A successful model for rapid triage of symptomatic patients at an HIV testing site in Haiti

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Background: Attrition from HIV testing to antiretroviral therapy (ART) initiation is high. Strengthening linkages in care from testing to treatment may reduce attrition. This study addresses the question: can social workers accurately identify symptomatic patients during HIV testing and fast-track them for rapid provision of services?

Methods: This study took place at the Haitian Study Group for Kaposi's Sarcoma and Opportunistic Infections (GHESKIO) in Port-au-Prince, Haiti. We compared symptoms reported by social workers at HIV testing using a checklist to diagnoses made by physicians on an intake exam to determine if social workers could accurately identify symptomatic patients.

Results: Among the 437 HIV-positive patients included in the study, social workers reported stage-associated symptoms in 100% of patients diagnosed with WHO stage 3 or 4 conditions and in 87% of patients with WHO stage 1 or 2 conditions. The sensitivity, specificity, positive predictive value, and negative predictive value of social worker-reported symptoms for the diagnosis of a WHO stage 3 or 4 condition was 100%, 47%, 31%, and 100%, respectively.

Conclusions: Social workers can identify symptomatic patients at HIV testing and refer them for fast-tracked services. This strategy may increase the rate of ART initiation among eligible patients.

Keywords: AIDS, Attrition, Haiti, HIV, Retention in care, Human resources

Introduction

Multiple studies have documented that attrition is high at every step from HIV testing to antiretroviral therapy (ART) initiation, even among patients who immediately qualify for treatment.^{1–8} Detailed tracking studies of ART-eligible patients lost to care have found that up to 58% have died, most within months of their last visit.^{9–12} In resource-poor settings, delays in ART initiation are common.^{3,6,13} Effective strategies to rapidly link patients to care are urgently needed.

At the Haitian Study Group for Kaposi's Sarcoma and Opportunistic Infections (GHESKIO), social workers routinely administer a symptom checklist before HIV testing, and refer symptomatic patients for same-day physician evaluation. The goal of the symptom checklist is to screen patients for HIV-related symptoms at the time of testing and triage symptomatic patients for urgent evaluation. It is not known if social workers can accurately identify patients with symptoms. If social workers miss symptomatic patients, this could lead to unnecessary suffering and a delay in

care since these patients will not be evaluated by a physician on the same day as HIV testing. If social workers over-report symptoms, then physicians could be swamped with patients, preventing symptomatic patients from being seen expeditiously. We conducted a study to evaluate the correlation between symptoms reported by social workers, and diagnoses made by physicians on the intake examination.

Materials and methods

Study setting and patient population

GHESKIO is the oldest and largest HIV testing facility in Haiti. Comprehensive HIV/AIDS treatment is provided free of charge. All patients are offered testing for HIV at the time of registration. During HIV pre-test counseling, the social worker administers a checklist of symptoms (fever; night sweats; weight loss >10% of body weight; cough; dyspnea; hemoptysis; dysphagia; thrush; diarrhea; prurigo; herpes zoster; lymphadenopathy) to all patients. The symptoms

Table 1. Proportion of illnesses diagnosed by a physician for which the social worker (SW) reported at least one associated symptom

	Total no. cases	Cases with symptom reported by SW n (%)
CD4 cell count ≤ 350 cells/mm ³ (n=209) ^a		
Patients with WHO stage 1 or 2 disease (n=144)		
Early stage illness		
Herpes zoster	34	33 (97)
Respiratory symptoms	29	27 (93)
Papular pruritic eruption	15	14 (93)
Isolated fever <1 month	15	9 (60)
Moderate unexplained weight loss	11	8 (73)
Gastrointestinal symptoms	5	3 (60)
Lymphadenopathy	3	3 (100)
Total number of early stage illnesses	112	97 (87)
Patients with WHO stage 3 and 4 diseases (n=65)		
WHO stage 3 or 4 condition		
Tuberculosis	28	28 (100)
Pneumonia	14	14 (100)
Severe unexplained weight loss	13	13 (100)
Unexplained chronic diarrhea	7	7 (100)
Esophageal candidiasis	5	5 (100)
Severe unexplained anemia	3	3 (100)
Chronic cryptosporidiosis	1	1 (100)
HIV wasting syndrome	1	1 (100)
Total number of WHO stage 3 and 4 conditions	72	72 (100)
CD4 cell count >350 cells/mm ³ (n=228) ^b		
Patients with WHO Stage 1 or 2 Disease (n=212)		
Early stage illness		
Herpes zoster	40	38 (95)
Respiratory symptoms	18	15 (83)
Papular pruritic eruption	4	2 (50)
Isolated fever <1 month	6	4 (67)
Moderate unexplained weight loss	7	7 (100)
Gastrointestinal symptoms	4	3 (75)
Lymphadenopathy	1	1 (100)
Thrush	3	2 (67)
Total number of early stage illnesses	83	72 (87)
Patients with WHO stage 3 and 4 diseases (n=16)		
WHO stage 3 or 4 condition		
Tuberculosis	12	12 (100)
Unexplained chronic diarrhea	2	2 (100)
Pneumonia	1	1 (100)
Severe unexplained anemia	1	1 (100)
Total number of WHO stage 3 and 4 conditions	16	16 (100)

SW: social worker.

^a Among patients with CD4 cell count ≤ 350 cells/mm³, 82 patients with WHO stage 1 or 2 disease presented with a total of 112 early stage illnesses; 65 patients with WHO stage 3 and 4 disease had a total of 72 WHO stage 3 and 4 conditions.^b Among patients with CD4 >350 cells/mm³, 67 patients with WHO stage 1 or 2 disease presented with a total of 83 early stage illnesses; 16 patients with WHO stage 3 and 4 disease had a total of 16 WHO stage 3 and 4 conditions.

included in the checklist correspond to conditions that are present at different WHO stages of HIV disease and that are commonly diagnosed at GHESKIO. These conditions are included in Table 1. The social workers at GHESKIO are all Haitians who have completed

secondary school as well as the equivalent of an undergraduate degree in social work. They all speak Haitian Creole fluently.

Symptomatic patients are referred for a same-day physician evaluation. A physician evaluates asymptomatic patients once

they receive a positive HIV test result, usually days after the test is conducted. A CD4 cell count is obtained after the physician evaluation and the results are available at a subsequent visit. Patients with HIV are treated with antiretroviral medications if they meet criteria for ART initiation.

To establish our study population, we generated a list of all patients with a positive HIV test between January and June 2009 and a completed CD4 cell count, using an electronic patient database. We chose every other patient on the list to include in our study. We excluded 53 charts that were missing a social worker checklist or a physician intake note. We also generated a list of patients with a negative HIV test from January to June 2009, to assess the proportion of HIV-negative patients with symptoms. We chose every 40th patient on the list for study inclusion.

Data collection and analysis

We reviewed all medical records for each patient, including the social worker symptom checklist, physician notes, laboratory and radiographic results and medications prescribed. For each patient, we determined whether the social worker reported at least one associated symptom for each illness diagnosed by the physician on the intake examination. Two members of the study team (ME and SK) independently reviewed the clinical data for each patient; a third reviewer (CG) reviewed charts for which there were discrepancies, and agreement was achieved by discussion between the three reviewers. The study was reviewed and approved by institutional review boards of all participating organizations.

Results

From January to June 2009, 11 578 adult patients (age ≥ 18 years) underwent HIV testing, and 1398 (12.1%) patients tested positive. Of these, 338 (24.2%) did not return for CD4 cell testing and were excluded from the study. Of the remaining 1060 HIV-infected patients, we randomly selected 500 charts for study inclusion, as described above. Among the included 437 patients with HIV, the median age was 36 years (IQR 28–44) and 275/437 (62.9%) were women. The median CD4 cell count was 365 cells/mm³ (IQR 178–520). A random sample of 250 patients from the 10 180/11 578 (87.9%) patients who tested negative for HIV, was included in the study. Among these HIV-negative patients, the median age was 29 (IQR 23–40) and 180/250 (72.0%) were women.

Patients with CD4 cell count ≤ 350 cells/mm³

Out of 437 patients, 209 (47.8%) had a baseline CD4 cell count ≤ 350 cells/mm³. Of these, 144 (68.9%) were characterized by the physician as having WHO stage 1 or 2 conditions at presentation. The physician diagnosed 82 (56.9%) patients with 112 early stage illnesses (see Table 1). The social worker reported at least one associated symptom for 97/112 (87.6%) syndromes during HIV pre-test counseling. Out of 144 patients, 62 (43.1%) were determined to be asymptomatic by the physician. Of these, 47 (76%) were also reported as asymptomatic by the social worker. Among the 15 patients that were reported as asymptomatic by the physician but not the social worker, symptoms included

weight loss (13 patients), fever (4 patients), prurigo (4 patients), respiratory symptoms (3 patients), lymphadenopathy (2 patients), dysphagia (2 patients), and herpes zoster (1 patient).

Out of 209 patients with a baseline CD4 cell count ≤ 350 cells/mm³, 65 (31.1%) were diagnosed with 72 WHO Stage 3 or 4 conditions. Of these, 28 (43%) had TB, 14 (22%) had pneumonia, 13 (20%) had severe weight loss, 7 (11%) had unexplained chronic diarrhea, 5 (8%) had esophageal candidiasis, 3 (5%) had severe unexplained anemia, 1 (2%) had chronic cryptosporidiosis, and 1 (2%) had HIV wasting syndrome. In each of these cases, the social worker reported at least one associated symptom on the checklist.

Patients with CD4 cell count >350 cells/mm³

Out of 437 patients, 228 (52.2%) had a baseline CD4 cell count >350 cells/mm³. Of these, 212 (93.0%) were characterized by the physician conducting the intake evaluation as having WHO stage 1 or 2 conditions. The physician diagnosed 67 (31.6%) of these patients with 83 early stage illnesses (see Table 1). The social worker reported at least one associated symptom for 72/83 (87%) syndromes. Out of 212 patients, 145 (68.4%) were determined to be asymptomatic by the physician. Of these, 120 (82.8%) patients were also reported as asymptomatic by the social worker. Among the 25 patients that were reported as asymptomatic by the physician but not the social worker, reported symptoms included weight loss (20 patients), fever (4 patients), a respiratory symptom (4 patients), prurigo (2 patients), and dysphagia (2 patients).

Out of 228 patients with a baseline CD4 cell count >350 cells/mm³, 16 (7.0%) were diagnosed with 16 WHO Stage 3 or 4 conditions. Of these, 12 (75%) had TB, 2 (13%) had unexplained chronic diarrhea, 1 (6%) had pneumonia, and 1 (6%) had severe unexplained anemia. In each of these cases, the social worker reported at least one associated symptom.

Clinical status of fast-tracked patients

The social worker reported at least one symptom for 270/437 (61.8%) patients with HIV. Among these patients, 230 (85.2%) were diagnosed with a symptomatic illness by the physician; 163 (60.4%) of these had a CD4 cell count ≤ 350 cells/mm³ or a WHO stage 3 or 4 condition. The other symptomatic patients were treated for early stage diseases, such as herpes zoster. Out of 270 patients, 40 (14.8%) were not diagnosed with an illness by the physician. In 33 (83%) of these patients, weight loss was the only symptom reported by the social worker.

Test characteristics of the symptom checklist

We calculated the test characteristics of the checklist for identifying patients with a WHO stage 3 or 4 condition. We found that the checklist had a sensitivity of 100%, a specificity of 47%, a positive predictive value of 31%, and a negative predictive value of 100% for the diagnosis of a WHO stage 3 or 4 condition by the evaluating physician. The symptoms with the greatest proportion of patients who had WHO stage 3 or 4 conditions were: thrush 7/8 (88%), diarrhea 22/29 (76%), dysphagia 15/24 (63%), cough 51/100 (51%), hemoptysis 6/12 (50%), fever 47/96 (49%), dyspnea 22/45 (49%) and night sweats 13/29 (45%). To determine whether

a checklist composed of these eight symptoms would be equally effective we also calculated the test characteristics of this checklist and found a sensitivity of 92%, a specificity of 75%, a positive predictive value of 46%, and a negative predictive value of 97%.

HIV-negative patients

Among the 250 HIV-negative patients, 189 (75.6%) did not report any symptoms and 61/250 (24.4%) patients had at least one symptom and were referred for same-day physician evaluation. Five HIV-negative patients were diagnosed with TB. Four of these patients presented with cough and one with fever and weight loss; social workers reported associated symptoms in all five patients.

Discussion

We found that social workers can effectively identify symptomatic patients during HIV pre-test counseling with the use of a symptom checklist. Eighty-five percent of patients who were determined to be symptomatic by social workers and referred for physician evaluation were diagnosed with an HIV-related illness and 60% had a CD4 cell count ≤ 350 cells/mm³. The social worker reported at least one associated symptom for 87% of patients with WHO stage 1 or 2 conditions and 100% of patients with WHO stage 3 or 4 conditions.

The symptom checklist had 100% sensitivity, 47% specificity, 31% positive predictive value and a 100% negative predictive value for the diagnosis of a WHO stage 3 or 4 condition by the evaluating physician. This high sensitivity and negative predictive value are ideal for a screening test. With the use of the symptom checklist, we found that social workers are able to identify the sickest patients. They are also able to screen out patients who are unlikely to have a WHO stage 3 or 4 condition and who do not need to be seen urgently. The low specificity and positive predictive value indicate that the symptom checklist did not identify with great accuracy whether or not patients who were triaged for same-day evaluation had WHO stage 3 or 4 conditions. However, the objective of the symptom checklist is not for the social workers to diagnose the patients with a WHO stage 3 or 4 condition, but to determine which patients should be referred for physician evaluation. A shorter checklist containing the symptoms most prevalent among patients with WHO stage 3 or 4 conditions had a sensitivity, specificity, positive predictive value, and negative predictive value of 92%, 75%, 46%, and 97% respectively. This suggests that a targeted checklist is also effective at screening out patients unlikely to have a WHO stage 3 or 4 condition, although it misses more patients with WHO stage 3 or 4 conditions.

The day of HIV testing represents an opportunity to link newly diagnosed patients to care. High rates of attrition during the period from HIV testing to ART initiation are reported worldwide, even among patients who already qualify for ART.^{3-7,13,15-17} Many studies have reported that attrition occurs early, often within weeks of HIV testing.^{6,8,13,17,18} Therefore, interventions to improve retention in care are likely to be most effective within days to weeks after presentation.

Patients identified at the time of testing as likely to qualify for treatment can be evaluated for treatment sooner, which may

decrease the time between testing and ART initiation. In clinical settings where rapid CD4 cell testing and ART can be provided, patients may even be able to start antiretroviral treatment on the day that they test positive, further eliminating barriers to care between testing and treatment. Even in sites with waitlists for ART initiation, earlier identification of patients with clinically advanced disease could help to distinguish patients in more need of rapid care and allow clinics to target their resources to patients with the greatest need.

There are few published studies on the ability of social workers to identify patients with HIV-related symptoms. Brentlinger et al. reported that expert clinicians agreed with fewer than half of stage-defining diagnoses by non-physician clinicians in Mozambique.¹⁹ McGrath et al. found that a checklist administered by non-physician field staff to a population-based sample of households in rural Malawi at the time of HIV testing had low sensitivity (50%) in identifying ART-eligible patients, compared with a checklist administered by medical assistants.²⁰ However, at GHESKIO, social workers do not stage patients. Rather, they screen patients for symptoms at the time of HIV testing, and refer them for physician evaluation.

We found that 15% of HIV-infected patients referred to a physician were not diagnosed with an illness. Weight loss was the most common symptom reported by the social worker but not the physician. With the inclusion of body-mass index in the decision to refer, it is likely that social workers could determine which patients have significant weight loss. Social workers can also be coached to improve their accuracy at detecting symptoms.

Current WHO guidelines recommend initiating ART in all patients with a CD4 cell count of ≤ 500 cells/mm³, however a lower threshold was used to initiate therapy at the time that this study was conducted.¹⁴ The goal of screening patients with the symptom checklist is to identify symptomatic patients at the time of HIV testing, before the result of a CD4 cell count is available, and to triage them for more urgent care. Regardless of the CD4 cell count threshold for ART initiation, it is important to prioritize patients with clinically advanced disease for early evaluation.

Referring symptomatic patients prior to HIV testing had minimal impact on physician workload, because most HIV-negative patients were asymptomatic. Among symptomatic HIV-negative patients, TB was the most common diagnosis.

Limitations

Our study was limited by the use of retrospective clinical data. It is also possible that physicians could have missed symptoms that were present at the time of HIV testing. The most prevalent HIV-related conditions and their associated symptoms may differ from country to country, however the strategy of using a social worker-administered symptom checklist could still be adapted to other settings.

Conclusions

Social workers can accurately identify patients with symptomatic early stage or WHO stage 3 and 4 conditions at HIV testing, permitting same-day physician evaluation and treatment. This may improve linkage to care for patients newly diagnosed with HIV

infection and decrease delays in ART initiation among eligible patients.

Authors' contributions: ME, SK, WP, and PS conceived the study; ME, SK, WP, and PS designed the study protocol; CG, FH, JE, RB, PJ, CB, DD, and PS provided clinical care for the patients included in this study; all authors participated in data collection and/or analysis; ME, SK, and PS wrote the first draft of the manuscript; all authors critically revised the manuscript for intellectual content. All authors read and approved the final manuscript. ME and SK are guarantors of the paper.

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