The Influence of HIV-Status Disclosure on Adherence, Immunological and Virological Outcomes among HIV-Infected Patients Started on Antiretroviral Therapy in Dar-es-Salaam, Tanzania

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Abstract

Background: Disclosure of HIV status pose a great challenge in many societies due to associated stigma. We prospectively investigated whether or not HIV-status disclosure before commencement of antiretroviral therapy (ART) has influence on adherence, immunological response and viral load suppression (VLS) in HIV-infected patients.

Methods: Using systematic sampling, 520 HIV-infected patients were selected prior to initiation of ART from 4 HIV care and treatment clinics (CTC) in Dar-es-Salaam. Data on HIV status disclosure and adherence were collected using a structured questionnaire, while viral load and CD4+ T-cell counts were determined through laboratory investigations. Patients were followed up for one year. We performed logistic regression to determine the association between HIV status disclosure and the outcomes.

Results: Four hundred and sixty two patients were analyzed, of whom 136 (29.4%) were males. Sixty (13%) and 310 (67.1%) of the study patients disclosed their HIV-status early and late respectively, while 92 (19.9%) did not disclose their HIV-status. Between males and females in each category, male had low number of HIV-status disclosure, p<0.05. The proportion adhering to therapy of 96.7% was higher in patients who disclosed their HIV-status before ART initiation compared to that of 85.4% among those who disclosed later on, p=0.0109. There was a statistically significant difference in terms of viral load suppression was also noted between early and later HIV status disclosure, p=0.0036.

Conclusion: Disclosure of HIV-status before initiation of ART improves patients’ adherence, and has a positive influence on CD4+ T-cell counts recovery as well as viral load suppression.

Keywords: Early HIV-status disclosure; Adherence; CD4+T-cell counts recovery; Viral load suppression

Background

Human immunodeficiency virus (HIV) infection brings about fear and worries to patients who contract it [1,2]. Experiences from Kenya show that patients who disclosed their HIV status were stigmatized [2-4]. As a result of the stigma attached to HIV status, some patients elect not to disclose their status to others [4,5]. This is because stigma is known to drive away HIV-infected patients’ from social support, family gathering and even spiritual support [5-8]. On the other hand, it is known that social, family and or spiritual support are of paramount importance in influencing treatment outcomes among HIV infected individuals [3,7].

Adherence to antiretroviral therapy (ART) has been associated with better prognosis. HIV-infected patients who take their medication at regular intervals improve their health significantly [3,9]. A study conducted by Ekam et al. [10] on the pattern and determinants of antiretroviral drug adherence revealed that patients who disclosed their HIV status had better adherence to therapy as well as receiving support from the family members [3,10-12]. Additionally, many studies have reported that disclosure of HIV status was linked to better adherence, with the ultimate better viral load suppression (VLS) and immunological improvement [10,13,14]. When patients take medicines without having the fear of being stigmatized it means that the medications can indeed be taken even at their work places, as well as in front of their relatives and other family members including their sexual partners [14]. In so doing patient’s confidence is increased and hence better health outcomes [10,12-14].

To our knowledge, the information about patients’ HIV status disclosure before or after initiation of antiretroviral medicines has not been documented in Tanzania. The current findings are limited to inform just disclosure or non-disclosure of serostatus among HIV-infected patients with their associated outcomes. We investigated whether or not HIV status disclosure before ART initiation has influence on the adherence to therapy; CD4+ T cell counts levels, and viral load levels.

Materials and Methods

Study design

This was a prospective cohort study among ART naïve HIV/AIDS infected patients who visited CTC’s in Dar-es-Salaam, Tanzania.
HIV-infected subjects (aged ≥ 18 years) were recruited from CTC’s supported by the Management and Development for Health (MDH) program in Dar es Salaam region. The MDH program is supported by the US President’s Emergency Plan for AIDS Relief (PEPFAR) to support HIV clinics within Dar es Salaam city. The clinics are located within hospitals or health centers, and include Muhimbili National Hospital (MNH); Temeke, Amana, and Mwananyamala hospitals; Infectious Disease clinic (IDC); and Mbaga, Sinza, Mnazi Mmoja, Buguruni and Tabata health centers. The clinics have enrolled about 70,000 patients and about two-thirds of them are women. Among these patients, about 7,000 were on care and monitoring at Mwananyamala, Amana, IDC and Temeke hospitals as they were not eligible for antiretroviral therapy. About 40 patients were identified on a daily basis as eligible and thus initiated on antiretroviral therapy. The study participants were recruited from 4 CTC’s which were at the IDC, Amana, Temeke and Mwananyamala hospitals. Selection of the study sites was based on the high enrolment and antiretroviral therapy initiation rates of eligible HIV infected patients. Inclusion criteria required that patients be HIV-infected as confirmed by positive HIV antibody test, able to give informed consent, and eligible for initiation of antiretroviral therapy and naïve to antiretroviral medicines as determined by self-reporting. Exclusion criteria included patients who lived outside Dar es Salaam region that could not keep their appointment due to distance and patients with a mental disorder.

Sample size and study procedures

Using systematic sampling, 520 HIV-infected patients were selected prior to initiation of ART from the 4 CTC in Dar-es-Salaam. The sample size was calculated based on 90% power, at significance level of 5%, assuming 5% differences between hypothetical and postulated proportion of patients adhering to therapy. Patients visited the clinic on a monthly basis with a total follow up period of one year. Patients were asked to remain in Dar-es-Salaam for the entire study period. Dar es Salaam is one of the big cities in Tanzania located in the East part of the country boarded by Indian Ocean with the total population of about 4.4 million people.

Disclosure of HIV status was assessed at the first initiation of antiretroviral therapy using a structured questionnaire. Patients were asked whether they have disclosed their HIV status or not to any of the family members, once they became aware of being HIV infected. Medicines were provided on a monthly basis and pill count (PC) and self-reporting (SR) were used to assess adherence at three, six, nine and twelve months. The dispensing personnel counted the remaining tablets before dispensing medicines for the following month. Also the dispensing personnel asked patients whether or not they had missed doses for the past thirty days. Adherence was expressed as a percentage based on the number of pills taken out of the monthly supply, as well as from deducting the number of missed days from the total number of days a patient was supposed to take the medicines. If the patient was taking twice-a-day dosing, each dosing was considered as half a day dosing.

Viral load was measured at baseline and six months by COBAS AmpliPrep/COBAS TaqMan HIV-1 Test, version 2.0 (Roche, Switzerland). CD4+ T cell counts were measured at baseline, three, six, nine and twelve months by FacsCalibur (BD Biosciences serial number E9750071, USA) at Immunology Laboratory, Muhimbili National Hospital.

Study endpoints

The primary outcomes were; the proportion of patients who adhered to therapy, the average increase in CD4+ T cell counts at twelve months from baseline, and the viral load suppression to <400 copies/mL at six months.

Data and statistical methods

Data were double entered into a secure Microsoft Access database. For statistical analyses Stata for windows software (version IC/12.1; 4905; Stata corp; College Station, Texas 77845 USA) was used. Patients’ baseline characteristics were compared and statistical tests were performed using Chi-square and t-tests for categorical and continuous variables respectively. We performed logistic regression to determine the association between HIV status disclosure and the outcomes. All tests were 2-sided and were tested at 5% level of significance.

We classified HIV status disclosure as “early” if patients disclosed before initiation of ART, while disclosure after initiation of therapy was regarded as “late”. We considered “non-disclosure” of HIV status if patients did not disclose their status during the entire study period. We classified adherence to antiretroviral therapy as good or bad, if patients took their prescribed medicines ≥ 95% and less than 95% respectively. We classified CD4+ T cell count recovery as “no recovery” if there was a decrease or no increase of average CD4+ T cell counts from baseline to the average of CD4+ T cell counts at three, six, nine and twelve months of follow up. On the other hand “recovery” was considered if there was an increase in the average CD4+ T cell counts at the 4 time points from baseline. We classified viral load suppression if patients had HIV-1 RNA less than 400 copies/mL at six months. We classified age groups as below 30, 31–40 years and >40 years. Marital status was classified as single, married and widowed if patients were unmarried, on the other hand, patients were considered married, if they were married or co-habiting while widowed were considered if patients were living alone due to partner’s death. We considered family member if the patients’ relationship with the other persons were in the category of being a wife, husband, mother, child, cousin, brother, sister, father, uncle, grandchild or grandmother. We defined a partner as a husband, wife or two persons of opposite sex having a sexual relationship.

Ethical issues

The institutional review board (IRB) of Muhimbili University of Health and Allied Sciences (MUHAS) approved the study. The respective Municipal authorities granted permission where the facilities were located.

Results

Between November 7th 2011 and February 28th 2013, a total of 462 (88.8%) of the 520 enrollees completed the study, of whom 136 (29.4%) were males. Of those who did not complete the study, there were 10 (1.9%) transfers, 9 (1.7%) deaths, 33 (6.3%) lost to follow up, and 6 (1.2%) withdrawal of consents (Figure 1). The overall mean (standard deviation [SD]) age was 39 (8.8) years, while it was 41 (9) and 38 (9) years for males and females respectively (Table 1).

**Figure 1**: Recruitment flow chart

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520 Recruited

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ten transfers</td>
<td>Nine deaths</td>
</tr>
<tr>
<td>33 Lost follow</td>
<td>Six withdrew consent</td>
</tr>
</tbody>
</table>

462 Analyzed
```

**Table 1:** Patient characteristics at baseline

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>39±8.8</td>
<td>38±8.6</td>
</tr>
<tr>
<td>Gender (%)</td>
<td>41 (9)</td>
<td>38 (9)</td>
</tr>
</tbody>
</table>

Disclosure and adherence

Of the 462 patients, 60 (13%) and 310 (67.1%) disclosed their HIV-status before and after ART initiation respectively. Ninety two (19.9%) did not disclose their HIV-status. Compared to females, males were significantly fewer in all the three categories. There were 9 (15%) males who disclosed their status before initiation of ART, 97 (31.3%) who disclosed later on, and 34 (37%) who did not disclose their HIV-status (p<0.05).

Overall, there were statistically significant differences between patients who disclosed their HIV-status and those who did not, in terms of adherence to therapy, with a risk ratio (95% CI) being 1.176 (1.060, 1.305; p=0.0038). Similarly, patients with better VLS was higher than that of 82% among those with poor adherence, with a risk ratio (95% CI) being 3.295 (2.521, 4.315; p<0.0001). Furthermore, there was a statistically significant difference in terms of mean (SD) CD4+ T-cell counts recovery between males and females, 276 (89.0) and 34 (11.0) respectively, p=0.002 in favor of females. Additionally, patients with age below 40 years were about 82% more likely to recover their CD4+ T-cell counts compared to those with age above 40 years, with a risk ratio (95% CI) being 1.82 (1.618, 2.048).

Disclosure and viral load suppression

The proportions of patients who achieved VLS were 80.1% and 19.9% among patients who disclosed their HIV-status and those who did not respectively, p<0.0001. Furthermore, the proportions of patients who achieved VLS were 96.7% (58/60) and 80.6% (250/310) among those who disclosed early and late respectively, p=0.0028.

Compared to non-adherent patients the proportion achieving better viral load suppression was 17.6% among those who adhered to therapy, with a risk ratio (95% CI) being 1.176 (1.060, 1.305; p=0.0038). Similarly, the proportion who had better CD4+ T-cell counts recovery of 94% among those with better VLS was higher than that of 85% among those with poor viral load suppression, p=0.034.

Discussion

Disclosure of HIV status poses significant challenges to patients. Consequent stigma and other social segregation ramifications compel some patients to hesitate revealing their status to family members and other associates. To our knowledge, this is the first study in Tanzania to confirm that disclosure of HIV status before or after initiation of ART impacts on adherence, restoration of immunity and viral load suppression.
However, our findings indicate that 67.1% patients reveal their HIV status after initiation of therapy. This is probably due to the need to have financial or moral support from either relatives or other family members as reported before [4,15]. Also the fact that side effects experienced from use of antiretroviral drugs in most cases are unlikely to be hidden for long may drive patients to reveal their status. The hesitancy to disclose HIV status before initiation of ART on the other hand may be due to the fear of being stigmatized at very early stage of infection as symptoms may appear later on from time of infection [15-17]. It has been reported that relatives and or sexual partners might discriminate against patients who have revealed their HIV status; therefore patients may fear to lose their social status that has been built for a long time [15].

Our findings indicated that patients who disclosed their HIV status before initiation of ART had better adherence, immunity and viral load suppression outcomes. This is likely due to the fact that early disclosure brings about courage for one to strive against the disease than looking for solution when it is late. Furthermore, if it so happens that a patient gets stigmatized at the point of revealing the status, the early disclosure would have wiped off all bad experiences encountered during disclosure allowing the patient to focus on addressing the infection as previously reported [17]. The psychological tortue that is known to occur [18] would have been healed, hence once the patient starts therapy, he/she would be having nothing to fear and is more likely to observe a higher adherence than would those who disclose later on or do not disclose at all [17]. Our findings indicate that patients with better adherence have better immunological recovery and viral load suppression [19]. This is because patients who adhere to therapy have good maintenance of drug therapeutic concentrations that halt viral replications with the ultimate good immune recovery [19].

It was found in this study that males were less likely to reveal their HIV status compared to females. This is probably due to the fact that males are known to have poor health seeking behavior [20-23]. Females on the other hand are known to be more likely attending medical services more frequently than men, especially during pregnancy, when taking their children for medical services and or when attending for gynecological problems [22]. Indeed these services might be the entry points for HIV testing among females, hence knowing their serostatus earlier than males. Once patients know their HIV status, they are more likely to seek for solution when it is late. Furthermore, if it so happens that a patient gets stigmatized at the point of revealing the status, the early disclosure would have wiped off all bad experiences encountered during disclosure allowing the patient to focus on addressing the infection as previously reported [17].

In conclusion, disclosure of HIV status before initiation of ART is important to have excellent adherence to therapy, immune restoration and viral load suppression. This needs to be emphasized in our health care and other settings. Additionally more studies are recommended to assess the motivation for HIV-infected patients to reveal their status before initiation of therapy.

Acknowledgements

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Conflicts of Interest

There were no potential conflicts of interest disclosed.

References


