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Original Article

Clinico-Epidemiological Study of HIV Patients in El Beheira Governorate

Ahmed Metwaly Anan *[1], Amgad Ali Alzahaby [2], Ahmed Ghazy [2], Osama Mostafa Abdelrazik [2]

[1] Department of Hepatology and Gastroenterology and Infectious Diseases, Damanhur Fever Hospital, Ministry of Health, Damanhur, Egypt

[2] Department of Hepatology, Gastroenterology and Infectious Diseases, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

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*Corresponding author
Email: ahmadanan1992@gmail.com

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ABSTRACT

Background: Human Immunodeficiency Virus [HIV] is a global pandemic affecting millions of lives. Understanding epidemiological characteristics and clinical presentations can aid in management.

The aim of the work: To study the demographic profile, risk factors, clinical features, and opportunistic infections seen in HIV-infected patients at Damanhur Fever Hospital in El Beheira governorate.

Patients and Methods: A retrospective study was conducted on 146 patients diagnosed with HIV at Damanhur Fever Hospital between January 2019 and December 2022. Clinico-epidemiological data were collected and analyzed through record-based file extraction.

Results: The majority were males [76%] in the middle-age group [11-50 years]. Injection drug use was the most common reported risk factor [31.5%]. Most of our patients were asymptomatic at the time of diagnosis. The majority of HIV patients were compliant with the prescribed treatment regimen, and most of them showed improvement. Opportunistic cancers were observed in 5 patients [3.4%].

Conclusion: Middle-aged adult males engaged in intravenous drug use behavior were the most vulnerable. Strategies to promote early testing, timely linkage to care, and reduce stigma are warranted to curb the epidemic.

Keywords: Adaptive Immunity; Antigens; HIV; Lentivirus Infections.

INTRODUCTION

Human immunodeficiency virus [HIV], a blood-borne virus, is commonly spread through sexual contact, sharing of intravenous drugs, and transmission from mother to child during child-birth or breastfeeding. The disease results from being infected with either HIV-1 or HIV-2, both retroviruses belonging to the Lentivirus genus within the Retroviridae family [1]. Scientists have identified two separate types of HIV - HIV-1 and HIV-2, each consisting of various subtypes known as clades. While all HIV-1 clades generally lead to similar illnesses, their prevalence varies across the world [2].

There is a particular decrease in CD4+ helper T cells, leading to a reversal of the typical CD4/CD8 T-cell ratio and disruption of B-cell antibody production [3]. The immune system's reaction to specific antigens weakens, causing the host to inadequately combat opportunistic infections and typically harmless commensal organisms. Since the deficiency mainly impacts cellular immunity, the infections are predominantly nonbacterial, such as fungal and viral infections [4].

Individuals with HIV can exhibit signs and symptoms corresponding to different stages of HIV infection. There are no specific physical signs exclusive to HIV; instead, the physical manifestations are related to the current infection or ailment the individual is experiencing [5]. During acute sero-conversion, individuals may experience flu-like symptoms such as fever, fatigue, and a wide-spread rash. The asymptomatic stage is usually mild [6]. Having swollen lymph nodes all over the body is common and might be an initial symptom. AIDS appears as frequent, severe, and sometimes life-threatening infections or cancers caused by opportunistic pathogens [7].

In Egypt, a focused HIV epidemic is present within high-risk populations; however, it remains unacknowledged due to social stigma and insufficient data on its prevalence [8].

The prognosis for individuals with untreated HIV is bad, with a mortality rate exceeding 90%. On average, people die within 8-10 years of being infected, but some may succumb in less than a year, while others may not show disease progression for a long time [9]. This study aims to analyze the personal history and symptoms of HIV-infected patients in El Beheira Governorate, as well as to identify risk factors associated with HIV transmission.

PATIENTS AND METHODS

A Retrospective record-based file extraction data study was conducted upon 146 patients with Human immunodeficiency virus who are receiving treatment at HIV clinic at Damanhur Fever Hospital, during a period from January 2019 and December 2022.

Ethical consideration: This study was approved by the Medical Research Ethics Committee at Al-Azhar University Faculty of Medicine and Scientific Research Ethics Committee of the Egyptian Ministry of Health**.**

Inclusion Criteria: Patients diagnosed to have HIV infection living in El Beheira governorate, receiving treatment at HIV clinic at Damanhur Fever Hospital. Patients who were lost to follow up or had incomplete records were excluded.

The diagnosis of HIV was based on the National Protocol for HIV testing. In Egypt, the diagnosis of HIV infection in adults and children over 18 months is conducted through a two-step process involving serological testing to detect viral antibodies and/or antigens. The first step is the Ag/Ab Rapid test, where a negative result is interpreted as negative accounting for the window period of 2-3 weeks, and a positive result necessitates moving to the next step. In the second step, the HIV Chemiluminescence/ELISA Immunoassay is performed. A positive result is considered positive, while a negative result prompts a repeat of step 1 after 2 weeks. If the result remains inconclusive, an HIV PCR test is conducted after 3 months, with a positive result being declared as positive, a negative result as negative, and continued inconclusiveness leading to a negative declaration.

Data collection: We reviewed medical records of 146 patients positive for HIV who receiving treatment at HIV clinic at Damanhur Fever Hospital. The demographic details collected included age, sex, marital status, education level, occupation and residence. Information on probable mode of transmission and known risk factors was also noted.

Statistical Design: Data on 146 eligible HIV-infected patients was entered into a pre-designed proforma and analyzed using IBM SPSS version 25.0 statistical software. Frequencies and percentages were calculated for categorical variables. Means with standard deviations were determined for continuous variables.

RESULTS

Regarding the baseline characteristics of the studied patients, the mean age was 35.78±11.54. The majority of the patients were male [76%], manual workers [25.3%], with intermediate education [technical diploma] [74.0%], residing in rural areas [52.1%], and smokers [65.1%]. Additionally, 43.2% were single, 25.3% had a positive spouse status, 21.9% had a negative spouse status, 6.8% were widows, and 2.7% had an unknown spouse status. Furthermore, most patients did not have children [82.2%] as presented in Table [1].

In terms of the mode of disease discovery, the majority were identified during blood donation screening [21.2%], followed by pre-travel screening [17.8%], mother's health initiative [13.7%], and pre-operative screening [13%]. A total of 96.5% of patients received treatment [Table 2].

Regarding the mode of infection, most patients were IV drug users [31.5%], followed by those from discordant couples [25.3%], heterosexual transmission [17.8%], and a smaller percentage from homosexual and vertical transmission [2.8%] as presented in Table [3].

Regarding vertical transmission among the studied female patients, a total of 35 females were infected. Out of those, 34 were married or widows. Nine of them didn't have children, while 25 had children. Among the children, 4 were infected [16%], and 21 were not infected [84%] [Table 4].

Concerning co-infections, HCV was the most prevalent at 11.0%, followed by HBV at 2.1%. The most common comorbidities were hypertension [4.1%], diabetes mellitus [2.7%], and CKD on dialysis [1.4%]. The most associated tumors were Kaposi sarcoma [3.4%] and cholangiocarcinoma [0.7%] as shown in Table [5].

At the time of diagnosis, most patients were asymptomatic, while a few presented with chest infections [4.1%], chronic diarrhea [3.4%], and fever of unknown origin [2.8%] as presented in Table [6]. Regarding vaccination status, the patients had received two doses of the HBV vaccine and the COVID vaccine at rates of 69.2% and 60.3%, respectively [Table 7]. The majority of patients were survivors [94.52%], while 5.5% had passed away, with chest infection and CNS infection being the most commonly known causes of death [25%] as shown in Table [8].

Table [1]: Demographic data among the studied cases [n=146]

Variables		The studied cases [n=146]
Sex, n [%]	Males Females	111 [76%] 35 [24%]
Age [years]	Mean± SD [Range]	35.78±11.54 [1.50-70.00]
Job, n [%]	Manual worker Unemployed Driver Housewife Government Employee Student Children [pre-school age]	37 [25.3%] 29 [19.9%] 27 [18.5%] 23 [15.8%] 14 [9.6%] 13 [8.9%] 3 [2.1%]
Level of education, n [%]	Technical diploma University graduate Preparatory school Pre-school age Primary school Secondary school Non-educated Master's degree	108 [74%] 15 [10.3%] 11 [7.5%] 3 [2.1%] 3 [2.1%] 3 [2.1%] 2 [1.4%] 1 [0.7%]
Residence	Rural Urban	76 [52.1%] 70 [47.9%]
Smoking	Yes No	95 [65.1%] 51 [34.9%]
Spouse status	Single positive Negative Widow Unknown	63 [43.2%] 37 [25.3%] 32 [21.9%] 10 [6.8%] 4 [2.7%]
Had Children	No Yes	121 [82.9%] 25 [17.1%]

Table [2]: Mode of disease discovery and treatment status

Variables		The studied cases [n=146]	
		No.	%
Mode of discovery	Screening during blood donation	31	21.2
	Pre-travel screening	26	17.8
	Mother's health initiative	20	13.7
	Pre-operative screening	19	13
	Inpatient with clinical suggestion	16	11
	Referral from another private clinic	13	8.9
	Hospital outpatient clinic	10	6.8
	Partner +ve for HIV	6	4.2
	Pre-employment screening	5	3.4
Treatment status	On treatment	141	96.5
	Non-compliance	4	2.8
	No treatment	1	0.7

Table [3]: Mode of infection

Mode of infection	The studied cases [n=146]	
	No.	%
IV drug	46	31.5
Partner positive [discordant couple]	37	25.3
heterosexual	26	17.8
Unknown	27	18.4
Homosexual	4	2.8
Vertical transmission	4	2.8
History of blood transfusion	2	1.4

Table [4]: Analysis of infected females' data

	The studied female [n=35]	
	No.	%
Child 2 years old	1	2.86
Single	0	0.00
Married/widow	34	97.14
No children	9	26.47
Have children	**25**	**73.53**
+Ve for HIV	4	16
-Ve for HIV	21	84

Table [5]: Coinfections, comorbidities and tumor association of infected patients

Variables		The studied cases [n=146]	
		No.	**%**
Coinfections	No Coinfections	126	86.3
	Infected with HCV	16	11.0
	Infected with HBV	3	2.1
	Co infected with HCV& HBV	1	0.7
Comorbidities	No comorbidities	128	87.7
	Hypertension [HTN]	6	4.1
	Diabetes mellitus	4	2.7
	CKD on dialysis	2	1.4
	HTN & Diabetes mellitus	4	2.7
	CKD not on dialysis	2	1.4
Tumor associated	No	140	95.9
	Kaposi sarcoma	5	3.4
	Cholangiocarcinoma	1	0.7

Table [6]: Clinical presentation at time of diagnosis

Clinical presentation at time of diagnosis	The studied cases [n=146]	
	No.	%
Asymptomatic [Routine investigation]	130	89
Chest infection	6	4.1
Chronic diarrhea	5	3.4
Fever of unknown origin	4	2.8
Infective endocarditis	1	0.7

Table [7]: Vaccination history

Vaccine		The studied cases [n=146]	
		No.	%
2-doses HBV vaccine	Yes	101	69.2
	No	45	30.8
COVID 19 vaccine	Yes	88	60.3
	No	58	39.7

Table [8]: Prognosis of the studies patients

Mortality		
	No.	%
Survivor	138	94.52
Death	8	5.48
Cause of death		
Chest infection	2	25
CNS infection	2	25
Unknown	2	25
Heart failure	1	12.5
Cholangiocarcinoma	1	12.5

DISCUSSION

The global impact of Human Immunodeficiency Virus [HIV] continues to pose a significant challenge to public health worldwide. Around 39 million individuals are currently living with HIV globally [10]. In Egypt, the prevalence of HIV among the general population is low [below 0.02%], but there is a concentrated epidemic among specific groups such as men who have sex with men [MSM] in Cairo [5.4%] and Alexandria [6.9%], as well as injecting drug users [IDUs] in Cairo [7.7%] and Alexandria [6.7%] [11]. Egypt is experiencing the fastest growing epidemic in the Middle East and North Africa Region [MENA], with a 76% increase in the number of cases between 2010 and 2016 [12].

In our study, the mean age was 35.78 ± 11.54 years [age ranged from 1.5 to 70]. Moreover, most of our patients were males [76%]. These data are supported by many studies. **Yang *et al.*** [13] documented that 58.1% of the study population were males, and the mean age of subjects was 35 years [range 18–65 years]. **Wamamba *et al.*** [14] reported that 76% of the population were males, with a mean age of 30 ± 9.6 years. In contrast to our results, a study by **Moran *et al.*** [15] reported that 70% of the study population were females and 30% were males.

In our study, HIV infection is common among manual workers [25.3%], unemployed persons [19.9%], drivers [18.5%], and governorate employees [9.6%]. This data is supported by many studies. For example, **Tessema *et al.*** [16] found that the majority of the persons in their study group were daily laborers [27.8%], farmers [24.8%], and most frequently college/university students [21.2%]. This may be explained by the fact that manual workers and farmers make up a sizable portion of the general population. In another study, only 6.2% of the HIV cases were unemployed [17]. **Yang *et al.*** [13] reported that a sizeable section of the study population consists of employees [18.1%], students [10.7%], farmers [9.0%], and merchants [8.8%].

In our study, most of our patients had intermediate educational levels: technical diploma [74.0%], and 52.1% were rural inhabitants. Also, 65.1% of our patients were smokers. Supporting our findings, **Suleiman *et al.*** [18] found few participants with post-secondary education in their study. Another study conducted in Tehran reported that the most common levels of education attained were low and intermediate education [72.7%],

with 7.8% being illiterate [19]. This difference could result from limited literacy rates, low socio-economic status, particularly influenced by early marriages, and insufficient education for girls in the specific area under investigation.

This study showed that the majority of our patients were single [43.2%], 25.3% of patients had a positive spouse status, 21.9% had a negative spouse status, 6.8% were widows, and 2.7% had an unknown spouse status. In this concern, a study conducted by **Nalugoda *et al.*** [20] revealed that individuals in monogamous relationships had a lower risk of HIV infection compared to those who were unmarried. This is likely because married individuals are more likely to remain faithful to their partners, unlike unmarried individuals who may have a higher likelihood of engaging in multiple sexual partnerships.

This study showed that most of our patients were discovered during screening for blood donation [21.2%], followed by pre-travel screening [17.8%], mother's health initiative [13.7%], and pre-operative screening [13.0%]. In a study by **Ertunc *et al.*** [21], it was noted that 81.7% of their patients were diagnosed through screening tests during blood and organ donation. Additionally, **Yemisen *et al.*** [22] documented that nearly two-thirds [62.6%] of individuals with HIV/AIDS received their diagnosis as a result of routine scanning tests.

In this study, the most common comorbidities were hypertension [4.1%], followed by diabetes mellitus and hypertension with diabetes mellitus [2.7%], and then chronic kidney disease [CKD] on dialysis [1.4%]. The most common coinfections were hepatitis C virus [HCV] at 11% and hepatitis B virus [HBV] at 2.1%.

In a study by **Dias *et al.*** [23] involving twenty-four HIV patients, 37.5% were found to have HCV, and only 12.5% showed co-infection with HBV. Furthermore, a study by **Lorenc *et al.*** [24] highlighted hepatitis as the most common comorbidity, followed by cardiovascular diseases. Additionally, a study by **Hattoh *et al.*** [25] indicated that HBV was the most prevalent comorbidity, with hypertension being the next most prevalent comorbidity detected.

In the current study, 2.1% of patients tested positive for HBsAg, and 11% had HCV antibodies. In a study conducted by **Okocha *et al.*** [26], the prevalence of HBsAg positivity was 6.3% among HIV positive individuals and 5.6% among HIV negative individuals. **Daniele *et al.*** [27] reported that 1.04% of patients had HBV coinfection, and 12.5% tested positive for anti-HCV antibodies.

The present study showed that most of the tumors associated with our patients were Kaposi sarcoma [3.4%], followed by cholangiocarcinoma [0.7%]. **Ertunc *et al.*** [21] discovered that the most prevalent malignancy was intracranial sarcoma, followed by pulmonary sarcoma and Kaposi's sarcoma.

Concerning vertical transmission among the female patients included in the study, a total of 35 women were found to be infected, of which 34 were either married or widowed. Nine [26.47%] of them did not have children, while 25 [73.53%] had children. Among the children, 4 [16%] were infected, and 21 [84%] were not infected. In a study by **Akinboro *et al.*** [28], it was revealed that only one-tenth of their subjects had HIV-positive children.

The current study showed that the most common modes of infection were intravenous [IV] drug abuse [31.5%], followed by transmission from a discordant couple where one partner is positive [25.3%], heterosexual transmission [17.8%], and then homosexual and vertical transmission [2.8%]. **Ertunc *et al.*** [21] found that the most common route of transmission of HIV/AIDS is through heterosexual relations, while other routes include transmission through blood products, perinatal transmission, and among injecting drug users. **Ogbuji** [29] reported that HIV could be transmitted primarily through blood transfusion, followed by sexual intercourse and the use of blades at a salon. According to **Daniele *et al.*** [27], the primary risk factor identified was engaging in unprotected heterosexual intercourse [37.5%], followed by men who have sex with men [35.4%] and injection drug use [18.7%].

In the present study, most of our patients were asymptomatic at the time of diagnosis. However, some patients presented with chest infections [3.4%], chronic diarrhea [3.4%], followed by fever of unknown origin [2.8%]. Consistent with previous studies, **Montalvo-Otivo *et al.*** [30] found that diarrhea is the most frequent presenting symptom in patients with HIV infection at the time of diagnosis.

Conclusion

The most common patients with Human Immunodeficiency Virus [HIV] were males with an intermediate educational level. The predominant risk factor for infection was intravenous drug use,

followed by sexual transmission. Most patients were asymptomatic at the time of diagnosis. The most common comorbidities among our patients were hypertension [4.1%], followed by diabetes mellitus and a combination of hypertension and diabetes mellitus [2.7%], and chronic kidney disease requiring dialysis [1.4%]. The most common co-infections were HCV [11.0%], followed by HBV [2.1%]. The majority of our patients were identified during blood donation screening [21.2%], followed by pre-travel screening [17.8%], the mothers' health initiative [13.7%], and pre-operative screening [13.0%]. Most of the HIV patients who adhered to the prescribed treatment regimen responded well to their treatment.

Conflict of Interest: None

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