Determinants of Antiretroviral Adherence Behavior among Reproductive Age Malawian Women

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Background

- An estimated 15.9 million (Malawi), about 1.1 million are living with HIV (WHO, 2013; UNAIDS, 2010; UNDP, 2011).
- Women in Malawi account for 51% (560,000) of those living with HIV/AIDS (WHO, 2012).
- As of 2010, 21% (228, 478) of people living with HIV/AIDS (PLWHA) had access to antiretroviral (ART) medication (UNAIDS/WHO, 2010).
- For effectiveness and decreases in the risk of drug resistance and treatment failure (Erah and Arute, 2008), adherence—95%.

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The Problem

- In Malawi referral clinics, adherence rates in many individuals was below 95%.
- HIV treatment is readily available in Malawi, adherence is still a major public health concern.

Significance of Study

- The two ART Clinics were our study took place (Malamulo Hospital (rural) and Queen Elizabeth Central Hospital ART Clinics (urban)) are among those treatment centers that provide HIV/AIDS related services to patients.
- No known study has been done comparing adherence level of patients attending these two facilities.
- Nor any assessing Malawian women's antiretroviral (ART) adherence behaviors using the theory of planned behavior.

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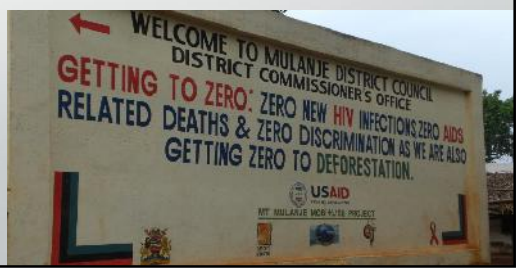
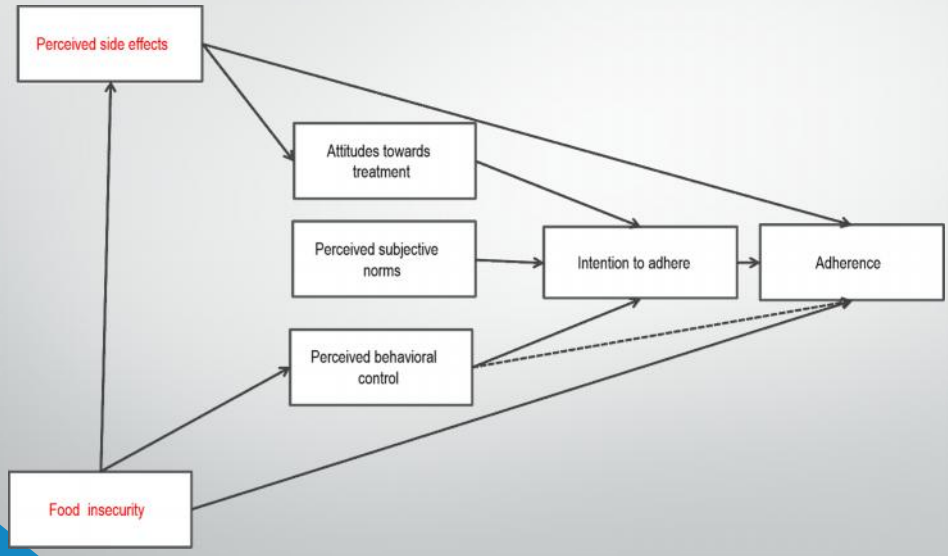
Purpose

- To determine whether the theory of planned behavior (TPB) constructs (attitude, subjective norms, and perceived behavioral control (PBC)) directly predict adherence behaviors without the influence of intention in the model.
- To determine if food insecurity and perceived side effects directly predict adherence to ART.



Theoretical Framework - TPB



Proposed model of adherence based on the TPB (Azjen, 2012). 6

Study Settings

- Malamulo Seventh Day Adventist Hospital ART Clinic (129,000- two surrounding districts).
- Queen Elizabeth Central Hospital (QECH) ART Clinic (primary, secondary, tertiary-surrounding southern region of Malawi).

Data Collection

- Recruitment – direct solicitation, word of mouth, and referrals
- **Face –to-face survey**
- n=358
- 40 minutes to an hour each
- From October to December 2013
- Logistic regression analyses were used to assess associations with adherence.

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Outcome	Items	Measure
Adherence (VAS-Past month) (Interval) Adherence (Recent and Three months)	1 item 11 items	Visual Analog Scale of 0 to 100% • 0=none • 50%=half taken • 100%=all taken
Predictors	**Items**	**Measure**
Intention (Ordinal)	• 4 items	Five-point Likert scale.
Attitude (Ordinal)	• 5 items	Five-point Likert scale.
Subjective Norm (Ordinal)	4 items	Five-point Likert scale.
Perceived Behavioral Control (Ordinal)	5 items	Five-Point Likert Scale
Perceived Side Effects (Ordinal)	5 items	One 'Yes/No' 4 Five-Point Likert Scale.
Food Insecurity (Individual and Household) (Ordinal)	8 items	Five-point Likert scale.
Covariates	**Items**	**Measure**
Age (Ordinal)	4 age groups	18-28; 29 -39; 40-50; Other
Marital Status (Nominal)	5 groups	Married; divorced; never been married; windowed, separated.
Educational level (Nominal)	7 groups	No formal education; Did not complete primary; Completed primary; Did not complete secondary/vocational school; Completed secondary/vocational school; Post secondary or more; Other
Language (Nominal)	3 groups	Chichewa; English; Other
Location (Binary nominal)	2 groups	Rural or urban

Table 1: Socio-demographic characteristics of patients

Variables	N	%
Patients Location		
Rural ART Clinic	200	55.9%
Urban ART Clinic	158	44.1%
Age range		
18-28	36	10.1%
29-39	200	55.9%
40-50	122	34.1%
Education		
Less than Primary School	228	63.7%
Primary school or more	130	36.3%
Marital status		
Married	231	64.5%
Never Married	32	8.9%
Others	95	26.5%
Parity		
No Children	32	9.0%
At least one child	324	91.0%

Variables	N	%
Living Situation		
Lives with Husband	210	58.8%
Live with Children	103	28.9%
Other	44	12.3%
Housing		
Rent	103	28.9%
Own	254	71.1%
Income level		
Less than K162, 998	354	98.9%
Greater than K162, 998	4	1.1%
Language		
Chichewa	238	66.7%
Other	119	33.3%
Religion		
SDA	75	20.9%
Catholic	68	19.0%
Others	215	60.1%

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Table 2.**Binary Logistic Regression Analysis of Self-reported Adherence with Intention and PBC**

		B	S.E.	Sig	OR	LL	UL
Step 1[a]	Age (18-28)			.399			
	Age (29-39)	-.658	.580	.256	.518	.166	1.613
	Age (40-50)	-.340	.621	.584	.712	.211	2.403
	Education (Less than primary education)	.027	.328	.934	1.027	.541	1.953
	Location (Rural)	-1.265	.337	.000	.282	.146	.546
	Marital status (Married)			.685			
	Marital status (Never married)	.402	.534	.452	1.494	.525	4.257
	Marital status (Others)	.200	.362	.581	1.221	.601	2.482
	Intention	.481	.441	.275	1.618	.682	3.840
	PBC	-.714	.330	.030	.490	.256	.935
	Constant	3.639	1.929	.059	38.054		

a. Variable(s) entered on step 1: Intention, Perceived Behavioral Control (PBC).

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Table 3.**Binary Logistic Regression Model of Self-reported Adherence**

		B	S.E.	Sig	OR	LL	UL
Step 1[a]	Age (18-28)			.200			
	Age(29-39)	-.792	.616	.199	.453	.135	1.517
	Age(40-50)	-.259	.647	.689	.772	.217	2.741
	Education (Less than primary education)	-.118	.348	.735	.889	.450	1.757
	Marital status (Married)			.442			
	Marital status (Never married)	.666	.578	.249	1.947	.627	6.046
	Marital status (Others)	.266	.371	.473	1.305	.630	2.703
	Location (rural)	-1.123	.361	.002	.325	.160	.660
	Attitude	.979	.419	.019	2.662	1.171	6.055
	Subjective norms	-.774	.416	.063	.461	.204	1.042
	Perceived behavioral control	-.483	.341	.157	.617	.316	1.204
	Food insecurity	-.502	.161	.002	.605	.441	.829
	Perceived side effects	.128	.184	.488	1.136	.792	1.630
	Constant	5.242	2.230	.019	189.089		

a. Variable(s) entered on step 1: Food Insecurity, Perceived Side Effects.
Note: adherence is coded as 1 and non-adherence as 0. B=standardized beta; S.E. =Standard Error; Sig=p-value; OR=odds ratio; LL and UL= Lower and Upper Limits.

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Table 4. **Interaction Analyses of FI and PSE**

	Sig	OR	LL	UL
Age (18-28)	.326			
Age (29-39)	.250	.508	.160	1.613
Age (40-50)	.658	.757	.221	2.591
Education (less than primary education)	.748	1.114	.577	2.148
Location (Rural)	.004	.363	.183	.719
Marital status (Married)	.557			
Marital status (Never married)	.365	1.659	.555	4.955
Marital status (Others)	.469	1.305	.635	2.685
Att by FI	.007	1.334	1.083	1.643
PBC by PSE	.058	.866	.747	1.005
Att by PSE	.002	1.301	1.101	1.536
FI by SN	.036	.795	.641	.985

Note: FI=Food Insecurity, Att=Attitude, PSE=Perceived side effects, SN=Subjective norm, PBC=Perceived behavioral control.

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Table 5.**Correlations of Key Constructs**

		Adherence	Att	SN	PBC	FIH	FII	PSE
Adherence	Correlation	1.000	.038	-.086	**-.111**	**-.157**	**-.134**	.069
	Significance (2-tailed)		.478	.107	.038	.003	.012	.198
Att	Correlation	.038	1.000	**.466**	**.297**	**.160**	**.188**	**.209**
	Significance (2-tailed)	.478		.000	.000	.002	.000	.000
SN	Correlation	-.086	**.466**	1.000	**.393**	**.126**	**.124**	**.153**
	Significance (2-tailed)	.107	.000		.000	.017	.020	.004
PBC	Correlation	**-.111**	**.297**	**.393**	1.000	**.193**	**.193**	**.188**
	Significance (2-tailed)	.038	.000	.000		.000	.000	.000
FIH	Correlation	**-.157**	**.160**	**.126**	**.193**	1.000	.902	-.047
	Significance (2-tailed)	.003	.002	.017	.000		.000	.379
FII	Correlation	**-.134**	**.188**	**.124**	**.193**	**.902**	1.000	-.006
	Significance (2-tailed)	.012	.000	.020	.000	.000		.905
PSE	Correlation	.069	**.209**	**.153**	**.188**	-.047	-.006	1.000
	Significance (2-tailed)	.198	.000	.004	.000	.379	.905	

Note: Control variables included were Age, Education, Marital status, Location.
FIH=Food Insecurity-Household, FII= Food Insecurity-Individual, Att=Attitude, PSE=Perceived side effects, SN=Subjective norm, PBC=Perceived behavioral control. Partial correlations, which are bolded, are statistically significant at $p < .05$.

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Results

- Intention was not a significant predictor of self-reported adherence.
- Perceived behavioral control (*OR*=.49), location (*OR*=.28), food insecurity (*OR*=.60), and patients' attitude (*OR*=2.66) were significant predictors of adherence.
- Interactions were found between attitude, side effects, and food insecurity, along with subjective norm.
- Attitude predicted better adherence only when food insecurity (*OR*=9.84; *p*=.001; CI=2.67, 36.23) or side effects (*OR*=3.45; *p*=.03; CI=1.10, 10.8) were high.
- Food insecurity predicted better adherence only when subjective norm (OR=0.795; p=.036; CI=.641, .985) is high.

Discussion

- Location was found to be a significant predictor of women's adherence behaviors, in that women from Malamulo Hospital ART Clinic (rural hospital) are more likely to adhere to their ART than women from Queen Elizabeth Central Hospital ART clinic (urban hospital).
- Food insecurity was a significant predictor of women's adherence behaviors, in that women who have access to food are more likely to adhere to their ART regularly.
- Attitude and PBC both directly predict women's adherence behaviors without the direct influence of intention.

Conclusion and Recommendations

- Findings from this study highlight some characteristics of the two treatment centers that influence adherence while providing important information for public health professionals responsible for the development and implementation of programs focusing on increasing ART adherence.
- Results of this study can be use to better plan adherence interventions by modifying women's attitudes and PBC over the behavior instead of focusing on her intention.
- Treatment location, food insecurity, and perceived side effects should also be considered in interventions targeting adherence.

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For more information about the research itself:

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