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Factors Associated with Self-Reported Adherence among Adolescents on Antiretroviral Therapy in Zimbabwe

Robert Gross, MD, MSCE,

University of Pennsylvania Perelman School of Medicine - CCEB, 804 Blockley Hall 423
Guardian Drive, Philadelphia, Pennsylvania 19104-6021, United States

Tsitsi Bandason,

BIOMEDICAL RESEARCH AND TRAINING INSTITUTE - RESEARCH, P.O. BOX CY1753,
CAUSEWAY HARARE, HARARE 004, Zimbabwe

Lisa Langhaug, PhD,

REPSSI, Harare, Zimbabwe

Hilda Mujuru, MMed Paeds, MSc Clin Epi,

University of Zimbabwe College of Health Sciences - Paediatrics and Child Health, Harare,
Zimbabwe

Elizabeth Lowenthal, MD, MSCE*, and

Children's Hospital of Philadelphia - General Pediatrics, 3535 Market Street Room 1513,
Philadelphia, Pennsylvania 19104, United States

Rashida Ferrand, MD, PhD*

Biomedical Research & Training Institute, Harare, Zimbabwe

Abstract

Non-adherence to medication is the key obstacle to HIV treatment success. The group at highest risk of non-adherence is adolescents, but relatively little is known about risk factors for and protective factors against poor adherence in this age-group. We undertook a cross-sectional study of 262 HIV-infected adolescents aged 10–19 on antiretroviral therapy at two clinics in Harare, Zimbabwe to investigate personal and system-level factors associated with optimal self-reported adherence. Suboptimal adherence was common with only 101(39%) reporting “excellent” adherence. Having the guardian present at each clinical encounter, comfort with asking questions to the health provider and participating in group sessions led by a professional facilitator were all significantly associated with excellent adherence ($p < 0.05$). Strengthening the parent-child dyad and professional-led groups as strategies to improve adherence should be evaluated.

Corresponding Author: Robert Gross MD MSCE, Associate Professor of Medicine and Epidemiology, University of Pennsylvania Perelman School of Medicine, 804 Blockley Hall, 423 Guardian Drive, Philadelphia, PA 19104-6021, USA, Tel. 215-898-2437, grossr@mail.med.upenn.edu.
*equal work by senior authors

Introduction

Suboptimal adherence to antiretroviral therapy for human immunodeficiency virus (HIV) infection leads to virologic failure (Gross, Bilker, Friedman, & Strom, 2001), drug resistance (Gardner, Burman, Steiner, Anderson, & Bangsberg, 2009), and the need for more complex regimens. In resource-limited settings, suboptimal adherence can quickly rob patients of effective treatment options. Many adherence interventions have been studied in adults (Simoni, Amico, Smith, & Nelson, 2010). Few have demonstrated both adherence and virologic benefits. Much less data are available on interventions in adolescents (Thompson et al., 2012).

Ninety percent of the estimated three million HIV infected children live in sub-Saharan Africa (“Global Report: UNAIDS Report on the Global AIDS Epidemic,” 2012), and ART has resulted in increasing numbers of children surviving to adolescence. Unfortunately, compared to other ages, adolescents have the highest rates of suboptimal adherence and treatment failure (Flynn et al., 2007; Nachega et al., 2009). Adolescents with HIV are challenged by psychosocial issues including increased responsibility for medications, (Berg et al., 2011), decreased family support as they are perceived to be “of age” (Williams, Mukhopadhyay, Dowell, & Coyle, 2007), psychological reactance against authority (Hong, Giannakopoulos, Laing, & Williams, 1994), HIV-related stigma (Fielden, Chapman, & Cadell, 2011), poor outcome expectancy (Rudy, Murphy, Harris, Muenz, & Ellen, 2009; Tamaroff, Festa, Adesman, & Walco, 1992), and limited orientation towards consequences of actions (Reisner et al., 2009).

Determinants of adherence can be both individual and system factors. For adolescents, relationships with responsible adults may play a larger role than do social supporters in older patients (Naar-King et al., 2013). We aimed to identify risk/protective factors for non-adherence in adolescents in Harare, Zimbabwe, a country with an HIV prevalence of approximately 10% in pregnant women ages 15–24 years and an annual incidence of 1% (“Global AIDS Response Country Progress Report: Zimbabwe 2014,” 2014). We assessed potential personal and structural barriers to inform both the development and the rejection of strategies to support adherence in adolescents.

Methods

Study Site and Participants

Participants were HIV-infected adolescents aged 10–19 years and aware of their HIV status. They were consecutively surveyed from Parirenyatwa and Harare Hospital HIV clinics, the two main public sector sites primarily serving lower income patients. The Parirenyatwa Hospital site is a family clinic caring for both HIV-infected children and adults. The Harare Hospital site is a children’s clinic with transition to adult clinics around age 16 years. Both sites care for large numbers of adolescents, most of whom are on ART. All patients see a lay counselor for an adherence assessment and feedback prior to seeing the clinician. Professional counseling is available via support groups led by trained nurses and counselors (Mavhu et al., 2013).

An HIV infected young man working as a peer supporter provided a structured questionnaire to participants. The questionnaires were self-completed and placed by participants in a box to maintain anonymity.

Variables Measured

The primary outcome was self-reported adherence using a modification of the Self-Rating Scale Item (Feldman et al., 2013). The questionnaire queried about attitudes and preferences related to social support and activities they participated in related to HIV. The questionnaire is provided in the Appendix.

Analysis and Sample Size Considerations

Although this was a cross-sectional study, we conceptualized self-reported adherence as the “outcome” and dichotomized it as optimal if reported as ‘excellent.’ All other categories (very good, good, poor, very poor) were defined as suboptimal adherence given the ceiling effect inherent in self-reports (Simoni et al., 2006). The association between categorical and ordinal variables with optimal adherence was assessed using Chi-squared tests and non-parametric tests of trend, respectively. We used multivariable logistic regression to control for potential confounders. Variables were considered potential confounders if they were associated with adherence with a p value <0.1. Age and sex were included in the models since they were considered potentially clinically significant confounders irrespective of association with adherence. Confounding was considered to be present if the point estimate of the relation between the primary variable and adherence changed by >15% when the potential confounder was included in the models. We targeted enrolment of approximately 100 patients per site (200 total) to allow for a precision of <10% around estimates of the proportion with optimal adherence.

Ethical Considerations

The study was conducted as an assessment of utilization of services and no personally identifiable information was recorded. Informed consent and documentation of assent were waived by the Medical Research Council of Zimbabwe.

Results

We enrolled 262 adolescents on antiretroviral therapy and Table 1 compares demographic and personal characteristics between the optimal and suboptimal adherence groups. 101 (39%) patients reported suboptimal adherence. Overall, there were more females than males, most adolescents were living with family and many traveled for more than an hour to their clinic appointments. The majority felt comfortable talking with their health provider, confident in their ability to take medications, and very satisfied with their care. Those with optimal adherence more commonly reported each of these factors compared to the suboptimally adherent adolescents. Travel time and sources of social support did not differ between the groups.

Table 2 compares clinic-level factors between the excellent and suboptimal adherence groups. Having a parent or guardian in the room during visits was more common in the

excellent compared to suboptimal adherence group. For patients whose parents were always in the room, the odds ratio (OR) for excellent adherence was 2.1 (95% CI 1.3–3.5). Although uncommon, receiving contact through telephone calls or Short Messaging System if a visit was missed was more common in the adherent group with an OR of 2.4 (95% CI 1.2–4.8). Home visits were rare after missed clinic visits (Table 2). The adolescents commonly participated in group activities and individual counseling, but only group sessions conducted by trained professionals were associated with high rates of adherence. Adolescents who participated in these professionally run groups had a 1.8 times (95% CI: 1.1–3.0) the odds of excellent adherence compared with non-participants.

In multivariable models, there was no change in the relation between the significantly associated variables from the univariate comparisons with adherence. Therefore, only univariate analyses are presented.

Discussion

We found that self-reported suboptimal adherence was common in these adolescents, consistent with findings of others in the setting of chronic diseases including asthma (Desai & Oppenheimer, 2011), diabetes (Palmer et al., 2011), and HIV (Nachega et al., 2009). Nachega et al. demonstrated that adolescent adherence with antiretrovirals in sub-Saharan Africa was worse than that of adults (Nachega et al., 2009). We also found that there was more direct involvement of parents/guardians in clinic visits in those with excellent adherence. A simple explanation would be that the involvement at clinic reflected greater social support by these caregivers at home. This finding is consistent with that of Mellins et al. who found that the quality of parent-child communication was associated with adherence rates in HIV infected children in the US (Mellins, Brackis-Cott, Dolezal, & Abrams, 2006).

Our findings regarding confidence and trust in providers have previously been shown to be associated with adherence in HIV-infected adults. Confidence is a measure of self-efficacy (Barclay et al., 2007), an important determinant of behavior as conceptualized in Social Cognitive Theory (Bandura, 1998). Comfort in talking with the provider is engendered by trust, which has previously also been associated with adult adherence to antiretrovirals (Altice, Mostashari, & Friedland, 2001).

The relation between counseling and adherence was mixed. Attendance at group sessions run by a professional were protective against non-adherence, but group activities run by peers and individual counseling sessions were not associated with better adherence. Although we were unable to elucidate in further detail the etiology of these differences, possibilities include implementation of ineffective strategies or poor fidelity to effective strategies due to high volume (Thurman, Haas, Dushimimana, Lavin, & Mock, 2010) and/or poor training of staff regarding children's needs. Further, referral of those with the worst adherence problems, and thus, least likely to improve their adherence, may be responsible for the lack of effect. Group activities and interventions are commonly implemented in HIV care settings (http://www.aidstar-one.com/promising_practices_database/g3ps/teen_club_peer_support_group_hiv_positive_adolescents). However, few have been formally tested (Thompson et al., 2012).

Our study's strengths included the large numbers of adolescents at the main sites of care for HIV-infected adolescents in Harare. This study also had several limitations. Although self-reports can identify non-adherent individuals, they typically overestimate adherence. However, we found substantial non-adherence when using the threshold of less than "excellent" adherence. Neither objective measures of adherence nor viral loads were available and hence we are unable to comment on the clinical relevance of the suboptimal adherence. In addition, more detailed information about the support groups including the content of activities and the individuals who facilitate them would help determine which aspects are most promising. Several community based support groups exist in Harare, and are run by a variety of individuals including lay community workers, peers, churches and lay counselors as well as professional groups. Unfortunately, there are limited data to determine which of these models is more or less successful at improving adherence.

In conclusion, we found non-adherence to be common in HIV infected adolescents in care in Harare and that parental involvement and group sessions led by professional staff may hold promise for further development as systematically implemented adherence interventions (Mellins, Brackis-Cott, Dolezal, & Abrams, 2004). Formal evaluation of current support programs are warranted to determine if they merit continued support and adaptation.

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Table 1

Personal and Demographic Characteristics and Adherence

Characteristic	Overall (n=262)	Excellent Adherence (n=101)	Suboptimal Adherence (n=161)	P value
Female sex	156 (61%) n=257	55 (57%) n=96	101 (63%) n=161	0.39
Median age in years (IQR)	15.5 (14–17)	15 years (13–17)	16 years (14–17)	0.45
Live with family	245 (94%)	98 (97%)	147 (91%)	0.07
Currently working	16 (6%) n=260	5 (5%) n=101	11 (7%) n=159	>0.5
Social support				
By family	225 (86%)	84 (83%)	141 (88%)	0.32
By friends	41 (16%)	19 (19%)	22 (14%)	0.26
By faith community	34 (13%)	15 (15%)	19 (12%)	0.48
By provider	83 (32%)	34 (34%)	49 (30%)	>0.5
Use traditional healer	31 (12%) n=259	8 (8%) n=99	23 (14%) n=161	0.13
Travel time to clinic	n=259	n=100	n=159	>0.5
<15 minutes	26 (10%)	10 (10%)	16 (10%)	
15–30 minutes	89 (34%)	38 (38%)	51 (32%)	
30 minutes–1 hour	87 (34%)	29 (29%)	58 (36%)	
>1 hour	57 (22%)	23 (23%)	34 (21%)	
Expressed comfort asking provider questions	n=260	n=99	n=161	0.02*
Not at all	32 (12%)	9 (9%)	23 (14%)	
Sometimes	67 (26%)	20 (20%)	47 (29%)	
Very much	161 (62%)	70 (70%)	91 (57%)	
Confidence in maintaining adherence	n=258	n=99	n=259	0.04*
Not at all	7 (3%)	0	7 (4%)	
Sometimes	43 (17%)	13 (14%)	30 (19%)	
Very Much	203 (79%)	83 (87%)	120 (76%)	
Belief in importance of adherence	n=259	n=99	n=160	0.25
Not at all		4 (4%)	10 (6%)	
Sometimes		7 (7%)	16 (10%)	
Very Much	214 (83%)	85 (89%)	129 (81%)	
Satisfied with HIV care	n=257	n=98	n=159	0.046*
Not at all	31 (12%)	11 (11%)	20 (13%)	
Sometimes	42 (16%)	9 (9%)	33 (21%)	
Very Much	184 (72%)	78 (80%)	106 (67%)	

* test for trend

n – number with data available for analysis overall and by subgroup. If not listed for variable, no data was missing.

Table 2

Clinic-Level Factors and Adherence

Characteristic	Overall (n=262)	Excellent Adherence (n=101)	Suboptimal Adherence (n=161)	P value
Visit frequency	n=259	n=100	n=159	0.35
< 4x/year	31 (12%)	12 (12%)	19 (12%)	
4x/year	36 (14%)	10 (10%)	26 (16%)	
>4x/year	192 (74%)	78 (78%)	114 (72%)	
Action Taken for Missed Visit	n=260	n=100	n=160	0.04
None	146 (56%)	49 (49%)	97 (61%)	
Telephone call or SMS to patient	37 (14%)	21 (21%)	16 (10%)	
Contact parent/guardian	67 (26%)	28 (28%)	39 (24%)	
Home visit	10 (4%)	2 (2%)	8 (5%)	
Parent/guardian in room for clinic visit	n=259	n=100	n=159	0.01*
Never	35 (14%)	12 (12%)	23 (14%)	
Sometimes	107 (41%)	31 (31%)	76 (48%)	
Always	117 (45%)	56 (56%)	61 (38%)	
Participate in group meetings for HIV+ children run by professional	145 (56%) n=260	64 (65%) n=99	81 (50%) n=161	0.02
Participate in group activities for HIV+ children	146 (56%) n=259	62 (62%) n=100	84 (53%) n=159	0.15
Participate in peer run support group	128 (49%) n=260	47 (47%) n=100	81 (52%) n=160	>0.5
Received individual counseling/mentoring	138 (53%) n=259	54 (53%) n=101	84 (53%) n=158	>0.5

*
test for trend

n – number with data available for analysis overall and by subgroup. If not listed for variable, no data was missing.