



Utilization of post-exposure prophylaxis for HIV exposures among health care professionals in Ethiopia: A Systematic Review and Meta-analysis

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Abstract

Background: Post-exposure prophylaxis (PEP) is a crucial medical intervention to prevent HIV transmission after possible exposure, especially for healthcare professionals (HCPs). Its effectiveness depends on being administered within 72 hours of exposure. The objective of this study was to assess the pooled prevalence of post-exposure prophylaxis (PEP) utilization among healthcare professionals in Ethiopia.

Methods:

A comprehensive review of studies was conducted using databases such as PubMed, Web of Science, Google Scholar, EMBASE, and Google. After carefully assessing the quality of the studies, relevant data were extracted and analyzed using R version 4.2.3 and STATA version 17.0. **Results:**

An analysis of nine studies on postexposure prophylaxes of HIV the findings shows that the overall pooled prevalence of postexposure prophylaxes utilization among 1,175 participants was 43% (95% CI: 24% - 62%). The Amhara region reported the highest rate of PEP usage at 61% (95% CI: 14% - 100%), while the Oromia region had the lowest at 19% (95% CI: 14% - 24%). Several factors contribute to the low utilization rates of postexposure prophylaxes among healthcare workers in Ethiopia. These barriers were limited access to PEP medications, insufficient training on how to report occupational exposures, and fear of stigma related to HIV discouraging healthcare workers from seeking the care they need. To improve the utilization of post-exposure prophylaxis among healthcare professionals in Ethiopia, it is crucial to address these challenges through comprehensive training programs and better access to post-exposure prophylaxis.

Conclusions: The meta-analysis shows that postexposure prophylaxis utilization among healthcare professionals in Ethiopia is low, despite its proven effectiveness in preventing HIV transmission. The low overall uptake of postexposure prophylaxis shows the necessitates giving attention and intervention towards the hindering factors via creating supportive environments that mitigate stigma. Improving access to post-exposure prophylaxis medications is essential in enhancing occupational safety for healthcare workers.

Keywords: Utilization; Post-Exposure Prophylaxis; Systematic review; Meta-analysis; Ethiopia

Introduction

Post-exposure prophylaxis is the treatment to be provided to a person if he/she is suspected to be at risk of having potentially been exposed to HIV. When administered the viral medication may significantly reduce the rate of transmissions postexposure prophylaxis acts as a protective measure, which is most recommended for high-risk individuals soon after a potential exposure. Moreover, it must be noted that the recommended regimen should be started within 72H following the exposure. With ramifications,

The prospect of the efficacy of this approach somewhat changes; PEP can cut down the risk of contracting HIV by 79% given that it is started within the shortest timeframes. The duration of the short-term treatment is 28 days or a month. Overall, PEP should be taken cautiously but urgently [1], [2].

Although effective in practice, PEP is rarely accepted among HCPs because of reasons such as little knowledge of relevant guidelines, fear of social discrimination, and fear of adverse reactions to treatment. Most HCPs have some knowledge of the PEP and what the points of contact are, however, the usage of it and especially the complete 28-day course-is frequently disregarded, with many discontinued early [3].

The inconsistent use of post-exposure prophylaxis (PEP) amongst global healthcare professionals indicates that educational and implementational standards characterizing PEP fall short of the actual targets. Nevertheless, this is often seen as one more aggravating factor in the public fight against HIV and other blood-infectious diseases for which health workers have poor knowledge and adherence to PEP recommendations [4][5]. Despite advances in testing and treatment, more than one million people became infected with HIV in 2022 [2].

In Africa, the rate at which HIV/AIDS proliferates is a great concern, alongside the increased risk of occupational exposure among healthcare workers [4]. A rise in the magnitude of and utilization of PEP among healthcare professionals is an area of concern in Ethiopia. Specific goals include raising awareness regarding the importance of PEP among healthcare professionals and making it accessible through targeted training and active integration into existing health services while encouraging timely treatment and supportively establishing environments that would encourage HCPs to seek help without fear of discrimination. This calls for evidence-driven approaches such as HIV post-exposure prophylaxis (PEP) as HIV prevention interventions [2].

Methods:

Protocol registration:

This study protocol has been registered with the PROSPERO International Prospective Registry of Systematic Reviews, receiving the registration code CRD42023439974

Search method and study selection:

A comprehensive search was performed across various databases, including PubMed, Web of Science, Google Scholar, University research repositories, EMBASE, and Google databases. This search aimed to identify both published and unpublished primary studies. The search strategy involved combining specific keywords such as (((((((Magnitude [Title/Abstract]) AND (Utilization [Title/Abstract])) AND (Utilization [Title/Abstract])) AND (post-exposure prevention [Title/Abstract])) OR (PEP)) OR (Post-exposure prophylaxes [Title/Abstract])) AND (Health care workers [Title/Abstract])) OR (health care professionals [Title/Abstract])) OR (Health staffs [Title/Abstract]))

Criteria for inclusion and exclusion:

The search focused on identifying all accessible cross-sectional studies, both published and unpublished, that examined the magnitude of knowledge, attitudes, and utilizations related to Post-Exposure Prophylaxis (PEP) for HIV among healthcare professionals in Ethiopia. These studies had to be published in English. Two teams of reviewers initially assessed the titles and abstracts, followed by a detailed evaluation of the full texts of the selected studies. The quality of the eligible studies was subsequently assessed, and those identified as low quality were excluded from further analysis.

Evaluation of bias and Evidence Quality:

The quality of the studies included in this analysis was assessed using a modified version of the Newcastle-Ottawa Scale, tailored for cross-sectional studies. Only those studies that received a quality score of seven or higher were considered eligible for inclusion in the meta-analysis (see Table 1).

S. N	First author's last name, year	Representativeness	Sample size	Response rate	Surveillance tool	Comparability	Outcome assessment	Statistical test	Quality score
1	Gurmu. T et al, 2014 [6].	1	1	1	2	1	2	1	9
2	Sewunet. A et al, 2022 [7].	1	1	1	2	1	2	1	9
3	Endalkachew.M et al, 2019 [8].	1	1	1	2	1	2	1	9
4	Girish. D et al, 2020 [9].	1	1	1	2	1	2	1	9
5	Ousman. A et al, 2023 [10].	1	1	0	2	1	2	1	8
6	Biyadgie A et al, 2017 [11].	1	1	1	2	1	2	0	8
7	Yohannes. T et al, 2021 [12].	1	1	1	2	1	2	1	9
8	Bosena T et al. 2010 [13].	1	1	1	2	1	2	1	9
9	Biniam. Met. Al. 2013 [14].	1	0	1	2	1	2	1	8

Table 1: Quality Assessment of Eligible Studies Using the Modified Newcastle-Ottawa Scale

A total of 31230 studies were identified from various electronic databases, with an additional 7 studies retrieved from other sources, resulting in a combined total of 31237 studies. During the initial screening, 5940 records were excluded as they did not meet the inclusion criteria for human studies. Subsequently, 25297 records were screened based on their titles and abstracts, leading to the exclusion of

25285 articles. Following this, 12 full-text articles were assessed for eligibility. Of these, 3 articles were excluded after a detailed full-text review. Finally, 9 studies met the inclusion criteria and were included in the final meta-analysis (see Figure 1).

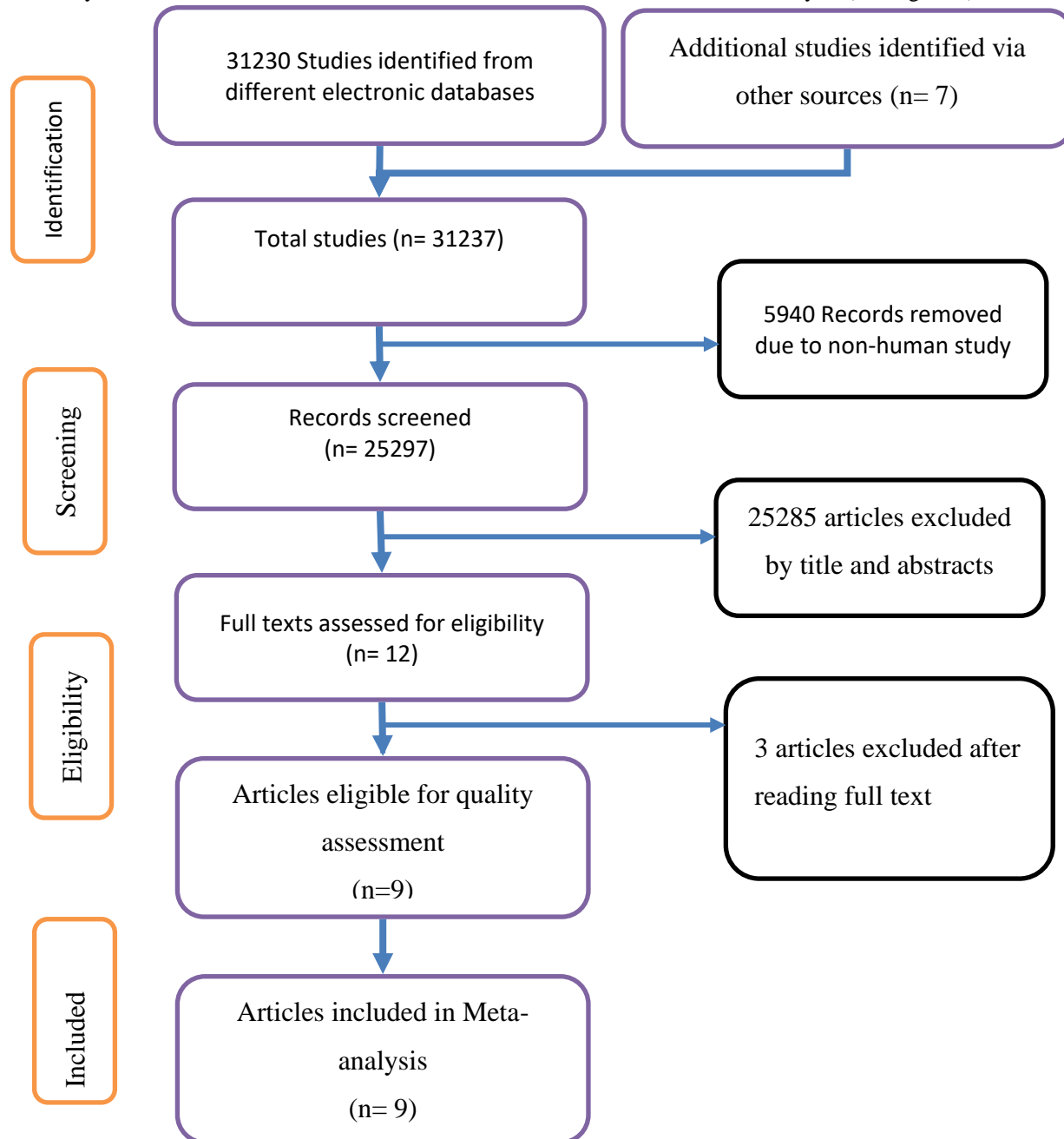


Figure 1: PRISMA Flow Diagram Illustrating the Selection Process for Included Studies in the Systematic Review and Meta-Analysis.

Data collection:

The two authors (DET and HDH) independently extracted the required data from the included studies using a format prepared in Microsoft Excel. The reviewers' team resolved any differences found throughout the data extraction process by discussing them further.

Data analysis:

The statistical analysis was performed using R version 4.2.3 and STATA version 17.0. Given the heterogeneity present in the data, a random-effects model was utilized to aggregate the results. Individual measures of utilization for post-exposure prophylaxis were calculated separately. The PRISMA guidelines reported the findings for systematic reviews and meta-analyses.

Results

Magnitude of utilization of post-exposure prophylaxis:

This analysis encompassed nine studies with a total of 1,175 participants. The overall pooled prevalence of post-exposure prophylaxis (PEP) utilization was found to be 43% (95% CI: 24 - 62) as illustrated in Figure 2.

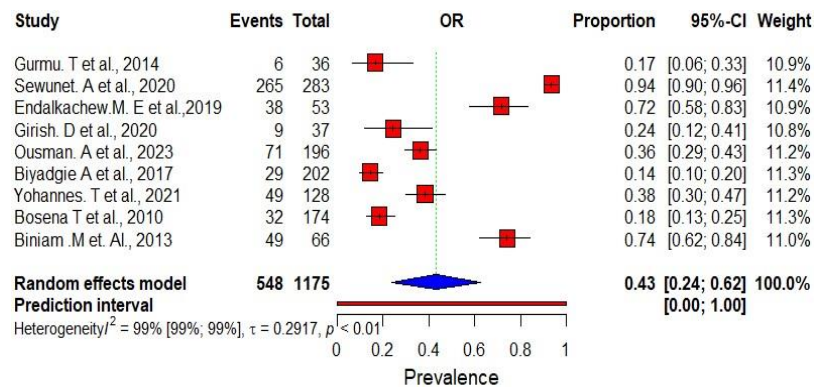


Figure 2: Forest plot depicting the pooled utilization of post-exposure prophylaxis in Ethiopia.

Subgroup Analysis of Post-Exposure Prophylaxis Utilization:

The analysis found that the highest utilization of post-exposure prophylaxis (PEP) occurred in the Amhara region, reaching 61% (95% CI: 14 - 100%). In contrast, the Oromia region reported the lowest utilization rate at 19% (95% CI: 14 - 24%) as shown in (Figure 3).

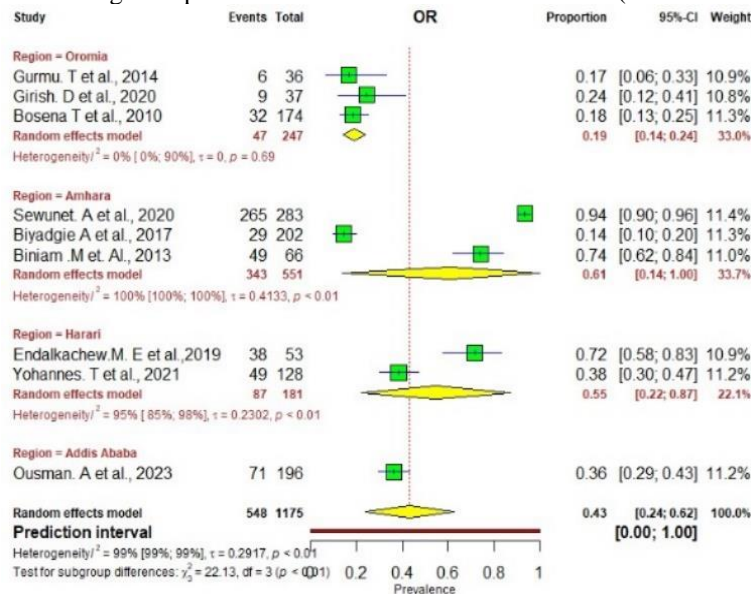


Figure 3: Forest plot illustrating the subgroup analysis of post-exposure prophylaxis usage by region.

The funnel plot indicates the symmetrical distribution of papers, with an Egger test p-value of 0.485, excluding publication bias (Figure 4).

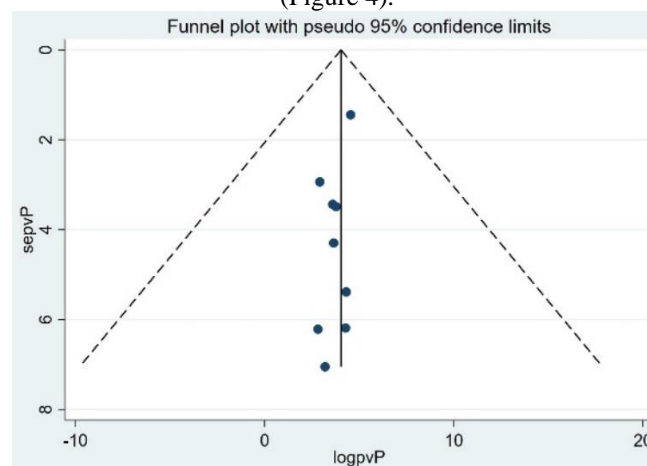


Figure 4: Funnel plot indicating the symmetric distribution of the studies included in the analysis

Discussion:

Healthcare workers (HCWs) face a notable risk of infection when exposed to workplace blood and body fluids (BBFs). Such exposure can lead to the transmission of bloodborne pathogens, including the hepatitis B virus (HBV), hepatitis C virus (HCV), and the human immunodeficiency virus (HIV) [15][16][17]. This systematic review and meta-analysis aimed to assess the pooled estimate of post-

exposure prophylaxes (PEP) utilization among healthcare professionals in Ethiopia. The finding revealed that the pooled estimate of post-exposure prophylaxis (PEP) utilization was determined to be 43% (95% CI: 24 - 62). This finding is higher than the study conducted in 40.1% of Africa [4], 35.3% Pakistan [18], 2.1 % Bhutan [19], 13.7% in Tanzania [20], 29 in South Africa [21], 18.9% in Cameroon [22]. Conversely, it is lower than the study done in 65.9 in Nigeria [23]. These discrepancies might arise due to variation across sociodemographic factors, wherein income influences access to healthcare resources, along with differences in setting sample size and methodology. In addition, geographical access to healthcare services often widens the differences between urban and rural areas, therefore propagating health disparities [24].

From the subgroup analyses, the use of post-exposure prophylaxis was highest in the Amhara region (61%: 95 % CI: 14-100%), while the lowest was in the Oromia region (19%: 95 % CI: 14-24%). The difference may be due to heterogeneity in sample size, and sociodemographic characteristics.

Conclusions:

The meta-analysis shows that postexposure prophylaxis utilization among healthcare professionals in Ethiopia is low, despite its proven effectiveness in preventing HIV transmission. The low overall uptake of postexposure prophylaxis shows the necessitates giving attention and intervention towards the hindering factors via creating supportive environments that mitigate stigma. Improving access to post-exposure prophylaxis medications are essential step in enhancing occupational safety for healthcare workers.

Ethical approval and consent to participate

Not applicable

Authors' contributions statement

DET was responsible for conceptualization, searching, extraction, formal analysis, and manuscript writing. HDH and TMM contributed to the searching, extraction, and manuscript writing. ZBG and WKG were involved in the searching, extraction, analysis, and manuscript writing. All authors approved the final version of the manuscript.

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Disclosure:

The authors declared that they have no competing interests.

Data availability:

The dataset analyzed for this study's findings is available with the corresponding author and can, therefore, be assessed upon reasonable request.

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