Utilization of a basic care and prevention package by HIV-infected persons in Uganda


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Abstract
Opportunistic infections are the leading cause of mortality among HIV-infected people. Several simple interventions prevent illness, prolong life, or prevent HIV transmission from HIV-infected people in Africa. These include: cotrimoxazole prophylaxis; insecticide-treated bed nets; supplies for household water treatment and safe storage; materials promoting family voluntary counselling and testing (VCT); and condoms. We provided these interventions to adults and children with HIV who were members of the AIDS Support Organization in Uganda. To evaluate use of this basic care and prevention package, we surveyed a representative sample of 112 clients of TASO in their homes. Among respondents, 95% reported taking cotrimoxazole everyday, 89% said they had slept under a bednet the night before, 65% reported current treatment of household drinking water, 89% of sexually active respondents reported using condoms, and 96% reported family use of VCT. Household observations verified that use of cotrimoxazole, bednets, and water treatment products were consistent with reported use. This evaluation suggests successful distribution and use of basic care and prevention services at an AIDS organization in Uganda.

Background
HIV/AIDS is a leading cause of morbidity and mortality in Africa. Sub-Saharan Africa is home to 24.5 million (64%) of an estimated 38.6 million people worldwide living with HIV (UNAIDS, 2006). In Uganda, the overall prevalence rate of HIV/AIDS is 7.0%, with an estimated 530,000 people infected (http://www.cdc.gov/nchstp/od/gap/countries/docs/04profiles/FY04%20OGAC%20Uganda.Final.pdf).

Opportunistic infections (OI) present severe challenges to people living with HIV in Africa, where access to antiretroviral therapy is limited, palliative care is often suboptimal, and poor environmental conditions increase the risk of infection (Chaisson, 1998; Grant, 2001; Jeffrey, 1994). There is an urgent need for implementation of standardized, evidence-based measures to prevent OIs in adults and children with HIV (Mermin, 2005).

To help prevent HIV transmission and reduce morbidity and mortality, a basic care and prevention package (BCP) was developed and provided to health care institutions in Uganda for free distribution to people with HIV. The BCP incorporated five interventions:

1. Cotrimoxazole prophylaxis, which reduces mortality; decreases the risk of diarrhoea, malaria, and bacteremia; and potentially benefits CD4 cell count and viral load among people with HIV living in Africa (Badri, 2001; Castetbon, 2001; Mermin, 2004; Witkor, 1999). Cotrimoxazole prophylaxis has been recommended for daily use by adults and children with HIV by the Joint United Nations Program on HIV/AIDS (UNAIDS) and the World Health Organization (WHO, 2006) and is recommended by the Ugandan Ministry of Health for all individuals living with HIV.

2. Insecticide-treated bed nets (ITNs). Among people with HIV, malaria is more common and more severe (Grimwade, 2003; Whitworth, 2000), and may increase HIV viral load (Kublin 2005) and decrease CD4 cell count (Mermin, 2006b). ITNs reduce the risk of malaria in both HIV-infected (Mermin, 2006a) and uninfected people (Lengeler, 2004; Ter Kuile, 2003a, 2003b).

3. The Safe Water System (SWS), (CDC, 2000; Reiff, 1996) is a household-based water quality intervention that has been shown to reduce the
risk of diarrhoea through treatment of water with sodium hypochlorite solution, safe water storage, and behaviour change techniques (Luby, 2004; Semenza, 1998; Quick, 1996, 2002). A recent study in Uganda demonstrated that use of the SWS reduced the number of episodes and duration of diarrhoea among people with HIV (Lule, 2005).

4. **HIV voluntary counselling and testing (VCT)**
   Among family members of people with HIV (family VCT) effectively identifies children and adults with HIV as well as HIV-discordant couples (Were, 2006; Malamba 2005).

5. **Condoms**
   The provision of condoms to HIV-discordant couples has been associated with an 80-90% reduction in HIV transmission in Africa (Allen, 2003, 1992; Gallo, 2006; Kamenga, 1991; Weller, 2001).

During the first six months of the BCP Program, which began in September 2005, The AIDS Support Organization (TASO) and other programmes in government and non-governmental clinics and hospitals funded by the Centers for Disease Control and Prevention (CDC) distributed the BCP to over 30,000 people with HIV in Uganda. During the first six months of the programme, BCPs were primarily distributed in central and southern regions of the country. In April 2006, we conducted an evaluation of the programme to determine utilization rates and barriers to use of the different BCP components.

**Methods**

**Population**

The evaluation population included people with HIV living in urban and rural settings in Uganda who were enrolled in TASO facilities in Mbale, Mulago, and Mbarara, where approximately 23% of BCPs had been distributed. As of March 2006, TASO Mbale had distributed 2,000 BCPs among its active (seen within last six months) client population of 8,000, and the TASOs in Mbarara and Mulago had each distributed 2,500 BCPs among their populations of approximately 10,000 active clients each.

**Sampling**

We selected the evaluation population from 1,911 TASO clients from the three sites who had received the BCP during the first three months of the programme, before 31 December 2005. Review of the TASO BCP enrolment database revealed that the 1,911 clients were spread out among 251 subcounties. Because of time, logistical, and resource limitations, we selected clients for evaluation only from subcounties that had a minimum of 10 BCP recipients; 41 subcounties met this criterion, accounting for 1,333 (70%) of 1,911 BCP recipients.

We calculated a sample size of 90 TASO clients, assuming that the utilization rate of the least-used of four main household interventions (cotrimoxazole, ITNs, the safe water hypochlorite solution [which, in Uganda, had the brand name WaterGuard], and the safe water storage vessel) would be 50%, with an error of ±10%. In anticipation that some TASO clients’ households would be difficult to locate because of a lack of named streets and numbered homes and high client mobility, we selected 180 TASO clients for interview, using a random numbers table.

**Basic care and prevention package**

The BCP was packaged in a cardboard box that contained two insecticide-treated bednets; a 20-liter plastic jerry can with a narrow mouth, tap, and lid for safe drinking water storage; three bottles of WaterGuard solution which lasts approximately three months per family; a cloth for filtering water poured into the vessel; and a pamphlet for family members describing household-based VCT services, which include education about HIV counselling and testing offered by TASO. The three TASO facilities followed similar BCP distribution procedures, which included health education, counselling, a medical visit (if necessary), a pharmacy visit to obtain free cotrimoxazole, followed by distribution of the BCP. Some clients received cotrimoxazole from other health facilities. The TASO facilities provided free condoms separately, usually during counselling sessions. Typically, condoms were only provided to sexually active clients. The components of the BCP cost a total of US$19.14 and were provided free to TASO clients.

**Survey**

The survey was conducted from 3 to 7 April, 2006; by this period, BCP recipients had been using the package for three to seven months. The survey instrument, which included questions on household demographics and socioeconomic characteristics; water sources, storage, and treatment; use of cotrimoxazole, ITNs, condoms; and VCT participation by family members, was translated into three local languages and back-translated into English. Nine field workers fluent in the local languages visited TASO clients in their homes, administered the questionnaires, and made observations of cotrimoxazole tablets, water storage containers, total chlorine residuals in stored water using the orthotolidine
method (www.aquachem.com), location of ITNs in the home, and the presence of soap, latrine, and condoms. The field workers obtained informed consent from all respondents.

Data analysis
Data from questionnaires were entered into Epi-Info version 3.2.2 and analyzed using SAS version 9.1 (Cary, North Carolina). Bivariate analyses were used to assess the effect of TASO centre, age, education, gender and other treatment variables on utilization rates of BCP components, using Chi Square tests to evaluate statistical significance.

Informed consent
This activity was determined by CDC to be a programme evaluation of public health practice and IRB regulations did not apply. Participation in the evaluation was voluntary and informed consent was obtained from all participants; personal identifiers were permanently removed from the database.

Results
For the evaluation, 112 (62%) of 180 selected TASO clients were interviewed; 31 (86%) of 36 from TASO Mbale, 35 (75%) of 47 from TASO Mbarara, and 46 (47%) of 97 from TASO Mulago. The reasons for 68 unrealized interviews included: inability to locate clients’ households (45); failure to find client at home after three visits (9); client deceased (5), receipt of BCP after December 2005 (4); client age less than 18 years (4); and client incapacitated (1). Of 112 study participants, 41 (37%) were on antiretroviral (ARV) therapy; information on why clients were not on ARVs was not obtained.

Demographics
Of 112 respondents, 85 (76%) were female and the median age was 39 years (range 19–67 years); 84 (75%) had received only a primary school education or less. Respondents’ households had a median of five family members (range 1–20). Overall, 42 clients (38%) reported that they lived with a spouse and 39 (35%) had disclosed their HIV status to their spouse/living partner. Of 42 respondents spouses, 27 (63%) had been tested for HIV and 21 (81%) were found to be HIV positive.

Cotrimoxazole prophylaxis
Of all respondents, 106 (95%) reported taking cotrimoxazole everyday; 91 (86%) reported no problems with the drug, seven (7%) had experienced an allergic/skin reaction, and 8 (7%) indicated other unspecified symptoms. The reasons given by six respondents for not using cotrimoxazole included ran out (2), allergy (2), never received it (1), and insufficient funds for transportation to the clinic (1). TASO centres provided cotrimoxazole to 93% of study participants while 7% received the medication from another medical facility. Reported reasons for using cotrimoxazole included: preventing infections (93%), treating infections (39%) and staying alive longer (25%). All respondents currently taking cotrimoxazole stated that it improved their health. Reported health improvements included: less illness (81%), more energy (46%), less malaria (26%), weight gain (18%), and less diarrhoea (8%). Cotrimoxazole tablets were observed in 101 (90%) of 112 respondent households.

ITNs and malaria
Of 112 study participants, 111 (99%) received two ITNs and one reported receiving only one ITN. At the time of interview, 87 (78%) of 111 still had two ITNs in the home, 23 (21%) had one, and one had no nets in the home; all 24 who were missing nets reported giving them away. Of 112 respondents, 100 (89%) reported that they slept under an ITN the night before. A median of three persons per household (range 0–10) slept under an ITN. Of 109 respondent households where observations were made, two ITNs were observed to be hanging over a sleeping area in 44 (40%), one ITN in 53 (49%), and more than two ITNs in 5 (5%) households. In seven households, bednets were observed but were not hanging over sleeping areas.

Of 112 participants, 106 (96%) reported that they had received information about malaria prevention, 98 (92%) from TASO staff, 60 (57%) from radio, and 21 (20%) from other health facilities. A total of 111 (99%) respondents believed that they could do something to avoid getting malaria, including using an ITN (99%), removing standing water (29%), and closing windows at night (14%).

Water sources, storage practices, and treatment
Water sources used by respondents included public tap/kiosk (39%) borehole (26%), well (17%), spring (9%) river/lake (6%), and household tap (3%); 85% of respondents did not consider water from their current source safe for drinking without treatment. All respondents stored drinking water in the household. Reported storage vessels included BCP vessel (74%), other plastic jerry can (13%), clay pot (9%), plastic buckets (2%), and metal cans (2%). BCP water storage vessels were observed to be filled with water in 70 (63%) of 112 households, empty in
33%, filled with another liquid in 1% and not observed in 3%. Of 112 survey participants, 109 (97%) stated that they did something to make their water safer for drinking, including using WaterGuard (88%), boiling (45%) and sieving through a cloth (22%). Overall, 104 (93%) respondents reported ever treating their water with WaterGuard. At the time of interview, 67 (65%) respondents stated that water stored that day in their home had been treated with WaterGuard; of these, 54 (81%) used the BCP vessel.

Chlorine residuals were found in stored water samples from 24 (36%) of 67 respondents reporting current treatment with WaterGuard. Of 43 stored water samples with no chlorine residual, only 5 (13%) had reportedly been treated less than 24 hours previously, a time period for which residual chlorine would be expected to be present. In contrast, of 24 samples with a chlorine residual, 9 (38%) had been treated less than 24 hours previously (p = 0.03).

Among the reasons given by eight respondents who had never used WaterGuard were the following: belief that water source is safe (12.5%), no WaterGuard in the house (25%), and bad taste (25%).

**VCT**

All 112 respondents had received VCT from TASO, while 107 (96%) reported that at least one other HH member of their household had received VCT. The median number of persons per household receiving VCT was 2 (range 1–11).

**Condoms**

Of 112 respondents, 104 (93%) reported having received condom use information, 101 (97%) from TASO staff, and 51 (49%) from radio. Overall, 69 (62%) participants reported that they received condoms as part of the BCP. Of 27 male study participants, 23 (85%) received condoms compared to only 46 (54%) of 85 females (p = 0.008). Condoms were observed in 54 (48%) respondents’ households.

Of 69 respondents who received condoms as part of the BCP, 38 (55%) reported having sex during the preceding 3 months. Of the 38 sexually active respondents, 27 (71%) reported always using condoms when having sex and 34 (89%) reported having used a condom during the last sexual encounter, for which 32 (94%) said they used a condom from the BCP. Of 38 recently sexually active respondents, 28 (74%) reported that their use of condoms had changed since receiving the BCP with 23 (82%) reporting an increase in condom use. The reasons reported by 4 respondents who had not used a condom last time they had sex included partner objection (50%), ran out of condoms (25%) and disliked condoms (25%).

**Discussion**

Results of this evaluation suggest that TASO was successful in distributing a package of effective, low-cost interventions and in motivating the use of these preventive measures. In the three TASO evaluated, BCPs had been distributed to about 25% of clients in the first 6 months of the project, and most clients had put the interventions to use. These findings support the recommendation to make evidence-based care and prevention interventions widely available to people with HIV (Masur 2002, Mermin 2005).

Of the five interventions included in the BCP, cotrimoxazole prophylaxis was the most widely accepted and used, with greater than 95% reporting daily use. This very high acceptance rate is likely due to several factors. First, survey respondents believed that the drug had a beneficial impact on their health including mortality reduction, a perception that was congruent with health impact data from several efficacy studies (Badri, 2001; Castetbon, 2001; Mermin, 2004; Witkor, 1999). Second, the Ugandan Ministry of Health has promoted use of cotrimoxazole prophylaxis for people with HIV since April 2005. Third, few respondents reported adverse effects from taking cotrimoxazole.

The level of use of ITNs was similarly high, with virtually all respondents reporting a belief in the effectiveness of ITNs in preventing malaria, 93% of households having at least one ITN hanging over a sleeping area, and 89% of respondents reporting having slept under an ITN the previous evening. ITNs prevent malaria among children and pregnant women when distributed at a community-level (Lengeler, 2004; Ter Kuile, 2003a, 2003b), and among adults with HIV (Mermin, 2006a). The high incidence and potentially poor outcomes of malaria among people with HIV supports the use of ITNs in HIV-infected populations (Korenromp, 2005; Kublin, 2005; Mermin, 2006b; Patnaik, 2005; Witworth, 2005).

The BCP water storage vessel also had a high degree of reported (74%) and observed (63%) use. Although 88% of survey respondents said they used WaterGuard to treat their water, only 65% reported that they had used it to treat drinking water on the day of interview. WaterGuard use was confirmed through the finding of detectable chlorine residuals in stored water in only 36% of reported current WaterGuard users. There are two possible explanations for confirmed use of WaterGuard having been
lower than reported use. First, respondents may have given an answer to the question about Water-Guard use that they believed the interviewer hoped to hear. Second, confirmed WaterGuard use may have been underestimated because water treated more than 24 hours before the household visit would be less likely to have a detectable chlorine residual than water treated less than 24 hours before the household visit. The probable reason for this finding was high chlorine demand, caused by organic material in the water that consumes chlorine over time and decreases the possibility of confirming chlorination (Oguto, 2001). However, even though chlorine demand may have eliminated residual chlorine protection of treated water for a substantial number of respondents, the risk of recontamination of water was low because of its storage in the narrow-moutheed, covered BCP containers (Deb, 1986; Roberts, 1994); 54 (81%) of 67 reported Water-Guard users stored water in the BCP vessel.

It was not possible to confirm utilization of VCT services in this survey, however, nearly all respondents reported that at least one additional household member had received VCT, and for the 64% of married people, their spouse had received HIV testing. It was also not possible to determine the marginal increase in utilization of VCT services that was motivated through the receipt of standard education regarding VCT.

Because not all TASO clients were sexually active, TASO had a policy that condoms were not routinely included in the BCP but, were provided after a counselling session in which the need was identified. Among respondents who received condoms, well over half reported having recent sex and the majority of them said that they had used condoms. The high percentage of sexually active respondents who reported an increase in condom use since receiving the BCP supports their inclusion as one of the components (Meekers, 2001; Myer, 2001). Some organizations distributing the BCP have requested and receive boxes that contain condoms. In this evaluation, very few respondents objected to condom use, and it might simplify distribution and potentially increase use if they were included.

This evaluation had several important limitations. First, the sampling method included only subcounties with at least 10 clients. Subcounties with fewer clients were typically more remote from TASO. It is possible that this population may have had different BCP utilization patterns; future evaluations should assess BCP use by more remote populations. Second, we were unable to locate a high percentage of TASO clients, particularly in Mulago, an urban TASO where the population is crowded and mobile, and homes are difficult to locate. BCP utilization patterns may be different in such populations. Third, because we did not collect baseline data for this evaluation, we could not directly measure the impact of the BCP programme on utilization of the interventions. However, other studies in Uganda have demonstrated less frequent use of cotrimoxazole prophylaxis in a similar HIV-infected population (Watera, 2006) and low utilization (6%) of insecticide treated bednets in children (Davis, 2006). Also, studies in other African settings have demonstrated substantially lower use of disinfectant solution attributable to social marketing in Safe Water System programmes (Thevos, 2000; Parker, 2006). Fourth, because of limited resources, we were unable to measure the health impact of the different interventions. Finally, for some interventions, respondents may have over-reported use. This possibility was mitigated by direct observations in respondents’ households.

Based on 6 months’ experience, the provision of BCPs appears to be a promising approach to palliative and preventive care for people with HIV. Free distribution of BCPs likely contributed to high adherence to recommended use of the various interventions by eliminating economic barriers to access. However, free distribution may be difficult to sustain over the long term. To assess potential sustainability, a cost analysis of the programme should be conducted to determine its cost effectiveness relative to other health interventions and further evaluations of BCP use should be conducted over the longer term. In the meantime, results of this evaluation justify more widespread dissemination of BCPs in Uganda and potentially elsewhere.

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References


