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Hospitalizations and its related factors in HIV/AIDS patients in Tehran, Iran

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Abstract

Background: HIV/AIDS patients are mainly hospitalized for HIV-related diseases and opportunistic infections.This study was performed to determine the causes of hospitalization and its related factors in HIV/AIDS patients in Tehran's Imam Khomeini Hospital during 2009-2012.

Methods: This study was a descriptive cross-sectional study. HIV patients admitted to the Imam Khomeini Hospital were included in the study through census method, during the study. Demographic variables, hepatitis co-infection, CD4 count, history of receiving anti- retroviral therapy (ART), cause of admission, length of hospitalization and patient's outcome were recorded. Data were analyzed by SPSS software and by means of Chi-square and Mann Whitney U tests.

Results: During the study, 555 HIV patients were included in, 84.9% of whom were male, with the mean age of 36.59±8.51 years and the average length of hospitalization for 16.04±18.82 days.
Opportunistic infections were the most common cause of hospitalization (46.5%) with prevalent of which was pulmonary tuberculosis being the most prevalent (37.6%).
Patients suffering from opportunistic infections had significantly lower CD4 count and longer hospitalization than the other diseases.
A significant difference was detected between patients outcome and the history of ART.

Conclusion: Low CD4 count may contribute to an increase in number and length of hospitalization in HIV/AIDS patients. Accordingly, it appears to affect outcome of their treatment and ART was accompanied by a drop in the death rate of hospitalized patients.

Keywords: HIV Infection, AIDS, Hospitalization, Opportunistic infections, ART.

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Introduction

Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome (HIV/AIDS) is a spreading epidemic that devours more victims day in day out and imposes a lot of cost on national health systems of several countries. According to the latest statistics publishe d by the ministry of Health and Medical Education of Iran, by 2012 a total of 24290 people infected with HIV/AIDS had been identified in the country (1), and the estimated number of infected people is much higher than this figure. Generally, the rate and length of hospitalization in HIV/AIDS patients is more than other patients. Each hospitalization is costly

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for patients as well as the health care systems [2]. Several studies have evaluated the rate and causes of hospitalization among HIV/AIDS patients [3, 4]. Causes of hospitalization in this population are mainly due to HIV/AIDS related diseases and or opportunistic infections. With the introduction of Anti-Retroviral Therapy (ART) since 1996 and a combined antiretroviral therapy, the treatment of this disease has been revolutionized (2).

A recent studies carried out in the industrialized countries, indicated a decreasing trend in the rate of hospitalization and the causes of hospitalization in HIV patients are showing a changing trend away from opportunistic infections and towards other diseases with the widespread use of antiretroviral therapy (4-8). However, increasing side effects in patients must be considered (7). But it seems that opportunistic infections are the leading cause of hospitalization in the poor and developing countries yet (9-15). Age, gender, CD4 count, underlying diseases and prolonged infections were amongst factors leading to the hospitalization of patients (6,7,10,11&16).

So far, only one study has conducted the causes in hospitalization in HIV/AIDS patients conducted in Iran, retrospectively on 52 patients during 2000 to 2005 (15).

This study was performed to determine the causes of hospitalization in HIV/AIDS patients and its related factors in Tehran's Imam Khomeini Hospital during 2009-2012.

Methods

This study was a descriptive cross-sectional in one population which included all hospitalized patients in Imam Khomeini hospital in a four-year period. The sample size of this study embraced through census method in which all HIV/AIDS patients admitted in this Hospital were included in this study.

The variables in this study included age, gender, underlying diseases, IDU (injection drug user) status, HCV and HBV co-infection, CD4 count, ART history, anemia, thrombocytopenia, cause of admission (based on ICD-10), length of hospitalization and the final outcome of the patients which were obtained from hospital patients records and these information were recorded in the questionnaire prepared beforehand.

At all stages of the study, confidentiality of information obtained from the hospital records was observed.

Data were analyzed and classified by SPSS software through which the frequency, mean and standard deviation were calculated. Kolmogorov Smirnov test was used to determine the normal distribution of the quantitative variables and Chi-square, Mann Whitney U tests were applied to analyze the data and compare the studied variables as well.

Results

According to the findings of this study of 555 cases of hospitalized HIV/AIDS patients studied. 471 (84.9%) were men and 84 (15.1%) women (male to female ratio 6.5 to 1). Furthermore, 417 cases (75.1%) had a history of IDU.

The HIV infection had been diagnosed for the first time in 138 cases (24.9%) in their first admissions.

The mean age of the samples was 36.59±8.51 years (range 16-67 years), and the mean duration of hospitalization was 16.04±18.82 days (range 1-322 days).

Of all patients 498 (89.7%) were hospitalized in the infectious diseases ward, and 15 (2.7%), 13 (2.3%) and 29 (5.2%) cases were hospitalized in internal medicine, surgery and other wards respectively.

The frequency of hospitalization of patients was 140 (25.2%), 136 (24.5%), 131 (23.6%), and 148 cases (26.7%) in the years 2009, 2010, 2011, and 2012 respectively.

The overall mortality rate in HIV/AIDS patients admitted to the hospital in four years course of the study was 101 cases (18.2%), in which 31 (30.7%) were diagnosed with HIV in their recent hospitalization.

The frequency of mortality in patients was 25 (24.8%), 33 (32.7%), 17 (16.8%),

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and 26 cases (25.7%) in the years 2009, 2010, 2011, and 2012 respectively.

Of all the HIV patients in the hospital during the study period, 258 (46.5%) were admitted due to opportunistic infections and 297 cases (53.5%) hospitalized for other illness such as skin and soft tissue diseases in 37 (12.5%), and liver and bile ducts diseases in 35 (11.8%). 15 (2.7%) of all admissions were because of malignancy and 6 cases (1.1%) were hospitalized due to drug reactions.

The most common opportunistic infections in the samples were pulmonary tuberculosis, brain toxoplasmosis, and Pneumocystis jirovecii pneumonia in 97 (37.6%), 47 (18.2%), and 34 (13.2%) respectively.

Among the HIV patients 138 (24.9%) were hospitalized due to tuberculosis infection from which, pulmonary TB, miliary TB, TB lymphadenitis, pleural TB, TB meningitis, pericardial TB, TB of larynx, peritonitis TB, genitalia TB, and abdominal TB were seen in 97 (70.3%), 18 (13.0%), 8 (5.8%), 5 (3.6%), 4 (2.9%), 1 (0.72%), 1 (0.72%), 2 (1.44%), 1 (0.72%) and 1 cases (0.72%), respectively.

Co-infection with hepatitis C and B, was observed in 331 (59.6%) and 74 patients (13.3%) respectively and the mean of CD4+ T lymphocyte was 144.12±181.73 (range 5-1400) on admission. The CD4 count was less than 200 in 386 (75.8%), between200-349 in 58 (11.4%), 350-499 in 33 (5/6%) and equal to or greater than 500 cells per micro liter in 32 (6.3%). The CD4 counts in 46 (8.3% of all cases) were also uncertain.

139 patients (30.0%) were treated with ART and the mean of time spent in the receiving ART was 24.49±27.08 months (range 1-108 months).

The mean platelet count in samples was 183000±102154 (range 240 to 568000) and 226 cases (40.7%) had thrombocytopenia (less than 150,000) on admission. Mean of hemoglobin in samples was 10.48±2.31 gr/dl (range 3-18.5 gr/dl) and 494 cases (89%) were anemic (Table 1).

Patients admitted due to the opportunistic infections had significantly lower CD4 counts, longer hospital stay and lower hemoglobin levels in comparison with other causes ($p < 0.005$) (Table 1).

Of 101 deceased HIV/AIDS patients, only 13 (12.9%) had received ART ($p=0.006$). In 54.4% (55 cases) of the deceased patients, opportunistic infection was the cause of admission ($p=0.128$) and the most common cause of hospital death in 25 (24.7%) was pulmonary tuberculosis.

History of IDU, hepatitis C and B co-infection were seen in 79.2%, 49.5% and 16.8% of all HIV/AIDS deaths respectively ($p> 0.05$). In 74.3% (75 cases) of deceased patients, CD4 count was less than 200 ($p=0.01$).

Patients who died had lower CD4 count, hemoglobin levels and platelet counts ($p<0.05$) (Table 2).

Table 1. Demographic and laboratory characteristics of patients admitted with opportunistic infections and other patients enrolled in the study.

Characteristics	Cause of admission			p
	Opportunistic Infection	Other	total	
Age (year)	36.36±7.74	36.77±9.21	36.59±8.51	0.94
Disease duration (month)	31.21±33.71	32.47±37.46	32.86±34.48	0.73
Admission duration (day)	17.77±14.84	14.77±21.20	16.04±18.82	<0.0001
Hb (gr/dl)	10.14±2.18	10.73±2.38	10.48±2.31	0.004
Platelet count (count/µl)	184000±101929	183000±102477	183000±102154	0.75
CD4 count (cell/µl)	82.64±117.35	192.83±207.36	144.12±181.73	<0.0001
ART history [n (%)]				
Yes	73 (28.3)	66 (22.2)	139 (30.0)	
No	85 (71.7)	231 (77.8)	316(70.0)	0.73
Gender [n (%)]				
Male	217 (84.1)	250 (84.2)	467 (84.1)	
Female	41 (15.9)	47 (15.8)	88 (15.9)	0.96

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Table 2. Demographic and laboratory characteristics of patients who died and other patients enrolled in the study.

Characteristics	Outcome		p
	Death	Other	
Age (year)	37.23±8.40	35.94±8.12	0.17
Disease duration (month)	27.73±29.98	31.78±36.96	0.49
Admission duration (day)	12.75±13.64	17.57±20.44	<0.0001
Hb (gr/dl)	9.9±2.21	10.5±2.26	0.02
Platelet count (count/µl)	130000±81259	190000±103331	<0.0001
CD4 count (cell/µl)	94.94±122.306	144.33±186.927	0.02
HAART history [n (%)]			
Yes	13 (12.9)	126 (27.8)	0.006
No	88 (87.1)	328 (72.2)	

A significant difference was not found between the duration mean of hospital stay in patients who received ART (15.19±12.50 days) and those without ART (16.32±20.50 days), and also patients with hepatitis C co-infection (17.25±22.19 days) and without hepatitis C co-infection (14.25 ± 12.06 days) (p> 0.05). Regression analysis showed no significant relation between hospitalization and risk factors (ART and hepatitis C) (p=0.54 and p=0.6 respectively).

There was significant difference between the mean duration of hospital stay in patients with CD4 count of less than 200 in comparison with other cases (17.73±20.91 days versus 13.54±13.03 days) (p=0.001).

82.6%, 51.4%, and 20.3% of patients in the current admission had CD4 count less than 200, were infected with opportunistic infections and died in the same admission respectively and 93.5% of those patients who received ART had less than 350 CD4 count.

Discussion

Our findings showed that the most hospitalized HIV/AIDS patients in the study period were men with a history of IDU and CD4 counts less than 200 (in the advanced stage of AIDS) and the most prevalent cause of admission was opportunistic infections of pulmonary TB as the most common cause. In addition, about a quarter of the patients had a history of receiving ART.

HIV infection leads to progressive deficiency in cellular immunity and increases risk of opportunistic infections and mortality in these patients (17). By increasing viral load and reducing CD4 count, HIV-positive individuals are increasingly susceptible to opportunistic infections that may lead to hospitalization (18). A clear reduction in mortality and rates of hospitalization of HIV/AIDS patients have occurred with the availability of antiretroviral therapy in the industrialized countries since 1996. The majority of former studies have revealed the relationship between applying ART and the reduction of mortality in these patients (8,9,16&19). Currently the leading cause of death in the industrialized countries has shifted from opportunistic infections to chronic diseases in HIV/AIDS patients (6, 20-24). Meanwhile, due to less availability of ART in poor and developing countries, it seems that opportunistic infections remain the major cause of hospitalization and death in these patients (9,10 &15).

In our study only quarter of patients had history of ART due to the fact that a high percentage of them were in advanced stage of AIDS (CD4 count at 75.8% of samples were less than 200), this would reveal the lack of convenient access to ART and also show delayed presentation or late diagnosis in patients in Iran. However in some previous studies, a quarter of patients were under ART too (16). In our study 24.9% of patients were diagnosed with HIV/AIDS in current admission, this figure in the conducted study in England was 17% (25). Some previous studies also have reported late presentation and late diagnosis in people with HIV/AIDS in different populations (13, 16, 26-28). The interesting point in our study was that CD4 counts were less than 200 in 82.6% of patients who diagnosed

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with HIV/AIDS in current hospitalization. This means that a majority of our patients were diagnosed in the advanced stages of AIDS, whereas in the conducted study in the UK this figure was 56.3% (25). It seems that the disease screening is still a very important topic in our country and especial consideration and wide educational services are necessary to promote community awareness about this disease and its transmission. Nonetheless, two points are worth mentioning; first, since Imam hospital is a sub-specialty and a reference hospital in the country, a high percentage of admitted patients in advanced stage of AIDS may be justified; the next point is the high figure of IDU among hospitalized patients (75.1%) which can justify their being more in advanced disease stages and more hospitalization rate in these patients. Previous studies also have shown a meaningful relationship between unemployment, poor hygienic, and IDU with hospitalization rate in patients with HIV/AIDS (18).

Tuberculosis is the most common opportunistic infection in HIV/AIDS patients in a formerly published study in Iran, but CD4 count was not regarded in that study (15).

In the present study, the mean hospital stay was 16.04 days which is partly in consistent with the mean of hospital stay in the carried out study in Cameroon (14 days) (11) and is less than the reported mean hospital stay in Ethiopia (10), it is more than the reported mean hospital stay in studies conducted in industrialized countries (7,14,16& 18). It seems that high percentage of advanced AIDS cases in our study may help explain the longer duration of their hospital stay .There might be other factors influencing the length of hospitalization for which further studies have to be taken into consideration.

There were not any significant differences between the mean duration of hospital stay in HIV/AIDS patients receiving ART (15.19 days) and those who did not (16.32 days) (p=0.7). While in the Vidigal et al study (5) the mean duration of hospital stay in patients not receiving ART was reported 17.5 days in comparison with 7.7 days in the group receiving ART.

The mean age of our samples was 36.59 years which was less than reported figures in the United states (6) and Canada (16) (40 and 38 years respectively), but it was higher than the reported mean age (32.8 years) in Ethiopia (16).

In Vidigal et al study the mean age of the patients who received ART was 34 years versus 30.6 years in those who did not (5).

It appears that the application of ART as well as the reduction of mortality has boosted life expectancy resulting in higher mean age in patients in countries such as United States and Canada.

The majority of the study subjects were males (84.9%). This figure is in consistent with the majority of formerly conducted studies (6,12& 18), particularly the one in Iran (15).

The most prevalent cause of hospitalization in our samples was opportunistic infections (46.5%), and with pulmonary tuberculosis as the highest rate (37.6%), also patients with opportunistic infections significantly had lower CD4 count and longer duration of hospital stay (p=0.000). These findings are in completing consistent with the results of a former study conducted in our country (15). In studied conducted in Ethiopia (10) and India (13) tuberculosis was also the most prevalent cause of hospitalization in patients, while in performed studies in the industrialized countries, causes of admission showed a trend away from AIDS-related diseases (6,16). Non AIDS-related diseases have risen at 42% in the study performed in Canada (16) and the rate of hospitalization due to opportunistic infections was reduced from 31% in the years 1994-1996 to 9.5% in the years 2003-2005 in a study conducted in the United States (6). Based on our findings in comparison with previous studies in other countries, widespread application of ART and the use of new drugs with greater efficacy as well as identification patterns of drug resistance in our country are absolutely necessary and tangible.

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In our study 18.2% of patients who were admitted with HIV/AIDS died and the most prevalent cause of death was opportunistic infections (54.4%), and only 12.9% of deceased cases were receiving ART (p=0.006). This figure in comparison to 31% and 27% of reported mortality in studies conducted in Ethiopia (10) and Cameron (11) is much less, but our findings were much higher than 7% overall mortality rate which reported by Floris-Moore et al (8) during the years 1996 to 2000 in the United States. Meanwhile, the number of the deceased patients due to opportunistic infections during the Floris-Moore et al study period was reduced from 40 to 27 percent (8) and their results showed that patients who received ART had a lower risk of hospitalization. Thus, once again, this puts emphasize on the development of the use of ART in Iran.

Hepatitis C co-infection was seen in 59.6% of our samples, although the mean of hospital stay was higher in patients with HCV co-infection compared to the group without (17.25 versus 14.25 days), but there was no significant difference between the two groups (p>0.05). Falster et al (7) and Vidigal et al (5) noted the co-infection of hepatitis C as an independent factor which increases hospitalization and length of hospital stay in HIV/AIDS patients.

Our limitations include, lack of data on patients who were admitted because of mental illness since they referred to other centers, and unavailability CD4 count in some patients.

Conclusion

Based on our findings, the majority of admitted patients to Imam Khomeini hospital were male with IDU history in that the opportunistic infections were the most prevalent cause of admission.

Low CD4 count may contribute to an increase in number and length of hospitalization in HIV/AIDS patients. Accordingly, it appears to affect outcome of these patients. ART was accompanied by a drop in the death rate of hospitalized patients; however, a further study should be carried out into an intermediate variable which contributes to this fact.

Also, in further studies, various antiretroviral therapies along with their effects should be compared. Moreover, the impact of the new generation drugs on the cause, and length of hospitalization, as well as the outcome of the patients is capable of being taken into account. Furthermore, we could conduct a research on educating, and promoting the public awareness about AIDS as well as the dire role of controlling the IDU, which are the leading means of transmission of HIV in the country, to decline the incidence of opportunistic infections.

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