

# Infection Prevention Practices and Associated Factors Among Healthcare Workers in Governmental Hospitals in Addis Ababa, Ethiopia, 2022

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## Abstract

**Background:** Failure to follow proper infection prevention practices puts healthcare workers, patients and communities in danger. Despite the increases of highly contagious infections, infection prevention practices among healthcare workers are unknown in many developing countries. The need to know infection prevention practices is vital for prevention and control of nosocomial infections. Therefore, the target of this study was to assess infection prevention practices and associated factors among healthcare workers in governmental healthcare facilities in Addis Ababa, Ethiopia.

**Objective:** the aim of this study to assess infection prevention practices and associated factors among healthcare workers in governmental Hospitals in Addis Ababa, Ethiopia

**Methods:** A facility based cross-sectional study design was conducted in the study period from May to June 2021, in Addis Ababa among 419 healthcare workers who was selected by simple random sampling technique from 12 governmental Hospitals. Data was collected using pre-tested interviewer administered structured questionnaire. Data was entered into Epi -data 3.1 and exported to SPSS version 20 for analysis. Findings were presented using odds ratios with their 95% confidence intervals. A p-value but 0.05 were wont to declare statistical significance. Multivariate logistic regression analysis was used to determine the relationship between various factors and infection prevention practice of health professionals.

**Result:** A general of 419 study participated in the study were involved 100%. The imply age of members changed into 28.22 years (SD =  $\pm 7.18$ ), and amongst them 157 (37.5%) had been men and 262(62.5%) had been females. The type of hand hygiene reported by the respondent was 250 (59.7%) soap and water, and 151 (36%) alcohol. Knowledge, availability of guides, and working hours were all significantly related to infection prevention practices.

**Conclusion and Recommendation:** The results of the study show that half of health professionals (53.8%) rated good infection prevention practices as low. Government Hospitals, along with interested parties, should track and oversee health care professionals to understand the safe practice of infection prevention professionals and maximize infection prevention practices with routine work and enhancing sustainable care such as PPE and healthcare provider encouragement, PPE and IP - guidelines to use.

**Keywords:** Healthcare Workers, Infection Prevention, Nosocomial Infection, Practice

## Introduction

Infection prevention and control may be a central component of safe and prime quality service delivery at the power level [1]. With an inadequate practice of infection prevention, the danger of acquiring infections through exposure to blood, body fluids or contaminated materials in healthcare facilities is substantial [2,3]. In reference to that, contracting an infection while during a healthcare setting challenges the essential concept that healthcare is supposed to create people well [4].

Obviously, lack of compliance with infection prevention and control measures includes a number of consequences [5,6].

Globally, many several people are affected per annum by avoidable infections in health care [1].

During this respect, healthcare associated infections (HAIs) affect patients, healthcare workers (HCWs), support staff, medical students and patient attendants [2].

The associated burden of disease associated with HCAs is extremely high and therefore the impact of HCAs implies prolonged hospital stay, long-term disability, increased resistance of microorganisms to antimicrobials, massive additional financial burden for health systems, high costs for patients and their family, and unnecessary deaths [5-7].

HCAs accounted for 16 million additional hospital stay in Europe with estimated total costs of €7 billion, and this also cost the United State healthcare system to loss an estimated \$ 30-45 billion every year.

The worldwide estimated indicated quite 1.4 million people are stricken by infections acquired in hospitals. Such risk is 2-20 times higher in developing countries [8-11].

Despite the simplicity and clarity of precautions; understanding how poor practice could fuel up the transmission, the practice among health care worker remains low.

This problem is exacerbated in resource limited settings, like Africa [12,13]. Alike other African countries, HCAI in Ethiopia are a significant public unhealthiness with the magnitude isn't clearly known or not well studied. Besides, adherence to the precautions of infection prevention practices among HCWs is questionable and not addressed well [3,14].

Conversely, the Federal Ministry of Health (FMoH) of Ethiopia undertook a mess of initiatives to shield patients and HCWs by setting standards and guidelines [2,3,15].

Although, in many healthcare settings, resources are constrained and control of the chance of acquiring HCAs are a small amount challenging and HCWs lack adequate knowledge and motivation to implement the recommended infection prevention practice [3].

Compliance with infection prevention measures is that the only thanks to reduce and protect HCWs, patients and therefore the community from the occurrence of HCAs and unnecessary injuries [2,3]. On top of this, various multifaceted factors extremely play a good role to realize the goal of infection prevention, like adequate knowledge towards infection prevention, availability of non-public protective equipments and materials, human power, training, policy and guidelines and essential environmental health conditions [6,11].

Hence, it's important that HCWs must know and use the recommended infection prevention measures accordingly[2,6,11-14].

The globe fitness organization (WHO) estimated that a minimum of 50% of the 12 billion injections administered annually within the developing world are unsafe –posing serious health risk to recipients, physicians and therefore the public [11-13].

Injuries from sharp devices are related to the transmission quite

40 pathogens, including HBV, HCV and HIV [12,14,15]. Among the 35 million medical experts worldwide, about 3 million experience percutaneous exposures to blood borne pathogens each year; millions of these to HBV, 0.9 million to HCV and 170000 to HIV.

These injuries may end in 15000 HCV, 70000 HBV and 1000 HIV infections. Quite 90% of those infections occur in developing countries [16].

In sub-Saharan countries the issues related to patient safety is commonly hampered by inadequate data.

However, prevalence studies on hospital-wide healthcare associated infection from some African countries reported high infection rates (Mali 18.9%, Tanzania 14.8%, Algeria 9.8%) with patients undergoing surgery being the foremost frequently affected. Additionally, to HCAs developing countries are hit hard by HIV/AIDS, pandemic hepatitis B and hepatitis C viral infection. In resource poor settings, rates of infection can exceed 20 % [17]. Hospital wide health care associated infection prevalence varied between 2.5% and 14.5% in Algeria, country, Senegal and Tanzania.

Over all HCAI cumulative incidences in surgical ward ranges from 5.7% to 45.8% in studies conducted in Nigeria and Ethiopia [18]. High prevalence of sharp injuries was observed among health professionals working in New Flower hospitals. Sharp injuries were related to over use of injection, workload, and recap, disassembling of needle and syringe, working privately hospitals, taking infection prevention training, taking injection safety training, and availability of safety box. A big number of health professionals were infected by blood borne pathogens [19].

### Statement of the Problem

Health care workers (HCW) are in danger of infection with blood borne pathogens (BBP) through occupational exposure to blood and infectious body fluids presents the best risk for transmission within the health care settings [3]. HBV could be a contagious and straightforward to be transmitted from one infected individual to a different by blood to blood contact, mother to child, unprotected gender sharing of eating utensils and other barbershop and sweetness salon equipment [4]. Hospital acquired infections now every day reaches 7-10% of hospital admissions. These infections result from the transmission of microorganisms from hands of health care workers (HCW) in health institutions [5]. Health care associated infections place a big economic burden on the health care system [6,7].

Infection control (IC) practices are paramount to attenuate health care associated infections. Health care associated infections particularly those who are surgery related, are important causes of pre-operative morbidity and mortality, prolonged hospital stays and increased cost. Health care workers (HCW) could also be to blame for patient to patient transmission of infection.

Additionally, there's the danger of patient to practitioner transfer

which will lead to lifetime of careers threatening of consequences [8].

The practice of contemporary medicine has contributed plenty within the increase of the case and spreading blood born disease like HIV and HBV because of lapse within the sterilization technique of instruments and improper hospital waste management because 10 to twenty health care waste is considered hazardous [9].

Although high risk exposures to infected blood, humor and needle stick injuries are common occupational hazards for health care workers, statistics globally underestimate the severity of the matter because many HCWs don't report their exposures [10].

With health care providers having the foremost contacts with patients, understanding their knowledge, and practice patterns with relevancy nosocomial infections could also be a very important mode by which this health care issue is also addressed.

The aim of this study will to analyze the amount of data and practice of health care providers with regards to infection prevention and associated factors and compare the knowledge, and practice in novice and experienced health care providers with regards to infection prevention.

### **Significant of the Study**

Globally WHO estimates that each unsafe injections and needle stick injuries cause a minimum of 8-12 million serum hepatitis infections, 2.3-4.7 million viral hepatitis infections and 160,000 HIV AIDS infections [13-15].

The middle for disease control and prevention (CDC) in US estimated that every year 385,000 needle stick injuries are sustained by hospital-based health care personnel [14].

Health care providers, planners and evaluators shouldn't ignore this high morbidity and life threatening infection situation. On top of those, unless appropriate infection prevention is in practice health care facilities will be the source of infection and infectious disease for the community at large.

Therefore, this study is meant to assess level of infection prevention practice and awareness among health care providers. The proposed study would have a momentous input in identifying and improving the patterns of infection prevention at the sanatorium level within the study area and baseline information for decision makers to place appropriate solution. This study will help to clarify pictures of problems among infection prevention practice of health care providers in hospital. The study again was important to form the mandatory awareness of health care providers about methods of infection prevention in health facilities.

It'll also function source information for further study.

## **Methods**

### **Study Area**

Addis Ababa is that the capital and largest city of Ethiopia. In step with the 2007 census, town includes a population of two, 739,551 inhabitants. As a chartered city, it's where the African Union is headquartered and where its predecessor the Organization (OAU) was based. It also hosts the headquarters of the global organization Economic Commission for Africa (ECA), additionally as various other continental and international organizations. national capital is therefore often brought up as "the political capital of Africa" for its historical, diplomatic and political significance for the continent. town lies some miles west of the East African Rift which splits Ethiopia into two, between the Nubian Plate and also the Somali Plate. the town is surrounded by the Special Zone of Oromia and populated by people from different regions of Ethiopia. a complete of 86 governmental health facilities and 12 hospitals are found in New Flower. In these healthcare facilities, 7,563 health professionals are performing at the time of this study [16].

### **Study Period**

Study was conducted from May to June, 2021

### **Study Design**

A facility based cross-sectional study was conducted in governmental 12 hospitals found in New Flower (the capital city of Ethiopia).

### **Population**

#### **Source Population**

All Health Care Workers (general practitioners, public health officers, nurses, midwifery, laboratory technicians and technologists, dentists, anesthetists, ophthalmologists and cataract surgeons) working altogether governmental healthcare facilities in national capital was considered as sources population.

#### **Study Population**

From all, HCWs who was found in randomly selected 12 governmental hospitals facilities was the study population.

#### **Study Unit**

The health care workers who were willing to check participants and sampled of the study.

### **Inclusion and Exclusion Criteria**

#### **Inclusion Criteria**

All health professionals in selected governmental hospitals were included within the study.

#### **Exclusion Criteria**

Health care workers who wasn't willing to participated and who was absent during data collection considered as exclusion criteria.

#### **Sample Size Determination**

Sample size decided using single population proportion formula

considering proportion of getting good infection prevention practices among HCWs, (54.2%) (17), 5% margin of error, 95% confidence interval and 10% for non-response. to spot predictors of the end result variable, two-population proportion formula for comparative cross-sectional design was also used. Large sample size (419) calculated employing a single population proportion formula was used to address both objectives.

$n = \frac{z\alpha/2 \cdot 2p(1-p)}{d^2}$  Where:  $n$  = sample size  $Z_{\alpha/2}$  = get from the quality statistical distribution table if CI 95% it was 1.96  $d$  = margin of error meaning 5%  $p$  = probability that get from the study 54.2%  $(1.96)^2 \cdot 0.542(1-0.542) / (0.05)^2 = 381$  Adding non-response that's 10%, supported this the ultimate sample was 419 Sampling Method.

A simple sampling technique was used. First, all governmental hospitals found in national capital city are identified and stratified by sort of hospitals. The sample size ( $n=419$ ) was allocated to every selected four hospitals supported the proportional to the scale of HCWs who was working during data collection period. Afterwards, the sampling frame was prepared using list of HCWs obtained from human resource department of every healthcare facilities. Healthcare workers who participated within the study were randomly selected using lottery method.

Sampling technique From total of presidency hospitals was four hospitals selected. Those hospitals were selected by use of interval procedure.

$K = 1 + 3.22 \log(n)$   $K = 1 + 3.22 \cdot \log(12) = 4.47 \sim 4$  so supported this calculation the hospital was selected.

### Data Collection

Two trained BSc nurses were collected the information through face-face interview employing a structured and pre-tested questionnaire prepared in West Germanic language was used. Data collectors were trained and supervised during data collection period. Description of Variables Dependent variables Practice of infection prevention Independent variables Socio-demographic characteristics (Age, sex, legal status, occupation, educational status)

### Data Analysis

After data collection, each questionnaire was checked for completeness, missing and edited for other errors. Data was entered into Epi-data version 3.1 and exported to SPSS version 25 for further analysis. Before analysis, data was cleaned and checked for outliers and missing. Univariate analysis like frequency tables, graphs, means and standard deviations was computed. Bivariate analysis like chi-squared test, binary and multivariable logistic regressions was performed to look at the presences of association between variables. Data was presented using Odds ratios (OR) and their 95% confidence intervals (CIs). Variables with P-value but 0.2 at bivariate logistic regression model were entered into multivariable logistic regression model. Finally, multivariable logistic regression model was done to spot predictor's infection prevention practices.

### Data Internal Control

To assure the information quality, data collection instruments were pre-tested, and so as to reduce contamination of practices, the questionnaire was also arranged in PAK (Practice, Attitude and Knowledge) order. For every component, reliability test was done and also the reliability coefficient for exercise. The completeness and consistency of the questionnaire was checked by the PI and also the supervisors throughout data collection period.

### Operational Definitions

Infection prevention practices of HCWs were assessed for main components of infection prevention measures like hand hygiene practices, utilization of non-public protective equipment (PPE), and post-exposure prophylaxis (PEP), healthcare waste control practices, tool decontamination and disinfection practice, tuberculosis infection control practice and safe injection and drugs practice.

The mean was used to classify HCWs infection prevention practices as having good practice if the score was equal or above the mean.

## Results

### Socio-Demographic Characteristics

A general of 419 study participants in the look at with a reaction rate of 94.5%. The average age of members ranged from 28.22 years ( $SD = \pm 7.18$ ), and amongst them 157 (37.5%) had been men and 262 (62.5%) had been females. There had been 100 physicians (23.9%), 117 nurses (27.9%), 72 Midwife (17.2%) and 130 (31%), health officers and other professionals. Regarding their career 278 (66.3%) had served for much less than 5 years 95 (22.7%) served among 5 and 10 years and 33 (7.9%) served greater than 15 years of their respective professions. A better share 192 (45.8%) of the respondents had been BSc holder, degree 82 (19.6%), Medical Doctors 45 (10.7%), 12 (2.9%) and 88 (21%) diploma, MSC and other level of employee had been respectively. concerning Marital popularity 165 (39.4%) married, 241 (57.7%) single and 13 (3.1%) divorced.

### Infection Prevention Practices

Respondents Infection prevention practices were assessed in terms of the main elements of infection prevention practice, such as hand hygiene, use of personal protective equipment, and injection safety. The type of hand hygiene reported by the respondent was 250 (59.7%) soap and water, and 151 (36%) alcohol. According to the self-reported hand washing practice of health professionals, (10.26%) health professionals practiced hands before contact with the patient, (12.17%) after contact with the patient, (4.06%) if the feeling looks dirty. After using the toilet, (3.58%) after blood and body fluid contact, (5.25%) before wound care, (2.15%) after removing gloves, (62.53%) washes their hands in all procedure.

The results of this study show that 232 (55.4%) of the respondents were trained in infection prevention. Three hundred and fifty-seven (85.2%) of those surveyed said they had safety guidelines in place in their labor department. 376 (89.7%) of the health profes-

sionals uses antiseptic hand rubs.

### Factors Related To Infection Prevention Practices

Bivariate logistic regression was used to compare the membership between each unbiased variable and the established variable. The degree of association between the impartial and established variables was assessed using the gross odds ratio with a 95% programming language c and a P and value; 0.05 are considered to be statistically significant.

Variables with a P 0.2 value in the bivariate analysis were entered into the final multivariate logistic regression analysis to control possible confounders and to obtain estimates of the relationship between factors and dependent variables. Knowledge, availability of guides, and working hours were all significantly related to infection prevention practices. Multivariate logistic regression analysis was used to determine the relationship between various factors and infection prevention practice of health professionals. Statistically significant between the levels of knowledge, availability of guidelines and work plans with infection prevention practices. There was no significant difference in infection prevention practice with gender AOR= (0.84 CI: 95% (0.48, 1.46)), age AOR= (9.67 CI: 95% (4.28, 21.81)), year of service AOR= (0.84 CI: 95% (0.39, 1.83)), attitude, education, regular supervision, civil status, and availability of a safe, average monthly income, additional responsibility and Labor department.

### Discussion

Infection prevention practice is fundamental to quality of care and essential to protect HCWs, patients and communities from tremendous risks. This study attempted to assess infection prevention practice of HCWs in Addis Ababa city.

In this study, two-third (66.1%) of HCWs had good infection prevention practices. This result is higher than the studies conducted in Northwest of Ethiopia (54.2%), North Ethiopia (42.9%) and West Arsi Zone, Ethiopia (36.3%) [13,17,18]. Difference in practice could be attributable to the difference in study settings, composite scoring, and sampling technique and HCWs experiences. Since HCWs in the capital cities had better work experience and get the opportunities for various infection prevention trainings, the likelihood of having better prevention practice will be higher than HCWs residing in the country-side. This findings is also higher than Edo State, Nigeria (46.8%) Iran Hospital (42%) [19,20]. The possible explanations for the difference were difference in sample size, study time, study area and type of healthcare facilities from which HCWs were selected to participate in the study.

This study identified 46.8% of the HCWs always wore goggle or eye protection during patient care procedures, likely to generate splashes of body fluid into the eye and the mouth. This finding is much higher than the study finding from Northern Ethiopia (10.4%) [21]. This discrepancy could be due to dissimilarity in level of awareness on infection prevention practices and PPE supply and utilization difference of the study populations. In this

study, 57.9% of the HCWs wore mask on every occasion while approaching TB suspected and confirmed patients. This finding is higher than the study finding previously conducted in Addis Ababa city (50.2%) and better than the study from North West Ethiopia (21.1%) [22,23].

Safe injection practice like use of sterile syringes and needles, injection verification before administering, method of sharp waste disposal and HCWs needle recapping practice were used as a key criterion for safe injection practices. Above 90% of HCWs performed safe injection practices. This finding is better than the study finding from Northwest Ethiopia (57%) [17]. The study also reported that 98.3% of HCWs disposed sharps or needles immediately after use in safety box. This finding is encouraging and in accordance with Federal Ministry of Health (FMOH) recommendations and higher than to the study finding in Northern Ethiopia (79.5%) [2,3,21].

This study also assessed the overall knowledge about infection prevention measures. Almost half (55.4%) of HCWs had good knowledge on infection prevention measures. This finding is consistent with the finding from West Arsi Zone of Ethiopia (53.7%) , but much lower than the finding of a study conducted in Northwest Ethiopia (84.2%) and a study reported from Egyptian Cancer Hospital (63.6%) [17,18,24]. The variation might be attributable to differences in sample size, study setting and nature of the population involved...

More than 80% of HCWs had positive attitude towards infection prevention practices. This finding is much higher than study finding in North West Ethiopia (55.6%), Eastern Ethiopia (53.1%) and finding from Iran (33%) [17,20,25]. These differences might be due to differences in the experience of HCWs and training exposure. The result of the study indicated that one year prevalence rate of needle stick injury was (30.2%) among HCW. This result is much higher than the study conducted in Eastern Ethiopia (17.5%), North Ethiopia (22.2%) and Northwest Ethiopia (19.5%) [17,21,25]. One year exposure of blood or body fluid on their mucus membrane (i.e. eye, nose or mouth) was 41.5% among HCW. This finding is lower than the study in North Ethiopia (60.2%) and Tigray Region of Ethiopia (56.3%) [21,26].

This study revealed that HCWs who were aware on availability of infection prevention standard operating procedures (SOP) were two times more likely to have good practices than their counterparts. This finding is consistent with study conducted in West Arsi (Ethiopia) and North Ethiopia [18,21]. HCWs working in department with continuous running water supply were 1.7 times more likely to have good infection prevention practices as compared with HCWs working in department without continuous running water. This finding is inconsistent with the finding from West Arsi, Ethiopia. But, as a matter of fact, having access to water and other infrastructures may directly impact the practice [18].

The study showed that HCWs who had good knowledge regarding infection prevention measures were 1.5 times more likely to

have good infection prevention practices. This finding is supported studies from China and other similar studies [19,20,27]. In addition, this study indicated that positive attitude towards infection prevention practices is the core to achieve good infection prevention practices in healthcare facilities.

## Conclusion and Recommendation

### Conclusions

The results of the study show that half of health professionals (53.8%) rated good infection prevention practices as low. Knowledge, availability of infection prevention guidelines, and average weekly hours worked by health professionals are predictors of good infection prevention practices. Infection Prevention Practices. Therefore, in order to maintain and improve good infection prevention practices, adequate pre- and professional training for health care professionals and access to guidelines on infection prevention should be provided in every department and health care workers should be improved.

### Recommendations

Government Hospitals, along with interested parties, should track and oversee health care professionals to understand the safe practice of infection prevention professionals and maximize infection prevention practices with routine work and enhancing sustainable care such as PPE and healthcare provider encouragement, PPE and IP - guidelines to use. Resealing used needles should be prohibited in hospitals. Signs should be posted throughout the facility to remind healthcare professionals of the need to follow general precautions [28,29].

- The hospital must plan to be able to equip the lack of IP devices and lockers. Medical professionals in particular should receive regular training in infection prevention.
- To improve the overall safety of patients and healthcare providers.
- More large-scale studies should be carried out covering different levels of health facilities and regions of the country.

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### Conflict of Interest

The authors have no conflict of interest to declare for this study.

### References

1. Velleman, Y., Mason, E., Graham, W., Benova, L., Chopra, M., Campbell, O. M., ... & Cumming, O. (2014). From joint thinking to joint action: a call to action on improving water, sanitation, and hygiene for maternal and newborn health. *PLoS medicine*, 11(12), e1001771.
2. Ababa, A. (2003). Federal democratic republic of Ethiopia ministry of health. Ethiopia: Postnatal Care.
3. Federal Ministry of Health of Ethiopia. (2012). Infection prevention and patient safety reference manual for service providers and managers in healthcare facilities of Ethiopia.
4. Gichuhi, A. W., Kamau, S. M., Nyangena, E., & Otieno-Ayayo, Z. N. (2015). Health care workers adherence to infection prevention practices and control measures: A case of a level four district hospital in Kenya.
5. Wilson, J., Fenoff, R., & Backgrounder, A. C. (2011). The health and economic effects of counterfeit pharmaceuticals in Africa. *Global Edge Business Rev*, 5(6), 1-2.
6. Chartier, Y., Adams, J., & Bartram, J. (2008). Essential environmental health standards in health care. Geneva: WHO.
7. Jigjidsuren, A. (2012). Mongolia: Fifth Health Sector Development Project.
8. Allegranzi, B., Nejad, S. B., Combescure, C., Graafmans, W., Attar, H., Donaldson, L., & Pittet, D. (2011). Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. *The Lancet*, 377(9761), 228-241
9. Nelson, S., Stone, P. W., Jordan, S., Pogorzelska, M., Halpin, H., Vanneman, M., & Larson, E. (2011). Patient safety climate: variation in perceptions by infection preventionists and quality directors. *Interdisciplinary perspectives on infectious diseases*, 2011.
10. World Health Organization. (2010). Infection prevention and control in health care: time for collaborative action (No. EM/RC57/R. 6).
11. Tietjen, L., Bossemeyer, D., & McIntosh, N. (2003). Infection prevention: guidelines for healthcare facilities with limited resources. *Jhpiego Corporation*.
12. Gammon, J., Morgan-Samuel, H., & Gould, D. (2008). A review of the evidence for suboptimal compliance of healthcare practitioners to standard/universal infection control precautions. *Journal of clinical nursing*, 17(2), 157-167.
13. Thu, T. A., Anh, N. Q., Chau, N. Q., & Hung, N. V. (2012). Knowledge, attitude and practices regarding standard and isolation precautions among Vietnamese health care workers: a multicenter cross-sectional survey. *Intern Med*, 2(4), 115.
14. Haileamlak, A. (2011). Editorial: Preventing healthcare associated infections. *Ethiop Journal of Health Sciences*, 21(1), 7-8.
15. Federal Ministry of Health (FMoH). (2008). Healthcare waste management national guidelines, hygiene and environmental health development.
16. Sahiledengle, B., Gebresilassie, A., Getahun, T., & Hiko, D. (2018). Infection prevention practices and associated factors among healthcare workers in governmental healthcare facilities in Addis Ababa. *Ethiopian journal of health sciences*, 28(2), 177-186.
17. Gulilat, K., & Tiruneh, G. (2014). Assessment of knowledge, attitude and practice of health care workers on infection prevention in health institution Bahir Dar city administration. *Sci J Public Health*, 2(5), 384-393.
18. Gulilat, K., & Tiruneh, G. (2014). Assessment of knowledge, attitude and practice of health care workers on infection pre-

- vention in health institution Bahir Dar city administration. *Sci J Public Health*, 2(5), 384-393.
19. Morka, G. (2015). Assessment of the Knowledge and Practices towards Infection Prevention and Associated Factors among Healthcare Providers of Public Health Facilities in West Arsi, Oromia Regional State, Ethiopia (Doctoral dissertation, Addis Ababa University).
  20. Temesgen, C., & Demissie, M. (2014). Knowledge and practice of tuberculosis infection control among health professionals in Northwest Ethiopia; 2011. *BMC health services research*, 14(1), 1-7.
  21. Sarani, H., Balouchi, A., Masinaeinezhad, N., & Ebrahimi-tabs, E. (2016). Knowledge, attitude and practice of nurses about standard precautions for hospital-acquired infection in teaching hospitals affiliated to Zabol University of Medical Sciences (2014). *Global journal of health science*, 8(3), 193.
  22. Gebresilassie, A., Kumei, A., & Yemane, D. (2014). Standard precautions practice among health care workers in public health facilities of Mekelle special zone, Northern Ethiopia. *J Community Med Health Educ*, 4(3), 286.
  23. Demissie Gizaw, G., Aderaw Alemu, Z., & Kibret, K. T. (2015). Assessment of knowledge and practice of health workers towards tuberculosis infection control and associated factors in public health facilities of Addis Ababa, Ethiopia: A cross-sectional study. *Archives of public health*, 73, 1-9.
  24. Temesgen, C., & Demissie, M. (2014). Knowledge and practice of tuberculosis infection control among health professionals in Northwest Ethiopia; 2011. *BMC health services research*, 14(1), 1-7.
  25. Eskander, H. G., Morsy, W. Y. M., & Elfeky, H. A. A. (2013). Intensive care nurses' knowledge & practices regarding infection control standard precautions at a selected Egyptian cancer hospital. *prevention*, 4(19), 160-174.
  26. Reda, A. A., Fisseha, S., Mengistie, B., & Vandeweerd, J. M. (2010). Standard precautions: occupational exposure and behavior of health care workers in Ethiopia. *PLoS One*, 5(12), e14420.
  27. Gessesew, A., & Kahsu, A. (2009). Occupational exposure of health workers to blood and body fluids in six hospitals of Tigray region (August 1-30, 2006): magnitude and management. *Ethiopian medical journal*, 47(3), 213-219.
  28. Sahiledengle, B., Gebresilassie, A., Getahun, T., & Hiko, D. (2018). Infection prevention practices and associated factors among healthcare workers in governmental healthcare facilities in Addis Ababa. *Ethiopian journal of health sciences*, 28(2), 177-186.
  29. Luo, Y., He, G. P., Zhou, J. W., & Luo, Y. (2010). Factors impacting compliance with standard precautions in nursing, China. *International Journal of Infectious Diseases*, 14(12), e1106-e1114.

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