

Infection Prevention Practices and Associated Factors Among Health care workers In Hospitals of West Shoa zone, Central Ethiopia.



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Abstract

Background: Infection prevention plays a key role in preventing and reducing the rate of healthcare associated infections. Proper infection prevention practices are fundamental to quality of care, and essential to protect healthcare workers, patients, and communities. Particularly in a country such as Ethiopia, where the prevalence of serious infectious diseases so high, and preventive interventions for both these diseases are minimal, failure to follow proper infection prevention practices puts healthcare workers, patients and the communities at tremendous risk. There were no studies in study area, which focused on infection prevention practices of health care workers by using observational checklist.

Objective: The objective of this study was to assess the infection prevention practice of health care workers and associated factors in hospitals in west shoa zone, Central Ethiopia 2019.

Method: A facility based cross-sectional study was conducted from March 4 up to 25, 2019 among health care workers in Hospitals of west shoa zone, Central Ethiopia. Seven Hospitals were included in the study from west shoa Zone. There were 857 health care workers and 276 were included in the study selected proportionally from the Hospitals. Data were collected using self administered questionnaire, observational checklist and entered into Epi-data and using the Statistical Package for the Social Sciences (SPSS) version 24. Multivariable logistic regression model was carried out to identify potential predictors of infection prevention practices. A p- value of < 0.05 and 95% confidence interval was considered as statistically significant.

Results: A total of 259 health care workers participated and yielding a response rate of 93.8% and majorities, 157(60.6%) were male. About 225(86.9%) of the respondents were found to be knowledgeable about infection prevention ,more than half of the respondents 134(51.7%) have positive attitude and 123(47.5%) of healthcare workers who had good practice towards infection prevention. Observational result showed that ,22(39.3%) of service unit observed, health care workers have good practice on infection prevention. The knowledge of participants has association with infection prevention practice and attitude did not have.

Conclusion: The study revealed that majority of healthcare workers were knowledgeable about infection prevention and infection prevention practice among healthcare workers was considered to be low. Individual factors (profession, knowledge) and Organizational factors (Sufficient and appropriate personal protective equipment) were found to be significantly associated in the multivariate analysis.

Key words: *Health care associated Infection, West shoa; Ethiopia.*

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Acronyms and abbreviations

AOR	Adjusted Odd Ratio
CDC	Centers for Disease Control and Prevention
COR	Crude Odd Ratio
FMOH	Federal Ministry of Health
HAI	Health Care Associated Infection
HCF	Health Care Facility
ICU	Intensive Care Unit
IPPC	Infection prevention practices and control
IPPS	Infection prevention and patient safety
SPSS	Statistical Package For Social Science
US	United State
WHO	World Health Organization

Chapter One: Introduction

1.1. Back ground

The need for infection control in healthcare facilities is born out of the need to prevent Healthcare associated infections (HCAIs) .HCAI can be defined as an infection occurring in a patient during the process of care in a hospital or other healthcare facility which was not present or incubating at the time of admission [1].

Proper infection prevention practices are fundamental to quality of care, and essential to protect healthcare workers, patients, and communities. Particularly in a country such as Ethiopia, where the prevalence of serious infectious diseases such as Hepatitis B and HIV is so high, and preventive interventions for both these diseases are minimal, failure to follow proper infection prevention practices puts healthcare workers, patients and the communities at tremendous risk[2].

Effective implementation of infection prevention practices in healthcare facilities leads to a significant reduction more than 30% in HAIs [3].

HAIs, are the most frequent adverse event in healthcare worldwide can occur as a part of an endemic or epidemic situation and affect the quality of care of hundreds of millions of patients every year in both developed and developing countries [4, 5].

These infections are a major public health concern and a threat to patient safety, contributing to increased morbidity, mortality, and cost. Based on the available evidence, the overall impact of HAIs implies prolonged hospital stay, long-term disability, increased resistance of microorganisms to antimicrobials, high costs for patients and their family, and unnecessary deaths . In addition, it places a significant massive additional economic burden on the health care system [4].

1.2 Statement of the Problem

A prevalence survey conducted under the auspices of WHO in 55 hospitals of 14 countries representing 4 WHO Regions (Europe, Eastern Mediterranean, South-East Asia and Western Pacific) showed an average of 8.7% of hospital patients had nosocomial infections. At any time, over 1.4 million people world-wide suffer from infectious complications acquired in hospital[5].

According to World Health Organization (WHO), of every 100 hospitalized patients, 10 in developing countries and 7 in developed countries will acquire at least one HAI [6]. The CDC also estimates that 2 million patients suffer from HAIs every year and nearly 100,000 of them die in United States (US) [7]. In US and Europe the point prevalence of patients with at least one HAI in acute care hospitals has reached 6%, prevalence (19.5%) was highest among patients admitted to intensive care units (ICU) [8, 9]. By contrast in developing countries, the problem is three times higher when compared to the incidence observed in adult intensive care units in the US. It is also thought that the prevalence is more than 40% in parts of Asia, Latin America and sub-Saharan Africa[10, 11].

In Sub-Saharan countries the problems associated with patient safety is often 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 most frequently affected). In addition to HCAIs, developing countries are hit hard by HIV/AIDS pandemic hepatitis B virus and hepatitis C virus infections. In resource-poor settings, rates of infection can exceed 20 [12].

Hospital wide health care associated infection prevalence varied between 2.5% and 14.5% in Algeria, Burkinafaso, Senegal and Tanzania. Over all HCAI cumulative incidences in surgical ward ranges from 5.7% to 45.8 % in studies conducted in Ethiopia and Nigeria [13].

Study conducted in Trinidad and Tobago on HCWs displayed substandard practices towards infection prevention, with only 44% of participants having good practices to prevent hospital acquired infections and contamination. Over 80% of the participants responded that they washed their hands with soap and water after taking a sample and that they washed their hands immediately when they came into contact with blood, bodily fluids or contaminated items[14].

Research conducted in Mizan Aman hospitals shows,(29.6%) of health care workers ever had needle stick injury and wash their hand before examining patients.Infection prevention knowledge and practice of health care workers were not sufficient to standard level of universal/standard precaution. The use of personal protective device in provision of cares ever worn were 98.5% for gown, 57.7% for apron, 100% for gloves, 64.4% for mask [15].

Study conducted in west Arsi shows 28.4% healthcare workers received infection prevention training and infection prevention knowledge of healthcare workers was positively associated with training. In addition to this physicians are less knowledgeable about infection prevention than nurses and Healthcare workers who have served for ten and more years were about three times more likely to appear knowledgeable about infection prevention than those with less than five years service [16].

As guideline developed by Federal Ministry of Health of Ethiopia on infection prevention practice indicate there is little evidence concerning the burden of unsafe care and infection prevention practice in resource limited settings . Although most HAIs can be prevented with relatively inexpensive infection prevention and control measures such as hand washing.In Ethiopia, different activities have been made relentlessly by Federal Ministry of Health of Ethiopia(FMOH) to scale up infection prevention[9]. Despite of this effort, infection prevention activities is low and high burden of HAIs in Ethiopia is a great concern [17]. In addition to this, there is limited national data on infection prevention regardless of the dramatic increase in the development of healthcare facilities[18].

How ever the researcher of the study has not come across sufficient evidences on infection prevention practice of healthcare workers using observational check list in oromia region and no one in study area.

From observational obtained on one Hospital at the time of Executive practice program,there was poor infection prevention practice and want to observe other hospitals too.

The study has assessed the practice of healthcare workers towards infection prevention and associated factors in public Hospitals in study area by using both self administered and observational checklist.

1.3 Significance of study

The study will point out the infection prevention practice of health care workers by using observational checklist which other study did not come up with.

The study will be essential for:

- Policy and decision makers in the development of HAIs prevention programs and strategic plans.
- Hospital managers to conduct plan on infection prevention activities.
- Healthcare workers to improve the quality of healthcare delivery services, and infection prevention activities.
- Study area and other health facilities to guide the development and implementation of infection prevention and control activities

Chapter Two: Literature Review

2.1 Overview of HAIs

Hospital acquired infections are a worldwide phenomenon. Patient care is provided in settings ranging from small health care clinics with basic facilities to large sophisticated highly equipped hospitals with state of the art of technology. Despite progress in public health and Hospital care, infections continue to develop in hospitalized patients and also in hospital staff. The WHO called HAIs a major cause of death and disability for patients. About 1.4 million people worldwide suffering from HAIs and 80,000 deaths annually. The actual rates vary from 5% to 10% of all patients admitted to modern health care centers in the industrialized world to up to 25% in developing countries. The risk of health care associated infection in developing countries is 2 to 20 times higher than in developed countries [4].

2.2 Prevalence of HAIs

Research conducted at Jimma University Teaching Hospital on Knowledge, Attitude and practice on infection prevention revealed that the commonest disease that is known to be transmitted by health care workers include HIV (100%), HCV(70.5%) (Hepatitis C virus) and HBV (100%)(Hepatitis B virus). [19] The risk of serious blood borne viruses such as human immune deficiency virus (HIV), HCV and HBV among health care workers and staff who process surgical instrument and equipment is increasing [10].

2.3 Factors associated with HAIs.

Study conducted in Nigeria on Knowledge, attitude and practice of standard precautions of infection control revealed, lack of resources for practice of standard precautions, lack of infection prevention committee and lack of training as the major challenges preventing routine practice of standard precautions of infection control in the hospital setting. Addition to this there was poor knowledge of injection safety and poor practice of standard precautions of infection control, especially among less experienced health workers [20].

The study conducted on Assessment of knowledge and practices of healthcare workers towards infection prevention and associated factors in healthcare facilities (HCF) of West Arsi showed 53.7% healthcare workers were knowledgeable about infection prevention. The finding indicated that a large percentage of respondents (46.3%) in the healthcare facilities studied demonstrated inadequate knowledge about infection prevention. In this study only 28.4% of healthcare workers received infection prevention training and infection prevention knowledge of healthcare workers was positively associated with training. In addition to this physicians are less knowledgeable about infection prevention than nurses and Healthcare workers who have served for ten and more years were about three times more likely to appear knowledgeable about infection prevention than those with less than five years service [16].

Regarding infection prevention practice, the study identifies healthcare workers who appear to be practicing safe infection prevention practice was 36.3%. The study indicated gap in training could result in poor infection prevention practice among healthcare workers. The odds of safe practice were likely to be three and five times higher in healthcare workers who had infection prevention guidelines available and trained in infection prevention respectively. The study found out differences in the reported practices of infection prevention among different healthcare professionals, such as the odds of safe practice among mid-wives likely to be reduced by 72% compared to nurses. Healthcare workers who have higher ten and above service year were about two times more likely to had safe practice when compared with who had less than five. High prevalence of occupational exposure to needle stick injury and blood and body fluid splashes among healthcare workers [16].

Assessment conducted on management of healthcare waste in Hawasa city showed, there was no waste segregation in most healthcare facilities and only one used a complete color-coding system. Solid waste and wastewater were stored, transported, treated and disposed inappropriately at all HCFs. Needle stick injuries were prevalent in 25-100% of waste handlers employed at these HCFs. Additionally, low level of training and awareness of waste legislation was prevalent amongst staff [21].

The research conducted in Debre Markos referral hospital indicated healthcare workers who were practicing proper infection prevention activities was 57.3% and who were advanced age were significantly associated with knowledge. Male healthcare workers were found to be two times more likely to be knowledgeable about infection prevention when compared with females. The study revealed that working experience is another factor significantly associated with the practice of infection prevention activities. Health care workers who had work experience of above ten years were three times more likely practiced infection prevention activities and healthcare workers who aged above 30 years or older were about two times more likely to practice infection prevention activities properly when compared with those who are less than 30 years old. Healthcare workers who adhered the guideline were more likely practiced infection prevention activities than those who don't adhere to the guideline [22].

Another study conducted in Addis Ababa on Infection Prevention Practices identify, two-third (66.1%) of HCWs had good infection prevention practices. The study identified 46.8% of the HCWs always wore goggles or eye protection during patient care procedures, likely to generate splashes of body fluid into the eye and the mouth. 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 criteria for safe injection practices. Above 90% of HCWs performed safe injection practices. Almost half (55.4%) of HCWs had good knowledge on infection prevention measures[23].

The 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. 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. The study showed that HCWs who had good knowledge regarding infection prevention measures were 1.5 times more likely to have good infection prevention [23].

The study conducted at Adama on Healthcare Waste Generation and Management revealed that high level of hazardous waste generation may be due to lack of segregation of waste at the point of generation. In Addition the best available final disposal method of HCW was incineration using a single chamber incinerator built of brick [24].

Institutional based cross-sectional quantitative survey conducted by Bahir dar city administration on Assessment of knowledge, attitude and practice of health care workers on infection prevention indicated that Majority of the respondents, 84.2%, had knowledge regarding infection prevention and More than half of the respondents (55.6%) had positive attitude about infection prevention. Infection prevention training was given for health care workers and safe infection prevention practice was low in this study. In this study (19.5%) of HCWs had history of sharp and needle stick injuries within the last twelve months. Regarding the availability collection materials for wastes , nearly two third, 64.4% of units in each health care facilities use safety box. 43 % of the injections given in the study were unsafe. the overall hand hygiene practice by the respondents was 69.0 %[25].

Cross-sectional study design conducted in Jimma University Medical Center on Infection Prevention indicated 94.78% of the respondents were knowledgeable regarding infection prevention and being BSC health care professionals was 1.5 times higher knowledgeable than being diploma health care workers. The practice scores of study subjects were 61.08%.About 24.4% respondents wash their hands before and after patient care and 64% always use mask. 82.25% always put-on gloves when giving patient care and 50.6% of nurses has no infection prevention guidelines [26].

A Case of a Level Four District Hospital in Kenya conducted identify that, 98.7% of HCWs were aware of various policy guidelines and Hand washing among HCWs at the Hospital was average(50%). The study revealed that hand washing practices was 86% and the occurrence of nosocomial infection was 6.7%. Overall compliance level to infection prevention practices and control (IPPC) seemed to be average with a mean score of 60.8% for the hospital and Based on results from the focused group discussion, there was adequate implementation of IPPC[27].

The study conducted in Wolaitta Sodo Otona Teaching and Referral Hospital on Knowledge, Attitude and Practice of Infection Prevention Measures among Health Care Workers revealed that 99.3% of health care workers had good knowledge and 60.5% of health care workers had good practice towards infection prevention practice. In addition this study revealed that there is significant statistical association in sex of HCWs, working in different units or wards and there also statistically negative association in having of training with infection prevention practice [28].

2.1. Conceptual framework of the study

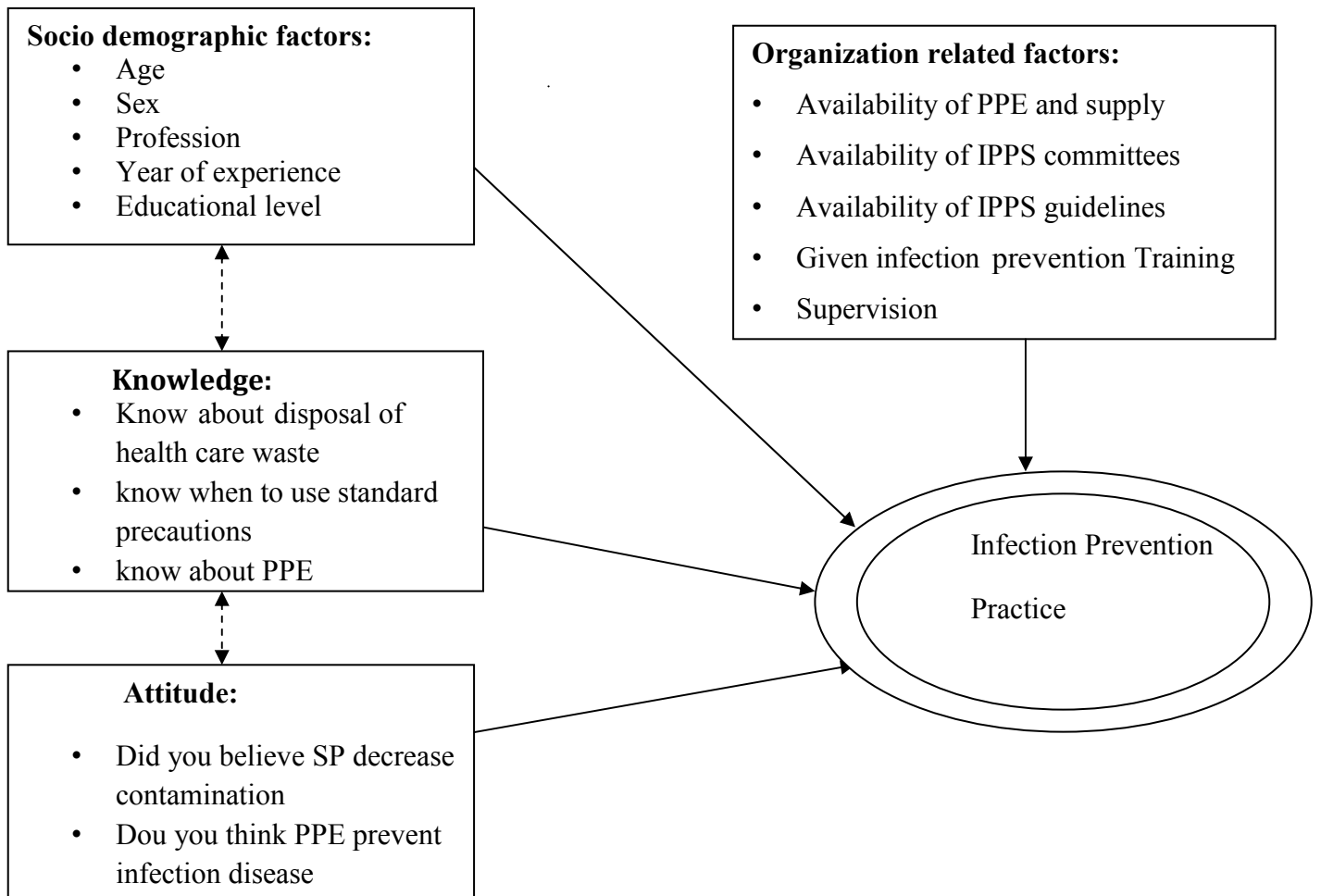


Fig-1-conceptual framework of Infection prevention practice and its associated factors[16]

Chapter Three: Objectives

3.1 General Objective

To assess the infection prevention practice of health care workers and associated factors in hospitals in west shoa zone, Central Ethiopia 2019

3.2 Specific Objectives

- ✓ To assess infection prevention practice of health care workers in Hospitals in west shoa zone
- ✓ To identify factors associated with infection prevention practices of health care workers hospitals in west shoa zone

Chapter 4: Methods and Materials

4.1 study area and period

The study was conducted in hospitals of West Shoa zone. It is one of the 20 zones of Oromia Regional state. The capital city of the Zone, Ambo is located 125 kilometers far away from Addis Ababa, Ethiopia's capital, to the west direction. A total of 2,652,781 inhabitants are living in the 22 districts of the zone. The zone has 91 Health centers, 519 health posts, 7 Hospitals (4 primary Hospitals and 3 General Hospitals). Currently about 1281 human resource are employed in hospitals of the zone. From these 748(58.39%) are health professionals, the remaining 533(41.6%) and 109(8.51%) are administrative staffs and cleaners respectively [29].

The study was conducted from March 04 – March 25, 2019 on health care workers in Hospitals of west shoa zone.

4.2 Study Design

A facility based cross-sectional study was conducted.

4.3. Population

4.3.1 Source Population

All health care workers working in hospitals of west shoa zone.

4.3.2 Study Population

Randomly sampled Health care workers (General practitioners, nurses, midwifery, laboratory technicians and technologists, pharmacist, anesthetists, cataract surgeons and Cleaners) were the study populations.

4.3.3 Inclusion and Exclusion Criteria

Inclusion Criteria

The Health care workers - who was found at the time of data collection and served 2 months .

Exclusion Criteria

Health care workers-who are seriously ill

-on annual leave during data collection and were excluded.

4.4 Sample size and sampling procedure

4.4.1. Sample size Determination

Sample size was determined using single population proportion formula

$$n = \frac{\left(Z_{\left(\frac{\alpha}{2}\right)} \right)^2 P (1 - P)}{d^2}$$

n= Minimum sample size

P= (proportion of having good infection prevention practices among HCWs, (36.3%) [16]

d=the margin of error tolerated 5 %

$Z_{\alpha/2}$ = is the critical value for standard normal distribution at 1- α % confidence level and α is mostly 5%= 1.96

$$n = \frac{(1.96)^2 \times 0.363(1-0.363)}{(0.05)^2} = 355$$

$$(0.05)^2$$

Since source population size is less than 10,000 the required sample obtained from the above estimation by making some adjustment, by using Population correction formula.

Hence the final sample size (nf)= $n/(1+n/N)$, where N=857(Ambo General Hospital 201,Gindiberet General Hospital 144,Gedo General Hospital 130, Guder Primary Hospital 136,Bako primary Hospital 55, ,Incini Primary Hospital 103 ,Gojo Primary Hospital 88)

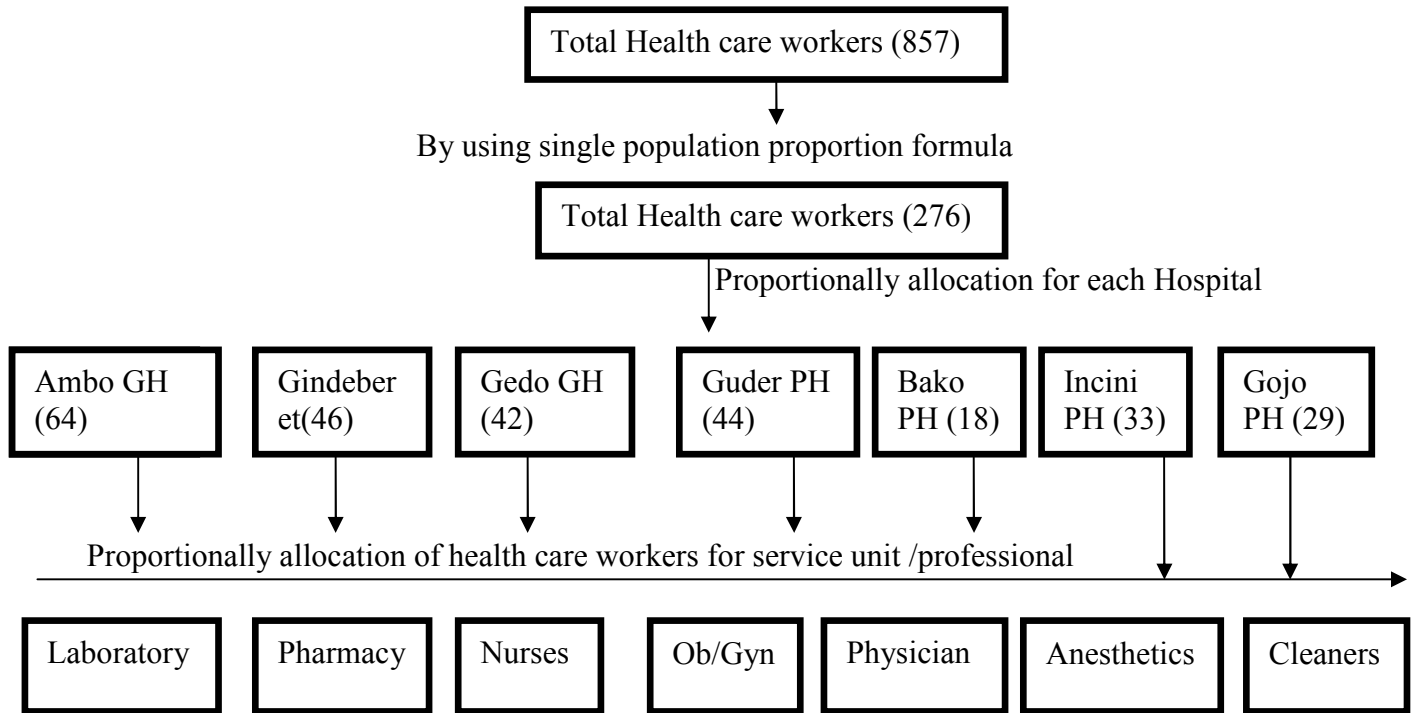
$$= 355 / (1 + 355 / 857) = 251$$

The resulting sample size becomes 251 participants.

From the total 251 participants, 59, 42, 38, 40, 16, 30 and 26 participants were selected proportionally from Ambo General Hospital, Gindiberet General Hospital, Gedo General Hospital, Guder Primary Hospital, Bako primary Hospital ,Incini Primary Hospital and Gojo Primary Hospitals respectively. Considering 10% (25 interviewees) of non-response rate the total sample size is 276 from the seven hospitals.

4.4.2. Sampling Technique

Simple random sampling technique was applied to select study participants. For each hospital participants were allocated proportionally. In addition to this Participants were allocated to service unit proportionally from a given Hospital. Lottery method was employed to select study population from lists of health care workers posted in each service unit of the hospitals.



-Numbers of health care workers selected proportionally from each service unit/professionally from each Hospital were listed below.

S/N	Name of Hospitals	Number of health care workers from each service unit							Total
		Laboratory	Pharmacy	Nurses	Ob/Gyn	Physician	Anaesthetics	cleaner	
1	Ambo GH	8	9	21	10	8	2	6	64
2	Gindiberet GH	4	7	15	7	4	1	8	46
3	Gedo GH	5	7	12	6	4	1	7	42
4	Guder PH	7	6	14	7	5	1	4	44
5	Bako PH	2	3	7	4	1	0	1	18
6	Incini PH	4	5	14	6	3	1	0	33
7	Gojo PH	3	4	11	5	2	0	4	29

For observational, eight service units (IPD, OPD, OR, delivery, Injection room, NICU, ART, laboratory) were selected purposively from each Hospital of high risk area for infection.

4.5 Data collection tools and procedures

4.5.1 Data collection Instrument

Self-administered questionnaire was used to collect the data on Socio-demographic characteristics, Organizational related factors, knowledge of Infection prevention, attitude towards to Infection prevention and Infection prevention practice by reviewing different articles to prepare data collection tools (self-administered questionnaires) especially, which conducted in west Arsi[16] and Infection Prevention Guidelines for Healthcare Facilities in Ethiopia[2]. CDC infection prevention and control assessment tool were also used for observational checklist [30].The questionnaire was tested for internal consistency (reliability) by Cronbach's Alpha test and score 0.81. Well organised and specific questionnaire format which has 70 questions was used to collect data on assumed factors associated with infection prevention practices of HCW.

The status of healthcare workers on infection prevention practice was measured by 30 items in which responses related to practice are answered in a dichotomous (yes or no) options on Observational checklist. Observational checklist was used for eight service units from each hospital to observe infection prevention practice of HCWs. About 56 service units selected from the seven hospitals. Data collectors observe the procedure conducted by health care workers in each service unit by already prepared checklist. The first filled three questionnaires were excluded from analysis from each service unit to reduce hawthorn effect.

Three supervisors (from Ambo specialized and teaching Hospital) and seven data collectors (BSC Nurses) were involved in the collection of data.

4.6 Variables

4.6.1 Dependent variables

Infection prevention practice

4.6.2 Independent variables

- Socio demographic variables: Age ,Sex, Profession, Educational level
- Knowledge: Know about disposal of health care waste, know when to use standard precautions, know about PPE
- Attitude: Did you believe standard precaution decrease contamination, Do you think PPE prevent infection disease

- Organizational related factors: Availability of Supply, Supervision, IPPS committees and IPPS guidelines and given infection prevention training for HCWs.

4.7 Operational definition

Health care workers-The one who deliver care and services directly and indirectly for patients in the hospitals.

Knowledgeable- when participants answer $\geq 60\%$ of knowledge assessment questions correctly.

Not knowledgeable-When participants answer $< 60\%$ of knowledge assessment questions [31].

Positive attitude- when participants answer \geq mean of practice assessment questions.

Negative attitude -when participants answer $<$ mean of practice assessment questions.

Good practice-when participants answer \geq mean of practice assessment questions.

Poor practice-when participants answer $<$ mean of practice assessment questions.

Hand washing-cleaning hands with soap and clean water before and after each procedure.

Injection safety-putting used sharps and needles in a safety box immediately after use.

Health care associated infections-any infection that arises as a result of health care.

To analyze the practice, a score of 1 was assigned for each acceptable or correct practice and 0 for unacceptable, hence the total score of infection prevention practice ranged from 0 to 30.

Accordingly, healthcare workers infection prevention practice was classified into two categories: good (if equal to or above the mean) and poor (below the mean)

4.8 Data processing and analysis

The data were coded, checked for completeness and entered into Epi-data and then exported into Statistical Package for the Social Sciences (SPSS window version 24) for analysis, descriptive summary using frequencies, proportions, graphs and cross tabs were manipulated to present study results. Bivariate analysis was performed to assessing crude relationship by using OR and select variables for multivariate analysis. Variables with P-value less than 0.25 at bivariate logistic regression model were entered into multivariable logistic regression model. The result of Hosmer and Lemeshow test of goodness of fitness was (chi-square- 6.8, P value-0.45). Finally, multivariable logistic regression model was carried out to identify potential predictors of infection prevention practices. A p- value of < 0.05 and 95% confidence interval was considered as statistically significant.

4.9 Data quality management

Data quality was ensured by translate the questionnaire written in English in to Afan Oromo and re translated to English by different expert for both version. During forward and backward translation of questionnaire, well experienced peer consult was obtained.

Two days training was given for data collectors and supervisors on how to collect data and facilitate self-administered questionnaire. At data collection time, supervisors and data collectors checked the completeness of data. The collected data was checked to pick out the incomplete records. Pre-test among 5 % of total samples was conducted on Sire primary Hospital(East Wollega Zone).

4.10 Ethical consideration

Ethical clearance was obtained from Ethical Review committee of Institute of health, Jimma University. Supportive letter was written from West shoa zone to respective Hospitals. Study was not to harm or expose people to unnecessary risk as a result of my research project. The purpose of the research was told to the participants. Informed consent was taken from each participant. Moreover, all collected data was used for the purpose of this study only.

4.11. Plan for dissemination of results

The result of this study will be disseminated for seven Hospitals, Jimma University Department of health policy and Management, West shoa zonal health department, Oromia Regional Health Bureau and local NGOs. Publication of the study will also consider.

Chapter Five: Result

5.1 Socio-demographic characteristic of healthcare workers

A total of 259 health care workers were participated and yielding a response rate of 93.8%. About 156 (60. 2%) were male and 134 (51.7%) were in the age group between 26 and 30 years old. The mean age of the respondents was 29.7 (SD ± 4.9) .More than half (55. 6%) of the respondents were degree and 44.8% of healthcare worker were nurses.

(Table 1) Socio-demographic characteristic of health care workers in Hospitals in west shoa zone, Central Ethiopia, March 2019 (n = 259)

Variables		Number	%
Age	≤25	43	16.6
	26-30	134	51.7
	31-35	54	20.8
	36-40	21	8.1
	≥41	7	2.7
Sex	Male	156	60.2
	Female	103	39.8
Profession	Laboratory	30	11.6
	Pharmacy	38	14.7
	Nurse	116	44.8
	Physician	38	14.7
	Anaesthesia	5	1.9
	Midwife	8	3.1
	Cleaners	24	9.3
Educational level	Master and MD	40	15.4
	Degree	144	55.6
	Diploma	61	23.6
	Certificate	14	5.4
Year of experience	1-5	130	50.2
	6-10	108	41.7
	11-15	9	3.5
	16-20	8	3.1
	≥21	4	1.5
Marital status	Married	167	64. 5
	Single	92	35.5

Knowledge about infection prevention

In this study, only 225(86.9%) of the respondents were found to be knowledgeable about infection prevention based on operational definition. Among study participants 223(86.1%) heard about infection prevention principles and 241(93.1%) knew Safety box should be closed when three quarters filled.

(Table 2) knowledge of health care workers on infection prevention in Hospitals of west shoa zone, Central Ethiopia, March 2019 (n = 259)

Variables(knowledge)	Response	Number	%
Have you heard about infection prevention principles	Yes	223	86.1
Disinfection prevents HAIS	Yes	200	77.2
All microorganisms including spores are destructed by autoclaving.	Yes	192	74.1
Washing hands with soap or use of an alcohol based antiseptic decreases the risk of transmission of HAIs	Yes	233	90
Use of an alcohol based antiseptic for hand hygiene is as effective as soap and water if hands are not visibly dirty	Yes	185	71.4
Masks and goggles are necessary if procedure and patient care activate are likely to cause flushing of blood or exposure to deep body flood.	Yes	155	59.8
Gloves cannot provide complete protection against transmission of infections	Yes	108	41.7
Gloves should be worn if blood or body fluid exposure is anticipated	Yes	208	80.3
Do you think glove is effective substitute for hand washing?	Yes	120	46.3
Hand washing is necessary before procedures are performed	Yes	240	92.7
Tuberculosis (TB) is carried in airborne particles that are generated from patients with active pulmonary tuberculosis	Yes	218	84.2
There is need to change gloves between patients as long as there is no visible contamination	Yes	169	65.3
Used needle should be placed in puncture resistance container.	Yes	207	79.9
Know about safety precautions for disposal of needles syringes and any wastes	Yes	226	87.3
Safety box should be closed when three quarters filled	Yes	241	93.1

Attitude towards Infection prevention practice

The mean score of the Attitude questions was 7.2 (SD=1.4). About 134 (51.7%) of the respondents have positive attitude towards infection prevention. About 217(83.8%) of the participants believe that overcrowding of the working area increases transmission of infection and 211(81.5%) think that an increased workload increases the risk of hospital acquired infections.

(Table 3) Attitude of health care workers on infection prevention in Hospitals of west shoa zone, Central Ethiopia, March 2019 (n = 259)

Variables(Attitude)	Response	number	%
Do you think that a new pair of gloves should be used for each new patient visiting the hospital?	Agree	188	72.6
Do you believe that following standard operation procedures decreases the risk of contamination?	Agree	217	83.8
Do you believe that decontaminating equipment with 10% sodium hypochlorite for 10 minutes is enough?	Agree	153	59.1
Do you think that vaccination decreases hospital acquired infection?	Agree	217	83.8
Do you think that prophylaxis decreases hospital acquired infection?	Agree	206	79.5
Do you believe that keeping proper personal hygiene decreases the risk of contamination?	Agree	240	92.7
Do you believe that overcrowding of the working area increases transmission of infection?	Agree	217	83.8
Do you think that an increased workload increases the risk of hospital-acquired infections?	Agree	211	81.5
Do you think that a patient's awareness about transmission of microorganisms decreases the risk of hospital acquired infection	Agree	223	86.1

Practice of health care workers towards infection prevention

The mean score of the practice questions was 7.2 (SD = 2.9). Mean was calculated to classify their practice as good and poor practice, based on this 123 (47.5%) of respondents had good practice (above the mean) and 136 (52.5%) of them had poor practice (below the mean). About 94.6% of participants were vaccinated for Hepatitis B. The result indicated potential high prevalence of occupational exposure to needle stick injury and blood and body fluid splashes among healthcare workers in the study area (27%). Of the respondents 31.3%, 48.3%, 61.8% and 36.7% were come up with Urinary infections, surgical site infections, Nosocomial pneumonia and Nosocomial bacteraemia respectively. More than half (59.5%) of participants have written guide line on waste disposal in their department and from them 35% were apply the guideline.

(Table 4) Practice of health care workers on infection prevention in Hospitals of west shoa zone, Central Ethiopia, March 2019(n=259)

Variables(practice)	Response	#	%
Are you boiling to prevent infection in your hospital	Yes	67	25.9
Are you use sterilization to prevent infection in your hospital	Yes	189	73
Are you use dry heat ovens to prevent infection in your hospital	Yes	41	15.8
Are you use PPE to prevent infection in your hospital	Yes	208	80.3
Are you come up with Urinary infections	Yes	81	31.3
Are you come up with Surgical site infections	Yes	125	48.3
Are you come up with Nosocomial pneumonia	Yes	160	61.8
Are you come up with Nosocomial bacteraemia	Yes	95	36.7
Are you vaccinated for Hepatitis B?	Yes	245	94.6
All reusable medical equipment are processed according to national guidelines	Yes	145	56
Is there a patient who stay longer than seven days in your department	Yes	162	62.5
Are you come up with splashes of blood and body fluid into your body	Yes	126	48.6
Are you exposed to accidental needle stick injuries	Yes	70	27
Is hazardous and non-hazardous waste collected and transported separately?	Yes	189	73
Put on protective device during collection and transportation of hospital waste.	Yes	216	83.4
Recap used needle before disposing.	Yes	126	48.6
Is there written guideline on waste disposal in department?	Yes	154	59.5
If yes do all staffs apply the guide line?	Yes	91	35.1

Do you incinerate used sharp materials	Yes	214	82.6
Do you have isolation criteria for who admitted with highly contagious diseases?	Yes	182	70.3
Do you properly sterilizing or, carrying out high-level disinfection of instruments	Yes	234	90.3
Proper storing and handling of processed instruments	Yes	227	87.6

The status of health care workers by hospitals on infection prevention practice

In general hospitals, there is a complex structure when compared with primary hospitals. The result of this study indicated that health care workers who are working in primary hospitals were conducted good infection prevention practice (51.3%) than General hospitals (44.5%).

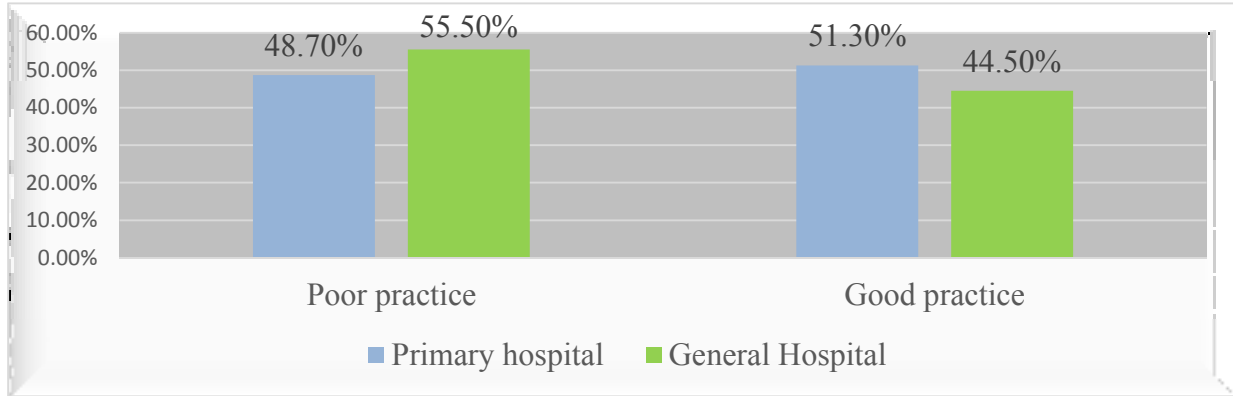


Figure 1. status of health care workers by hospitals on infection prevention practice among west shoa hospitals, 2019

Percentage of health care workers by Professional conduct good infection prevention practice

The result indicates that Anesthesia, physician and nurses were conducting more infection prevention practice than cleaners, which were higher opportunity to expose to hospital-acquired infection and need consideration.

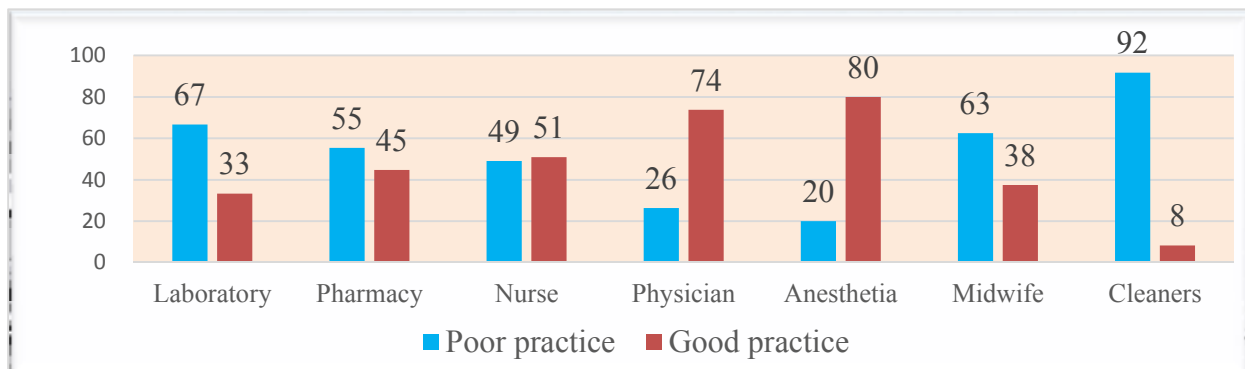


Figure 2. Percentage of health care workers by Professional conduct good infection prevention practice Among west shoa hospitals, 2019

Organizational related factors

About 56% of respondents got supplies necessary for hand hygiene and 66.7% have sufficient and appropriate personal protective equipment. Written infection prevention guidelines, policies and procedures are available to 57.1% of health care workers. The result also indicate that, 30% of participants did not got infection prevention training by hospital and 40.5% were available to enough and continuous drinking water. About 12% were accessible to bathing and 75% respond there was functional incinerator in the hospitals.

(Table 5)Organizational factors on infection prevention in Hospitals of west shoa zone, Central Ethiopia, March 2019 (n = 259)

Variables(Organizational factors)	Response	%
Supplies necessary for hand hygiene (e.g. soap, water, paper towels, alcohol-based hand rub) are accessible to Health care workers in patient care areas.	Yes	56.0
Are there Sufficient and appropriate PPE is available to Health care workers.	Yes	66.7
Written infection prevention guidelines, policies and procedures are available	Yes	57.1
Is there functional IPPS committees in your Hospital	Yes	48.3
Is there regular supervision on infection prevention	Yes	29.7
Do you got infection prevention training by the Hospital	Yes	30.5
Is there enough and continuous availability drinking-water	Yes	40.5
Is there enough and continuous availability bathing	Yes	12.0
Is there fenced placental pit	Yes	80.3
Is there functional incinerator	Yes	75.3
Is there a means of transporting and disposal of wastes	Yes	75.3

Observational result on infection prevention practice

The study revealed that 22(39.3%) of service unit observed health care workers have Good practice on infection prevention and about 34(60.7%) were conduct poor practice.

Eight Service units such as OR, IPD, lab, injection, delivery, NICU, ART and OPD were areas included for observations. Infection prevention practices such as performance of hand hygiene, injection practice, Instrument processing, use of personal protective equipment and methods of waste collection and disposal in the health care facilities and working area were activities focused for observational assessment.

Hospital system

About 64.3% of service unit observed, Safety boxes to be disposed were put on hand reach area. In 38% of service units, after cleaning and drying instruments were appropriately packed.

In 20% of units, there were supplies necessary for appropriate cleaning. Of 23% observed units, contaminated and non contaminated wastes are separated at source. About 35% of service units Service room are visibly clean and absence of bad odour and well ventilated. In 18% observed service unit safety boxes disposed of when they are three quarters full. At the time of observation, Bako and Gojo hospitals did not have any colour coded bins in their hospitals instead they used other local materials. The possible reason was, they are new hospitals and started service before one year.

During observational assessment waste disposal Problems observed: the location of waste disposal nearest to working site, the waste were not burnt properly, some safety box observed at disposal site, syringe and needle were observed out of safety box .

Study participants

About 26% of health care workers wash hands with soap and water before patient care which was very low and 41% conduct safe injection. This implies that, health care workers and their patients have high chance to exposed to hospital acquired infection and other contagious disease. The results shows, 88% of study participants wear gown properly for every procedure and 38% wear gloves. This result is less than study conducted in Bahardar (99.4%) and in lines those who wear glove which was 32% . About 14 % of the respondents use mask, which is similar with study done in Bahardar 12% [25].

The following figure indicates service delivery unit conduct good infection prevention practice than others and OPD was the least. From hospitals, general hospitals (Ambo, Gedo, and Gindiberet) conduct good infection prevention practice than primary hospitals, which was opposite to the results obtained by self-administered questionnaires.

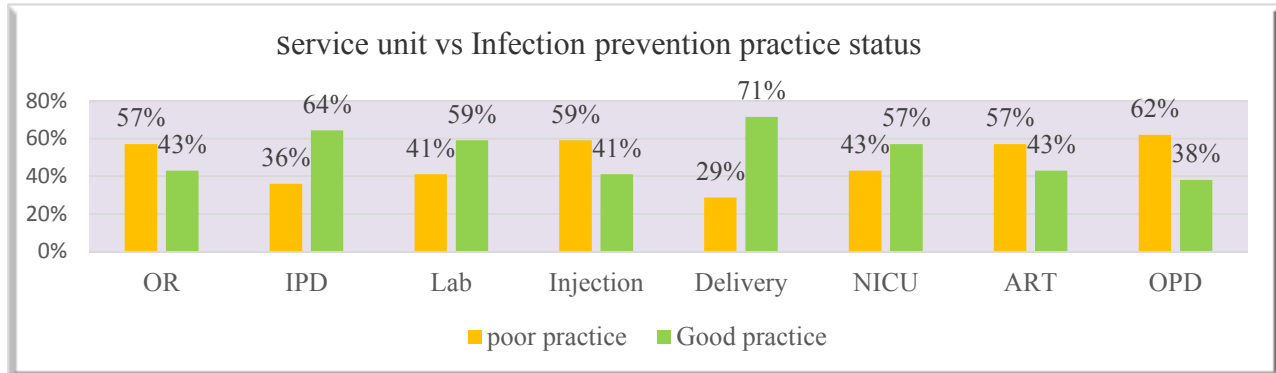


Figure 3, Infection prevention practice of health care workers by service units among west shoa hospitals, 2019

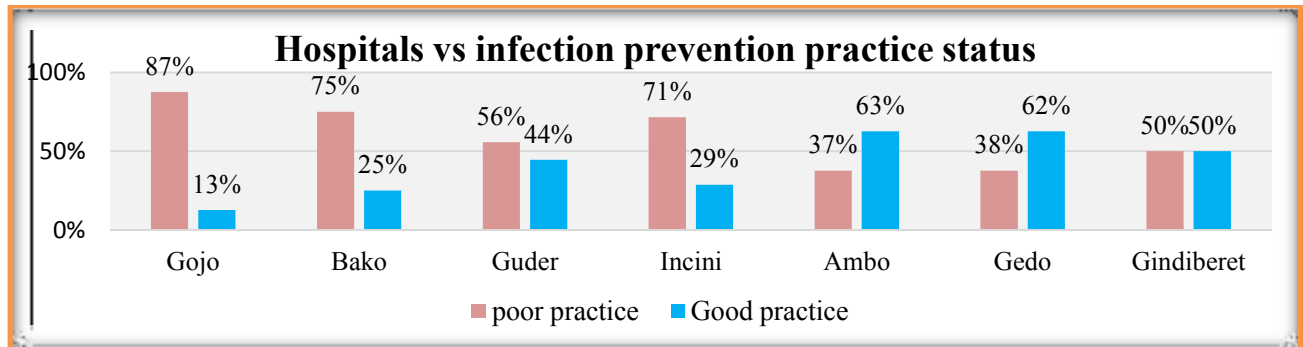


Figure 4, Infection prevention practice of health care workers by hospitals among west shoa hospitals, 2019

Factors associated with practice of healthcare worker on infection prevention

In the bivariate analysis, age, profession, educational level, year of experience, sex of the participants, availability of personal protective equipment, Supplies necessary for hand hygiene, Sufficient and appropriate personal protective equipment, available of Written infection prevention guidelines, policies and procedures, functional IPSS committees, functional incinerator, knowledge and attitude were factors which were significantly associated with practice about infection prevention. However, Sufficient and appropriate personal protective equipment and knowledge were found to be significantly associated in the multivariate analysis.

(Table 6) Bivariate analysis of factors affecting practice of healthcare worker on infection prevention practice in Hospitals of west shoa zone, Central Ethiopia, March 2019 (n = 259)

Variable	Category	Poor practice (n=136)	Good Practice (n=123)	P-value	COR (95% CI)
Age	<25	30(69.7)	13(30.3)	1	1
	26-30	69(51.5)	65(48.5)	.038	2.1(1.0-4.5)*
	31-35	22(40.7)	32(59.3)	.005	3.3(1.4-7.8)*
	36-40	11(52.4)	10(47.6)	.177	2.0(0.7-6.1)*
	≥41	4(57.1)	3(42.9)	.510	1.7(0.3-8.8)
Sex	Male	73(46.8)	83(53.2)	0.024	0.5(0.3-0.9)*
	Female	63(61.2)	40(38.8)	1	1
Professional	Laboratory	20(66.7)	10(33.3)	.041	5.5(1.0-28.1)*
	Pharmacy	21(55.3)	17(44.7)	.007	8.9(1.8-43.3)*
	Nurse	57(49.1)	59(50.9)	.001	11.3(2.5-30.6)*
	Physician	10(26.3)	28(73.7)	.000	28.8(6.1-65.2)*
	Anaesthesia	1(20)	4(80)	.005	34.0(3.1-72.1)*
	Midwife	5(62.5)	3(37.5)	.069	6.6(0.8-50.5)
	Cleaners	22(91.7)	2(8.3)	1	1
Educational level	Master and MD	12(30)	28(70)	.001	4(1.8-9.4)*
	Degree	76(52.8)	68(47.2)	.113	1.5(0.8-2.8)*
	Diploma and certificate	48(64)	27(36)	1	1
Year of Experience	1-5	75(57.7)	55(42.3)	1	1
	6-10	48(44.4)	60(55.6)	.042	1.7(1.1-2.8)*
	11-15	6(66.7)	3(33.3)	.599	.68(0.1-2.8)
	16-20	4(50)	4(50)	.671	1.36(0.3-5.6)
	≥21	3(75)	1(25)	.500	.45(0.04-4.4)
Marital status	Single	51(55.4)	41(44.6)	1	1
	Married	85(50.9)	82(49.1)	0.48	0.8(0.5-1.3)

In above table * indicate, variables which who have p-value less than 0.25 in bivariate analysis and candidate for multivariable logistic regression.

Variable	Category	Poor practice (n=136)	Good Practice (n=123)	P- value	COR (95% CI)
Supply	Yes	66(45.5)	79(54.5)	.011	.525(0.3-0.8)*
	No	70(61.4)	44(38.6)	1	1
PPE	Yes	54(44.6)	67(55.4)	.018	1.8(1.1-2.9)*
	No	82(59.4)	56(40.6)	1	1
Guideline	Yes	68(45.9)	80(54.1)	.015	.53(0.3-0.8)*
	No	68(61.3)	43(38.7)	1	1
IPPS committee	Yes	56(44.8)	69(55.2)	.017	.54(0.3-0.8)*
	No	80(59.7)	54(40.3)	1	1
Supervision	Yes	41(53.2)	36(46.8)	.877	1.04(0.6-1.7)
	No	95(52.2)	87(47.8)	1	1
Got training	Yes	40(50.6)	39(49.4)	.689	.89(0.5-1.5)
	No	96(53.3)	84(4.7)	1	1
Functional incinerate	Yes	74(46.8)	84(53.2)	.023	.554(0.3-0.9)*
	No	62(61.4)	39(38.6)	1	1
Knowledge	Knowledgeable	110(48.9)	115(51.1)	.004	3.3(1.4-7.8)*
	Not knowledgeable	26(76.5)	8(23.5)	1	1
Attitude	Positive attitude	62(46.3)	72(53.7)	.038	.59(0.3-0.9)*
	Negative attitude	74(59.2)	51(40.8)	1	1

In above table * indicate, variables which have p -value less than 0.25 in biviate analysis and candidate for multivariable logistic regression.

Multivariate logistic regression on infection prevention practice of health care workers

As the result indicates respondents those who were Knowledgeable (AOR=3, 95% CI=[1.2-7.1]) have significant association with infection prevention practice than not knowledgeable.

According to multiple regression analysis of this study, available supply of infection prevention increases the utilization of those supplies for the prevention of Hospital-acquired infections, Health care workers who get an available supply of PPE had higher of practiced infection prevention activities (AOR = 2.1, 95% CI=[1.1–3.7]) than those healthcare workers can't get infection prevention supplies.

Physician (AOR=19.5, 95% CI=[3.4–110]), Anesthesia (AOR=21.5, 95% CI=[1.4–329]) and nurses (AOR=6.8, 95% CI=[1.3–34.9]) were conduct good infection prevention practice more than six times when compared with cleaners.

(Table 7) Bivariate and multivariate analysis of factors affecting infection prevention practice of healthcare worker in Hospitals of west shoa zone, Central Ethiopia, March 2019 (n = 259)

Variable	Category	Poor practice (n=136)	Good Practice (n=123)	COR (95% CI)	P-value	AOR (95% CI)
Age	≤25	30(69.7)	13(30.3)	1	1	1
	26-30	69(51.5)	65(48.5)	2.174(1.0-4.5)*	.631	.47(0.02-9.7)
	31-35	22(40.7)	32(59.3)	3.357(1.4-7.8)	.682	.54(0.02-10.1)
	36-40	11(52.4)	10(47.6)	2.098(0.7-6.1)	.866	.77(0.04-14.7)
	≥41	4(57.1)	3(42.9)	1.731(0.3-8.8)	.662	.51(0.02-10.4)
Sex	Male	73(46.8)	83(53.2)	0.5(0.3-0.9)*	0.18	0.6(0.3-1.2)
	Female	63(61.2)	40(38.8)	1	1	1
Professional	Laboratory	20(66.7)	10(33.3)	5.5(1.0-28.1)*	.173	3.3(0.5-18)
	Pharmacy	21(55.3)	17(44.7)	8.9(1.8-43.3)*	.044	5.5(1.0-29.1)**
	Nurse	57(49.1)	59(50.9)	11.3(2.5-30.6)*	.021	6.8(1.3-34.9)**
	Physician	10(26.3)	28(73.7)	28.8(6.1-65.2)*	.001	8.5(3.4-31)**
	Anaesthesia	1(20)	4(80)	34.0(3.1-72.1)*	.027	14.5(1.4-58)**
	Midwife	5(62.5)	3(37.5)	6.6(0.8-50.5)	.141	4.8(0.5-39)
	Cleaners	22(91.7)	2(8.3)	1	1	1

In above table * indicate, variables who has p -value less than 0.25 in bivariate analysis and ** showed that variables who have p<0.05 in multivariate analysis.

Variable	Category	Poor practice (n=136)	Good Practice (n=123)	COR (95% CI)	P-value	AOR (95% CI)
Educational level	Master and MD	12(30)	28(70)	4(1.8-9.4)*	.361	0.3(0.02-3.6)
	Degree	76(52.8)	68(47.2)	1.5(0.8-2.8)	.446	0.7(0.3-1.5)
	Diploma and Certificate	48(64)	27(36)	1	1	1
Year of Experience	1-5	75(57.7)	55(42.3)	1	1	1
	6-10	48(44.4)	60(55.6)	1.7(1.1-2.8)*	.326	6.3(0.1-248)
	11-15	6(66.7)	3(33.3)	.6(0.1-2.8)	.312	6.6(0.1-266)
	16-20	4(50)	4(50)	1.3(0.3-5.6)	.606	2.8(0.05-143)
	≥21	3(75)	1(25)	.4(0.04-4.4)	.374	5.7(0.1-270)
Supply	Yes	66(45.5)	79(54.5)	.525(0.3-0.8)*	0.4	0.7(0.3-1.5)
	No	70(61.4)	44(38.6)	1	1	1
PPE	Yes	54(44.6)	67(55.4)	1.8(1.1-2.9)*	0.011	2.1(1.1-3.7)**
	No	82(59.4)	56(40.6)	1	1	1
Guideline	Yes	68(45.9)	80(54.1)	.53(0.3-0.8)*	0.7	0.8(0.4-1.7)
	No	68(61.3)	43(38.7)	1	1	1
IPPS committee	Yes	56(44.8)	69(55.2)	.5(0.3-0.8)*	0.38	0.7(0.4-1.4)
	No	80(59.7)	54(40.3)	1	1	1
Functional incinerator	Yes	74(46.8)	84(53.2)	.554(0.3-0.9)*	0.004	0.4(0.2-0.7)**
	No	62(61.4)	39(38.6)	1	1	1
Knowledge	Knowledgeable	110(48.9)	115(51.1)	3.3(1.4-7.8)*	0.01	3(1.2-7.1)**
	Not knowledgeable	26(76.5)	8(23.5)	1	1	1
Attitude	Positive attitude	62(46.3)	72(53.7)	.593(0.3-0.9)*	0.3	0.7(0.4-1.3)
	Negative attitude	74(59.2)	51(40.8)	1	1	1

In above table * indicate, variables who has p -value less than 0.25 in bivariate analysis and ** showed that variables who have p<0.05 in multivariate analysis

Chapter Six

Discussion

Infection prevention is one of the most important challenges in the health institutions. For this, the study assessed knowledge, attitude, practice and associated factors towards infection prevention among HCWs. In this study, the proportion of healthcare workers who were knowledgeable about infection prevention was found to be 86.9%. This finding indicated that majority of the healthcare workers in the hospitals had adequate knowledge on prevention of infections and the finding in line with study done in Bahir dar, 84.2 % [25]. However, the study conducted in Wolaitta Sodo Otona Teaching and Referral Hospital, 99.3% [28], Jimma University, 94.78% [26] were better than this study. This gap might be due to educational level of health care workers in teaching hospital and other hospitals are different. On Other hand, other Studies conducted in West Arsi 53.7% [16], Addis Ababa 55.4 % [23], were less when compared to this study. This difference might be due to lack of in-service training, sample size, and socio demographic difference.

Positive attitude about infection prevention is the pillar to prevent cross infection. The present study also found out health care workers who have positive attitude towards infection prevention practice was 51.7% which is similar with the study conducted in Bahir dar city administration 55.6%) [25].

The proportion of healthcare workers who were practicing good infection prevention activities was 47.5% which is lower than study conducted in Debremerkos referral hospital, 57.3% [22], Walayita sodo, 60.5% [28], Jimma University, 61.08% [26] and Addis Ababa 66.1% [23]. This discrepancy might be due to a difference in sample size. In other ways, this study was better than the study conducted in West Arsi, 36.3% [16]. This difference might be due educational status of health care workers in health center and hospitals.

The study showed that health care workers who had good knowledge regarding infection prevention measures were three times more likely to have good infection prevention practices. This finding is better than study conducted in Addis Ababa (1.5 times more likely to have good infection prevention practices) [28]. This gap might due to difference in operational definition of the studies.

Another factor which was significantly associated with infection prevention practice is profession. This study found out Anesthesia, Physician and nurses practice more than six times when compared with cleaners. This finding is not similar with the study conducted in West Arsi which was nurses more practices [25]. This difference might be due to educational level.

Healthcare workers who get an available supply of infection prevention were more likely to have a good practice of infection prevention. This finding is similar with research conducted in Debremerkos, [22].

When we compare the result of infection prevention practice of health care workers obtained from self-administered and observation checklist methods they have some difference. About 47.5% of health care workers conduct good practice from self-administered questionnaires and 39.3% were from observational checklist. Not only on this variables, but also there were some discrepancy between the two methods. In 18% of service unit Safety boxes did not disposed of when they are three quarters full. But on self administered questionnaires 93% health care workers know that Safety box should be closed when three quarters filled. This difference might be due to healthcare workers might not give true and genuine responses on the self-administered questionnaire, preferring to provide more socially acceptable responses than their actual day to day practice.

The study also identify that, general hospitals conduct good infection prevention practice than primary hospitals. This difference might be due to, health care workers in general hospitals have higher education level than primary hospital which leads to good infection prevention practice.

Strength and Limitations of the study

6.1 Strengths

Hawthorn effect was minimized in observational by excluding the first three questionnaires filled.

6.2 Limitations

Health care workers might not give genuine responses during self-administered questionnaires and exposed to social desirability bias.

During this study, there may be observational bias.

Chapter Seven

Conclusion and Recommendation

7.1 Conclusion

The present study revealed that majority of healthcare workers were knowledgeable about infection prevention. Overall level of Good infection prevention practice among healthcare workers was low. Individual factors (profession, knowledge) and Organizational factors (Sufficient and appropriate personal protective equipment) were found to be significantly associated in the multivariate analysis.

7.2 Recommendation

Based on the study finding the following recommendations are forwarded:

The hospitals should fulfilling necessary personal protective equipment for their staffs.

Ministry of Health, Hospitals, Other stake holders have to update the knowledge and practice of health care workers regarding infection prevention activities through giving continuous mentorship.

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Annex questionnaire

Annex 1. Consent form

How are you? My name is Alemu Mekonen. I am going to collect data on infection prevention practice in -----Hospital for Jimma University Institute of Health, Department of Health Management and Policy, Master of Health care and Hospital Administration students. The objective of the study to assess infection prevention practice of health care workers in -----Hospital. For fruitful of my study results, your participation plays a great role. I would like to get your permission in order to fulfill this self administered questionnaire which were concerned about infection prevention and related information. Your participation is the pillar for the success of my study. Your identity will not be written on the questionnaire format and I do not disclose your information to the third person. Every data obtained from you will be kept confidentially. Without permission from you and legal body any part of this study will not be disclosed to third person. Your participation is based on your consent and you can withhold giving information during the self administered. Are you satisfied by my idea? If yes, continue self administered questionnaire. If you are not satisfied, you can discontinue.

Name of the data collectorsignature.....date.....

Name of the advisor..... signature.....date.....

Name of the investigator:	signature	Date
1. Alemu Mekonen

Part I: Self administered questionnaires

Instruction

There were questions related to infection prevention as listed below. Fill the blank space with possible answer and circle the alternative questions that you assume as answer.

S/No	Variable	Code
	Socio-demographic characteristics	
1	Age
2	Sex	1.male 2.female
3	Your profession
4	Your educational level	1.MD 2.Master 3.Degree 4.Diploma 5. Certificate.
5	Year of service
6	Service unit	1.Laboratory 2.Pharmacy 3.Nursing 4.Obstetrics/Gynecology 5.Physician 6.Anesthetics 7.Cleaners 8.Radiolist/technician
7	Type of Hospital	1.Primary Hospital 2.General Hospital
8	Marital status	1.single 2.married 3.divorced 4.widowed
9	Monthly salary

S/No	Variable	Code
	Organizational related factors	
10	Supplies necessary for hand hygiene (e.g.soap, water, paper towels, alcohol-based hand rub) are accessible to Health care workers in patient care areas.	1.yes 2.no
11	Are there Sufficient and appropriate personal protective equipment is available to Health care workers.	1.yes 2.no
12	Written infection prevention guidelines, policies and procedures are available	1.yes 2.no
13	Is there functional IPPS committees in your Hospital	1.yes 2.no
14	Is there regular supervision on infection prevention	1.yes 2.no
15	Do you got infection prevention training by the Hospital	1.yes 2.no
16	Is there available PPE in your hospital	1.yes 2.no
17	Is there enough and continuous availability drinking-water	1.yes 2.No
18	Is there enough and continuous availability bathing	1.yes 2.No
19	Is there fenced placental pit	1.yes 2.no
20	Is there functional incinerator	1.yes 2.no
21	Is there a means of transporting and disposal of wastes	1.yes 2.no
22	Which method did the hospital use to dispose wastes	1.burning 2.buring waste 3.incenirator 4. Others (specify).....
23	Which types of waste are most common in your Department?(you can answer more than one if there)	1.Infectious waste 2.Pathological waste 3.Sharps wastes 4.Pharmaceutical waste 5.Cytotoxic waste 6.Chemical waste 7. Others (specify).....

S/No	Variable	Code
	knowledge of infection prevention	
24	Have you heard about infection prevention principles	1.yes 2.no
25	Do you know the impact of HCAs in clinical outcomes?	1.yes 2.no
26	Disinfection prevents HAIS	1.yes 2.no
27	Do you know nosocomial infections can be transmitted through medical equipment's?	1.yes 2.no
28	Do you know nosocomial infections can be transmitted through blood and body fluid	1.yes 2.no
29	Do you know when to use standard precautions?	1.yes 2.no
30	All micro organisms including spores are destructed by autoclaving.	1.yes 2.no
31	Washing hands with soap or use of an alcohol based antiseptic decreases the risk of transmission of healthcare acquired infections	1.yes 2.no
32	Use of an alcohol based antiseptic for hand hygiene is as effective as soap and water if hands are not visibly dirty	1.yes 2.no
33	Masks and goggles are not necessary if procedure and patient care activate are likely to cause flushing of blood or exposure to deep body flood.	1.yes 2.no
34	Gloves cannot provide complete protection against transmission of infections	1.yes 2.no
35	Gloves should be worn if blood or body fluid exposure is anticipated	1.yes 2.no
36	Do you think glove is effective substitute for hand washing?	1.yes 2.no
37	Hand washing is necessary before procedures are performed	1.yes 2.no

S/No	Variable	Code
38	Tuberculosis (TB) is carried in airborne particles that are generated from patients with active pulmonary tuberculosis	1.yes 2.no
39	There is no need to change gloves between patients as long as there is no visible contamination	1.yes 2.no
40	Used needle should be placed in puncture resistance container.	1.yes 2.no
41	Know about safety precautions for disposal of needles syringes and any wastes precautions for disposal of needles syringes and any wastes	1.yes 2.no
42	Do you know by what mechanism bacteria and virus spread through can?	1.yes 2.no
43	Safety box should be closed when three quarters filled	1.yes 2.no

S/No	Variable	Code
	Attitude of infection prevention	
44	Do you think that a new pair of gloves should be used for each new patient visiting the hospital?	1.Agree 2.Disagree
45	Do you believe that following standard operation procedures decreases the risk of contamination?	1.Agree 2.Disagree
46	Do you believe that decontaminating equipment with 10% sodium hypochlorite for 10 minutes is enough?	1.Agree 2.Disagree
47	Do you think that vaccination decreases hospital acquired infection?	1.Agree 2.Disagree
48	Do you think that prophylaxis decreases hospital acquired infection?	1.Agree 2.Disagree
49	Do you believe that keeping proper personal hygiene decreases the risk of contamination?	1.Agree 2.Disagree
50	Do you believe that overcrowding of the working area increases transmission of infection?	1.Agree 2.Disagree
51	Do you think that an increased workload increases the risk of hospital acquired infections?	1.Agree 2.Disagree
52	Do you think that a patient's awareness about transmission of microorganisms decreases the risk of hospital acquired infection?	1.Agree 2.Disagree

S/No	Variable	Code
	Practice of infection prevention	
53	As health care worker which you use to prevent spread of infection in your hospital. (more than one answers possible)	1.boiling or steaming 2.Antiseptics chemical 3.sterilization 4.dry heat ovens 5.Personal protective equipment 6. Others (specify).....
54	In your Hospital which Nosocomial infection you come up with? You can answer more than one answer if there	1.Urinary infections 2.Surgical site infections 3.Nosocomial pneumonia 4.Nosocomial bacteraemia 5. Other nosocomial infections (specify).....
55	Are you vaccinated for Hepatitis B?	1.yes 2.No
56	In your department all reusable medical equipment are processed according to the national IPPS guidelines	1.yes 2.No
57	Is there a patient who stay longer than seven days in your department	1.yes 2.No
58	Are you come up with splashes of blood and body fluid into your body or eye or mouth	1.yes 2.No
59	Are you exposed to accidental needle stick injuries	1.yes 2.No
60	If question number 62 yes, Are you wash after touching?	1.yes 2.No
61	If question number 63 yes, by what you did it?	1.Plain soap 2.antimicrobial agent 3.with only water
62	Is hazardous and non-hazardous waste collected and transported separately?	1.yes 2.no
63	Put on protective device during collection and transportation of hospital waste.	1.yes 2.no
64	Recap used needle before disposing.	1.yes 2.No
65	Is there written guide line on waste disposal in department?	1.yes 2.No
66	If yes do all staffs apply the guide line?	1.yes 2.No
67	Do you incinerate used sharp materials	1.yes 2.No
68	Do you have isolation criteria for those who are admitted with highly contagious diseases?	1.yes 2.No
69	Do you properly sterilizing or, when sterilization is not possible, carrying out high-level disinfection of instruments	1.yes 2.No
70	Proper storing and handling of processed instruments	1.yes 2.No

Kutaa I: Guca dhuunfan guutamu

T/L	Variable	Koodii
	Ragaa hawwaasummaa	
1	Umurii
2	Saala	1.Dhiira 2.Dhalaa
3	Ogummaa kee
4	Sadarkaa barnootaa	1.Doktorii 2.Digirii lammaffaa 3.Digirii 4.Dipiloma 5. sertifiketii.
5	Bara tajaajilaa
6	Kutaa hojattu
7	Gosa Hospitalaa	1.Hospitaala Jalqabaa 2.Hospitala waligalaa(general)
8	Haala fuudhaa fi heerumaa	1.kan hin heerumne 2.kan heerumte 3.kan wal hiikan 4.Kan abbaan manaa irraa du`e
9	Mindaa ji`aa

T/L	Variable	Koodii
	Waantota Hospitalan walqabatan	
10	Iddoo ogeessi tajaajila itti kennu Dhiyeessin meeshaalee qulqullina harkaaf oolan(saamunaa,bishaan,fooxaa,alkoolii) jiruu	1.eeyyen 2.lakkii
11	hojjattootaf uffatni seeraa gahaan jiraa hojjattotaaf	1.eeyyen 2.lakkii
12	Qajeelfamootni infekshinii ittiin too`atan kanneen barreefaman jiruu	1.eeyyen 2.lakkii
13	Koreen qulqullinaa hospitaala keessatti hundeeffame fi sochii gaarii taasisu jira	1.eeyyen 2.lakkii
14	too`annoo wal irraa hin citne infeekshinii irratti taasifame jira	1.eeyyen 2.lakkii
15	Infeekshinii irratti leenjiin hospitalan siif kenname jiraa	1.eeyyen 2.lakkii
16	Hospitaalli hojjattootaf uffata seeraa gahaa qabaa	1.eeyyen 2.lakkii
17	Hospitala keessa bishaan dhugaatii gahaan jira	1.eeyyen 2.lakkii
18	Hospitala keessa iddoon qaama itti dhiqatan jira	1.eeyyen 2.lakkii
19	Iddoo plaasentalin itti gatamu seeran dalleeffamee jira	1.eeyyen 2.lakkii
20	Insinireetorii tajaajila kennaa jiru jiraa	1.eeyyen 2.lakkii
21	Balfaa karaan ittiin geejjibanii fi gatan jiraa	1.eeyyen 2.lakkii
22	Hospitali tooftaa kamin balfaa dhabamsiisa	1.awwaaluu 2.gubuu 3.incenirator 4. kannen biroo.....
23	Gosoota balfaa kamtu kutaa keessaatti uumama(deebii tokkoo ol deebisuun ni danda`ama)	1.balfaa infekshinii 2.balfaa qaamota namaa 3.balfaa meeshaa qaraa 4.balfaa qorichootaa 5.balfaa keemikaalaa 6. kannen biroo.....

T/L	Variable	koodii
	Beekumsa infekshinii ittisuu irratti	
24	Akkataa ittiin infeekshinii ittisan dhageessee beektaa	1.eeyyen 2.lakkii
25	Dhiibbaa infeekshii hospitaalaa keessaa nama irraan geessisu beektaa	1.eeyyen 2.lakkii
26	Disinfeekshiniin infekshinii(waantota dhukkuba fidan)hospitaala keessaa dhabamsissuu danda`a	1.eeyyen 2.lakkii
27	Dhukkubonni hospitaala keessaa karaa meeshaalee yaalatiin daddarbuu danda`a?	1.eeyyen 2.lakkii
28	Dhukkubonni hospitaala keessaa karaa dhagala`aa qaama keessan daddarbuu danda`a?	1.eeyyen 2.lakkii
29	Of eeggannoo istandardi beektaa?	1.eeyyen 2.lakkii
30	Jarmiin hundi autokilevtin dhabamsiifamuu danda`a?	1.eeyyen 2.lakkii
31	Harka ofii saamunaa fi alkoolin dhiqachuun dhukkuboota hospitaala hir`isu danda`a?	1.eeyyen 2.lakkii
32	Alkoolin dhiqachuun akkuma saamunaa fi bishaanii dhukkuba ittisuu danda`a yoo harki xurii mulatu qabaachuu baates	1.eeyyen 2.lakkii
33	Maskii fi meeshan fuulatti godhamu yoo carraan dhiigni dhangalau hin jiraanne taanan hin barbaachisu	1.eeyyen 2.lakkii
34	Gilaaviin tattamsaina infekshinii itisuu hin dandau	1.eeyyen 2.lakkii
35	Gilaavin baafamuu qaba yoo dhiigan kan faalame ta`e	1.eeyyen 2.lakkii
36	Gilaavin harka dhiqachuu bakka bu`a?	1.eeyyen 2.lakkii
37	Tajaajila osoo hin eegalin harka dhiqachuu barbaachisa	1.eeyyen 2.lakkii
38	Dhukkubni TB qilleensan kan daddarbuufi dhukkubsataa TB irraa gara nama fayyatti daddarba	1.eeyyen 2.lakkii
39	Glavi dhukkubsataa garaagaraa gidduutti jijjiruun hin barbaachisu haga xuriin hin jirretti	1.eeyyen 2.lakkii
40	Lilmoo itti fayyadamne meeshaa isaaf qophaa`e keessatti gatuu qabna	1.eeyyen 2.lakkii
41	Of eeggannoo yeroo lilmoo fi balfa kamiyyuu gatnu goonu beektaa	1.eeyyen 2.lakkii
42	Karaalee bakteriyaa fi vaayirasin daddarban beektaa?	1.eeyyen 2.lakkii
43	Sefti boxin harka sadi arfaffaa yoo guute cufamuu qaba	1.eeyyen 2.lakkii

T/L	Variable	koodii
	Ilaalcha infekshinii ittisuu irratti	
44	Gilaavii harka lamaa haaraa kan ta'e dhukkubstaa hospitaala dhufu maraaf jijjiiruu barbaachisaa?	1.Ittan walii gala 2.itti walii hin galu
45	Of eeggannoo istandardi hordofuun saxilamummaa faalamaa ni hir`isaa?	1.Ittan walii gala 2.itti walii hin galu
46	Meeshaalee sodiyaamee hayipokilorati 10% daqiiqaa 10f keessa tursiisun gahaadha	1.Ittan walii gala 2.itti walii hin galu
47	Talaalliin dhukkuboota hospitaalaa ni xiqqeessa jettee yaaddaa?	1.Ittan walii gala 2.itti walii hin galu
48	Piroofilaksisin dhukkuboota hospitaalaa ni xiqqeessa jettee yaaddaa?	1.Ittan walii gala 2.itti walii hin galu
49	Harka dhiqachuun carraa faalamaa xiqqeessuu danda`a?	1.Ittan walii gala 2.itti walii hin galu
50	Baayachuun namootaa dhukkuboota hospitaalaa ni xiqqeessa jettee yaaddaa?	1.Ittan walii gala 2.itti walii hin galu
51	Hojiin baayachuun dhukkuboota hospitaalaa ni xiqqeessa jettee yaaddaa?	1.Ittan walii gala 2.itti walii hin galu
52	Kaka`umsi dhukkubsattota dhukkuboota hospitaalaa ni xiqqeessa jettee yaaddaa?	1.Ittan walii gala 2.itti walii hin galu

T/L	Variable	Koodii
	Raawwii infekshinii ittisuu irratti	
53	Akka hojjataa hospitaalatti maaloota kam fayyadamtee infection hospitaala keessaa xiqqeessuu dandeeessa (deebin tokkoo ol ni danda`a yoo jiraate)	1.danfisuu 2.keemikaala 3.istiralizeshinii 4.ho`a cimaa 5.Hidhannoo 6. kan biroo (haa ifu).....
54	Hospitaala keessatti infekshinii si qunname kami	1.afuffee fincaanii 2.iddoo baqafame 3.nimooniyaa 4.baakteriyaa
55	Hepatitis B dhaaf taalallii fudhattee?	1.eeyyee 2.lakkii
56	Kutaa ati jirtutti meeshaaleen yaalaa akkaataa qajeelfama biyyaa kanaatin qulqullaa`uu	1.eeyyee 2.lakkii
57	Kutaa ati jirtutti dhukkubsataan guyyaa torbaa oliif ciise jiraa	1.eeyyee 2.lakkii
58	Dhangalaa`a fi dhiigni sitti faca`ee beekaa	1.eeyyee 2.lakkii
59	Yoo gaaffiin 58 eeyyee ta`e,erga tuqte dhiqattee?	1.eeyyee 2.lakkii
60	Yoo gaaffiin 59 eeyyee ta`e,maalin dhiqatte?	1.saamunaa 2.keemikaala 3.bishaan qofaan
61	Ulee lilmootiin miidhamtee beektaa	1.eeyyee 2.lakkii
62	Balfaan gargar bahuu sadarkaa jalqabaatti	1.eeyyee 2.lakkii
63	Yeroo balfaa geejjibdu uffata seeraa godhattaa	1.eeyyee 2.lakkii
64	Lilmoo itti fayyadamte osoo hin gatin qadaaddaa	1.eeyyee 2.lakkii
65	Kutaa kee keessatti qajeelfamni balfaa ittiin gatan jiraa	1.eeyyee 2.lakkii
66	Eeyyee yoo ta`e hojjattootni hunduu hojiirra oolchaa	1.eeyyee 2.lakkii
67	Meeshaalee qaraa incineretara keessatti gubdaa	1.eeyyee 2.lakkii
68	Dhukkuboota baayee daddarboo ta`an haalli ittin adda baafamu jiru	1.eeyyee 2.lakkii
69	Isterilizid ta`aa meeshaaleen	1.eeyyee 2.lakkii
70	Kanneen isterelized ta`an seeran kaawwamuu	1.eeyyee 2.lakkii

Part II. Observational checklist prepared to assess the infection prevention practice of HCWs

Name of the Hospital-----

Name of Unit Observed-----

Name of data Collector-----signature-----Date-----

S/No	Infection prevention practice	Code
71	Contaminated wastes and non contaminated wastes are separated at the source in your department	1.yes 2.No
72	Wash hands with soap and water before patient care	1.yes 2.No
73	Wash hands with soap and water after patient care	1.yes 2.No
74	Immediately after removing gloves	1.yes 2.No
75	Wash hand after barehanded touching of instruments, equipment, materials and other objects likely to be contaminated by blood, saliva, or respiratory secretions	1.yes 2.No
76	Hand hygiene is performed when moving from a contaminated-body site to a clean-body site during patient care	1.yes 2.No
77	Wash hands immediately when encountered unwanted contacted with blood	1.yes 2.No
78	Service room are visibly clean and absence of bad odor and well ventilated	1.yes 2.No
79	PPE is removed before leaving the work area	1.yes 2.No
80	Hand hygiene is performed immediately after removal of PPE	1.yes 2.No
81	Safety boxes disposed of when they are three quarters full	1.yes 2.no
82	wear gown properly for every procedure?	1.yes 2.no
83	wear gloves when touching (blood, secretions, excretions and etc)	1.yes 2.no
84	During procedures and patient care activities which Personal Protecting equipment HCW (PPE) they use? more than one answers possible	1.mask 2.eye protection 3.face shield 4.gown 5. glove

		6.other(specify)--
85	All sharps are disposed of in container located as close as possible to the area in which the items are used	1.yes 2.no
86	All sharps are disposed of in a puncture-resistant sharps container.	1.yes 2.no
87	Filled sharps containers are disposed of in accordance with state regulated medical waste rules	1.yes 2.no
88	Where is they put sharp disposal boxes?	1.In high traffic 2.At corridor 3.Hand reach area 4.Other(specify)-
89	Injections are prepared using an aseptic technique in a clean area free from contaminants or contact with blood, body fluids, or contaminated equipment	1.yes 2.no
90	Medication containers are entered with a new needle and a new syringe, even when obtaining additional doses for the same patient.	1.yes 2.no
91	Color coded bins are available in units?	1.yes 2.no
92	Conduct Safe injection practice	1.yes 2.No
93	Mix dry and liquid healthcare wastes?	1.yes 2.No
94	The containers available where needles or other sharps are used.	1.yes 2.No
95	Posts signs at entrances with instructions to patients with symptoms of respiratory infection	1.yes 2.no
96	Are there Supplies necessary for appropriate cleaning and disinfection procedures	1.yes 2.no
97	Health care workers who engaged in environmental cleaning wear appropriate PPE to prevent exposure to infectious agents or chemicals	1.yes 2.no
98	Regulated medical waste is handled and disposed of according to local, state, and federal regulations	1.yes 2.no
99	Cleaners and disinfectants are used in accordance with manufacturer instructions	1.yes 2.no
100	Single-use devices are discarded after one use and not used for more than one patient	1.yes 2.no
101	After cleaning and drying, instruments are appropriately packaged for sterilization	1.yes 2.no
102	After sterilization, instruments are stored so that sterility is not compromised	1.yes 2.no

Thesis approval form final

I, the undersigned, hereby declare that this thesis is my original work. The work has not been presented for degree in any university and source of materials used for the project has been acknowledged.

Student's Name: Alemu Mekonen

Signature _____

Date _____

Approval of Internal Examiner:

Internal Examiner's Name: Mr Fikru Tafese (

Signature _____

Date _____

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Date _____

Approval of 2nd advisor:

Name: Mr Kiddus Yitbarek (MPH)

Signature _____

Date _____