

Research Article

Infection Prevention Practice and Associated Factors among Health Care Workers in South Gondar Zone, North West Ethiopia, 2020

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Abstract

Background: Infection prevention is universally acknowledged as a vital component of comprehensive approach to patient and healthcare worker safety, quality improvement, and improved health outcomes. Infections acquired during health-care delivery are a significant public health problem around the world. Thus, infection prevention is not only the most cost-effective option, but also the best strategy to prevent the spread of disease within health facilities. Therefore, the objective of this study was to assess infection prevention practices and associated factors among health care workers in governmental health care facilities in South Gondar zone, North West Ethiopia.

Methods: Institutional based cross-sectional study design was conducted from 15 February-15 April, 2020 in South Gondar zone among healthcare workers. Multistage was used as sampling procedures. Data were collected using pre-tested self-administered structured questionnaire. Data were entered and analyzed using Epi-data version 3.1 and SPSS version 23 respectively. The model was fitted using multivariable logistic regression to identify associated factors with infection prevention practices. Odds ratio with a 95% confidence interval was used

as measure of association. Finally p-value less than 0.05 were used to declare statistical significance.

Results: Six hundred two (97%) healthcare workers participated in the study. Three hundred thirty six 60.8%(57.1-64.8%) 95%CI health care workers had good infection prevention practices. Availability of gloves, AOR 3.69(2.015, 6.789)95%CI, Availability Safety box, AOR=1.9(1.2, 3.1)95% CI, Presence of Infection prevention guide line, AOR=0.498(.32, .83) 95% CI, presence of alcohol swab AOR = 0.49(.29, .82)95% CI. Accessibility of hand washing items AOR=2.0(1.2, 3.4) 95% CI were found to be significantly associated.

Conclusion: Nearly two-third of the healthcare workers had good infection prevention practices. On infection prevention measures, availability of guide lines, safety box, gloves, alcohol swab, and accessibility of items for hand washings were predictors of good infection prevention practices. To sustain good practices, accessible of hygiene materials should be kept to all units of health facility all times.

Keywords: Infection prevention practice; Health care workers; Healthcare facilities; Ethiopia

Abbreviations and Acronyms

AOR: Adjusted Odds Ratio; COR: Crude Odds Ratio; HAIs: Hospital Acquired Infections; HBV: Hepatitis B Virus; HCAI: HealthCare Acquired Infections; HCV: Hepatitis C Virus; HCFs: Health Care Facilities; HCP: Health Care Personnel; HCW: Health Care Wastes; HCWs: Health Care Workers; IP: Infection Prevention; IPC: Infection Prevention Committee; IPPS: Infection Prevention and Patient Safety; MRSCA: Methicillin Resistance Staphilo Cocus Aurous; PPE: Personal Protective Equipment; PI: Principal Investigator; RH: Respiratory Hygiene; SIP: Safety Injection Practice

Introduction

Infection prevention is universally acknowledged as a vital component of comprehensive approach to patient and healthcare worker safety, quality improvement, and improved

health outcomes. The re/emerging infectious diseases necessitate increased awareness and attention to infection prevention. A resilient health system that have good infrastructure for infection prevention will equip to respond and manage outbreaks and will prevent infections [1].

Infections acquired during health-care delivery are a significant public health problem globally. Although estimates of the global burden of health-care associated infections are limited by reliable data, it is estimated that in developed countries, between 5 and 10 percent of patients admitted to acute care hospitals, acquire one or more infections. On the other hand, in developing countries, the risk of infection is 2-20 times higher [2].

Health care facilities may act as permanent reservoirs of resistance or amplify transmission of resistant bacteria within facilities and in the community, if there is no infection prevention. The experience from epidemics of emerging infectious diseases, such as severe acute respiratory syndrome (SARS), various viral

hemorrhagic fevers, demonstrates how easily health care facilities can act as amplifiers of new pathogens and diseases in the community if there is no effective infection prevention program in place [3].

Successful infection prevention programs in health care facilities are based on understanding the facility's problems or needs, prioritizing activities, and using available resources effectively. In many settings, infection surveillance systems and identify the cause of health care-associated infections and treatment options for infections are limited. Thus, infection prevention is not only the most cost-effective option, but also the best strategy available to protect patients and limit the spread of disease within health facilities [4].

Health care-associated infections are a global health problem with over 1.4 million patients developing serious infections during care for an unrelated condition at any given time [2]. While the average rate for acquiring health care-associated infection may vary by country, the average mortality rate attributable to health care-associated infections among patients affected is presumed to be as high as 10% [3]. WHO estimates the global burden of disease due to occupational exposure to HBV and HCV infections to be about 40%, and 4.4% of HIV infections among health care workers to be attributable to percutaneous injuries at work [5].

Health-care workers are exposed to many microbiological agents that are present in patients. During the SARS epidemics, 37%–63% of cases in some of the highly affected countries were among health care workers [6]. In developing countries, increased risk of acquiring infection through occupational exposure due to a combination of higher prevalence of infections and fewer safety precautions [7].

In Ethiopia, the behaviors of health care workers indicate that, there was high level of exposure to blood and body fluids among HCWs [8-11]. There is limited study in the country in infection prevention practice among health workers [11].

Therefore, study was designed to assess infection prevention practice among health workers in public health facilities of south Gonder Zone, Northwest, and Ethiopia.

Methods

A facility based cross-sectional study was conducted from February 15 to April 15, 2020, in south Gondar zone, North West Ethiopia in public health care facilities. South Gondar zone is found at 625km from Addis Ababa, the capital city of Ethiopia. There are 13 districts and 5 city administrations with a total population of 2,578,908 found in this zone. It also has a total of 93 public health centers 6 districts and 1 general hospital. About 3,399 health care providers were working at the time of this study. Thirty health centers twodistricts and onegeneral hospital were selected randomly. All health care providers who were working in South Gondar zone health facilities were taken as source population and those who provide free services, apprentices and health care workers served less than 6 months were excluded.

Sample size was determined using single population formula considering good IP among health care providers as 57.3% from previous study, 5% margin of error, 10% non-response rate, 1.5 design effect and 95% confidence interval and 620

participants were selected using multi-stage sampling technique. First stratified sampling were used to select health facilities and strata's were selected by simple random sampling approach then, to enhance representativeness, 30% of healthcare facilities from each stratum were selected using simple randomly sampling method. Then health care providers were selected from each health facility using systematic random sampling approach. The sample size (n=620) was allocated to each selected 3 hospitals and 30 health centers based on the proportion to the size of healthcare workers who were working during data collection period. Afterwards, the sampling frame was prepared using list of healthcare worker's obtained from human resource department of each healthcare facilities. Health care workers who participated in the study were selected using systematic random sampling. Ten trained BSc. Nurses had collected the data using a structured and pre-tested questionnaire prepared in local language (Amharic). Two MSc holders were assigned as supervisor. Observation of the infection prevention practice was done using a check list to supplement the findings. To control the data quality training was given for data collectors and supervisors for two days and pretesting of questionnaire was made to assess the validity of the questions in out of the study area.

Infection prevention practice was outcome variable whereas education, year of services, age, sex, type of profession, marital status, taking training on infection prevention, accessibility of hand washing items, water availability, availability of guide line, color coded dust, gloves, safety boxes and alcohol were taken as independent factors.

Measurements, data processing and analysis

Infection prevention practices was assessed for main components of infection prevention measures like hand hygiene practices, utilization of personal protective equipment (PPE), safe handling of waste material practices, disinfection practice, and safe injection. There were seventeen questions with the mean value was used to classify infection prevention practices as having good or poor using the mean of the seven questions. Good practice: when subjects answer > mean of practice assessment questions and poor practice: when subjects answer < mean of practice assessment questions [11]. The data entry and analysis were done using Epi-data version 3.1 and SPSS version 23 respectively. Bi-variable and multi-variable logistic regression were done to identify associated variables infection prevention practice and variable with a p-value less than 0.05 were used to declare statistical significance and odds ratio with 95% confidence interval was used as measure of associations.

Results

Sociodemographic characteristics of the study population

A total of 602 healthcare workers participated in the study with response rate of 97%. About 250 (41.5%) of participants were females. Majority 424 (70%) of healthcare providers were nurses, health officers and midwives. The ages of the study participants ranged from 18-60 years with 18-29 years with the mean age of 28.73 (standard deviation (SD) ± 5.95) years. About 309 (51.3%) of respondents were first degree holders. Fifty nine point eight of healthcare providers have work experience between 1-5 years (Table 1).

Table 1: Result socio demographic characteristics of respondents in south Gonder zone healthcare providers, northwest, Ethiopia, 2020.

Variables	Category	N	%
Age	18-29	408	67.8
	30-39	153	25.4
	40-49	34	5.6
	≥ 50	7	1.2
Sex	Male	352	58.5
	Female	250	41.5
Marital status	Married	324	53.8
	Not Married	255	42.4
	Divorced	23	3.8
Profession	Nurse	236	39.2
	Health officer	105	17.4
	Laboratory technologist	58	9.6
	Midwife	89	14.8
	Physician	18	3.0
	Pharmacist	58	9.6
	Laboratory technician	38	6.3
Educational level	Diploma	280	46.5
	First degree	309	51.3
	Specialty training	13	2.2
Year of service	1-5	360	59.8
	6-10	138	22.9
	11 & above	104	17.3

Infection Prevention practices among healthcare providers

Self-reported good infection Prevention practice in this study among healthcare providers was found to be 366(60.8%) with (95% CI=57.1, 64.8) while the remaining was poor. Majority of health care workers, 425 (78.9 %) of were washed their hands after touching an environmental surface near to the patient. Regarding to hand washing material, 481 (79.9%) respondents used soap and water, and 489(81.2%) of them were dry their hands properly to prevent recontamination whereas about 594(90.4%) keep nails short and polish free. Only 358 (59.5%) respondents avoid wrists and jewelers when on duty. In addition 507 (84.2%) of respondents were used water proof dressing materials when they exposed to cut and abrasions on their hands.

About 316(52.5%) of health care workers had no availability of personal protective equipment. Majority of the respondents of 473(78.6%) had no ever wear personal protective equipment (PPE) while providing patient care or caring equipment only 129 (21.4%)of the respondents used examination gloves for procedures needed to be necessary but among the respondents 543(90.2%) were changed their gloves before going to another patient.

Regarding the injection safety practice 427 (70.9%) of respondents were instructed about safe handling of waste materials 577 (95.8%) used safety box for needle collection after injection. The life-time prevalence of self-reported sharp injury was 97 (16.1%), 340(56.5%) avoid recap needle after injection, 549 (91.2%) also avoid used materials by burring and 53(8.8%) of respondents were not buried sharp waste materials properly and 527(87.5%) of dust bins were colored to differentiate mix ups. in addition 495 (82.2%) of respondents were used high level

disinfectant when there were no applicable sterilization technique and the same proportion of respondents 495(82.2%) were changed chlorine solution every 24 hours. Beside to this about 379(62.9%) of respondents were received all three doses of hepatitis B vaccine (Table 2).

Availability and access to materials

About 89.4% of the respondents indicated that gloves were always available on the room and (10.6%) indicated gloves were not always available on the working room for IP practices. On the issue of availability of Personal Protective Equipment (PPE), (47.5%) of participants stated that PPE were not always available while (52.5%) stated PPE were always available for IP practices. Whereas only (5.6%) respondents indicated that there were PPE in the working room. With regards to hand washing items, (54.7%) indicated that the items were not always available and (45.3%) stated that the items were available. (47.7%) of the respondents indicated that detergents were always available for decontamination, while (52.3%) stated that detergents were not available. About (70.3%) of the respondents mentioned that access to PPE was not easy and (29.7%) stated that PPE was easily accessible. With Hand washing items, about (28.1%) stated the items were easily accessible while (71.9%) were not easily accessible. with safety boxes, (62.8%) indicated that safety boxes were easily accessible and (37.2%) stated the safety boxes were not easily accessible. regarding to training on infection prevention 47.5% of respondents had taken training on infection prevention principles. about Infection prevention committee 67.7%of respondents stated that IP committee was established in their health facility. with availability of persistent water source in each department, respondents indicated that only 33.4% were always

Table 2: Result showing infection prevention practice of healthcare workers in south Gonder zone healthcare providers, northwest, Ethiopia, 2020.

Variables	Category	N	%
Do you always clean your hands after touching an environmental surface near to the patient	Yes	475	78.9
	No	127	21.1
Do you use sanitizer or plain water with soap to clean your hands at work	Yes	481	79.9
	No	121	20.1
Do you keep your nails short, clean and polish free	Yes	544	90.4
	No	58	9.6
Do you avoid wearing wrist watches and jewelers when on duty	Yes	358	59.5
	No	244	40.5
Do any cuts abrasions in hands are covered with a water proof dressing	Yes	507	84.2
	No	95	15.8
Do you change gloves before going to another patient	Yes	543	90.2
	No	59	9.8
Have you exposed to sharp injuries since one year	No	505	83.9
	Yes	97	16.1
Do you dry hands properly to prevent recontamination	Yes	489	81.2
	No	113	18.8
Have you received three doses of hepatitis B vaccination	Yes	379	63.0
	No	223	37.0
Did you recap used needles	No	340	56.5
	Yes	262	43.5
Do you disposed sharp materials in to the safety box	Yes	577	95.8
	No	25	4.2
Do you always wear personal protective equipment	Yes	129	21.4
	No	473	78.6

N= frequency, %= percentage

available. With the issue of alcohol swab 29.2% were stated that there were available in the room where as regarding to availability of soap 27.6% of respondents had soap in the room for hand washing. With regard to post-exposure prophylaxis for infection of hepatitis b virus 54%of the respondents stated that there was availability of PEP in their health facilities (Table 3).

Factors associated with infection prevention practice

Both bi-variable and multivariable logistic regression analysis revealed that availability of gloves, safety box, guide line and alcohol swap in the room were found to be significantly associated.

Health care workers who had gloves were 3.7 times more likely to practice good infection prevention compared to those who hadn't got have glove AOR=3.7(2.0, 6.8) 95% CI. The odds of good infection prevention 2 fold more likely to among healthcare workers who had safety both than their counterparts, AOR=1.9(1.2,3.1)95% CI. Health care workers who had accessible to hand washing items were 2.0 times more likely to practice good infection prevention compared to those who did not have access items for hand washing AOR=2.0(1.2,3.4)95% CI. And those who had no guide lines were 49.8% less likely to practice good infection prevention than those who had guide line. AOR=0.498(.32, .83)95% CI. In addition healthcare workers who had not alcohol swab in the room were about 49% less likely to use good infection practices as compared to workers who had alcohol swab in the room AOR=0.49(.29,.82) 95% CI (Table 4).

Discussion

Infection prevention practice is fundamental to quality of care

Table 3: Result showing availability and access of materials for infection prevention in south Gonder zone healthcare providers, northwest, Ethiopia, 2020002E.

Variable	N	%
PPE equipment		
Always available	316	52.5
Not always available	286	47.5
Items for hand washing		
Always available	273	45.3
Not always available	329	54.7
Detergents for decontamination		
Always available	287	47.7
Not always available	315	52.3
Safety boxes		
Always available	424	70.4
Not always available	178	29.6
Hand washing items accessible		
Always accessible	169	28.1
Not always accessible	433	71.9
Safety boxes accessible		
Always accessible	378	62.8
Not always accessible	224	37.2
Training on infection prevention		
Yes	286	47.5
No	316	52.5
Presence of IP committee		
Yes	408	67.8
No	194	32.2

and essential to protect healthcare workers, patient and communities from tremendous infectious diseases. This study attempted to

Table 4: Result showing factors associated with infection prevention practice towards (n=602) in south Gonder zone healthcare providers, northwest, Ethiopia, 2020.

Variables	Infection prevention practice		COR 95%CI	AOR95%CI
	Good(n=366)	Poor(n=236)		
Availability of materials				
Gloves				
Always available	348	190	4.68(2.639,8.301)	3.689(2.015,6.789)
Not always	18	46	1	1
Safety boxes				
Always available	285	139	2.455(1.717,3.512)1	1.904(1.167,3.107)
Not always	81	97		1
Guide line				
Yes	244	93	1	1
No	122	143	3.075(2.190,4.319)	0.498(.334,.741)
Alcohol swab				
Yes	141	35	1	1
No	225	201	4.509(2.374,5.456)	0.490(.290,.826)
Hand washing items accessible				
Easily accessible	134	35	3.316(2.185,5.034)	2.028(1.194,3.445)
Not easily accessible	232	201	1	1

COR= crude odds ratio, AOR= adjusted odds ratio

assess infection prevention practice and associated factors of healthcare workers in South Gondar zone health care facility. This discussion focuses on major findings of associated factors. Infection prevention measures like availability of guide lines, safety box, gloves, alcohol swab, and accessibility of items for hand washings were predictors of good infection prevention practices.

In the current study, two-third (60.8%) of healthcare workers had good infection prevention practices. This result is higher than the studies conducted in Debre Markos referral hospital Northwest of Ethiopia (54.2%) [8] and west Arise Zone, (36.3%) [9]. Difference in practice could be attributable to the difference in study settings and sampling technique of healthcare workers experiences and type of healthcare facilities from which healthcare workers were selected to participate in the study.

Accessibility of hand washing items in this study is 71.9%, this finding is much greater than study conducted in the hospital of Accra Ghana (18.6%) [10]. Possible explanations might be study settings, sample size and difference in study period. In the present study the availability of alcohol swab is (29.2.8%), this result is much less than the study conducted in Addis Ababa at Tikur Ambesa specialized hospital (54.4%) [11]. This could be due to difference in study period, setting and in addition there could be awareness using alcohol swab by health care workers in the capital.

Safety box availability in the current study is (70.4%) and study conducted in previous regional hospital in Accra Ghana was (28.4%) [10]. The current study is greater than the previous, possible explanation for the variation might be due to study settings, study period, different sample size, sampling procedure, and improved supply of materials. The study finding of availability regarding to infection prevention guide line is (56%), study conducted in west Arise showed that (47.8%) [9]. So the current study finding is greater than the previous. The result discrepancy might be difference in study period, study settings and sample size.

Conclusion

The present study revealed that nearly two third proportions of healthcare workers in south Gondar zone were practiced good infection prevention. But the study also detected unsatisfactory practice that place patients and HCWs at significant risk of acquiring infection.

Based on the study findings, it can be concluded that several factors affect with the infection prevention practice. Some of these factors were found to be accessibility of hand washing item, presence of infection prevention guide line, availability of alcohol swab and gloves were found to have independent predictors of good infection prevention practice.

Public health officials at each level had to be responsible to ensure availability of gloves, hand washing materials, alcohol, and safety box and infection prevention guide line to use for their work.

Ethical Considerations

The study was ethically approved by Debre Markos University Institutional Ethical Review Board (IRB), informed consent was obtained from each participant after explaining the purpose of the study. The right of participants to anonymity and confidentiality was maintained. The study didn't cause any harm to the participants. In addition, participants were also informed about their right to join or to withdraw at any time from the study.

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