The associations of age and being away from home with viral load in Batswana adolescents: a longitudinal cohort study

SUMR STUDENT: MAYLIN ORTIZ

MENTOR: DR. ALISA STEPHENS-SHIELDS

BACKGROUND

According to UNICEF , 370,000 (300 000-350 000) individuals were reported living with HIV in Botswana.

The HIV prevalence by age was as follows:
1.5-4 years old (2.2%),
 5-9 years old (4.7%),
10-14 years old (3.5%),
15-19 years old (3.7%).

In comparison to HIV-infected adults and younger children, HIV-infected adolescents have exhibited lowest levels of medication adherence.

Incredibly high virologic failure rates between 54% and 76% have been reported among adolescents on ART for a year or more

AIMS

AIM 1: To estimate associations between age and being away from home with adherence

AIM 2 : To estimate associations between of age and being away from home with detectable viral load

SIGNIFICANCE

Challenges of high rates of virologic failure among adolescents are studied to determine how to further improve potential intervention and solutions.

These types of Analyses help to improve adherence and reduce HIV transmission

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METHODS

Study Design: longitudinal cohort study, 300 participants (48-month period, quarterly assessments for 36 months, followed by semi-annual assessments)

Data Collection:
Collected observational data derived from multiple Case Report forms of infected HIV+ Batswana adolescents

Eligibility Requirements
  -Confirmed HIV infection
  -Positive HIV antibody test after 18 months of age, OR
  -Positive HIV RNA or DNA test
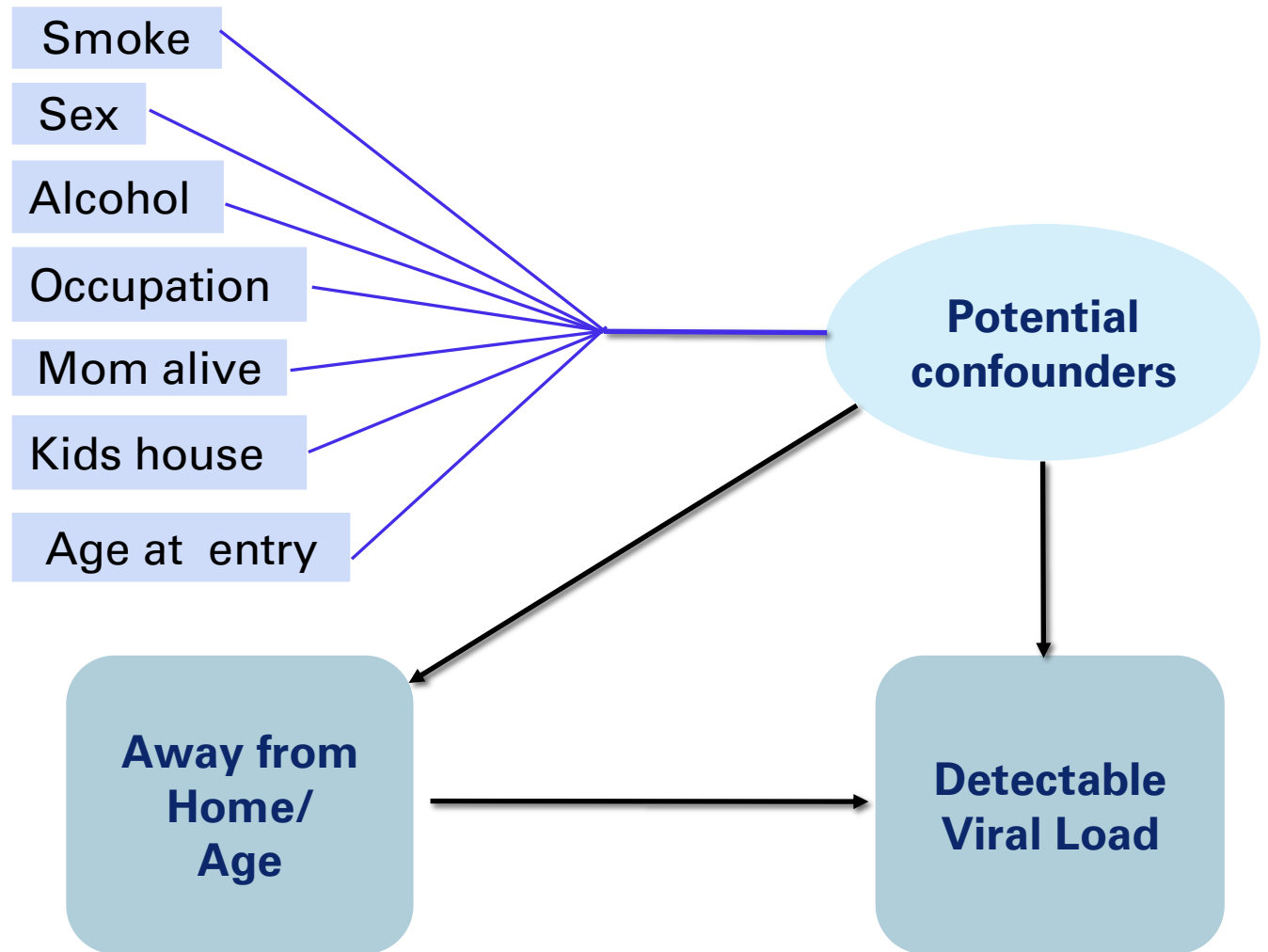 -Age 10-19 years (<20 years) at study entry

DATA MANAGEMENT

Use of Statistical Software: **R** and **STATA**

Constructed longitudinal dataset to operationalize and develop exposure, outcome, and covariates for data analysis

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EXPOSURE & OUTCOME

Smoke
Sex
Alcohol
Occupation
Mom alive
Kids house
Age at entry

Potential confounders

Away from Home/ Age

Detectable Viral Load

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DATA ANALYSIS

Descriptive Statistics
Mean, Median, IQR (Interquartile range), Proportions, and Standard Deviation

Unadjusted and Adjusted logistic regression estimated by generalizing estimating equations for repeated measures within models

Away from Home Demographic/ Characteristics

Sex	Away from home		
	No	Yes	*p*
M	1,308 (48.1%)	481 (45.0%)	0.339
F	1,411 (51.9%)	587 (55.0%)	

	Away from Home		
	No	Yes	*p*
Kidshouse	1.81 (1.71)	1.51 (1.42)	0.002

	Away from home		
	No	Yes	*p*
Age	13.8 (2.5)	14.0 (2.8)	0.073

Age
Demographic/ Characteristics

Sex	**Age**			
	<13	>=13 and <19	>=19	*p*
M	296 (42.8%)	1,266 (49.2%)	233 (43.7%)	0.335
F	396 (57.2%)	1,305 (50.8%)	300 (56.3%)	

	Age			
	<13	>=13 and <19	>=19	*p*
Mom alive	621 (89.7%)	1,808 (70.3%)	312 (58.5%)	0.000

Age Demographic/Charateristics cont.

Age					
		<13	>=13 and <19	>=19	p
Smoke	Never Smoked	692 (100%)	2,555 (99.4%)	496 (93.1%)	0.000
	Smoke, but Not every day	0	4 (0.2%)	0	
	Used to smoke, but does not currently smoke	0	12 (0.5%)	37 (6.9%)	

Age Demographic/Characteristics cont.

Age				
		<13	>=13 and <19	>=19	p
Alcohol	No	682 (98.6%)	0	10 (1.5%)	0.000
	Yes	2,520 (98.0%)	47 (1.8%)	4 (0.2%)	
	Refused to answer	415 (77.9%)	118 (22.1%)	0	

Associations of Covariates with Detectable Viral Load

Covariates	Odds Ratio	Confidence Interval		P-value
		LL	UL	
Sex	0.98	0.65 – 1.4		0.935
Attend School	0.34	0.18 – 0.64		0.001
Age	1.3	1.3 – 1.5		0
Mom alive	0.56	0.36 – 0.85		0.007
Dad Alive	1	0.99 – 1.0		0.938
Kids House	1.1	0.89 – 1.2		0.779
Houseroom	1	0.95 – 1.2		0.251
Smoke	2.1	1.4 – 3.2		0.01
Alcohol	0.99	0.91 – 1.0		0.63
Drunk	3	0.61 – 15.9		0.177
Occupation				
Work for pay full time	9.4	0.53 – 164.3		0.127
Looking for work/ unemployed	1.7	0.34 – 8.1		0.536
Too sick to work or study	13.0	0.48 – 352.7		0.128
Other	3.8	0.88 – 16.6		0.076
Age of diagnosis	1	0.96 – 1.1		0.413

Covariates for Models

Age

Mom alive, smoke, and alcohol

xtgee detectable age_c month momalive i.smoke i.alcohol, family (binomial 1) link (logit)

Away from home

Kids house, Mom alive, smoking, Attends school

xtgee detectable away_home month age kidshouse momalive i.smoke i.attendsch,

> family (binomial 1) link logit) eform

Unadjusted and Adjusted Analyses for Away from Home

Unadjusted:

Detectable	Odds Ratio	Std. Err	z	P>|z|	[95% conf. Interval]	
Away from home	1.1	0.09	0.03	0.973	0.83	1.2

Adjusted:

Detectable	Odds Ratio	Std. Err	z	P>|z|	[95% conf. interval]	
Away from home	0.99	0.2	-0.14	0.889	0.81.	1.3

Unadjusted and Adjusted Analyses for Age

Unadjusted:

Detectable	Odds Ratio	Std. Err.	z	P>|z|	[95% conf. interval]	
Age	1.7	0.3	4.66	0.000	1.5	2.3

Adjusted:

Detectable	Odds Ratio	Std. Err.	z	P>|z|	[95% conf. interval]	
Age	1.7	0.2	3.68	0.000	1.3	2.1

CONCLUSION

No associations between being away from home with detectable viral load

Based on results, there is an association between age throughout the study with detectable viral load among older adolescents

What I learned

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$$

Dependent Variable

Population Y intercept

Population Slope Coefficient

Independent Variable

Random Error term

Linear component

Random Error component

ACKNOWLEDGEMENTS

Elizabeth Lowenthal, MD, MSCE

Jennifer Chapman Clinical Research Project Manager

Alisa J. Stephens-Shields, PhD

Knashawn H. Morales Sc.D.

Joanne Levy, MBA, MPC

Works Cited

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g%20the,female%20(64%20per%20cent).

Away_home	Detectable 0	1	Total
0	1,901 85.3%	329 14.8%	2,230 100.00%
1	728 82.1%	159 17.9%	887 100.00%
Total	2,629 84.3%	488 15.7%	3,117 100.00%

Age	Detectable 0	1	Total
<13	542 95.8%	24 4.3%	566 100.00%
>=13 and <19	1,815 85.8%	302 14.3%	2,117 100.00%
>=19	273 62.8%	162 37.2%	435 100.00%
Total	2,630 84.4%	488 15.7%	3,118 100.00%

occupation

away_home	1	2	3	4	5	6	98	Total
0	2,655 97.7%	9 0.33%	0	0	28 1.03%	2 0.07%	25 0.92%	2,719 100.00%
1	1,028 96.3%	3 0.28%	0	0	21 1.97%	1 0.09%	15 1.40%	1,068 100.00%
Total	3,683 97.3%	12 0.32%	0	0	49 1.3%	3 0.08	40 1.06%	3,787 100.00%

Occupation

Age	1	2	3	4	5	6	98	Total
<13	692 100.00%	0	0	0	0	0	0	692 100.00%
>=13 and <19	2,549 99.1%	8 0.31%	0	0	2 0.08%	0	12 0.47%	2,571 100.00%
>=19	450 84.4%	4 0.75%	0	0	48 9.0%	3 0.56%	28 5.3%	533 100.00%
Total	3,691 97.2%	12 0.32%	0	0	50 1.3%	3 0.08%	40 1.1%	3,796 100.00%

Away_home	Sex		
	M	F	Total
0	1,308 48.1%	1,411 51.9%	2,719 100.00%
1	481 45.0%	587 55.0%	1,068 100.00%
Total	1,789 47.2%	1,998 52.8%	3,787 100.00%

Age	Sex		
	M	F	Total
<13	296 42.8%	396 57.2%	692 100.00%
>=13 and <19	1,266 49.2%	1,305 50.8%	2,571 100.00%
>=19	233 43.7%	300 56.3%	533 100.00%
Total	1,795 47.3%	2,001 52.7%	3,796 100.00%

Age	Away_home 0	1	Total
<13	492 71.1%	200 28.9%	692 100.00%
>=13 and <19	1,894 73.7%	675 26.3%	2,569 100.00%
>=19	333 63.3%	193 36.7%	526 100.00%
Total	2,719 71.8%	1,068 28.2%	3,787 100.00%

Age	Attend School 0	1	Total	
<13	0	692 100.00%	692 100.00%	
>=13 and <19	82 3.2%	2,489 96.8%	2,571 100.00%	
>=19	177 33.2%	356 66.8%	533 100.00%	
Total	259 6.8%	3,537 93.2%	3,796 100.00%	

mom alive	Away_home		
	0	1	Total
Yes	774 73.5%	279 26.5%	1,053 100.00%
No	1,945 71.14%	789 28.9%	2,734 100.00%
Total	2,719 71.89%	1,068 28.2%	3,787 100.00%