

**Training Needs Assessment for Clinicians at Antiretroviral Therapy Clinics:
Evidence from an National Survey in Uganda**

Short title: Training Needs Assessment at ART Clinics

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Abstract

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Background. To increase access to anti-retroviral therapy (ART) in resource-limited settings, several experts recommend “task shifting” from doctors to clinical officers, nurses and midwives. This study sought to assess task shifting and the ART training needs associated with it.

Methods. The Infectious Diseases Institute in collaboration with the Ugandan Ministry of Health surveyed health professionals and heads of ART clinics at a stratified random sample of 44 health facilities accredited to provide ART. A sample of 265 doctors, clinical officers, nurses, and midwives reported on tasks they performed, previous HIV training, and self-assessment of knowledge of HIV and ART. Heads of ART clinics reported on clinic characteristics.

Results. Thirty of 33 doctors (91%), 24 of 40 clinical officers (60%), 16 of 114 nurses (14%) and 13 of 54 midwives (24%) who worked in accredited ART clinics reported that they prescribed ART ($p<0.001$). Sixty-four percent of the people who prescribed ART were not doctors. Among professionals who prescribed ART, 76% of doctors, 62% of clinical officers, 62% of nurses and 51% of midwives were trained in initiating patients on ART ($p=0.457$); 73%, 46%, 50%, and 23%, respectively, were trained in monitoring patients on ART ($p=0.017$). Seven percent of doctors, 42% of clinical officers, 35% of nurses, and 77% of midwives assessed that their overall knowledge of ART was lower than good ($p=0.001$).

Conclusion. Training initiatives should support task shifting and ensure that ART is used correctly and that toxicity or drug resistance do not reverse accomplishments to date.

Key words: HIV Infections; Antiretroviral Therapy, Highly Active; Clinical Competence; Needs Assessment; Education, Medical, Continuing; Education, Nursing, Continuing; Africa South of the Sahara

Background

Considerable progress continues towards increasing access to anti-retroviral therapy (ART) in resource-limited settings. WHO, UNAIDS, and UNICEF recently estimated that 1.3 million people have access to ART in Sub-Saharan Africa, or 28% of people with HIV living there who need ART.¹ These accomplishments required training of health professionals, among other efforts to strengthen health systems. For example, the United States' Presidents Emergency Plan for AIDS Relief supported the training of 154,000 health professionals in ART from 2004 to 2007.²

The greatest challenge to increasing access to ART however, is the shortage of trained health care professionals.^{1 3 4 5} Several experts recommend “task shifting” from doctors to clinical officers and nurses^{6 7 8} or from clinicians to community health workers.^{8 9} Gimbell-Sherr et. al. demonstrated that expanding the role of nurses allowed doctors to have more visits with ART-eligible patients at two clinics in Mozambique.¹⁰ Recent articles report on clinical officers and/or nurses providing ART in Zambia,¹¹ Kenya,¹² and Malawi.¹³

Earlier this year, WHO published global recommendations and guidelines for task shifting that would promote access to HIV and other health care services.⁸ Recommendation Four is that countries undertake or update a human resource analysis on the extent to which task shifting is already taking place, among other things. Recommendation Nine is that countries adopt a systematic approach to harmonized, standardized, and competency-based training that is needs-driven and accredited.

The Infectious Disease Institute (IDI) in collaboration with the Ministry of Health (MOH) of Uganda recently conducted a training needs assessment that addressed both of these recommendations. Information was collected on the allocation

of ART tasks across health professionals. An audience analysis¹⁴ provided background on previous training and self-assessment of HIV and ART knowledge.

Uganda was chosen for its well-developed national ART program and mature training environment for HIV care. As of September 2006, an estimated 89,193 people had access to ART or 41% of people in need.¹ Uganda also pioneered in training nurses to perform some tasks of doctors, and lay health workers to perform some tasks of nurses.^{15 16} Health professionals benefited from several ART training initiatives, including the Drug Access Initiative,¹⁵ and WHO's Integrated Management of Adult and Adolescent Illness,¹⁶ as well as training from organizations such as Joint Clinic Research Centre, HealtheFoundation,¹⁷ IDI,^{15 17 18} Mildmay International,^{15 17} Paediatric Infectious Diseases Clinic at Mulago Hospital, The AIDS Support Organization (TASO),¹⁷ and Uganda Cares. The organizations trained a variety of health professionals with courses lasting from one day to 21 days.

This assessment contributes a method for measuring task shifting in resource-limited settings and the ART training needs associated with it to the literature on ART training needs. Previously, the Center for African Family Studies and Regional AIDS Training Network conducted an HIV/AIDS training need assessment in 12 countries in 2002 that predated scaling-up of ART.¹⁹ Renggli conducted a situational analysis in Africa that focused on organizations that provided training in clinical management of HIV infection including ART.¹⁷ Souville et. al. reported on knowledge of and attitudes about ART among physicians in Cote d'Ivoire,²⁰ and Dohrn et. al. reported on knowledge of ART among midwives in South Africa.²¹ The innovative method presented below can be replicated to inform ART training programs in the context of on-going scale-up and shifting tasks.

Methods

Study design. We surveyed health professionals and heads of ART clinics at a cross-section sample of clinics that the MOH had accredited to provide ART. Health professionals reported on the tasks they performed during a normal work day, previous HIV training, and overall knowledge of HIV and ART. Knowledge was rated on a six-point scale where one was “excellent” and six was “none.” The heads of ART clinics reported on the staff of the ART clinic, and the HIV and ART clinic population.

Sampling procedure and sample size. We sought a nationally representative sample of accredited ART clinics in Uganda. The Ugandan health system divides the country into 11 catchment areas of the regional referral hospitals. Each area serves several districts. The national referral hospital in Kampala is the twelfth area, but it was excluded from the assessment. Using a lottery method, the following six areas were selected: Arua, Lira, Masaka, Hoima, Kabale and Mbale.

Using proportionate allocation to size sampling method, a sample 44 of the 205 accredited facilities as of July 2006 was selected. According to the Ministry of Health, (personal communication, MOH, National Medical Stores, 2006), 12 percent of the accredited ART clinics in the six catchment areas were regional referral hospitals, 35 percent were district hospitals, and 54 percent were health center IV or III. The sample included six regional referral hospitals (14 percent), 16 district hospitals (34 percent), and 22 health centre IV or III (52 percent).

In each catchment area, a random sample of facilities was selected from a MOH list of accredited ART clinics, stratified by type of facility. The two strata were: ownership (government or non-governmental organization and/or faith-based

organization) and whether or not the facility was active, i.e. providing ART. Three government district hospitals were selected randomly from each of the four catchment areas of the biggest administrative regions and two from each of the others. One facility that was not active was selected from each catchment area. At least one non-governmental or faith-based facility was selected from each catchment area, including six hospitals and four health centers. Two remote facilities were replaced with proximate ones to stay within the bounds of the study schedule and budget.

Within health facilities, a convenience sample of health professionals was selected with the help of the head of the ART clinic. The inclusion criterion was any person providing services at the accredited ART clinic who was at the facility on the day that the study team visited (see below). We sought to include at least one doctor, clinical officer, nurse and midwife from each clinic. In Uganda, a doctor has secondary school education (13 years), five years of medical school and one year of internship. Clinical officers are among the non-physician clinicians described in a recent review.²² They have a secondary school education, three years of pre-service training and two years of internship. There are several types of nurses, all of which have a secondary school education: 1) enrolled nurse and enrolled midwives have one and one-half years of pre-service training, 2) comprehensive nurses, registered nurses, and registered midwives have three years of pre-service training, and 3) double-trained nurse-midwives have four and one-half years of pre-service training.

Data collection procedures. The questionnaires for health professionals and heads of ART clinics were designed based on examples from the National Evaluation Center of the United States AIDS Education and Training Centers. (See <http://www.nec.org>) Early versions were shared with stakeholders representing HIV

training organizations in Uganda in a participatory process that led to several improvements. Later versions of the questionnaires were pre-tested with health professionals and the head of the ART clinic at Mbuya Reach Out and a Kampala City Council clinic. The final questionnaires are available from the authors on request. Data were collected using self-administered questionnaires for individual health professionals and face-to-face interviews with heads of ART clinics as key informants.

Twelve research assistants were trained in data collection for three days. They were grouped into four teams, each comprising of a social scientist, medical doctor and field assistant. A team spent one day at each facility, and collected data from an average of 11 facilities during a two-week period in July and August 2006.

Data management and analysis. The completed questionnaires were coded and the data were double entered in Epi-Info version 6.01 (Centers for Disease Control and Prevention, Atlanta GA) to ensure accuracy and integrity of the data. Descriptive statistics and statistical tests were conducted with SPSS-PC version 11.0 for Windows (SPSS Inc, Chicago IL). Data analyses were stratified by health profession and chi-square (χ^2) tests were used to assess statistical significance of differences in proportions (percentages). Where there were a small number of cases (expected frequency less than 5); Fisher's exact tests were used.

Human subjects. The study was approved by the IDI training committee, the MOH and the Institutional Review Board of the Faculty of Medicine at Makerere University. Respondents provided oral informed consent.

Results

Characteristics of the sample. Forty-three of the 44 facilities selected were included; a team was unable to travel to one non-governmental health center that was not active. Thirty eight of the 43 health facilities were active and five (one district hospital and four health center IVs) were not. As shown in Figure 1, the regional referral hospitals provided ART to an average of 1,727 HIV patients per month, whereas the district hospitals and health center IV provided ART to an average of 228 and 78 people, respectively. Regional referral hospitals reported the highest proportion of HIV patients receiving ART (45%), while 33% and 17% of HIV patients received ART at district hospitals and health centre IVs, respectively.

The sample of health professionals included 265 clinicians: 34 were doctors, 46 clinical officers, 124 nurses, and 61 midwives. Sixty percent were female and 58% were aged 35 years or younger. Table 1 compares the respondents to the staff that the head of the ART clinics reported were assigned to the ART clinics. The distribution of respondents across health professions differed significantly from the distribution of staff assigned to the ART clinics. Doctors were under-represented at all types of facilities; nurses were under-represented at regional referral hospitals and district hospitals and over-represented at health center IVs. No doctors were on the staff of ART clinics at two district hospitals and two health centers.

Allocation of tasks by health profession. ART tasks were performed by all types of clinicians as shown in Table 2. Thirty of 33 doctors (91%), 24 of 40 clinical officers (60%), 16 of 114 nurses (14%) and 13 of 54 midwives (24%) who worked in accredited ART clinics reported that they prescribed ART ($p < 0.001$). Of the 83 people who prescribed ART only 36% were doctors; 29% were clinical officers, 19% nurses,

and 16% midwives. On a normal working day, nurses reported spending more than the average number of hours prescribing ART and midwives reported spending less.

Consequently, of the 234 hours devoted to prescribing ART, 36% were by doctors, 30% by clinical officers, 24% by nurses and 9% by midwives.

HIV training. Eighty-six percent of respondents reported they had attended at least one HIV training, and percentages did not differ significantly across health professions ($p=0.242$). Median duration of training varied across topics from three days for Infection Control to twenty-one days for HIV Research. The median duration of training in initiating ART was seven days, and in monitoring ART was also seven days.

The percentage of people with training in specific topics differed significantly across health professions as shown in Table 3. Seventy-one percent of doctors and 54% of clinical officers attended training on initiating ART compared to 54% of nurses and 40% of midwives ($p<0.001$). Higher percentages of doctors and clinical officers attended training on monitoring ART ($p=0.001$) and Paediatric HIV care ($p=0.023$) than nurses and midwives. Conversely, lower percentages of doctors and clinical officers attended training on voluntary counseling and testing ($p=0.003$) than nurses and midwives.

Focusing on ART training among respondents who reported that they prescribed ART, 24% of doctors, 38% of clinical officers, 38% of nurses and 49% of midwives had no training in initiating patients on ART ($p=0.457$). Twenty-seven percent of doctors, 54% of clinical officers, 50% of nurses, and 77% of midwives had no training in monitoring patients on ART ($p=0.017$).

Self assessment of HIV and ART knowledge. Health professionals were asked to rate their overall knowledge of HIV and overall knowledge of ART. Ratings of “excellent,” “very good,” and “good” were grouped together as “sufficient;” 75% of the respondents assessed that their overall knowledge of HIV was sufficient and 40% rated their overall knowledge of ART as sufficient. As shown in Figure 2, there were significant differences in ART knowledge across professions.

Respondents’ self-assessment of their ART knowledge was significantly related to training in initiating and monitoring ART. Twenty-two percent of 66 who rated their knowledge of ART less than good had training on initiating ART and 70% of 199 who rated their knowledge sufficient had training ($p < 0.001$). Similarly 16% of 159 who rated their knowledge of ART less than good had training on monitoring ART and 54% of 106 who rated their knowledge sufficient had training ($p < 0.001$). These measures were significantly related within health professions in seven out of eight comparisons.

Discussion

Access to ART in Uganda has extended beyond specialized urban clinics to district hospitals and primary care facilities. Although the percentage of HIV patients receiving ART was higher at regional referral hospitals (45%) than district hospitals (33%) and health center IVs (17%), they will even out over time as HIV patients transfer their care to accredited facilities closer to their homes.

Uganda’s well-developed ART program was staffed by a broad range of health professionals. Sixty-four percent of professionals who prescribed ART were clinical

officers, nurses, or midwives. This task-shifting followed the recommendations of experts and may have contributed to extending access to ART.

Training on initiating and monitoring ART had not however, always kept pace with task-shifting. Although the majority of people who prescribed ART had attended training on initiating and monitoring ART, 35% of respondents had not attended training on initiating ART and 49% on monitoring ART. The percentages of people who prescribed ART who had attended no training on monitoring ART were significantly different across health professions; 27% of doctors had no training on monitoring ART compared to 64% of other clinicians. Similarly, self-assessments of knowledge of ART differed significantly across professions; 7% of doctors who prescribed ART reported their overall knowledge of ART was lower than “good” compared to 48% of other clinicians. The criteria for a health facility to be accredited to provide ART in Uganda included that a minimum number of health professionals were qualified with experience in HIV/AIDS management,¹⁵ but the staff of the ART clinics may have changed over time.

This is the first article document task shifting and training needs across a range of health professionals. Other assessments of a range of health professionals did not document responsibilities for HIV care. Liljestrand reported significant differences in HIV training across professions in the United States; for example, registered nurses had less ART training than doctors, physician assistants, and nurse practitioners.²³ The multi-disciplinary training needs assessment by the Center for African Family Studies and Regional AIDS Training Network concluded that the two most critical training gaps for doctors, clinical officers and nurses were the same, but it was based on expert opinion rather than self-assessment.¹⁹

Training needs as measured by previous training and self-assessment of knowledge provided similar results and the measures were significantly related. A review of studies of health professionals in the United States and Europe concluded that the validity of self-assessment of performance was low to moderate, but could be improved with appropriate training.²⁴ Others recommended assessment based on more objective measures of competence.²⁵ Our results suggested that self-assessment of overall knowledge of ART was a valid measure of basic ART training needs in a resource-limited setting. Future research on detailed training needs may use diaries in which health professionals note difficult situations during patient encounters.²⁶

Limitations. The health professionals were a convenience sample of those who were at a nationally representative sample of accredited ART clinics on the day of the study. Consequently the sample over represented some types of professionals at some facilities and under-represented others; doctors were underrepresented at all facilities. The sample may have reflected the time doctors allocated to ART care more accurately than administrative records; higher rates of absenteeism among doctors have also been reported previously.²⁷

Conclusion

In a national sample of health facilities that were accredited to provide ART in Uganda, 64% who prescribed ART were clinical officers, nurses or midwives, 41% of which had not been trained in initiating ART and 64% of which had not been trained in monitoring ART. Training needs were heterogeneous and differed within professions by the tasks performed. It is important to assess the tasks performed and training needs to allocate training resources appropriately. Training initiatives should be

designed to support task shifting and ensure that ART is used correctly and toxicity or drug resistance do not reverse the successes to date.

List of abbreviations used.

AIDS – Acquired immune deficiency syndrome

ART – Antiretroviral therapy

HIV – Human immunodeficiency virus

IDI - Infectious Diseases Institute

MOH – Ministry of Health

TASO – The AIDS Support Organization

UNAIDS – Joint United Nations Program on HIV/AIDS

UNICEF - United Nations Children’s Fund

WHO – World Health Organization

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Author contributions. IM Lutalo and G Schneider led the design and field work for the training needs assessment. MR Weaver, F Lule, E Namagala, M Scheld, KPWJ McAdam, and MA Sande contributed to the design. R Kaye contributed to the data collection. IM Lutalo and MR Weaver analyzed the data. IM Lutalo and JK Oyugi wrote drafts of the manuscript, and MR Weaver wrote the final version based on written comments from G Schneider, L Mpanga Sebuyira, R Kaye, and MA Sande. All authors contributed to the final version and approved the text as submitted.

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Table 1: Comparison of respondents and all health professionals in the sample of ART clinics

Cadre	Total		Regional Referral Hospital		District Hospital		Health Centre IVs	
	Respon- dents (n=265) %	Staff reported by head of clinic (n=392) %	Respon- dents (n=54) %	Staff reported by head of clinic (n=81) %	Respon- dents (n=101) %	Staff reported by head of clinic (n=158) %	Respon- dents (n=110) %	Staff reported by head of clinic (n=153) %
Doctor	13	19	22	28	14	20	7	14
Clinical Officer	17	21	11	19	17	18	21	26
Nurse	47	44	41	48	47	53	50	33
Midwife	23	15	26	5	23	9	22	27
p-value	0.014		0.005		0.017		0.033	

Table 2: Allocation of tasks in ART clinics by profession

Tasks	Doctor	Clinical Officer	Nurse	Midwife	Bivariate analysis		
	n=33 %	n=40 %	n=114 %	n=54 %	χ^2	dF	p-value
Clinical Care							
Prescribing ART	90.9	60	14	24.1	82.89	3	<0.001*
Prescribing other medicines	100	90	43.9	57.4	42.13	3	<0.001*
Providing basic HIV care	69.7	70	58.8	50	6.04	3	0.152
Nursing care and counseling							
Counseling clients	54.5	52.5	71.9	90.7	24.08	3	<0.001*
Nursing care to PLWHA	15.2	15	53.5	48.1	32.72	3	<0.001*
Home visiting	12.1	20	35.1	37	10.3	3	0.022*
Other aspects							
Administration/Supervisor	78.8	40	35.1	46.3	22.54	3	<0.001*
Training other health professionals	54.5	15	9.6	29.6	34.37	3	<0.001*
Health education	48.5	60	70.2	96.3	28.4	3	<0.001*
Others	9.1	10	20.2	13	7.28	3	0.245

* - Significantly different

Table 3: Percentage with previous HIV training by type of health professional

Area of training	Percentage with previous HIV training					Bivariate analysis		
	Overall (n=265)	Doctors (n=34)	Clinical Officers (n=46)	Nurses (n=124)	Mid wives (n=61)	χ^2	dF	p-value
i. Ever been trained	86	82	87	83	93	4.11	3	0.242
ii. <u>Treatment and care</u>								
Initiate ART	43	71	54	40	25	22.06	3	<0.001 ^a
Monitor ART	32	68	41	26	16	30.84	3	0.001 ^a
Clinical HIV care	31	56	44	26	18	19.57	3	<0.001
Paediatric HIV care	19	32	28	15	13	9.54	3	0.023 ^a
Breastfeeding and infant feeding	22	9	22	17	38	14.26	3	0.003 ^a
Nursing care & HIV management	16	3	13	23	10	10.56	3	0.014 ^a
iii. <u>Prevention and counseling</u>								
VCT	53	34	44	56	69	13.98	3	0.003 ^a
PMTCT	52	47	50	44	74	15.53	3	0.001 ^a
HIV prevention	37	35	50	37	26	6.43	3	0.093
Stigma and discrimination	14	6	17	15	16	2.54	3	0.468
Infection control	27	27	30	24	31	1.3	3	0.729
iv. <u>HIV laboratory testing</u>								
Testing for HIV	17	18	17	15	21	1.36	3	0.714
Laboratory monitoring in ART	5	15	11	3	0	13.35	3	0.004 ^a
v. <u>Program management & drug supplies</u>								
ART supplies	13	27	15	14	2	12.81	3	0.001 ^a
HIV research	2	3	4	2	2	1.32	3	0.428 ^b
ART/HIV program management	11	18	11	7	15	5.16	3	0.160 ^a
M&E of HIV programs	5	9	11	3	2	6.77	3	0.099
vi. <u>Training of trainers</u>	12	15	15	10	12	0.81	3	0.469

^a – Statistically significant (p<0.05) ^b - Used Fisher exact test

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Figure 1. Average number of registered people living with HIV/AIDS and ART patients in the facility.

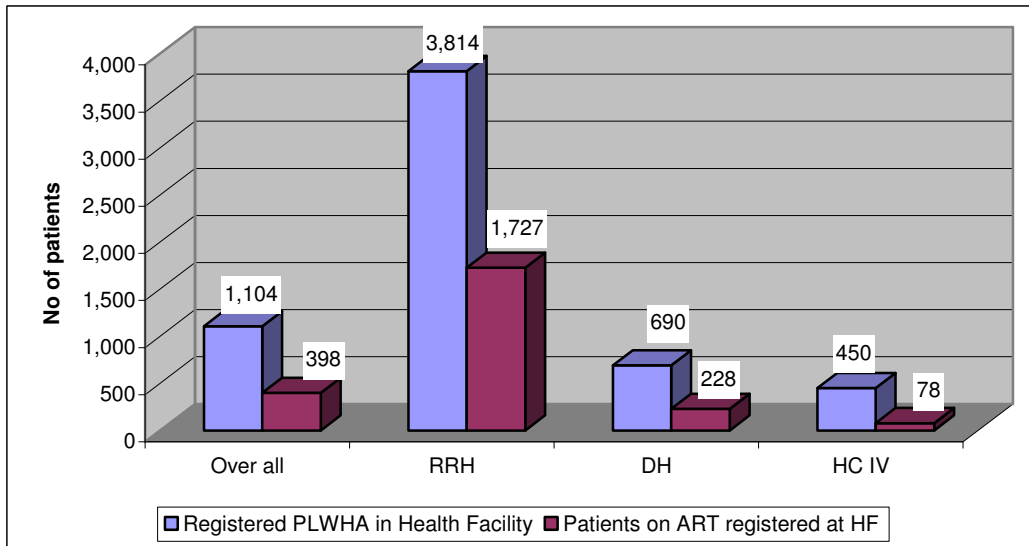


Figure 2. Percentage of health professionals who assessed their overall knowledge of ART as less than “good”

