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Implementation of routine counselor-initiated opt-out HIV testing on the adult medical ward at Kamuzu Central Hospital, Lilongwe, Malawi

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Abstract

The optimal approach of provider-initiated HIV testing and counseling (PITC) for inpatients in high-burden settings is unknown. We prospectively evaluated the implementation of task-shifting from clinician-referral to counselor-initiated PITC on the medical wards of Kamuzu Central Hospital, Malawi. The majority of patients (1905/3154, 60.4%) had an unknown admission HIV status. Counselors offered testing to 66.6% (1268/1905). HIV prevalence was 39.3%. Counselor-initiated PITC significantly increased HIV testing by 79% (643/2957 vs. 1228/3154), resulting in an almost 2-fold increase in patients with known HIV status (2447/3154 vs. 1249/3154) (both p<. 0001), with 18.4% of those tested receiving a new diagnosis of HIV.

Keywords

provider-initiated HIV testing and counseling (PITC); task-shifting; lay-counselor; HIV prevalence; HIV case-finding

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INTRODUCTION

Despite efforts to increase HIV testing through provider-initiated testing and counseling (PITC), an estimated 7.5 million people are eligible but do not initiate antiretroviral treatment because they are unaware of their HIV status.[1–3] Identifying HIV status is important for inpatient clinical management and for accessing HIV care. Practical approaches are needed to implement PITC within inpatient settings in low resource areas with medical staff shortages.[4]

In Malawi, approximately 11% of adults are HIV-infected[5] and national guidelines recommend routine opt-out HIV testing for all patients accessing health services using a PITC approach.[6] The World Health Organization (WHO) advocates task-shifting (the redistribution of tasks to healthcare workers with less training) to make efficient use of workforce resources and improve clinical care, including HIV testing.[7] Kamuzu Central Hospital (KCH), the tertiary referral center for central Malawi, serves an estimated five million people. Until recently, inpatient HIV testing occurred primarily through clinician referral, and medical ward HIV prevalence was unknown.[8] In Malawi, counselor-initiated PITC has been implemented in several settings and could potentially increase testing and case-finding on the medical wards.[9–12]

We implemented routine opt-out counselor-initiated HIV testing on the adult medical ward at KCH, assessed impact on testing uptake, estimated HIV prevalence, and evaluated factors associated with being offered testing.

METHODS

Study setting

After initial outpatient assessment at KCH, patients requiring further care are triaged to the medical “short stay” where approximately 46,000 patients per year are evaluated, resulting in 17–20 daily admissions to the 117 bed medical ward. The short stay and medical ward are staffed by 9 nurses and 4 medical teams; each team consists of a consultant, two registrars, one clinical officer and approximately 2 interns.

Previously, one HIV counselor was responsible for testing all adult inpatients referred by clinicians. In November 2011, we implemented counselor-initiated HIV testing for inpatients in collaboration with the Lighthouse Trust which operates HIV testing/treatment clinics and trains counselors.[13] One counselor was stationed in the medical short stay, and one was based on the wards to test those missed in short stay. Counselors were available Monday-Friday from 8am-4pm and one counselor worked Saturday mornings.

Counselors verified HIV status using the patient’s health passbook. Patients with a documented positive test were considered “previously positive”; those with a negative test within 3 months were “previously negative.” Patients without testing documentation or with a negative test ≥ 90 days were considered “unknown” admission HIV status and offered testing. Rapid point-of-care testing[14] occurred in counseling rooms for ambulatory patients, or at the bedside for immobile patients.

Data Collection

Pre-intervention data including the number of medical ward patients tested, their test results, and number of medicine ward admissions were retrospectively collected from HIV counselor registers and hospital admission logs for the six months prior to our program implementation.

At implementation, counselors used a standardized form to document HIV admission status, test result, or refusal. A standardized admission form including demographics, admission/outcome date, and outcome (discharge, death, abscond), were completed by clinicians as part of routine care. Data missing from charts was collected from hospital registers and counselor testing logs when available.

Data Analysis

Data was analyzed using SPSS 20.0 (SPSS Inc., Chicago, IL). Medians (for non-normally distributed continuous variables) were compared using Mann-Whitney U tests and proportions of descriptive categorical variables were compared using Pearson's chi-square. The proportion of admissions tested before vs. after intervention, and the proportion of patients with a known HIV status on admission vs. discharge were compared using prevalence ratios (PR). Factors associated with HIV testing offer were evaluated using univariate analysis with chi-square tests and odds ratios (OR). Patients with unknown admission HIV status with complete data were used in the multivariate logistic regression model. As all variables in the univariate model were identified *a priori* as potential confounders, all were included in the multivariate logistic regression model. Statistical tests were calculated with 95% confidence intervals.

Ethical Approval

This study was approved by the Malawi National Health Sciences Research Committee and the University of North Carolina Institutional Review Board.

RESULTS

During the six months prior to our intervention 21.7% (643/2957) of patients admitted to the medical ward were tested, with 31.4% (202/643) found to be HIV-infected (Table 1).

In our 6 month study (November 2011 – April 2012), 3154 patients were admitted to the medical wards (Supplemental Figure 1). Slightly more men were admitted than women, and the median age was 35 years (interquartile range [IQR] 26–48) (Supplemental Table 1). Median length of stay was 2 days, with the majority (63.3%) admitted for ≤3 days. Nearly 20% of patients died. Patients with previously known HIV status had slightly longer median length of stay and higher mortality.

Of the 1249 patients with a known admission HIV status, 81.1% were positive (1013/1249), with 71.3% (722/1013) on anti-retroviral therapy. Of the 60% (1905/3154) of admissions with unknown HIV status, counselors offered testing to 1268/1905 (66.6%), which was refused by 40/1268 (3.2%) (Supplemental Figure 1). HIV prevalence was 39.3% (1240/3154, 95% CI 37.6–41.0), including 227/1228 (18.4%) newly diagnosed patients.

HIV status was identified in 78.5% (2477/3154) of patients prior to discharge/death versus 39.6% (1249/3154) on admission (PR 2.0 [1.9–2.1] p<.0001).

Compared to the 6 months pre-intervention, the proportion of admissions receiving HIV testing increased by 79% from 21.7% (643/2957) to 40.2% (1228/3154, PR 1.8 [95% CI 1.7–2.0] p<.0001) (Table 1). The percentage of patients with unknown HIV status on admission is not known during the 6 month period prior to our intervention. However, the proportion of patients with unknown admission status appears to be stable at approximately 60% from previous estimates in 2008–2009 (62%),[8] our current study (60%), and a post-6 month implementation estimate (62%).[15] Using a reasonable assumption of 60% (1774/2957) of patients with unknown HIV status in the 6 months pre-implementation, our intervention resulted in an estimated testing increase of those with unknown admission HIV status from 36.2% (643/1774) to 64.5% (1228/1905, PR 1.8 [95% CI 1.7–1.9] p<.0001).

To identify barriers to HIV testing, we evaluated factors associated with being offered testing. In univariate analysis, female gender, weekday/non-holiday admission, and longer hospital stay were all significantly associated with increased odds of being offered testing, while death was significantly associated with decreased testing (Table 2). In the multivariate analysis, all remained significant except for gender. Patients admitted on weekdays/non-holidays were 3.6 ([95% 2.8–4.7] p<.001) times more likely to be offered testing than those admitted on weekends/holidays. Patients with a 2–3 day length of stay were 3.2 ([95% CI 2.5–4.3] p<.001) times more likely to be offered tested compared to patients admitted for ≤1 day. Patients who died were less likely to be offered testing (aOR 0.60 [95% CI 0.4–0.8] p<.001).

DISCUSSION

Task shifting from clinician-referral PITC to a counselor-initiated approach increased the proportion of patients receiving HIV testing by nearly 80% in a low resource, high prevalent HIV setting. This resulted in an almost 2-fold increase in the proportion of patients with known HIV status on discharge, with 18% of patients tested found to have a new diagnosis of HIV. Increasing case-finding allows patients to access HIV care including ART initiation which reduces HIV transmission to uninfected partners.[16,17] As ART eligibility expands, research regarding all steps of the HIV care cascade from testing to linkage to outcomes of long term care, are needed.[18]

Despite Malawi national guidelines promoting routine PITC and improvements in countrywide testing uptake, the percentage of patients admitted to the KCH medical wards with an unknown HIV status (no test within 90 days) remained high at 60%.[6,19] HIV prevalence also remains high among medical inpatients at KCH at approximately 40%, even in the era of ART.[20] Our sero-prevalence is similar to those found on tertiary care hospital medical wards in Uganda and Tanzania.[21,22] That the majority of medicine patients did not know their HIV status on admission, and a new diagnosis of HIV was made in nearly 1 in 5 patients tested, demonstrates the important role that inpatient testing plays in case-finding. Following our intervention, HIV status was identified for the majority (78.5%) prior to discharge.

Although the WHO recommends PITC, the optimal approach in inpatient settings is unclear.[1,4] Relying on clinician referral resulted in an unacceptably high number of patients with unknown HIV status on discharge, including those who were likely HIV-infected, representing a missed opportunity for case-finding. Previously described PITC barriers include high patient to provider ratios, provider turn-over, and provider discomfort.[4,11] A counselor-initiated approach has been used in diverse settings to increase HIV testing.[23–26] Counselor-based PITC resulted in the doubling of patients tested in outpatient clinics in Zambia.[26] In Botswana, transitioning from voluntary to routine opt-out HIV testing by counselors increased testing from 76% to 95% in antenatal clinics.[9–11] Incorporating counselor-testing and volunteer escorts increased the number of children offered testing from 6% to 65% on the KCH pediatric wards.[11] Over 99% of women accepted HIV testing by counselors in an antenatal care program in Lilongwe, Malawi.[10] Our lower proportion of patients receiving testing compared to outpatient examples is likely partially due to the lack of HIV counselor coverage during all admission hours and short lengths of stay. In outpatient settings, counselors are usually available during most clinic hours, whereas in the hospital, admissions occur at any time.

In our study, admission on a weekend/holiday, shorter length of stay, and death were all significantly associated with not being offered testing. In a Botswana tertiary care hospital, factors associated with not testing included female gender, shorter length of stay, and older age.[27] The authors speculated that clinician perception of HIV risk affected who was offered testing. In our study, factors associated with not testing were related to counselor coverage as opposed to socio-demographic factors. Counselors reported that locating patients admitted during non-testing hours was challenging. Additional barriers to patient tracing included missing paper charts and incomplete admission registers. Although we did not collect time of admission, a previous evaluation revealed that nearly 60% of KCH medical ward admissions occur between 4 pm-8 am.[28] Twenty-four hour testing strategies have been used on maternity wards to increase HIV testing coverage.[29] Increasing counselor coverage on nights, weekends/holidays, testing soon after admission, improving efficiency with group pre-test counseling, as well as coordination of locating patients with nursing staff could increase testing.

Limitations to this study include incomplete patient data due to missing/incomplete charts that reflect the realities of paper-based systems as well as clinician-collected data during routine care. Missing data may have affected our analysis of the factors associated with test offer, but did not affect primary testing outcomes. When available, we used additional sources including admission registers and counselor testing logs. Implementation of an electronic medical record is underway, which could decrease missing records. Strengths of our study include a counselor-initiated approach that is likely generalizable to many hospital settings in sub-Saharan Africa.

Our study found that the burden of undiagnosed HIV remains high in hospitalized adults at a tertiary referral hospital in Malawi and that counselor-initiated PITC is an acceptable and feasible approach to increase testing and case-finding, which is the first step in reducing the HIV epidemic.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Impact of routine opt-out counselor-initiated HIV testing on proportion of patients tested at Kamuzu Central Hospital, Malawi

	Pre-Intervention May 2011 – Oct 2011 ***Clinician Referral***		**Post-Intervention Nov 2011 – April 2012** ***Counselor-Initiated***		
	N	**%**	**N**	**%**	***p***
Medicine ward admissions	N=2957		N=3154		
Patients tested of total admissions	643/2957	21.7	1228/3154	38.9	<.0001
Unknown HIV status on admission	1774/2957*	60*	1905/3154	60.4	
Patients tested with unknown admission status	643/1774*	36.2*	1228/1905	64.5	<.0001
Sex of patients tested	N=643		N=1228		.049
Male	358	55.7	625	50.9	
Female	285	44.3	1228	49.1	
Age (years) of patients tested	N=642**		N=1166**		<.074
Median (IQR)	33	26–45	34	25–53	
Outcome of inpatient HIV testing	N=643		N=1228		<.001
Negative	441	68.6	1001	81.5	
Positive	202	31.4	227	18.5	

* Estimated number and percentage of patients with an unknown HIV admission status was based on the estimates from previous periods as described in the text.

** N does not equal number of patients tested due to missing data.

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Table 2

Correlates of HIV testing offered to patients with unknown admission status, odds ratio (OR) estimates from univariate and multivariate* logistic regression models

	Not Offered Testing N=637		Offered Testing N=1268							
	N	**%**	**N**	**%**	**Crude OR**	**95% CI**	***p***	**Adjusted OR****	**95% CI**	***p***
Gender	N=637		N=1268							
Male (ref)	373	58.6	648	51.1	1			1		
Female	264	41.4	620	48.9	1.4	1.1, 1.6	.002	1.0	0.8, 1.3	.978
Age (years)	N=547		N=1203							
<=19	56	10.2	149	12.4	1.3	0.9, 1.9	.15	1.4	0.9, 2.2	.123
20–29	169	30.9	324	26.9	1.0	0.7, 1.3	.71	0.9	0.6, 1.3	.550
30–39 (ref)	123	22.5	249	20.7	1			1		
40–59	96	17.6	230	19.1	1.2	0.9, 1.6	.30	1.1	0.7, 1.6	.656
>=60	103	18.8	251	20.9	1.2	0.9, 1.7	.25	0.8	0.5, 1.1	.138
Weekend/Holiday Admission	N= 637		N=1268							
Yes (ref)	246	38.6	253	20.0	1			1		
No	391	61.4	1015	80.0	2.5	2.0, 3.1	<.001	3.6	2.8, 4.7	<.001
Length of stay (days)	N=503		N=1208							
0–1 (ref)	305	60.6	33	25.9	1			1		
2–3	127	25.2	410	33.9	3.2	2.4, 4.1	<.001	3.2	2.5, 4.3	<.001
4–6	48	9.5	259	21.4	5.2	3.7, 7.4	<.001	6.1	4.2, 8.9	<.001
>=7	23	4.6	226	18.7	9.6	6.1, 15.1	<.001	14.2	8.3, 24.4	<.001
Hospital Outcome	N=507		N=1215							
Alive (ref)	391	77.1	1049	86.3	1			1		
Died	116	22.9	166	13.7	0.5	0.4, 0.7	<.001	0.6	0.4, 0.8	<.001

* Adjusted for all other variables in model (gender, age, weekend/holiday admission, length of stay, and hospital outcome)

** Only those patients with HIV unknown status on admission with complete data were used in the multivariate logistic regression model, N=1634