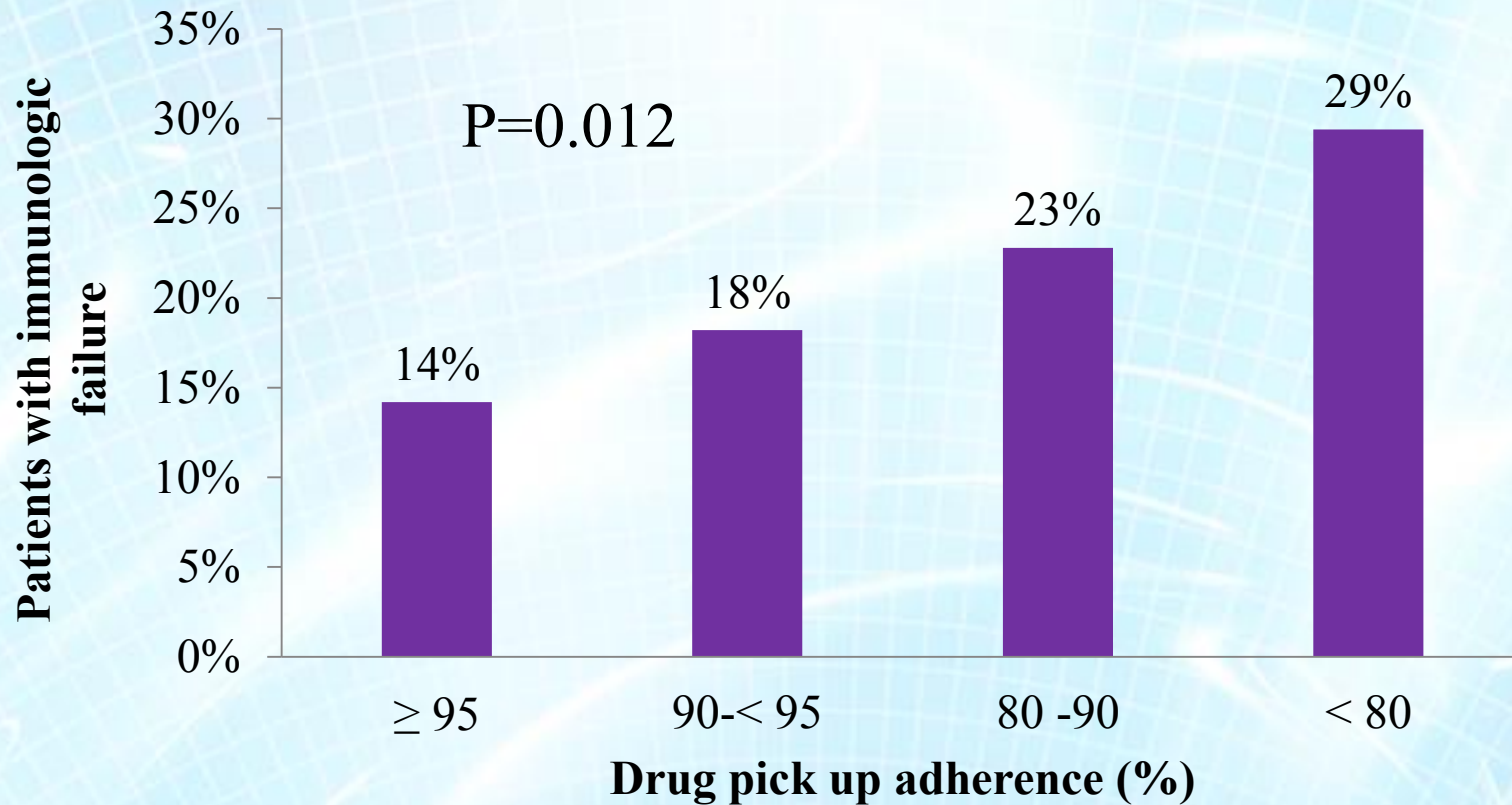
Higher rates of viral suppression achieved with increasing adherence



Virologic success increases with increasing adherence



Higher rates of immunologic failure associated with diminishing adherence



Predictors of virologic and immunologic failure

	Virologic failure				Immunologic failure			
	OR	95% CI		p-value	OR	95% CI		p-value
		Lower	Upper			Lower	Upper	
Drug Category	0.493	0.24	0.83	0.001*	1.806	0.442	7.385	0.28
Entry CD4	0.906	0.502	1.636	0.151	0.161	0.06	0.438	<0.0001*
Entry VL	0.785	0.472	1.304	0.362	0.847	0.444	1.615	0.19
Adherence	2.36	1.35	4.097	0.004*	1.571	1.002	2.466	0.04*

OR=Odds ratio, CI= Confidence interval, *significant predictor

Conclusion

- A significant association was observed between cumulative reduced adherence to drug pick up schedules and both early virologic and immunologic failure.
- A high proportion of the study cohort had sub-optimal adherence to drug pick up schedules and detectable HIV RNA (> 400 copies/ml) after a median of 12 months on cART.
- Adherence to drug refill is a useful indicator of drug exposure, predicts early virologic failure and is a feasible tool for routine monitoring of adherence to ART in resource-limited settings.

Limitations

- Single institution
- Detection limit of VL equipment was <400copies/ml

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Thank you

Questions

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