



Analysis of The Level of Knowledge of Medical Personnel About Occupational Post-Exposure Prophylaxis to The Human Immunodeficiency Virus (Hiv)

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 11 Sept 2023	Aim: Accidental exposure to blood and other biological fluids in the healthcare setting carries a variable risk for the acquisition of infectious diseases, such as the human immunodeficiency virus (HIV) and the Hepatitis C (HCV) and B (HBV) viruses. Material and method: In this context, it is vitally important that medical personnel are fully informed and trained on the proper protocol for managing unexpected occupational exposure. The objective of this study is to evaluate the level of knowledge of the medical staff of the IESS Quevedo General Hospital about occupational post-exposure prophylaxis (PEPO) to HIV. An observational, cross-sectional and prospective approach was adopted to collect the relevant data. The sample consisted of 94 doctors. Statistics and Result: A questionnaire designed by the principal investigator was used to assess the knowledge of medical personnel about PEPO. The data obtained were analyzed using the Excel 2016 statistical package. It is important to note that the study was approved by the institution's bioethics committee to guarantee ethics in research. To strengthen the practices and knowledge of medical personnel, it is essential to promote a constant update of the protocols and action measures against risk exposures.
CC License CC-BY-NC-SA 4.0	Keywords: HIV, Prophylaxis, Fluids, Infectious Diseases, Risk Exposures

1. Introduction

The Human Immunodeficiency Virus (HIV) is one of the major problems for global public health, according to data from the World Health Organization (WHO) it has so far claimed almost 33 million lives (WHO, 2020; Espinoza & Vazques, 2021). There is an increase in the promotion of prevention strategies, in the availability of early diagnosis methods, in addition to a significant improvement in access to treatment drugs allowing it to be free in many populations, as well as an increase in access to specialized care for people with HIV infection, which covers the comprehensive management of this pathology.

In Ecuador, the Ministry of Public Health (MSP) reported in 2017, 49,541 cumulative cases (from 1984 to 2016) of HIV and AIDS, of which 37,748 are cases of HIV infection and 11,793 correspond to AIDS cases. As of 2016, 17,574 deaths from this cause had been registered. According to the report, the Sierra presents 20.3%, Amazonia 1.93% and the Insular Region 0.11%. The coastal area registers the highest number of cases of HIV infection with 74.1%, however the provinces with the

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highest prevalence are: Guayas (53.2%), Pichincha (10.2%), El Oro (5.5%), Manabí (4.5%), Los Ríos (3.8%) and Esmeraldas (4.4%) (UNAIDS, 2017; MPHIC, 2017).

Preventing contact with high-risk fluids (primary prevention) is the most important preventive maneuver for work-acquired HIV infection. The institutions as well as their workers must be guarantors of compliance with prevention measures, which include several aspects such as access to them and their timely use, adequate labor practices, quality controls of labor practices, use of personal protective equipment according to the established risks, and timely compliance in the required cases of occupational post-exposure prophylaxis (OBEP), which should be considered as a secondary prevention measure. In the event of failure of primary prevention, every institution must have an immediate and effective action plan to comply with the PPEO in cases that require it.

The risk of contagion by occupational exposure is related to several factors: the prevalence of HIV in patients treated, the incidence of occupational accidents with risk fluids. The average risk of HIV transmission to a health worker after percutaneous exposure to HIV-infected blood has been estimated at 0.3% (95% CI: 0.2%-0.5%) (CDC, 2007; Caicedo, 2021).

The risk of acquiring HIV from occupational exposure is low, but existing, so it is vital for healthcare facilities and their workers to have a defined action plan for risk exposure, and to implement an action plan the knowledge of health personnel about PPEO against HIV is essential.

The appropriate deadlines for the indication and compliance with PPEO for HIV must be known, as well as the work plan inherent in the diagnosis and monitoring of the serological status of the source and the affected worker, with the aim of minimizing the risk of contagion.

In the Republic of Ecuador, not all health centers have the possibility of establishing an ART immediately, so knowledge of the action plan against a risk exposure is essential, since it will reduce the time that elapses between the event and the start of the ART if necessary.

Currently in Ecuador, there is no accurate report indicating the number of cases of HIV infection due to occupational exposure. Similarly, there is no national registry that establishes serological follow-up to individuals who suffered occupational exposure to this virus, there is also no research that certifies that all health professionals are able to establish the need or even implement a treatment regimen post occupational exposure

In this research, it is proposed to evaluate the knowledge of the medical staff of the General Hospital Quevedo on the use of post-occupational exposure prophylaxis to HIV, in order to establish the appropriate mechanisms to improve the quality of knowledge and protocol to be followed in cases of occupational exposure to HIV in this Hospital.

Objective: The objective of this study is to carry out an exhaustive and detailed description of the knowledge of the medical staff of the IESS Quevedo General Hospital on the use of occupational post-exposure prophylaxis (PEP) to the Human Immunodeficiency Virus (HIV). The evaluation of this knowledge is of vital importance to understand the level of preparation and training of health professionals in relation to preventive measures and actions to be taken in cases of accidental exposure to HIV.

By obtaining accurate and reliable data, it seeks to identify possible areas for improvement in the knowledge and understanding of the protocols and guidelines established for PPEO. This information will allow effective interventions and strategies to be established that contribute to strengthening safety practices and reducing the risks associated with occupational exposure to HIV.

The analysis of the information collected will provide us with a holistic view of the current situation, identifying possible gaps in the knowledge of medical staff. Through this approach, we will be able to implement specific education and training measures, as well as design educational programs that address the particular needs of each professional group within the hospital.

In addition, the detailed description of the knowledge of medical personnel will also allow to identify possible factors that influence adherence to preventive measures and the correct application of EOAP.

These factors could include availability of resources, access to up-to-date information, communication barriers, among others.

The ultimate purpose of this study is to improve the safety and well-being of medical personnel, as well as patients, by ensuring that health professionals are fully trained and aware of prevention measures and action against accidental exposures to HIV. Likewise, it is intended to strengthen the quality of care and the management of risk situations, thus contributing to the promotion of safer and more efficient work environments at the IESS Quevedo General Hospital.

2. Materials And Methods

An observational and cross-sectional study was conducted using a questionnaire designed by the principal investigator. This questionnaire, although not previously validated, has been carefully structured to collect detailed information on the practical knowledge of medical personnel in relation to primary and secondary prevention measures for post-occupational exposure prophylaxis (OP) to the Human Immunodeficiency Virus (HIV).

The questionnaire has addressed several key aspects related to EOPs, such as the frequency with which participants indicate the use of this preventive measure, the serological status of the source patient in cases of accidental exposure, the time of onset, the duration and the schedule of antiretroviral drugs recommended for EOAP.

The design of the questionnaire has allowed to obtain valuable and relevant data that describe the practice and knowledge of the medical staff in the IESS Quevedo General Hospital, regarding the actions to be taken in the face of occupational exposure to HIV. The information collected has been analyzed and evaluated with the aim of identifying areas for improvement and specific training needs.

Importantly, study participants have been informed and have given prior consent to complete the questionnaire. The confidentiality and anonymity of the data collected has been guaranteed to protect the privacy of the professionals involved.

It is also relevant to mention that this study has been developed in full adherence to ethical principles and current regulations on health research. It has the approval of the bioethics/teaching committee of the institution, thus ensuring the protection and well-being of the participants and the integrity of the research.

Data collection through the questionnaire has been carried out in person, allowing direct interaction with participants and ensuring a prompt response to the questions posed. This methodology has facilitated the obtaining of accurate data and has allowed the clarification of doubts that may arise during the information collection process.

The population was made up of 94 doctors who work at the IESS Quevedo General Hospital, the statistical data were processed, with the statistical package of Excel 2016, and presented in tables based on the following questions:

1. Specialty, gender, years of degree.
2. Post-occupational exposure prophylaxis to HIV received on previous occasions by the participant
3. Adequate preventive measure(s) in skin wounds (punctures, cuts), splashes to non-integral skin.
4. Serological status of the source patient.
5. HIV, HCV, and HBV (Anti-HBs, Anti-HBc, HBsAg) serological status of the exposed person.
6. Periods of correct initiation of post-exposure prophylaxis (PEP).
7. Protocol of action before source patient with known HIV infection, required aspects.
8. Antiretroviral therapy scheme available in Ecuador for occupational post-exposure prophylaxis (PEP) to HIV.
9. Directions of interruption of prophylaxis post exposition (EPP) occupational to HIV
10. Update inherent to occupational post-exposure prophylaxis (PEP) to HIV.

3. Results and Discussion

The questionnaire was applied to a total of 94 doctors, who work at the prestigious General Hospital of Quevedo IESS, a reference institution in the health field. These health professionals represent a diverse group in terms of experience, specialties and areas of performance, which brings additional

richness to the sample and guarantees a comprehensive view of knowledge on occupational post-exposure prophylaxis to HIV in the hospital setting.

The selection of these participants was carried out considering specific inclusion criteria, such as being practicing physicians within the institution and being in direct contact with situations of potential exposure to HIV in the development of their daily activities. This approach has allowed us to obtain a representative and relevant sample to assess the level of knowledge about this important preventive measure.

It is important to note that the data collection process was carried out with the utmost rigor and respect for ethical principles and the confidentiality of the information provided by the physicians surveyed. The informed consent of each participant was obtained before carrying out the application of the questionnaire, and it was guaranteed that their answers would be treated anonymously and confidentially.

The distribution of the questionnaire and the collection of responses were carried out in an environment conducive to reflection and analysis, so that clinicians could provide robust and informed answers. Likewise, an open space was fostered to clarify doubts or concerns regarding the questionnaire and the concepts addressed, which ensured the quality and accuracy of the data obtained.

The use of a questionnaire as a data collection tool has allowed to obtain a large amount of valuable information about the knowledge of the medical staff at the General Hospital of Quevedo IESS about post-occupational exposure prophylaxis to HIV. Through this instrument, it has been possible to identify possible knowledge gaps and areas for improvement, which will contribute to guide future interventions and strategies to strengthen the education and training of medical personnel in this important public health issue.

Table 1: **Socio-demographic characteristics**

Socio-demographic characteristics			
	Answer	Frequency	Percentage
Age in years	20 - 30	17	18
	31-40	62	66
	41-50	9	10
	>50	6	6
Sex	female	49	52
	male	45	48
Years of Experience	0 to 5	42	45
	06 to 10	27	29
	11 to 15	19	20
	16 to 20	6	6

Author: Own elaboration

Table 2: **Distribution according to specialty and gender**

Distribution according to specialty and gender		
	Male	Female
General practitioners in hospital functions	27.6 (%) (N=26)	35.10% (N=33)
Medical Specialists in Gynecology	3.19% (N=3)	3.19%(N=3)
Internal Medicine Physicians	6.38% (N=6)	4.25% (N=04)
Family and Community Medicine Physicians		1.06% (N=01)
Medical Specialists in Epidemiology		1.6%(N=01)
Medical Specialists in General Surgery	10.63 (N=10)	
Medical Specialists in		1.06(N=01)

Pediatric Surgery		
Medical Specialists in Pediatrics		6.38%(N=06)
Total	47.48% (N=45)	52.12%(N=49)

Author: Own elaboration

Table 3: Number of times you have received occupational post-exposure prophylaxis, distribution according to specialty

Specialty	No		Once		Twice		Three times or more		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Medicine Internal	3		6		1		0		10	11
Surgery General	0		3		7		0		10	11
Epidemiology	0		1		0		0		1	1
Family Medicine	0		1		0		0		1	1
Pediatric Surgery	0		0		1		0		1	1
Pediatrics	2		3		1		0		6	6
General Medicine	4		42		8		5		59	63
Gynaecology	1		1		3		1		6	6
TOTAL	10		57		21		6		94	100

Author: Own elaboration

Regarding the appropriate prevention measures in skin wounds (punctures, cuts), splashes on non-integral skin, (question 2) 76% (N = 72) of the participants indicate that it is necessary to wash with soap and water, let the blood flow, disinfect the wound with an antiseptic and then cover with a waterproof dressing. 5.93% (N=05) answered that only washing with soap and water should be complied with, 6.38% (N=06) indicated that disinfection with some antiseptic is sufficient, and 11.70% (N=11) would use only a waterproof dressing to cover the wound.

98% (N=92) of participants consider it necessary to know the HIV status of the source, and 100% consider it necessary to know the HIV, HBV, HCV serological status of the exposed person. 83% (N=78) of the participants consider that if they do not know the serological status of the source, it should be considered high risk (question 06). If the source is known, with a diagnosis of HIV, 96.8% (N=90) consider it essential to know the viral load, the ART regimen (if received), as well as the pharmacological history and the reasons for change of treatment (resistance, intolerance or toxicity) of the patient.

In relation to the serological status of the source patient, 57% (N=53) considered that if negative was known, the PPEO scheme could be interrupted regardless of the time received.

100% (N=94) of the participants consider it important to know the PPEO scheme. Regarding the optimal time of initiation of drugs for PPEO, 60% (N = 57) indicated that they should be administered in the first 24 hours, 18% (N = 17) at 72 hrs, and 13% (N = 12) reported that drugs should be started between the first 24 hours to 72 hrs, and 9% (N = 8) indicated that PPEO can be started after 72 hours. In addition, 62% (N=58) say they know the ART regimen for PIEP available in Ecuador, however, 26% (N=24) say they do not know the optimal duration of the scheme, 2% (N=2) say that the ideal duration is 30 days, and 4% (N=04) indicate that the duration should be 28 days.

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As the last question of the questionnaire, the subjective assessment of the participant regarding the requirement of updating in PPEO was raised, considering 100% that it is necessary to establish a strategy to update knowledge in this topic.

In this study, 94 physicians (specialists and general) were asked about their knowledge about PPEO and found that 24% of respondents were unaware of the action plan for a high-risk exposure event for HIV. In addition, 90% have received at least one opportunity PPEO, a percentage that mostly consists of general practitioners, who work in the emergency area and specialists in General Surgery. This figure seems high compared to other studies, such as Chan et al. ⁽⁷⁻¹⁴⁾, where only 18% of the sample indicated having received PEAP due to high-risk exposure.

Marnejon et al. ⁽⁹⁻¹⁵⁾, provide more information on the exposure of Resident Physicians to accidental injuries during graduate education. In this study conducted between the years 2000-2014, they observed 129 injuries due to punctures with needles and sharp objects in the studied group of 924 (13.9%), Resident Physicians. The most vulnerable groups were residents of dentistry, obstetrics and gynecology, and surgery, where exposure to needlesticks or cutting wounds was 30.6%, 28.9% and 18.5%, respectively. In our survey we observed that 100% of General Surgery Specialists have received PEAP conditioned by a high-risk contact.

Different studies (Chen et al., 2001; Bareki & Tenego, 2018; Balarezo et al., 2019) agree on the observation of inadequate knowledge about PEAP. In some cases, it was observed that 46% of the population studied (Bareki & Tenego, 2018) did not know when to start PEAP. In the present research, 30% do not know the correct time of initiation of PPEO, in which measures should be focused to establish and disseminate the correct application of policies for the management of occupational exposures.

In some studies (Chen et al., 2001; Bareki & Tenego, 2018; Balarezo et al., 2019), a higher prevalence is not found depending on the specialty or the time of professional practice (they were not objectives of the studies), however, a point to be considered is that physicians who perform invasive procedures (surgeons, emergency air doctors) frequently have an increased risk of injury, which translates into an increased risk of exposure, such is the case of what was observed in the present research in which specialists in general surgery in their entirety have received at least one opportunity PPEO, as already mentioned. But there has also been a high frequency of indication of EOAP in general practitioners, especially those who work in the emergency area, which also makes these populations considered as priorities in the establishment of preventive measures as well as in the improvement of their training to disseminate and correctly apply the protocols in relation to EOAP.

It is important to mention that in the present research it was observed that 2% of the sample does not highlight the importance of knowing the serological status of the source, in addition 17% would not qualify as high risk a source with unknown serological status, and 9% said that the ART regimen can be started at 72hrs or later. All these factors can condition an increased risk of HIV infection in the occupational environment.

The recommendations for action in the event of exposure in Ecuador are clear, the clinical practice guidelines on HIV management (MPH, 2019) state that the efficacy of EOP is related to the promptness of its onset, ideally recommended in cases considered high risk, its onset even before obtaining serological status, additionally provides that the serological diagnosis for HIV of the affected worker must be established in an estimated time of 2 hours and not exceeding 72 hours, in addition whenever possible the serological status of the source must be established, they also state that the guideline of post-occupational and non-occupational exposure prophylaxis consists of the use of three antiretroviral drugs; two nucleoside/nucleotide analogue reverse transcriptase inhibitors (NRTIs), associated with a third antiretroviral from another family, with better tolerance and fewer drug interactions, a PEAP regimen that is similar to that established by the GeSIDA expert panel in the Spanish consensus (GEP, 2015; Alberto et al., 2019).

Some studies ⁽⁶⁻¹⁷⁾ also conclude that education in relation to PEEP should be included in all induction programs for physicians, which corresponds to what was found in our study where 100% of those

evaluated consider of great importance the training and constant updating in terms of PEAP, one of the limitations found during the conduct of this research lies in the non-availability of regional data related to objectives studied here, so it would be ideal to give continuity to this research in other healthcare centers to establish an updated national statistics in relation to PPEO.

According to data from the Center for Disease Control in the United States for 2013, 58 cases of occupational transmission of HIV have been reported (CDC, 2007), however According to the Directorate of General Occupational Risk Insurance of Ecuador, in the country there is no information and statistical data on occupational exposures as causes of HIV infection in the health sector. which could condition ignorance of the dimension of this problem at the national level.

4. Conclusion

Despite the limitations inherent in this study, the relevance of its results and the value of the conclusions obtained stand out, which allow us to glimpse important areas for improvement in the field of education and training of health personnel, as well as in the implementation of more effective and appropriate preventive measures in each work area within our institution. Considering options for improvement in staff training is a critical step towards strengthening the knowledge and skills needed to effectively address situations of occupational exposure to HIV. It is imperative to promote continuous and updated education that empowers professionals with the latest information and best practices in occupational post-exposure prophylaxis and action against these circumstances. In line with this, the importance of implementing preventive measures adapted to each work area is highlighted, considering the particularities and specific risks of each work environment. Personalizing prevention strategies will ensure greater effectiveness in reducing the risk of exposure to HIV and protecting the health of health workers. In this sense, occupational post-exposure prophylaxis (EOAP) emerges as a powerful prevention tool that should be incorporated as a standard and widespread practice in our institution. It is essential that this preventive strategy be addressed in a comprehensive manner, including not only staff training, but also the availability of timely and reliable serological diagnoses, as well as immediate and constant access to the drugs established in the national treatment scheme. A health care infrastructure with the availability of necessary diagnostics and medications in all health facilities is essential to ensure a rapid and efficient response to situations of occupational exposure to HIV. Likewise, it is essential to have highly trained and specialized personnel, capable of providing advice and guidance to health professionals in the face of any doubt or concern related to risk exposure. It can be concluded that the research has allowed us to identify crucial areas for improvement in training, implementation of preventive measures and knowledge about occupational exposure to HIV in our health personnel. Through the incorporation of PEAP as a comprehensive prevention strategy, along with ongoing training and the availability of necessary resources, we will be on the path to safer and more effective healthcare for our team and ultimately for our patients.

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