

Prevalence of HIV Infection among Health Care Workers in Major Health Care Settings in Eastern Part of Libya

Salwa Muftah Eljamay^{1*}, Emhamed Boras², Aziza. M.AGWIDA ALsheek³, Rabie A Ali Elhsadi⁴

¹ Assistant professor at Department of Public Health, Collage of Medical Technology, Derna \ Libya

² Assistant professor at Libyan Academy for postgraduate Studies, Tripoli \ Libya

³ Lecturer at Department at Lab Medicine, Collage of Medical Technology, Derna \ Libya

⁴ Assistant lecturer at Department of Genetic Engineering, Collage of Medical Technology, Derna \ Libya

¹salwaeljamay@gmail.com, ²e.bora@hitmail.com, ³azizaalsheek44@gmail.com, ⁴Elhuda342@hotmail.com,



***Corresponding Author :**
Salwa Muftah Eljamay

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ABSTRACT

Health care workers (HCWs) who have occupational exposure to blood are at increased risk for acquiring blood-borne infections. Aims of the study: To determine the prevalence of HIV among HCWs in five major hospitals in the eastern part of Libya. Material and Methods: A cross-sectional study was conducted in a random sample; this study was done on 601 of HCWs healthcare workers in five major healthcare settings in the eastern part of Libya, during the period between July 2008 to June 2009 rapid methods for HIV, and enzyme-linked immunosorbent assay (ELISA) techniques method and polymerase chain reaction (PCR). A structured and anonymous questionnaire sheet was filled by each of the HCWs through direct personal interviews. After verbal consent 5-10 ml, a blood sample was extracted from each HCW. Results: The majority of HCWs (89.0%) were able to identify that HIV is caused by viruses and not by other microorganisms like bacteria or parasites. Although the majority of HCWs know that contamination with blood or blood products, unsterilized needles or surgical instruments, unsafe sex, folk behaviour like tattooing and piercing, and sharing personal items (e.g. toothbrush, razor, and nail scissors) are essential modes of transmission of these viruses, however many of them were falsely reported that sharing clothes, usage of same toilet and skin contact are also an important mode of transmission of these viruses. Moreover, most HCWs did not believe that the infected persons with these viruses may remain asymptomatic for a long time and always persist for one's whole life. More than one-third of HCWs were unaware of any available policy or procedure for reporting sharp injuries in their place of work. Moreover, the majority of HCWs (88.7%) do not use needle removers or needle cutters before disposing of injection pieces of equipment. Furthermore, half of the HCWs do not have sufficient quantities of sharps boxes to dispose of sharps safely in their workplaces. More surprisingly, more than half of the studied HCWs never attend any education or training programs on infection control and prevention during their previous work careers. As for HIV infection, it is almost non-existent (0.0%), Conclusion: The present study showed that no infection by HIV and the lack of educational programs and the lack of post-exposure documentation are concerns. A clear, thoughtful, well-planned and carefully structured risk reduction approach to hospital infection control is needed for this high-risk population.

INTRODUCTION

There are increasing calls for an integrated health system response to the management of HIV infection and the growing non-communicable disease (NCD) epidemics in low-income and middle-income countries, aimed at addressing poor coverage of NCD services and evidence of a high burden of multimorbidity in people living with HIV (Adeyemi et al., 2021), According to the latest statistics on HIV/AIDS in the Islamic Republic of Iran, published by the Ministry of Health, Treatment and Medical Education, from the beginning of the epidemic until April 2011, 22,727 individuals infected with HIV are identified in the country, where 91.7 percent of them are men and 8.3 percent are women (Siuki et al., 2019), Health education intervention based on theory of planned behavior, regarding AIDS disease preventive behavior, significantly affects Health volunteers. Therefore, according to behavior theory, such educations lead to

positive changes in AIDS preventive behaviors.(Tawiah et al., 2022), : The educational programs appeared to have positive impact on reducing recapping injuries, but many other needlestick categories did not change significantly. Mechanical opening needle disposal boxes appear to present a hazard when compared with fixed opening boxes.(Sellick et al., 1991), The World Health Organization (WHO) guidelines advocate taskshifting from physicians and nurses to community health workers, including PLWAs, to provide HIV services at the community level(Selke et al., 2010), Accurate knowledge about HIV/AIDS along with an in-depth understanding of patients' needs can help alleviate much of the fear, anxiety, and stigma associated with caring for patients with HIV/AIDS.(Sallam et al., 2022), Training for the prevention of occupational HIV exposure should be strengthened in both medical institutions.(Qianqian et al., 2022), Exposure risk is related to job tasks, as well as to the type and complexity of care provided in different areas, whereas HIV exposure risk mainly relates to the prevalence of HIV-infected patients in a specific area.(Puro et al., 2001), HCWs have high knowledge, positive attitudes, but low compliance concerning standard precautions. Nurses had higher knowledge, perceived risk, and appropriate HAIs' control measures than physicians and HCWs answered correctly and used appropriately control measures if have received information from educational courses and scientific journals.(Parmeggiani et al., 2010), Percutaneous injuries, caused by needle sticks and other sharps, are a serious concern for all health care workers (HCWs) and pose a significant risk of occupational transmission of blood borne pathogens.(Muralidhar et al., 2010), While advances in antiretroviral therapy (ART) treatment efficacy have significantly reduced HIV- and AIDS-related mortality and morbidity, HIV is still progressing at an alarming rate of 1.7 million new cases per annum(Moffatt et al., 2021), Needle stick injuries (NSIs) are among the most common occupational hazards among healthcare workers (HCWs) worldwide that need to be addressed and represent the most common sources of infection(Mengistu et al., 2021), some major health challenges and recent trends in health, wealth, health care, and health care personnel provides glimpses into future prospects.(Mayosi & Benatar, 2014), Accurate knowledge about HIV/AIDS along with an in-depth understanding of patients' needs can help alleviate much of the fear, anxiety, and stigma associated with caring for patients with HIV/AIDS.(Hassan & Wahsheh, 2011). Healthcare workers have better knowledge and safer practices if they had received infection prevention training and had infection prevention guidelines in their workplace. Interventions should be designed to consider these identified factors.(Geberemariam, 2018), In the last three decades, the HIV/AIDS epidemic has been one of the most challenging public health problems in the world(Feyissa et al., 2019), The modes of transmission of these two bloodborne viruses in developing countries include perinatal transmission or household contact, while sexual contact, shared needles in intravenous drug abusers and contaminated blood or organ transplants are responsible for their transmission in developed countries(Elzouki et al., 2014), There has been a vigorous recent effort to measure HIV disease burdens among MSM globally, including in many settings in which, despite decades of HIV research and programs, no studies had been done with MSM.(Beyrer et al., 2013), Despite the limited evidence of effectiveness, some East African countries have already taken steps towards HIV and NCD service integration.(Adeyemi et al., 2021).

LITERATURE REVIEW

This study revealed that was no infection rate of HIV among HCWs in the Eastern part of Libya that was reported nationally. In light of our findings, a combined set of strategies in risk reduction might be appropriate, including education (McCormick RD, et al. 1991, Sellick JA, et al. 1991), more effective systems for sharps disposal (Sellick JA, et al. 1991, Linnemann CC. et al. 1991). Availability and consistent use of personal protective equipment, and innovative technology-based approaches to prevention (Vincenzo Puro. et al.2001). Education and training programs were shown previously to have a positive impact on reducing exposures and enhancing exposure reporting (McCormick RD, et al. 1991, Sellick JA, et al. 1991). Training courses directed to all hospital personnel, including interns and student nurses, could lead to a global reduction of potentially preventable exposures, such as those occurring with improperly discarded needles or due to a lack of protective garments. Moreover, an increase in reporting rates can provide the opportunity for a consistent implementation of post exposure prophylactic measures and for changing hazardous patterns of practice through counseling (Vincenzo Puro. et al. 2001). Although reports have been published on the effectiveness and performance of specific safety devices, the reports are few, and their findings are, in some cases, inconsistent with each other. (Vincenzo Puro. et al. 2001).

METHOD

Study population:

The study population was defined as workers at risk of needle sticks or other sharps injuries. This included HCWs, such as physicians, dentists, nurses, midwives, laboratory technicians, nursing aids and medical assistants, and cleaners.

Reference study population:

This study was conducted during the period July 2010 to June 2011 on 601 of HCWs in five major Hospitals in

Eastern part of Libya, ELjamhuria Hospital (Benghazi), Elfateh Children Hospital (Benghazi). Elthawra Hospital (Elbaida), Elwahda Hospital (Derna), and Albutnan Medical Center (Tubruk). One hundred and sixteen, 120, 100, 152 and 113 HCWs were randomly selected representing 1007, 455, 556, 405 and 680 of total number of HCWs in Aljomhuria Hospital and Alfateh Children Hospital in Benghazi, Althawra Hospital in Albaida, Alwahda Hospital in Derna, and Albutnan Medical Center in Tubruk, respectively.

They were selected from different places of work in these hospitals (i.e. Operation theaters, Labor rooms, Dental clinics, Laboratories, Endoscopy units, Nephrology unit, Coronary care units (CCU), Intensive care unit (ICU), Surgical and medical wards, and Out-patients departments, as well as Hospital cleaners and workers in Pharmacy and Administration departments.

Data collection:

A pre-designed, pre-tested, structured and anonymous questionnaire sheet was filled in each work place by each HCW through direct personal interview carried out. The questionnaire sheet included the following data: knowledge of HCWs about HIV infection, mode of transmission and prevention of these viruses, risk factors for transmission of these infections, including history of needle stick injury

Demographic characteristics (sex, age, professional activities and practices, type of work, place and duration of work in the Hospital). Data on exposure of the HCWs to patient "blood and blood containing materials", needle sticks and cuts from sharp instruments, and safety practices.

Sample collection:

After a verbal consent, 5-10 ml blood sample was extracted from each HCWS and send to each hospital laboratory where it was centrifuged and sera were stored in -20 °C until analyzed. Samples were first tested HIV enzyme linked immunosorbent assay (ELISA) techniques, and for Polymerase chain reaction (PCR) was performed for all positive and HIV-RNA viremia, respectively.

Statistical analysis:

The data was entered and analyzed using statistical package for social sciences (SPSS) version 26.

1. Analysis was divided into two parts, the first part with descriptive statistics and by viewing the data in tabular form distributions
2. Frequency and percentages of Frequencies and also the bar was used to illustrate some of the variables of the study
3. The second part of analysis was used inferential statistics and using the Chi square and to study the relationship between some independent variables when the value of (P- Value) is less than 5% are not significant (there is no relationship between the two variables under study) and vice versa

Ethical Aspects:

Before a verbal constant was obtained from each studied HCWs, they were given a briefing on the aims of the study, and were information not disclose their names or identity to assure them that this study was only for academic purpose.

RESULT

The cohort Comprised 601 HCWs from five major hospitals in the Eastern part of Libya: ELjamhuria hospital (Benghazi), Elfateh children hospital (Benghazi). Elthawra hospital (Elbaida), Elwahda hospital (Derna), and Albutnan Medical Center (Tubruk). They were 164 (27.3%) males and 437 (72.3%) females and 560 were Libyan and 41 were non Libyan. The mean age of the cohort was 32.90 ± 8.85 years (Range: 17 – 60 years). The distribution of gender and age groups of HCWs in all five hospitals is shown in figuer (1) and figuer13, respectively . More than three quarters (78.6%) of the studied population were younger than 40 years of age.

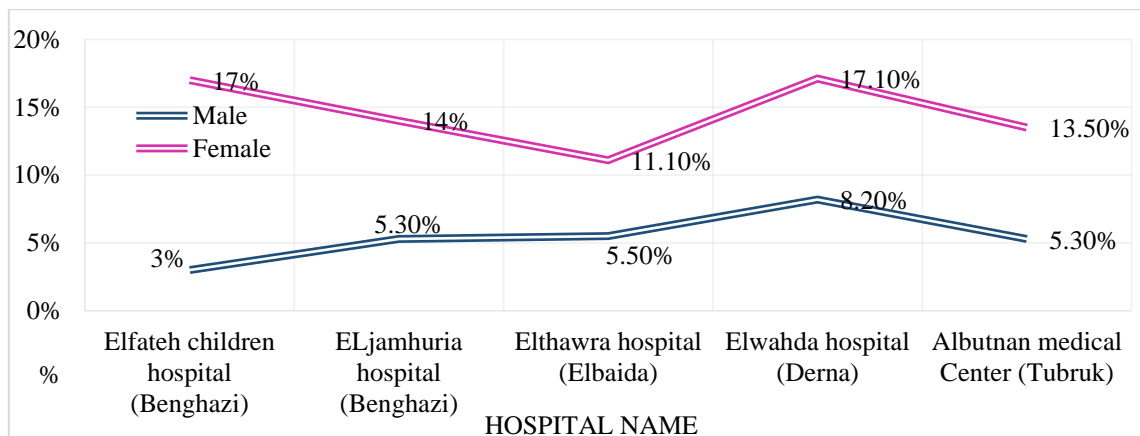


Figure: 1. The distribution of gender in HCWs in all five hospital

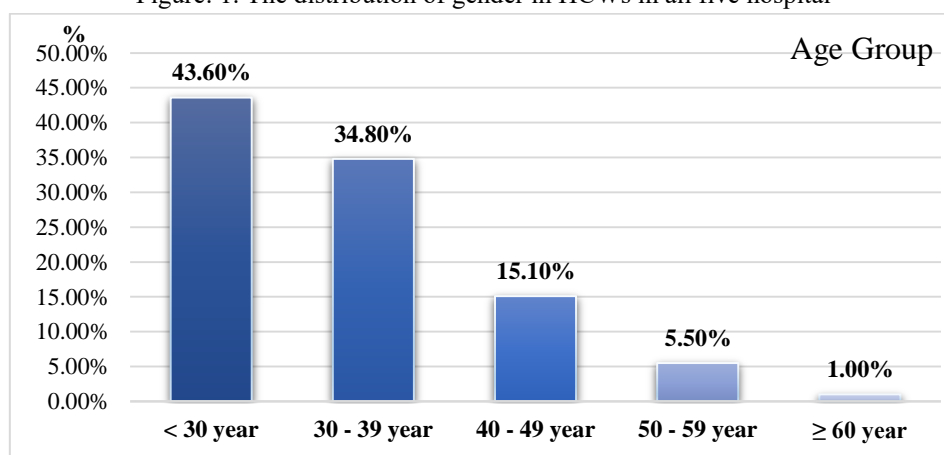


Figure: 2. The age groups distribution of HCWs in all five hospitals

Knowledge of HCWs about case and mode of transmission of HIV

Table 1 Shows the basic knowledge of HCWs about the cause and mode of transmission and prevention of HIV. The majority of HCWs (89.0%) were able to identify that HIV are caused by viruses and not by other microorganisms like bacteria or parasites. Although majority of HCWs know that contamination with blood or blood products, unsterilized needle or surgical instrument, unsafe sex, folk behaviour like tattooing and piercing, and sharing personal items (e.g. tooth brush, razor, and nail-scissors) are important mode of transmission of these viruses, however many of them were falsely reported that sharing clothes, usage of same toilet and skin contact are also important mode of transmission of these viruses. Moreover, majority of HCWs were not believed that the infected persons with these viruses may remain asymptomatic for along period of time and always persist for one's whole live.

Table 1. Knowledge of HCWs about mode and case of transmission and prevention of HIV

Question	Answer	I don't know No (%)	Yes No (%)	No No (%)
Have you been exposed to needle stick injury:		0(0.0)	391(65.1)	210(34.9)
Are you aware of the policy and procedure for reporting sharps injuries to healthcare workers?		12(2.0)	366(60.9)	223(37.1)
Do you use needle removers or needle cutters before disposing of injection equipment?		13(2.2)	55(9.2)	533(88.7)
Do you have sufficient quantities of sharps boxes to dispose of sharps safely		6(1.0)	294(42.1)	301(50.1)
Did you attend any education/training programs on infection control and prevention		0(0.0)	532(42.1)	348(57.9)

Knowledge and attitude of HCWs about sharp injuries and prevention from HIV

As shown in Table 2 approximately two third of the studied HCWs (65%) have been exposed to needle stick injuries at least once in their past work period. More than one third of HCWs are not aware about any available policy or procedure for reporting sharp injuries in their place of work. Moreover, the majority of HCWs (88.7%) do not use needle removers or needle cutter before disposing of injection equipments. Furthermore, half of HCWs do not have sufficient quantities of sharps boxes to dispose of sharps safely in their work places. More surprisingly, more than half of the studied HCWs never attend any education or training programs on infection, control and prevention during their previous work carriers.

Table 2. Knowledge and attitude of HCWs about sharp injuries and prevention from HIV

Question	Answer	I don't know No (%)	Yes No (%)	No No (%)
HIV is caused by viruses		38(6.3)	538(89.5)	25(4.2)
HIV transmitted by contaminated blood or blood products		8(1.3)	591(98.3)	2(0.3)
HIV transmitted by unsterilized needles or surgical instruments		5(0.8)	593(98.7)	3(0.5)
HIV transmitted by unsafe sex		5(0.8)	589(98.0)	7(1.2)
HIV transmitted by tattooing and piercing		21(3.5)	560(93.2)	20(3.3)
HIV infected person always remain asymptomatic		26(4.3)	235(39.1)	329(54.7)
HIV may persist for one's whole life:		31(5.2)	517(86.0)	53(8.8)
HIV transmitted by usage of the same toilet:		29(4.8)	342(56.9)	230(38.3)
HIV transmitted by sharing clothes:		25(4.2)	210(34.9)	366(60.9)
HIV transmitted by skin contact		21(3.5)	127(21.1)	453(75.4)
HIV transmitted by sharing personal items (e.g. toothbrushes, nail-scissors, razor)		2(0.3)	572(95.2)	27(4.5)

As shown in Table 3, Most of HCWs have no quantitative level of viremia as manifested of HIV- DNA by quantitative PCR.

Table 3. Distribution HIV markers according to type of occupation of HCWs

Occupation	PCR(HIV)	
	+ve (%)	-ve (%)
Doctors (n=100)	0(0.0)	100(100.0)
Lab technicians (n=110)	0(0.0)	110(100)
Nurses(n=188)	0(0.0)	188(100)
Help nurses(n=61)	0(0.0)	61(100)
Hospital cleaner(n=70)	0(0.0)	70(100.0)
Anesthesia tech(n=13)	0(0.0)	13(100)
intern student(n=34)	0(0.0)	34(100.0)
Pharmacy(n=3)	0(0.0)	3(100.0)
Others(n=22)	0(0.0)	22(100.0)
Total(n=601)	0(0.0)	601(100)

Table 4. HIV according to work period of HCWs five major hospitals in eastern part of Libya.

Place of work	PCR(HIV)	
	+ve (%)	-ve (%)
ICU (n=27)	0(0.0)	27(100.05)
CCU (n=33)	0(0.0)	33(100.0)
Surgery (n=63)	0(0.0)	63(100.0)
Operation room (n=55)	0(0.0)	55(100)
Dental (n=10)	0(0.0)	9(90.0)
Laboratory (n=130)	0(0.0)	129(99.2)
Emergency(n=33)	0(0.0)	33(100.0)
ENT (n=4)	0(0.0)	4(100.0)
Gynea (n=54)	0(0.0)	54(100)
Vaccine & syringes (n=7)	0(0.0)	7(100.0)
Medicine(n=52)	0(0.0)	52(100.0)
Pediatric (n=9)	0(0.0)	9(100.0)
Kidney(n=30)	0(0.0)	30(100.0)
Orthopedic (n=10)	0(0.0)	10(100.0)
Incubator(n=17)	0(0.0)	17(100.0)
Pharmacy (n=5)	0(0.0)	5(100.0)
Others (n=12)	0(0.0)	12(100.0)
Urology (n=3)	0(0.0)	3(100.0)
Isolation (n=18)	0(0.0)	18(100)
Endoscopy (n=7)	0(0.0)	7(100.0)
Oncology (n=22)	0(0.0)	22(100.0)
Total(n=601)	0(0.0)	601(100)

Table 5. Distribution of HIV markers according to place of work of HCWs in five major hospitals in eastern part of Libya

Work period	PCR(HIV)	
	+ve (%)	-ve (%)
0 – 5 years(n=280)	0(0.0)	280(100)
> 5years(n=321)	0(0.0)	321(100)
Total (n=601)	0(0.0)	601(100)

The distribution of HIV and PCR in each hospital.

The distribution of hepatitis HIV in ELJamhuria and Elfateh Children Hospital was 0.0%, Elthawra Hospital (Elbaida) and Elwahda Hospital (Derna) was 0.0%, and Albutnan Medical Center was 0.0%. The distribution of hepatitis HIV in ELJamhuria Hospital (Benghazi) was 0.0% and Elfateh Children Hospital (Benghazi) was 0.0%, Elthawra Hospital (Elbaida) was 0.0%, and Elwahda Hospital (Derna) was 0.0%, and Albutnan Medical Center was 0.0%, that shown in table 6.

Table 6. Show The distribution of HIV (PCR) in each hospital.

The distribution of HIV (PCR) in each hospital.	HIV N (%)	HIV(PCR) N (%)
ELJamhuria Hospital (Benghazi) n (116)	0(0.0)	0(0.0)
Elfateh Children Hospital (Benghazi) n (120)	0(0.0)	0(0.0)
Elthawra Hospital (Elbaida) n (100)	0(0.0)	0(0.0)
Elwahda Hospital (Derna) n (152)	0(0.0)	0(0.0)
Albutnan Medical Center (Tubruk) n (113)	0(0.0)	0(0.0)

DISCUSSION

HCWs worldwide face the risk of occupational infection by blood-borne pathogens, including HBV, HCV and HIV. Infection with these viruses is a significant occupational hazard for HCWs. In the present study, attempts have been made to assess the risk of infection associated with occupational exposure to HIV in five major health care settings in the Eastern part of Libya. The study population was workers at risk of needle sticks or other Sharps injuries. This included HCWs, such as physicians, dentists, nurses, midwives, laboratory technicians, nursing aids and medical assistants, and hospital cleaners, Table 1 Shows the basic knowledge of HCWs about the cause and mode of transmission and prevention of HIV. The majority of HCWs (89.0%) were able to identify that HIV are caused by viruses and not by other microorganisms like bacteria or parasites. Although majority of HCWs know that contamination with blood or blood products, unsterilized needle or surgical instrument, unsafe sex, folk behavior like tattooing and piercing, and sharing personal items (e.g. tooth brush, razor, and nail-scissors) are important mode of transmission of these viruses, however many of them were falsely reported that sharing clothes, usage of same toilet and skin contact are also important mode of transmission of these viruses. Moreover, majority of HCWs were not believed that the infected persons with these viruses may remain asymptomatic for a long period of time and always persist for one's whole live. As shows in Table 2 approximately two third of the studied HCWs (65%) have been exposed to needle stick injuries at least once in their past work period. More than one third of HCWs are not aware about any available policy or procedure for reporting sharp injuries in their place of work. Moreover, the majority of HCWs (88.7%) do not use needle removers or needle cutter before disposing of injection equipments. Furthermore, half of HCWs do not have sufficient quantities of sharps boxes to dispose of sharps safely in their work places. More surprisingly, more than half of the studied HCWs never attend any education or training programs on infection, control and prevention during their previous work carriers. As shown in Table 3, Most of HCWs have no quantitative level of viremia as manifested of HIV- DNA by quantitative in table 4. Show that period of work not effective in infected by HIV, as shown as in Table 5. There were no places of work have found to have infected HCWs by HIV, The distribution of hepatitis HIV in ELJamhuria and Elfateh Children Hospital was 0.0%, Elthawra Hospital (Elbaida) and Elwahda Hospital (Derna) was 0.0%, and Albutnan Medical Center was 0.0%. The distribution of hepatitis HIV in ELJamhuria Hospital (Benghazi) was 0.0% and Elfateh Children Hospital (Benghazi) was 0.0%, Elthawra Hospital (Elbaida) was 0.0%, and Elwahda Hospital (Derna) was 0.0%, and Albutnan Medical Center was 0.0%, that shown in table 6. Whether these safety devices, which in the Eastern part of Libya are not or only sporadically adapted to date, could have a further impact in reducing percutaneous exposure rates in all areas, and especially in reducing exposures at higher risk of infection, needs further evaluation, applying consistent and rigorous methods. The needle stick safety and prevention Act, the transition from conventional needles to safer needle devices needs to be expatriated in Libya. This may suggest the need for widespread adoption of needle stick prevention programs in HCW setting to reduce the risk of occupational infection (i.e. HBV, HCV and HIV) for HCWs in Libya. Nevertheless, the prevention of occupational infection by blood-borne viruses relies on avoiding exposure and receiving immunization prophylaxis. Efforts to reduce the risk of occupational exposure, such as introducing safer devices and techniques, should be strongly encouraged.

CONCLUSION

The present study showed the prevalence rate of HIV among the HCWs in the eastern part of Libya was not low, nevertheless a lack of educational programs and the lack of post-exposure documentation concerns. A clear, thoughtful, well-planned and carefully structured risk reduction approach to hospital infection control is needed for this high-risk population.

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