


Research



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Received: 28 Oct 2021 - **Accepted:** 12 Apr 2022 - **Published:** 22 Apr 2022

Keywords: Ethiopia, factors, healthcare workers, compliant, infection prevention, control precautions

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Cite this article: Alebachew Amsalu et al. Healthcare workers' compliance and factors for infection prevention and control precautions at Debre Tabor Referral Hospital, Ethiopia. PAMJ - One Health. 2022;7(35). 10.11604/pamj-oh.2022.7.35.32202

Available online at: <https://www.one-health.panafrican-med-journal.com/content/article/7/35/full>

Healthcare workers' compliance and factors for infection prevention and control precautions at Debre Tabor Referral Hospital, Ethiopia

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Abstract

Introduction: Healthcare workers (HCWs) are frequently exposed to infections and they are also a risk for infections between patients, HCWs, and the environment while working in a hospital. The HCWs compliant for infection prevention and control precautions (IPCP) and factors were investigated to contribute for sufficient and consistent findings in developing countries.

Methods: institutional based cross-sectional study was conducted. Data were collected through pre-tested, structured, and self-administered questionnaires. The outcome variable, "compliant" for IPCP was measured using 22 items on a 3-point Likert scale. Participants who had scored a cutoff point 66 (22 items multiplied by 3 points) were considered "compliant" for IPCP. Bivariable and multivariable logistic regression analysis were calculated to identify variables that are significantly associated with HCWs compliance with IPCP. **Results:** the overall HCWs compliance with IPCP was 10.6% and compliant variation among professions of anesthetists, laboratory technologists, nurses, midwives, and physicians were 25%, 13.3%, 11%, 7.7%, and 5.9%, respectively. Work experience > 5 years (AOR = 7.82, 95% CI = [1.61-12.07]), receiving IPCP training (AOR = 17.60, 95% CI = [3.58-8.65]) and availability of personal protective equipment (PPE) (AOR=21.20, 95% CI= [2.46-11.37]) were significant predictors for IPCP compliant of HCWs. **Conclusion:** compliance with IPCP among HCWs at Debre Tabor Referral Hospital (DTRH) is very low. The finding emphasizes the importance of work experience, receiving IPCP training, and the availability of PPE to increase compliance of HCWs with IPCP in the hospital.

Introduction

Healthcare-acquired infections (HAIs) are infections that begin 48 hours or more after being admitted to the hospital or within 30 days of receiving health care [1]. HAIs are a worldwide issue, particularly in low- and middle-income

countries, where the prevalence ranges from 5.7% to 19.1% [2] and death occurs in approximately 10% of affected patients [3]. In Ethiopia, the overall prevalence of HAIs was 16.96%, with surgical site infection (39.66%), urinary tract infection (27.69%), bloodstream infection (19.9%), dual infections (surgical site and urinary tract infection) (14.01%), and respiratory tract infection (13.51%) being the most common [4].

A comprehensive implementation of IPCP could potentially prevent up to 55-70% of HAIs [5]. IPCP are scientific approaches and practical solutions aimed at preventing infection-related harm to patients and health care workers (HCWs). Continuous running water supply, infection prevention guidelines, and IPCP training were all significantly associated with higher chances of safe infection prevention practice [6].

In Ethiopia, infection prevention practices range from 52.2% to 39.4%, and the likelihood of safe infection prevention practice is higher among HCWs who have good knowledge and a positive attitude toward infection prevention [7]. Building infection prevention and control capacity in low- and middle-income countries is feasible if there is sufficient and consistent evidence on strategies for specific needs interventions [8]. The current study investigated HCWs' compliance with IPCP measures and identified associated factors at Debre Tabor Referral Hospital (DTRH), which can be used to improve preventive measures in healthcare settings.

Methods

Study area: Debre Tabor Referral Hospital was designed to serve 1.5 million people per year, but it now serves 2.5 million people per year. It has five wards (surgery, medicine, pediatrics, obstetrics and gynecology, and intensive care), two large operating wards, and a small operating ward. Currently, the DTRH has a total of 409 employees (140 nurses, 27 midwives, 26 general practitioners, 28 pharmacists, 5 radiographers, 17

laboratory technicians, 6 medical laboratories, 6 anesthesiologists, 4 health informatics, an environmental health officer, 12 experts, 36 other technicians and 101 administrative staff.

Study design and period: institutional based cross-sectional study was conducted in DTRH from October 14 to November 4, 2021.

Sources population: all regularly employed HCWs working at the DTRH and providing direct patient care (nurses, physicians, anesthesiologists, midwives, and laboratory technicians/technicians during the study period).

Study population: regularly employed HCWs working at DTRH and provide direct patient care during the study period.

Inclusion criteria: healthcare workers regularly employed and provide direct patient care during the data collection period.

Exclusion criteria: healthcare workers who were seriously ill, on annual and maternity leave during data collection.

Sampling and sample size determination: the census method was used.

Measurement of variables: compliance with IPCP of HCWs is the outcome variable. The 22 items on a three-point Likert scale (1 = seldom, 2 = sometimes, and 3 = always) were used to measure compliance with IPCP of HCWs. Participants who scored 66 points (22 items multiplied by 3 points) were considered "compliant" for IPCP [9]. The independent variables of study are sociodemographic factors (age, sex, marital status, job category, work experience) and assigned place), knowledge about IPCP (knowledgeable: when the participants correctly answers the knowledge assessment question = mean (equal to or greater than 5), less knowledgeable: when the participants correctly answers the knowledge assessment question is less than five [9] and institutional factors (workplace infection

prevention guidelines, continuous water sources availability, alcohol swabs always present in wards, soap for handwashing always present in wards, availability of personal protective equipment (PPE), support administrative and training on safety practices).

Data collection procedures and quality assurance: data were collected using pre-tested, structured, and self-administered questionnaires. This questionnaire was developed based the guidelines for the prevention and control of environmental infections [10]. The data were collected by trained nurses and was carried out under the supervision of environmental health experts. Data quality was ensured in the data collection, coding, entry and analysis process.

Data processing and analysis: the collected data were entered into EpiData (version 3.1) software and exported to SPSS (version 23) software for cleaning and analysis. The results were presented using figure and tables as variables in terms of frequency and percentage. A bivariable and multivariable logistic regression analysis were calculated to identify predictors of compliance with IPCP. The odds ratio with a 95% confidence interval (CI) was used to determine the strength of the association. Enter variables with p values less than or equal to 0.2 in multivariable logistic regression analysis. A 95% CI at p value = 0.05 is declared statistically significant.

Results

Sociodemographic characteristics: the response rate in this study was 96% and half (50.5%) of the respondents were female HCWs. Majority of the respondents were in the range of 26-30 age group and married (59.6%). Among the HCWs participated, 70.2%, and 54.3% were nursing professionals and with five or more years of work experience, respectively (Table 1).

Level of compliance with standard precautions (SPs): the proportion of HCWs who were compliance with IPCP was 10.6%. Compliance with

IPCP of anesthesiologists (25%) was most compliant followed by laboratory technicians (13.3%) (Figure 1). The HCWs always wash their hands before touching a patient, after being exposed to body fluids, between patient contacts, and touching patients' surroundings were 37%, 78.4%, 15.4%, and 16.3%, respectively (Table 2). From participated HCWs, 71.6%, 32.7%, 20.7%, were always clean and disinfect equipment's and environmental surfaces, considered all patients as potentially infectious, and wear water proof apron when there was possibility of body fluid exposure, respectively. In addition to this 16.8% of HCWs was seldom place used sharps in a puncture-resistant containers at point of use and 69.2% was always segregated infectious medical wastes into yellow color-coded bin (Table 3).

Knowledge of HCWs about IPCP: in the current study, 76% of HCWs were knowledgeable on disinfection prevents HAIs and 66.3% of HCWs were knowledgeable on masks and goggles are necessary if the procedures and patient care activities are likely to cause blood flashing or exposure to deep body fluid. In addition, 76.4% HCWs was aware that used needles should be placed in a puncture resistant container (Table 4).

Factors associated with compliant with IPCP: multiple logistic regression analysis revealed that HCWs with the availability of PPE (AOR = 21.20, 95%, CI = [2.46-11.37]), receiving training on IPCP (AOR = 17.60, 95%, CI = [3.58-8.65]), and more than or equal to five years of work experience (AOR = 7.82, 95%, CI = [1.61-12.07]), were statistically significant predictors of compliance with IPCP (Table 5). Institutional factors for instance 70.2%, 71.2%, and 68.3% of HCWs were with no training on IPCP, no soap and no persistent water supply, respectively (Figure 2).

Ethical consideration: ethical clearance was obtained from the Research Review committee of Debre Tabor University. Participants were assured and convinced of confidentiality concerning all information acquired. In addition, verbal consent

was obtained from each participant and director of DTRH.

Discussion

Compliance with IPCP is a cost-effective strategy for preventing HAIs in resource-constrained developing countries like Ethiopia. The current study investigated HCWs' compliance with IPCP as well as personal and institutional factors that influence it. HCWs' compliance with IPCP was 10.6% in this study, which is comparable to the study in northern Ethiopia (12%) [11], but much lower than studies in Southern Ethiopia (56.5%) [12]. Regarding their profession and compliant, anesthetists were the most compliant (25%) and physicians were the lowest (5.9%). A similar study in Southeast Ethiopia showed that nurses were the most compliant professionals (57%) and anesthetists and laboratory professionals were the least in total of 8.9% [13]. Knowledge and work experiences of HCWs' might be the reason for discrepancy.

This low compliance might be due to lack of PPE, a lack of work experience, insufficient training for HCWs, and the study settings. However, when each specific domain of IPCP examined, better results were observed in some items. For instance, the overall hand hygiene of HCWs in this study was 33.6%, which is much higher than study in Northern Ethiopia, 16.5% [14] but lower than and the overall hand hygiene compliance of HCWs in Ethiopia (38%) [14]. These differences were most likely caused by persistent water and soap supply, and HCW knowledge of infection prevention and control.

Although skin provides some protection from exposure to potentially infectious substances, it is strongly recommended that health professionals use blood and body fluid precautions for further protection when they are providing health care [15]. Only 20.7% of HCWs always wore waterproof apron when there was possibility of body fluid exposure, which is lower than the study

in Southeast Ethiopia (39%) [13]. The proportion of HCWs who always protect themselves from any bodily fluid exposure in this study was 43%, which was lower than the proportion in Ghana, which was 50% [16]. This discrepancy might be due to HCWs' knowledge and availability of PPE in the working institution. The segregation of healthcare waste as infectious and non-infectious by HCWs in this study was 69.3%, which is lower than the study in Uganda, which was 80%, but higher than the study in Kenya, which was 38.9% [17]. This variation might be due to receiving IPCP training and the availability of PPE at the workplace.

The overall knowledge of HCWs on IPCP in this study was 76%, which is higher than similar study in Southeast Ethiopia 53.7% [13], and Nigeria 16.6% [18]. But lower than 84.6% [19], taking IPCP training and gaining work experience could be the causes of this discrepancy. Work experience of more than or equal to five years, access to PPE, and receiving SP training are predictors of HCWs' compliance with SP in this study. Compliance with SP was likely to be higher by 21 times, 17.6 times, and 7.8 times for availability of PPE, receiving training, and work experience greater or equal to five years than their counterparts, respectively [20]. Other studies also mentioned knowledge 3.8 times [14], training 12.3 times and PPE availability 10.2 times [21] as of predictors for compliance with SP by HCWs. There are studies reported that there was no association between knowledge [17], and work experience [22], on compliance with SP by HCWs. These differences on predictors and values might be due to healthcare facilities IPC setup and study setting.

Limitations of the study

Participants were only drawn from hospital settings, the study's generalizability is limited to referral hospitals and not to smaller healthcare facilities in the town. Another limitation of this study was its cross-sectional design, which does not establish the definitive and effect of a relationship between the dependent and independent variables.

Conclusion

HCWs' compliance with IPCP remains extremely low. Five years of work experience or more, availability of PPE, and receiving IPCP training were factors those are significantly associated with IPCP compliance. Updating infection prevention measures for HCWs through in-service training and the implementation of infection prevention measures (such as PPE provision) will improve IPCP compliance. Furthermore, follow-up actions and the implementation of infection prevention guidelines should be implemented to improve HCWs compliance with IPCP.

What is known about this topic

- *Inconsistent findings on HCWs' compliance with standard precautions;*
- *Compliance of HCWs in different locations other than the current study address.*

What this study adds

- *Compliance of HCWs with IPCP in the province;*
- *Investigation was based on modified indicators;*
- *Baseline for the study region (new for the study province).*

Competing interests

The authors declare no competing interests.

Authors' contributions

AA: participated in design, method, write up and manuscript preparations. HK: participated in method, data collection and analysis. Both authors have reviewed the manuscript and approved the final version for submission.

Tables and figures

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References

1. Cardoso T, Almeida M, Friedman ND, Aragão I, Costa-Pereira A, Sarmiento AE *et al.* Classification of healthcare-associated infection: a systematic review 10 years after the first proposal. *BMC Med.* 2014 Mar 6;12: 40. **PubMed** | **Google Scholar**
2. WHO. Health care-associated infections fact sheet. Accessed 28th October 2021
3. WHO. Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level. 2016. Accessed 24th Feb 2022.
4. Alemu AY, Endalamaw A, Bayih WA. The burden of healthcare-associated infection in Ethiopia: a systematic review and meta-analysis. *Trop Med Health.* 2020 Sep 7;48: 77. **PubMed** | **Google Scholar**
5. Bearman G, Doll M, Cooper K, Stevens MP. Hospital infection prevention: how much can we prevent and how hard should we try? *Curr Infect Dis Rep.* 2019 Feb 2;21(1): 2. **PubMed** | **Google Scholar**
6. Physiopedia. Infection Prevention and Control. Physiopedia. Accessed 28th February 2022.
7. Sahiledengle B, Tekalegn Y, Woldeyohannes D. The critical role of infection prevention overlooked in Ethiopia, only one-half of health-care workers had safe practice: a systematic review and meta-analysis. *PLOS One.* 2021 Jan 14;16(1): e0245469. **PubMed** | **Google Scholar**
8. Bardossy AC, Zervos J, Zervos M. Preventing hospital-acquired infections in low-income and middle-income countries. *Infect Dis Clin North Am.* 2016 Sep;30(3): 805-1. **PubMed** | **Google Scholar**
9. Haile TG, Engeda EH, Abdo AA. Compliance with Standard Precautions and Associated Factors among Healthcare Workers in Gondar University Comprehensive Specialized Hospital, Northwest Ethiopia. *J Environ Public Health.* 2017;2017: 2050635. **PubMed** | **Google Scholar**
10. National Institute of Health, Pakistan. National Guidelines Infection Prevention & Control 2020. Accessed 28th February 2022
11. Tariku Gebre Haile, Eshetu Haileselassie Engeda, Abdella Amano Abdo. Compliance with Standard Precautions and Associated Factors among Healthcare Workers in Gondar University Comprehensive Specialized Hospital, Northwest Ethiopia. *J Environ Public Health.* 2017;2017: 2050635. **PubMed** | **Google Scholar**

12. Bekele T, Ashenaf T, Ermias A, Sadore AA. Compliance with standard safety precautions and associated factors among health care workers in Hawassa University comprehensive, specialized hospital, Southern Ethiopia. *PLoS One*. 2020 Oct 15;15(10): e0239744. **PubMed** | **Google Scholar**
13. Geberemariyam BS, Donka GM, Wordofa B. Assessment of knowledge and practices of healthcare workers towards infection prevention and associated factors in healthcare facilities of West Arsi District, Southeast Ethiopia: a facility-based cross-sectional study. *Arch Public Health*. 2018 Nov 12;76: 69. **PubMed** | **Google Scholar**
14. Abdella NM, Tefera MA, Eredie AE, Landers TF, Malefia YD, Alene KA. Hand hygiene compliance and associated factors among health care providers in Gondar University Hospital, Gondar, North West Ethiopia. *BMC Public Health*. 2014;14: 96 **Google Scholar**
15. University of Michigan. Blood and Body Fluid Precautions. Accessed Accessed 4 March 2022.
16. Akagbo SE, Nortey P, Ackumey MM. Knowledge of standard precautions and barriers to compliance among healthcare workers in the Lower Manya Krobo District, Ghana. *BMC Res Notes*. 2017 Aug 30;10(1): 432. **PubMed** | **Google Scholar**
17. Moyo GM. Prevention Standard Precautions Among Nurses. *J Infect Prev*. 2019;414(85): 3337-9.
18. Okechukwu EF, Modteshi C. Knowledge and practice of standard precautions in public health facilities in Abuja, Nigeria. *Int J Infect Control*. 2012 Aug 9;8: 3. **Google Scholar**
19. Desta M, Ayenew T, Sitotaw N, Tegegne N, Dires M, Getie M. Knowledge, practice and associated factors of infection prevention among healthcare workers in Debre Markos referral hospital, Northwest Ethiopia. *BMC Health Serv Res*. 2018 Jun 18;18(1): 465. **PubMed** | **Google Scholar**
20. Zenbaba D, Sahiledengle B, Bogale D. Practices of Healthcare Workers regarding Infection Prevention in Bale Zone Hospitals, Southeast Ethiopia. *Adv Public Health*. 2020;4198081. **Google Scholar**
21. Beyamo A, Dodicho T, Facha W. Compliance with standard precaution practices and associated factors among health care workers in Dawuro Zone, South West Ethiopia, cross sectional study. *BMC Health Serv Res*. 2019 Jun 13;19(1): 381. **PubMed** | **Google Scholar**
22. Komuhangi G, Kevin NU, Felex IO, Kabiri L. Factors associated with compliance with infection control guidelines in the management of labour by healthcare workers at Mulago Hospital, Uganda. *Open J Nurs*. 2019;09(07): 93917,27. **Google Scholar**

Table 1: socio-demographic characteristics of HCWs working at DTRH, Ethiopia, 2021 (n = 208)

Variables		Frequency	Percent (%)
Sex	Female	105	50.5%
	Male	103	49.5%
Age of the respondent	<25 years	8	3.8%
	26 - 30 years	125	60.1%
	>31yrs	75	36.1%
Marital status	Single	75	36.1%
	Married	124	59.6%
	Widowed	3	1.4%
	Divorced	6	2.9%
Profession	Physicians	17	8.2%
	Anesthetists	4	1.9%
	Nurses	146	70.2%
	Midwives	26	12.5%
	Laboratory technologists	15	7.2%
Work experience	< 2 years	34	16.3%
	3 - 4 years	61	29.3%
	> 5 years	113	54.3%

Table 2: level of compliance with handwashing IPCP among HCWs working at DTRH, Ethiopia, 2021 (n = 208)

Components of IPCP	Level of compliance		
	Always	Sometimes	Seldom
Wash hands before touching a patient	77 (37.0%)	93 (44.7 %)	38 (18.3%)
Wash hands before clean or aseptic procedures	86 (41.3%)	82 (39.4%)	40 (19.2%)
Wash hands after body fluid exposure	163 (78.4%)	39(18.8%)	6 (2.9%)
Wash hands after touching a patient	61 (29.3%)	98(47.1%)	49 (23.6%)
Wash hands immediately after removal of gloves	36 (17.3%)	94 (45.2%)	78 (37.5%)
Wash hands between patient contact	32 (15.4%)	79 (38.0%)	97 (46.6%)
Wash hands after touching patient surroundings	34 (16.3%)	76 (36.5%)	98 (47.1%)

Table 3: level of compliance with IPCP among HCWs working at DTRH, Ethiopia, 2021 (n = 208)

Components of IPCP	Level of compliance		
	Always	Sometimes	Seldom
Provide nursing care considering all patients as potentially infectious	68 (32.7 %)	107(51.4%)	33 (15.9%)
Protect against body fluids of all patients regardless of their diagnosis	120 (57.7%)	73 (35.1%)	15 (7.2%)
Wear clean gloves during possibility of exposure to any body fluids	150 (72.1%)	39(18.8%)	19 (9.1%)
Change gloves between contacts with different patients	68 (32.7%)	96 (46.2%)	44 (21.2%)
Avoid wearing gown out of hospital	88 (42.3%)	61 (29.3%)	59 (28.4%)
Wear a waterproof apron whenever there is a possibility of body fluid splashing in my body	43 (20.7%)	62 (29.8%)	104 (49.5%)
Wear eye goggles whenever there is a possibility of body fluid splashing in my face	45 (21.6%)	44 (21.2%)	119 (57.2%)
Sterilize all reusable equipment before being used on another patient	141 (67.8%)	46 (22.1%)	21 (10.1%)
Clean and disinfect equipment and environmental surfaces	149 (71.6%)	52 (25.0%)	7 (3.4%)
Segregate noninfectious wastes in black color-coded dust bin	148 (71.2%)	51 (24.5%)	9 (4.3%)
Segregate infectious medical wastes in yellow-colored coded bins	144 (69.2%)	50 (24.0%)	14 (6.7%)
Never bend needles with my hands	97 (46.6%)	787 (37. %)	34 (16.3%)
Avoid removing used needles from disposable syringes	80 (38.5%)	83 (39.9%)	45 (21.6%)
Place used sharps in puncture-resistant container at point of use	77 (37.0%)	96 (46.2%)	35 (16.8%)
Never recap needles	67 (32.2%)	103 (49.5%)	38 (18.3%)

Table 4: knowledge of HCWs on IPCP working at DTRH, Ethiopia, 2021 (n = 208)

Knowledge question on IPCP	Yes	No
Disinfection prevents HAIS	158 (76.0%)	50 (24.0%)
Standard precautions are applied to HIV positive patient only	152(73.1%)	56 (26.9%)
Chemical sterilization technique is used for every equipment	60 (28.8%)	148 (71.2%)
Physical sterilization (heat and radiation) technique was used for every equipment	112 (53.8%)	96 (46.2%)
All microorganisms including spores are destructed by autoclave	158 (76.0%)	50 (24.0%)
Equipment need decontamination before sterilization	158 (76.0%)	50 (24.0%)
Masks and goggles are not necessary if the procedure and patient care activities are likely to cause flushing of blood or exposure to deep body fluid	70 (33.7%)	138 (66.3%)
Used needle should be placed in puncture resistance container	159 (76.4%)	49 (23.6%)
There is PEP (post exposure-prophylaxis)-for HIV after exposure	158 (76.0%)	50 (24.0%)
Drug resistance microorganisms are restricted to health institution	79 (38.0%)	129 (62.0%)

Table 5: bivariate and multivariate analysis of factors associated with compliance with IPCP among HCWs working at DTRH, Ethiopia, 2021 (n = 208)

Variables		Level of compliance		COR (95%, CI)	AOR (95%, CI)
		Compliance 22(10.6%)	Noncompliance 186(89.4%)		
Work experience	≤ 2 years	1	33		
	3-4 years	2	59		
	≥ 5 years	19	94	5.96 (1.34-6.53)	7.82 (1.61-12.07) *
Training on infection prevention	Yes	20	42	34.23 (9.69-13.48)	17.60 (3.58-8.65) **
	No	2	144	1	
Persistent water source	Yes	18	48	12.93 (4.17- 40.13)	
	No	4	138		
PPE availability	Yes	21	77	29.72 (3.91 -23.67)	21.20 (2.46-11.37) ***
	No	1	109		
Management support	Yes	15	76	3.10 (1.20-7.96)	
	No	7	110		

AOR: adjusted odds ratio; CI: confidence interval; COR: crude odds ratio; PPE: personal protective equipment; HW: handwashing; SP: safety practice; *significant association (p = 0.020) adjusted; **significant association (p = 0.000) adjusted; ***significant association (p = 0.015) adjusted

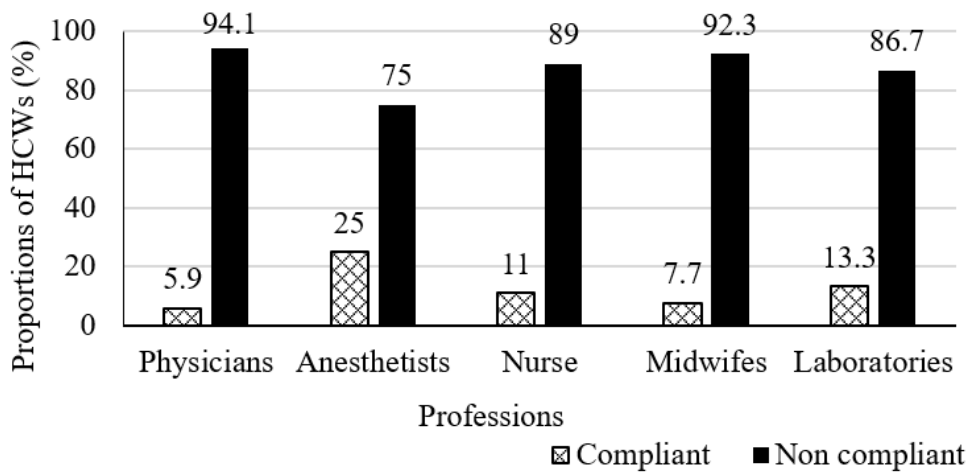


Figure 1: proportion of HCWs compliance with IPCP by profession at DTRH, Ethiopia, 2021 (n = 208)

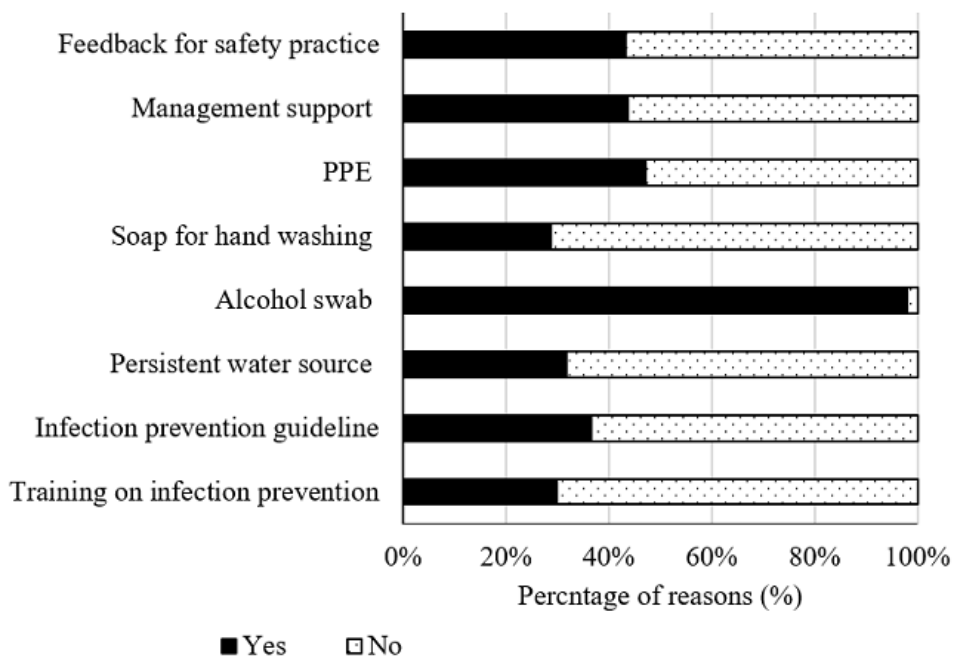


Figure 2: institutional factors affecting HCWs' compliance with IPCP at DTRH, Ethiopia, 2021 (n = 208)