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ANESTHETISTS KNOWLEDGE, PRACTICES AND ASSOCIATED FACTORS TOWARDS INFECTION PREVENTION IN ADDIS ABABA PUBLIC HOSPITALS, ADDIS ABABA, ETHIOPIA

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Declaration

I, the undersigned, declare that this thesis is my original work in partial fulfillment of the requirements for the Master of Science degree in Anesthesia. I understand that plagiarism will not be tolerated and all directly quoted materials have been appropriately referenced.

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Date of Submission: _____this thesis work has been submitted for examination with my/our approval as Advisors and Tutors on the Master of Science degree in Anesthesia.

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ABSTRACT

Background

Infection prevention is one of a central component of safe and quality service provide at the level of health organization. In health care system, globally hundreds of millions people are affected every year by avoidable infections. In sub-Saharan Africa, the rate of nosocomial infection ranges from 2.5 to 30.9% with surgical patients.

Objective: *The aim of this study is to assess anesthetists knowledge, practices and identify associated risk factors towards infection prevention in Addis Ababa public hospital*

Methodology*: A cross-sectional survey study was conducted with structured pretested, and self administered questionnaires on 220 anesthetists working at hospitals in Addis Ababa. The collected data was checked for its completeness, consistency, and accuracy and entered in EPI INFO7 software and then exported to SPSS version 24 for analysis. The descriptive statistical analysis was used to summarize important independent variables and logistic regression model was fitted for bivariate and multivariable analysis. For the determination of the existence of an association between variables, a 95% confidence level and alpha of 0.05 was used. The odds ratio was used to estimate a measure of effect and to show the strength of association.*

Result: *A total of 220 anesthetists have participated in this study with a response rate of 88%.Out of these 82.7 % (95% of CL: 77.7-87.7) and 48.2% (95% of CL: 41.4-55.4) of respondents were assessed as Knowledgeable and safe practices towards infection prevention respectively. Knowledge towards infection prevention is strongly associated with training on infection prevention, the presence of an infection prevention committee, and the availability of guidelines. Also, the presence of an infection prevention committee, personal protective equipment, and availability of guideline associated with safe practice toward infection prevention.*

Conclusion: *The finding of this study showed that the majority of anesthetists have a good knowledge of infection prevention and nearly half of anesthetists had poor practice towards infection prevention. Hospitals and concerned stack holders should focus on training of infection prevention, and develop infection prevention guidelines related to anesthesia practice, adequate supply of personal protective equipment, and need continuous mentorship by the infection prevention committee.*

Keyword: *Infection Prevention, knowledge, Practice, Anesthetists, Addis Ababa*

ACRONYMS AND ABBREVIATIONS

AIDS……..Acquired immune deficiency syndrome

AOR……..Adjusted Odds Ratio

CL……... Confidence Interval

ETT…….Endotracheal tube

HBV……Hepatitis B Virus

HCAI……Health care-associated infection

HAI…… Health care-associated infection

HAIs……Hospital Acquired Infection

HCV…….Hepatitis C Virus

HCWs……...Health-Care Worker

HH…….. Hand Hygiene

HIV……Human Immunodeficiency Virus

IC…….Infection Control

IP……Infection Prevention

IPC ……Infection prevention and control

IV……...Intravenous

JUTH……..Jimma University Teaching Hospital

NI……Nosocomial Infection

NSI…….Needle stick injury

OT……Operation Theater

PT……Patient

PEP……..Post Exposure Prophylaxis

PI……Principal Investigator

PPE……Personal Protective Equipment

SAP……Surgical Antibiotic prophylaxis

SSA.....Sub-Saharan Africa

SSI……..Surgical Site Infection

USA…… United State of America

WHO……..World Health Organization

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CHAPTER ONE: INTRODUCTION

1.1 Background

Nosocomial infection(NI),or hospital-acquired infection or Health-care-associated infection (HCAIs) refers to an infection acquired during the process of health service and not diagnosis at the time of admission to a hospital(1). Hepatitis B virus, Hepatitis C Virus and human immunodeficiency virus (HIV) infection are the commonest nosocominal infections, mostly transmitted by healthcare workers who had poor practice and control towards infection prevention (2).

Healthcare-associated infections are the most frequent adverse event in healthcare delivery worldwide. Urinary tract infection is the most frequent nosocomial infection in high-income countries; surgical site infection (SSI) is the leading health care-associated infection(HAI) in resources limited settings (3).

Surgical site infections (SSIs) are now considered to be the most common, prolong hospital stay, and highest cost HAI. It adds approximately 7 to 11 days to the expected postsurgical hospital stay and increasing perioperative morbidity and mortality(1).

Controls of infection are one of the most important for patients who had surgical site infection. Therefore modern operation room(OR) develop infection prevention policies and guidelines With an inadequate practice of infection prevention, the risk of acquiring infections through exposure to blood, body fluids, or contaminated materials in healthcare facilities is substantial (4–6). Many of the infections induced by the clinician are because of cross-contamination, inadequate hand hygiene, and infrequent cleaning of the anesthesia machine and equipment (7).

Infection prevention is one of a central component of safe and quality service provide at the level of health organization (4,8). Infection prevention is interested with preventing health care-associated infection (HCAIs), it is practical rather than academic sub-discipline of epidemiology(9). The prevention of HCAIs is an integral component of practicing medicine. Healthcare workers (HCWs) (anesthetists, physicians, nurses) often serve as vectors for hospitals acquired infections ; thus, their role requires serious consideration in the implementation of the highest standards in infection prevention and control strategies to prevent HAIs when pursuing their duties(8,10–13).

Anesthetists should be at the forefront of ensuring that their patients are cared for in the safest possible environment. An action against transmission of infection between patient and anesthetist

or between patients is routine part of anesthetic practice. They have an important role in preventing SSI risk reduction by timely fashion administering antibiotics in the preoperative period(11,14).

Hand hygiene is one infection control measures with appropriate and correct application of basic precautions during invasive procedures are simple and low cost, but require accountability and behavioral change. To utilize these precautions, the human element plays an important role in increasing or decreasing the chances of catching HCAI (15)**.**

1.2 Statement of the problem

Healthcare workers (HCWs) are more prone to needle sticks and sharp injuries and thus have a higher risk of exposure to blood-borne pathogens. Also study found that ,an estimated number of infection with 66,000 HBV, 16,000 HCV, and 1,000 HIV taken place in the year 2000 due to occupational exposure to percutaneous injury (PI) (16).

In health care system, globally hundreds of millions people are affected every year by avoidable infections (4). An estimated 2.5 million cases are reported per year in the United States alone and responsible for 99000 deaths annually by avoidable infections in health care(17). It is responsible for six million additional hospital stays in Europe with estimated costs of seven billion Euros, and also cost the US healthcare system an estimated $ 30-45 billion each year. Such risk is 2-20 times higher in developing countries. The range of HCAI varies from 25-40% which is two-three folds higher in resource-poor settings(4,17,18). A one-day survey conducted in single hospitals in Albania, Morocco, Tunisia, and the United Republic of Tanzania found that prevalence rates of HCAI varied between 19.1% and 14.8%(19).

In Sub Sahara Africa, the rate of nosocomial infection ranges from 2.5 to 30.9% and mostly affect surgical patient. Also high proportion of SSI is found in Ethiopia, with prevalence ranging from 11.4 to 52.1%(18). Another high proportion of SSI is also seen among cesarean deliveries in Addis Ababa public hospitals with a high prevalence of 15% (20). Which is against an acceptable post-operative wound infection rate of 5% which was stated by the World Health Organization(1). Anesthesia providers can directly impact perioperative infection risks. The healthcare-associated infection (HAI) risk in the operating room is higher with 7% of surgical patients suffering from one or more infections(14).A study points out that bacterial transmission in the OR anesthesia work area was associated with 30-day postoperative infections, impacting as many as 16% of patients undergoing surgery. This is because of poor hand hygiene, workspace contamination, contaminated endotracheal tubes, catheters, syringes, or IV injection ports such as stopcocks, not timely administer antibiotics, and duration of the anesthetic (14,21–23)

An emerging knowledge also sheds light on three important sources of perioperative pathogen vectors like the anesthesia provider, the operative patient, and the operative environment (13).

A study also found intra-operative environment assists as a reason for the expansion of HCAIs(19,24). A wealth of literature mentioned that anesthesia provider commonly cross-

contamination of their workspace, infrequent cleaning of the anesthesia machine and equipment, and poor hand hygiene has been directly linked to postoperative infection (7,19,21,25). This is particularly important when performing invasive procedures and when there is a risk of contact with blood and body fluids(26). Anesthesia equipment contaminated with secretion and blood is frequently placed in contact with the anesthesia machine. Therefore, they are a potential source of horizontal transmission leading to the development of HAIs (7,27).

The practice of anesthetists has potential for disease transition to the patient. Since it is fraught with a high bulk of invasive procedure which violates normal protective barriers which have been associated with increased infection rates and mortality (8,14,19). Placement of intravenous and intra-arterial catheters, when performing local or neuraxial block, airway equipment and mechanical ventilator are potential means for transmission of infection (8,23,28).

Anesthetists have a unique role in infection prevention by strengthening the perioperative period that improves best practice for IP (14,21).Hand hygiene and anesthesia workspace decontamination had a great role in decreasing infection rates in surgical patients. Standard protocols exist for the insertion and handling of central lines, arterial lines, and regional procedures, which should be strictly adhered to prevent infectious complications (14,22).

One of a key pillars of an ideal anesthetic is prevention and control of HCAIs from the patient (8).Hospital-acquired infections (HAIs) are largely preventable through risk analysis and modification of practice. Multi-faceted solutions are needed that address providing safe anesthesia care while adhering to infection control practices (27).

Anesthetists are ethically obligated to follow all recommended safety and infection control measures whenever possible to prevent patient harm. It is important to recognize that there are limited research and publication on anesthetist's knowledge, practice and associated factors towards infection prevention and control in developing countries, particularly in Ethiopia. Despite an increase of highly infectious disease, infection prevention practices among anesthesia professionals are poor in many developing countries. Therefore, adherence to safe practices toward infection prevention among anesthesia professionals is questionable and not addressed well. This study is aimed to assess anesthetist's knowledge, practices and identify associated risk factors towards infection prevention. The result of this study will provide better awareness of this growing problem and provide a better outlet for improved patient care

1.3 Justification of the study

The anesthetists had a potential role for development of healthcare-associated infections in the operating rooms; however, infectious complications derived from anesthesia have been underestimated (8). As far as my knowledge, in Ethiopia, there is insufficient data on anesthetist's knowledge, practices and associated risk factors towards infection prevention in the country in general and in the study area in particular. This study is aimed at to identify level of knowledge, practice and risk factors associated with infection prevention and hopefully, addition it has invaluable input for the researches to be done on the same problem. Achieve the goal of reducing the rate of SSI and morbidity cannot be realized unless much attention is given to anesthetist's knowledge, practice and associated factors infection prevention. The result of this study will be used as a bull's eye in risk factor identification, assess compliance with infection control measures, IP guideline development, and policy for IP anesthesia working area, health institutions, policymakers, and NGOs working on this area. The findings from this study will explore the existing practice and associated factors and may be used in developing interventions to optimize infection control practices in the anesthesia working area. Hopefully, this study will be used in the future as basic information for next studies to be done on the same problem.

CHAPTER TWO: LITERATURE REVIEW

2.1 Standard precautions

Practices of infection control can be categories into two groups such as standard precautions and transmission-based precautions. Transmission of infections in health care facilities can be prevented and controlled with the application of basic infection control precautions. It can be grouped into standard precautions which applied all times to all patients, regardless of diagnosis or infectious status, and transmission-based precautions which are specific to modes of transmission (airborne, droplet, and contact) (WHO)(29)

Principles of standard precautions are based on all blood, body fluids secretions, non-intact skin, and mucous membranes might be containing organisms that transmit disease from one person to another. Standard precautions are replacing 'universal precautions' as it expands the coverage of universal precautions. It includes hand hygiene, use of appropriate personal protective equipment (PPE), use of aseptic technique and management of sharps, safe injection practices, respiratory hygiene, blood spills, and waste to maintain a safe environment and hygiene(30).

The mode of transmission of disease may vary between organisms; one may have more than one route. The complex interrelationship between a potential host and infectious agent produces infection (31). Poor practice from a single anesthetist has the potential to put a large number of patients at risk. Documented studies revealed that re-use of multi-dose vials during anesthesia service without appropriate precautions had the potential to transfer blood-borne viruses from one patient to another (8).According to a WHO report in the developing world was found that 5% of HIV,32% of HBV, and 40% of HCV infections result from unsafe medical injections (32,33).

2.2 Knowledge and Practices of Health worker toward IP

A survey done in the USA on 712 anesthesia providers found that two-thirds of respondents reported having infection prevention and control guidelines specific to anesthesia services in their institution. According to their report 93.8%, they respond that alcohol-based hand rub (ABHR) was always available within the anesthesia work area. Regarding to hand hygiene practice, 58.3% and 44.2% of respondents were not washing their hand during emergency and in general respectively. Another 15.5% of respondents were reported that barrier to HH because of a lack of support from OR personnel. Anesthesia providers identified several barrier precautions

used for placing arterial lines: masks, 82%; sterile gloves, 74.2%; gown, 10.9%; cap, 76.8%; full drape, 3.7%). Almost half did not use a drape (48.1%)(23).

A Random surveillance study done on 450 anesthetists practicing in New Zealand found that majority 86.3% of respondents share one drug ampoule for more than one patient, 41.3% of them used multi-dose vials for more than one patient. Among them one hundred and ten respondents were wiping a multi-dose vial with alcohol before aspirating its contents. Seventy three percent of them would wipe before each aspiration and would only 24.5% wipe once after the vial was opened. Regarding to the use of gloves, 85.7% of them used gloves when performing vascular annulations and 65.1% of respondents have used the full aseptic technique when performing regionally(34).

A Prospective observational study done at the Utrecht University Medical Centre in the Netherlands was point out that, usage of glove during tracheal extubation was (100%).Only 88% of the respondent using a glove while inserting gastric tube insertion but 12% not using a glove. This study found that 68%) respondents use gloves during tracheal intubation and 12% not used gloves. During peripheral venous catheter 75% of them uses glove, but 25 % did not use a glove. All respondents (100%) use love during arterial line insertion(35).

A cross-sectional study conducted in Sao Paulo on 158 anesthesiologists was found that 30.3% of respondents washed their hands before touching every patient but 69.7% of them did not wash their hands before touching every patient and 52.5% did not use gloves during intravenous access. A small respondent (4.4%) recapping of a hypodermic needle after use (36). A cross-sectional study done in 2013 at Nanded city, India on 42 health workers stated that most of the healthcare workers those who had experienced NSIs were 83.4%. Out of them only 16.6% had not experienced NSI. Out of this, only 21.5% of respondent uses glove for every procedure and 38.1% knows universal prequetion principles guidelines. Regarding HBV vaccination, 42.9% and 47.6% had vaccinated and not vaccinated respectively. Of this 9.5% had not been completed HBV vaccination(37).

A cross sectional study done on 2016 in Trinidad and Tobago on 300 health care worker from different regional hospitals found that, only 20.3% and 46.7% of the respondent had adequate knowledge and good practice towards infection prevention respectively. Among them 72.7% of respondent had infection prevention manual(38)

A cross-sectional study conducted on 2016 in Addis Ababa health facility on 629 health worker was found that 66.1% and 55.4% of respondents had good practice and good knowledge towards infection prevention respectively. Availability of personal protective equipment (70.1%,$p<0.05$),availability of guidelines on infection prevention (70.1%) and good knowledge (73.1%) were strongly associated with safe practice towards infection prevention. In this study prevalence of needle stick injury was 40%(4).

A cross-sectional study conducted at four university hospitals in Iran on 109 anesthetists was found that 59 (56.7%) and 45 respondents had and not history of at least one NSI respectively. The rest 45 had no history of NSI. Regarding their level knowledge, 26 (25%) of anesthetists were aware that HBV could be transmitted by NSIs, but only 44 (42.3%) were aware that HCV and HIV could also be transmitted by the same route. Seventy-five respondents (72.1%) received the three HBV vaccination series. Of these 30.8% did not wear gloves when inserting intravenous catheters, but 95.2% of respondents wore gloves. Ninety-three (89.4%) washed their hands after inserting an intravenous catheter. Fifty-seven (54.8%) participants still recapped needles after use(39).

A study done by cross sectional study design on 394 health workers in Bale Zone Hospitals revealed 36.8% of respondent found to have good infection prevention practice. An availability of personal protective equipment (42.2%) and IP knowledge were strongly associated with good practice towards infection prevention. IP training (46.1%) and presence of committee (41.7%) significantly associate on bivariate analysis with practice towards infection prevention. However, they were not statistically significant on multivariable analysis .Among them 70%.1 and 53.6% were used all personal protective equipment and repeatedly use pair of glove respectively. Also this study found that 27.6% health workers had needle stick injury(40).

A surveillance study done in Colombia on anesthesiology shows that high 50%–59.6% of respondents were reuse single-used vials and 41.3% of respondents were reuse multi-dose for more than one patients (8). A cross-sectional study carried out among 74 healthcare workers in Nepal was found that. Only 46.4% of respondents were used alcohol based hand rub. Amongst them, only 17.6% % of respondents were washed their hand before and after pt contacts. This study also point out that 49.3 % of them do not have any infection control policy and 55.7% of them did not receive any training on HCAI control(41).

A prospective cohort study done at Irana Tertiary university hospital on 334 participants found that that majority of respondents had practicing IP with an average of 54.5% and only 36.8% of Also, this study reveal that 50% had a high knowledge level. HH before patient contact accounts 43%, which had the lowest percentage of proper performance. It was also found that 36.8% of subjects had good practice(42)**.**

A cross-sectional study done at Jimma University on 231 nurses was point out that the overall knowledge of respondents was 83.08%. The majority 215(83.08%) of the nurses were knowledgeable about infection prevention. This study also suggests that 64.06% and 35.09% of nurses had good practice poor practice towards infection prevention (43).

A cross-sectional study conducted at Gondar University referral hospital on 282 study participants was found that 81.6% and 57.4% had adequate knowledge, and adequate practice respectively. Among them more than half (55.3%) of the study participants were not take training on IP. Among them a high proportion of HCPs (98.6%) have an awareness of the transmission mechanisms of infectious agents, proper handling of used needles and sharps (98.9%), and the importance of wearing PPE during clinical practices (95.7%). This study also found that 26.6% of participants had history of NSI. Also, this study point out that 63.8 % of respondents always recap used needles before disposal(44).

A Cross-sectional study conducted in Debre Markos Referral Hospital on 158 healthcare workers was point out that 84.7% of respondents was found to have knowledgeable. Among them 57.3% of respondents demonstrated a good practice towards infection prevention. This study revealed that 44% and 66.7% of respondent were washing their hands with soap before and after patient care, or after contact with blood respectively. The majority 71.34% of respondents were doesn't vaccinate. In regarding the availability of IP supplies, 33.3% of healthcare workers don't use IP due to unable to get available supplies. In-service training (AOR=3.97, 95%, CI=2.576–5.457), availability of IP supplies(AOR=2.156,95%.CI=1.90–4.357) and adherence to IP guidelines(AOR =4.02, 95%, CI = 2.45–6.359) were also associated with the practice of IP(2).

A study done by cross-sectional design in Dessie Referral Hospital on 208 HCWS points out that in all respondents 208(100%) knew about PPE. Among respondents, 87.5% of HCWs believe that alcohol-based antiseptic for hand hygiene is as effective as soap and water. Among this all respondents 100% were used gloves and gowns. Nearly all of respondents 205(98.6%) were wash their hands with antiseptics/soap after work. Among them, 198(95.19%) had good

knowledge, and 182(87.5%) good practice of IP. Less than one-fourth (17.7%) were trained on infection prevention(45).

A cross-sectional study conducted in Mizan Aman General Hospital on 135 HCWs was found that 65.6% of them had ever participated in IP training. Also, this study found that 68.7% of HCWs were washed their hands before patients examination and 62.5% of HCWs were recap needles immediately after using them(46). Facility-based cross-sectional study conducted in JUTH on 17 anesthetists reviled that 29.41% anesthetists clean their hand for every patient contact. Out of this majority of 70.6% did clean their hands between every patient contact. Also this study revealed that 82.35% of anesthetists found to have good knowledge while 17.64% of them had poor knowledge. Among them majority 70.5% of anesthetists did not clean their hand for every patient. This study also found that practice of hand cleaning before and after touching patients was 23.5% and 29.41% respectively. Among them 82.35% using water and soap as methods of hand cleaning followed by alcohol-based hand rub was 17.64%. Almost 70.58% have no risk practice (safe) and 29.4% have at least one unsafe practice. All respondents at least use three personal protective equipment like boots, masks, gloves, gowns, capes. The entire respondents 100% clean laryngoscope between every patient they encounter. Regarding disinfection of laryngoscope, majority 70.5% of the respondents soak the in disinfectants for ten minutes and (23.5%) and (5.88%) of them soak the laryngoscope for five and twenty minutes respectively. Regarding training on infection prevention only 47% had training on IP after their respective pre-service course and 9 (53%) hadn't trained. Out of those who had training on IP training seminar was accounts 52.9%. Also, the study reveals that 29.41% of anesthetists had a needle or sharp injury (47).

Another facility-based cross-sectional study in West Arsi District, southeast, on 680 HCWs found that 36.3% (95% CI: 32.4, 40.1%) and 53.7% (95%CI: 49.8, 57.4%) of the respondents found to be safe and knowledgeable towards IP practice respectively. This study showed that a large proportion of respondents with 63.7 and 46.3% were found to be unsafe and inadequate knowledge towards IP practice. Regarding to hand washing practice, 450 (69.4%) and 364 (56.1%) of respondents frequently washed their hands after and before patient care respectively. Regarding safe IP practice, IP training (AOR = 5.31; 95% CI: 2.42, 11.63) and available infection prevention guidelines (AOR = 3.34; 95% CI: 1.65, 6.76) found to have increase the likelihoods of safe practice. Health workers who had infection prevention committees in

facilities (AOR=1.78; 95% CI: 1.01, 3.13),service ten year and more (AOR=3.41;95% OF CI=1.22,9.55) ,had infection prevention guidelines a (AOR = 2.44; 95% CI: 1.45, 4.12) and IP training (AOR=5.02; 95% CI: 1.45, 8.59) were more likely to had knowledgeable towards IP than counterparts.(18). A facility-based cross-sectional study conducted in the Addis Ababa health facility on 546 participants revealed that 39.7% of healthcare providers were trained on IP. This study found that 73.1% and 68.1% of healthcare providers were knowledgeable and safe practice towards infection prevention and controls(32).

2.2 CONCEPTUAL FRAMEWORK

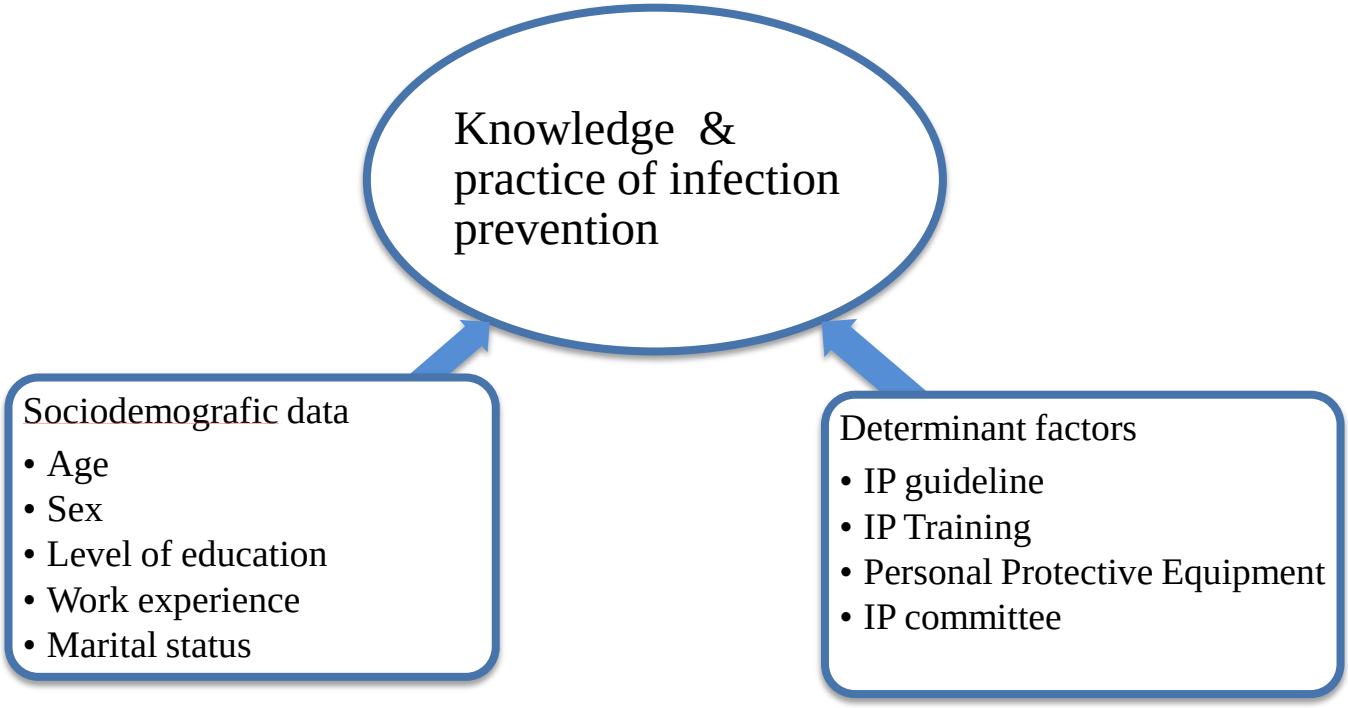

Figure 1. Conceptual framework showing factors affecting anesthetist's knowledge, practice and associated factors towards infection preventions and developed from different kinds of literature

CHAPTER THREE: OBJECTIVE OF THE STUDY

3.1 General objective

- To asses anesthetists' knowledge, practice and associated factors towards infection prevention in Addis Ababa public hospitals from February 1, 2021 to April 30,2021G. C

3.2 Specific Objective

- To asses anesthetists knowledge towards infection prevention
- To identify factors associated with anesthetists knowledge towards infection prevention
- To determine level of practice towards infection prevention among anesthetists
- To identify factors associated with anesthetist practice towards infection prevention

CHAPTER FOUR: METHODOLOGY

4.1 Study area and study period

This study was conducted in Addis Ababa public hospitals, Addis Ababa; Ethiopia. The city has total population of 3,273,000 according to 2007 population census. Among them 47.4% and 52.6% were male and female respectively. In Addis Ababa, there are thirteen governmental hospitals and ninety health centers were found. Out of this,7,642 number of health workers were found (32). The study was conducted in eleven public hospitals. From survey and Addis Ababa City Health Administration Bureau, the number of anesthetists working in eleven hospitals was 250. This study was conducted from February to April 2021G. C

4.2 Study Design

A facility-based cross-sectional survey study was conducted in Addis Ababa Public Hospitals.

4.3 Population

4.3.1 Source population

All anesthetists who were working in Addis Ababa public hospitals were considered as a source population

4.3.2. Study population

All anesthetists who were working in eleven public hospitals at AA during the study period were the study population

4.4 Eligible Criteria

Inclusion criteria

All anesthetists who were working at least 6 months and willing to participate in study during the study period were included

Exclusion criteria

Anesthetists who were ill and had night duty during data collection period were excluded

4.5. Variables and measurements

Dependant variables of the studied were knowledge and practices of anesthetists towards infection prevention. Whereas, the independent variables were age, Sex, level of education, marital status, year of service, presence of infection prevention guideline and committee at working area, training on infection prevention, availability of personal protective equipment.

Knowledge about infection prevention were measured using the cumulative score of 12 questions each with two possible response [1= yes (correct) & 0= no (incorrect)]. Knowledge scores were

summed up to get total knowledge score for each respondent which ranging from 0-12. Depending on this score those who were answered ≥70% and <70 % knowledge questions were labeled as "Knowledgeable" and Not knowledgeable" respectively(38)(40).

Practice about infection prevention were measured using the cumulative score of 20 questions each with two possible response [Always or Yes=1(correct) & rarely or No=0(incorrect)].

Practice scores were summed up to get total practice score for each participant which was ranges from 0-20. Based on this, those who were answered ≥70% and <70 % practice questions were categorized as 'Safe practice and Unsafe practice "respectively(38)(40).

4.8 Operational definition

- **Knowledge**
  - Respondents who were correctly answered ≥70%,and <70% from cumulative scores of knowledge questions were labeled as knowledgeable and not knowledgeable respectively
- **Practice**
  - Practices of anesthetists towards infection prevention were assessed by infection prevention measurement tools like hand hygiene, proper utilization of personal protective equipment(PPE), post-exposure of prophylaxis , disinfection of used anesthesia equipment and practice of re-use equipment.
  - Respondents who correctly answer ≥70%,and <70% from cumulative scores of practical questions were labeled as safe Practice and unsafe Practice respectively

4.9. Data Collection tool and Technique

After getting informed verbal and written consent, pre-tested and structured self-administered questionnaires were used to collect data. Data collection tool had three parts. The first pats of questioners was consisted of socio-demographic characteristics and work related background of participants (age ,sex, marital status, level of education, service year, history of IP training, HBV vaccination and needle stick injury),presence of IP committee and guidelines in their organization and availability of adequate PPE supply. The second parts was consisted of 12 knowledge question about IP which contain the following main variables: general principles of IP, hand washing and use of hand antiseptic, HCAI rout of transmission and presence of prophylaxis) and the third parts was consisted of 20 practical question contain the main variables like: hand washing practice ,use all necessary PPE, follow aseptic technique ,use of a breathing

circuit filter and humidifier ,re-use and disinfect airway equipment and use of antibiotic prophylaxis were used for infection prevention. The tools were adapted from American Journal of Infection control (48) and reviewing related literature(2)(18).

Tools were prepared in the English language to assess anesthetist's knowledge, practice and associated factors towards infection prevention. A short time discussion had given to participants about the study objective and questionnaires procedure. For each hospital, supervisors were assigned from anesthesia department. Timely collected data was checked for completeness by supervisor

4.10 Data quality assurance

Originally the questionnaires were prepared in English. To assure data quality, 5% of the questionnaire were pretested in the study area but not included in the actual study .The content was assessed and necessary modification was made before actual data collection. Based on the pre-test results, the questioners were distributed to each hospital. Questionnaires were checked thoroughly for their completeness before it is distributed to respondents. The collected data was checked daily by a supervisor for its completeness. Finally, data were checked for consistency and completeness before entry to computer software for analysis.

4.11 Data processing and analysis

The collected data was checked for its completeness, consistency, and accuracy and entered using EPI INFO 7 statistical software and then exported to SPSS version 24 for analysis. For analysis, knowledgeable and not knowledgeable anesthetists towards infection prevention were coded as 1 and 2 respectively. Likewise, anesthetists who had safe and unsafe practices towards infection prevention were coded as 1 and 2 respectively. Then a descriptive statistical method was used to summarize important independent variables and logistic regression model was fitted for bivariate to identify candidate for multivariable analysis using $p<0.2$. All exposure variables in a multivariate analysis that had $p < 0.05$ were considered as significant variables and strongly associated with the dependent variable. Hosmer and lemeshow goodness of fit test was determined. Odds Ratio (OR) and 95% Confidence Interval (CI) were used to estimate the strength of association between dependent and independent variable.

4.12 Ethical Consideration

After approval of a proposal, Ethical clearance was obtained from the Review Board of AAU, Department of Anesthesia. Official letters were obtained and were submitted to eleven public

hospitals in Addis Ababa and to other concerned bodies. The purpose and the importance of the study were explained and written informed consent was provided to each participant. Confidentiality was maintained at all levels of the study.

4.13 Dissemination of result

The final result of this study will be presented in the presence of Stakeholders that will be invited on the day of defense/ presentation. The findings of the research will be disseminated to all Addis Ababa public hospitals, AAU department of anesthesia, Addis Ababa health Bureau, and Ethiopian Anesthetists Association, Minister of health, and ministry of education. It will also present workshops and different seminars. Copies of the research report will also be available in College of health library. Efforts will be made to publish the research findings in peer-reviewed reputable journals and will be presented at professional conferences.

CHAPTER FIVE: RESULT

5.1. Socio-demographic data

A total of 220 study participants were included in this study for response rate of 88%.

Among these, 49.1% were male and 50.9% were female participants. The median age of the respondent was 27 years of IQR of 26-30 years. The majority of anesthetists age 210(54.5%) belonged to the 26-30 years of age category. Out of the respondents, 101(45.9%) were married and 117(53.2%) were single. In terms of level educational, the majority of the respondents 210(90.9%) were the first degree and 9(8.6%) were holding masters'. The majority of anesthetists' work experience 148(67.3%) where belongs to between 0-5 years of service. The median service year of anesthetists was 4 years with an IQR of 3-7 years.

Table 1.Socio-demographic characteristics of anesthetists at Addis Ababa public hospitals, Addis Ababa, Ethiopia, 2021

Variables	Characteristics	Frequency(N)	Percent (%)
Sex	Male	108	49.1
	Female	112	50.9
Age(year)	20-25	52	23.6
	26-30	120	54.5
	31-35	26	11.8
	>35	22	10.0
Marital Status	Single	117	53.2
	Married	101	45
	Divorced	2	0.9
Educational Status	Diploma	1	0.5
	BSC	210	95.5
	MSC	9	4.0
Work experience	0-5 Year	148	67.3
	6-10 Year	44	20.0
	11-15 Year	9	4.1
	>15 Year	19	8.6

This study also found that majority 156(70.9%) of anesthetists had needle stick injury while they recap with two hands. Out of them, only 40.9% had completed the Hepatitis B vaccine. Regarding IP committee and guidelines, less than half 45.9%, and 43.6% of respondents had IP committee and guidelines in their organization respectively. Also, the study found that only 44.1% of anesthetists were access to available personal protective equipment

Table 2 Anesthetists Occupational related background at Addis Ababa Public Hospitals, Ethiopia, 2021

Variables	Response	Frequency(N)	Percent (%)
Needle stick injury	Yes	156	70.9
	No	64	29.1
History of HBV vaccination	No dose	78	35.5
	1-2 doses	52	23.6
	3 dose	90	40.9
IP Committee	Yes	101	45.9
	No	119	54.1
IP guideline	Yes	95	43.2
	No	125	56.8
IP Training	Yes	96	43.6
	No	124	56.4
Availability of PPE	Yes	97	44.1
	No	123	55.9

HBV=Hepatitis B virus, IP= Infection prevention.PPE=Personal protective equipment

5.2. Knowledge about infection prevention

This study used 12 questions to measure the knowledge of study participants about infection prevention. A summary score was developed from the continuous date of knowledge response. The median score of knowledge questions was 10.5 with IQR of 9-11 score. Using cut-off points, who answered ≥70% from cumulative score of 12 questions, were labeled as knowledgeable. Accordingly, majority of 182(82.7%) (95% of CL: 77.7, 87.7) of our study participants were knowledgeable while 38(17.3%) of our respondents were not knowledgeable Also, this study suggested that 177(80%) of anesthetists were knew about principles of infection preventions. Out of 220 anesthetists, nearly two third 63.6% of anesthetists were believed that glove can't provide complete protection against transmission of infection. This study also suggest that 94.5% and 97.7% of study participants know that health- care associated infection found on normal intact skin and disease transmitted through contaminated needle and sharp respectively.

Table 3.Knowledge of anesthetist's regarding infection prevention in Addis Ababa public hospitals, Addis Ababa, 2021

Knowledge Question	Response Option	
	YES (%)	NO (%)
Do you know about IP principles	177(80.5)	43(25.9)
Glove can't provide complete protection against transmitted infection	140(63.6)	80(48.2)
HCA pathogen found on normal intact skin	208(94.5)	12(7.2)
Washing hand with soap/alcohol decrease risk of HAI	196(89.1)	24(14.5)
Alcohol-based antiseptic for hand hygiene as effective as soap and water if a hand has not visibly dirty?	160(72.7)	60(36.1)
A glove should be worn when blood or body fluid anticipated	176(80.0)	44(26.5)
TB is carried in airborne particles from a patient with active pulmonary TB	206(93.6)	14(8.4)
Hand washing is always necessary before and after every patient contact	183(83.2)	37(22.3)
Hand washing affect the clinical outcome of patient	180(81.8)	40(24.1)
Hand washing prevents transmission of infection even when glove worn	180(81.8)	40(24.1)
Disease transmitted through contaminated needle and sharp	215(97.7)	5(3.0)
Is there prophylaxis after exposure to contaminated needle and sharp?	198(90.0%)	22(13.3)

HCAI=Health care associated Infection, TB=Tuberculosis, IP= Infection Prevention

5.3. Practice of anesthetists towards infection prevention

This study was used 20 questions to measure the practice of study participants about infection prevention. The mean score of practice questions was 13.3 (±2.8). Using cut-off points, which were answered ≥70% from cumulative score of 20 questions. The proportion of safe practice towards infection prevention was 106(48.2%) with (95% of CI: 41-55.4) while 114(58.8%) of participants had unsafe practice towards infection prevention. From our study participants, 31.8% of them wash their hands before patient contact and 82.7% of them wash their hands after patient contact. All anesthetists disinfect the laryngoscope in 0.5% chlorine solution. From these, 17.7% of the study participants soaked the laryngoscope in 0.5% chlorine solution for <5 minutes, 35.5% for 5-10 minutes, and the rest 46.8% for ≥ 11 minutes. All anesthetists a pair of gloves during tracheal estuation. However, only 91.4% of them wear gloves during tracheal intubation. In regards to the use of personal protective equipment, more than half (60.9%) of anesthetists don't wear all necessary PPE during the procedure. This study showed that 74.1% of anesthetists were re-used of disposable airway equipment.

Table 4. Practice of anesthetist's towards infection prevention in Addis Ababa public hospitals, Addis Ababa, 2021

Practice Questions	IP Practice (Always/often) Response	
	YES (%)	NO (%)
Do you wash your hand for every before patient contact	70(31.8)	150(68.2)
Do you wash your hand after touching patient	182(82.7)	38(17.3)
Do you use hand antiseptic in an operation room	168(76.4)	52(23.6)
Do you wear all necessary Personal Protective Equipment?	86(39.1)	134(60.9)
Do you soak laryngoscope in 0.5% chlorine solution	220(100.0)	
Do you wear a pair of gloves before patient contact?	130(59.1)	90(40.9)
Do you wear a glove during tracheal intubation?	201(91.4)	19(8.6)
Do you wear a glove during NGT insertion?	220(100.0)	
Do you wear a glove during Tracheal extubation?	220(100)	
Do you wear a glove during Intravenous line insertion?	180(81.8)	40(18.2)
Do you use the same tray for holding syringes for more than one patient?	147(66.8)	73(33.2)
Do you scrub your hand before conducting spinal and epidural anesthesia	128(58.2)	92(41.8)
Do you use the aseptic technique for every patient before intra venous annulations?	133(60.5)	87(39.5)
Do you constantly use and wipe a multi-dose vial with alcohol prior to use?	114(51.8)	106(48.2)
Do you constantly use a breathing circuit filter and humidifier for every case	122(55.5)	98(44.5)
Do you constantly reuse ETT, airway, and suction tip for every cases	163(74.1)	57(22.9)
Do you give surgical antibiotic prophylaxis for every cases	174(79.1)	46(20.9)
Do you disinfect stethoscope after every use	74(33.6)	146(66.4))
Do you clean anesthesia machine and face mask with disinfection after every procedure?	56(25.5)	164(74.5)
Do you not recap needle before disposing	71(32.3)	149(67.7)
Time of laryngoscope in 0.5% chlorine solution <5 minute	39(17.7)	
5-10 minute	78(35.5)	
≥ 11 minute	103(46.8)	

5.4 Factors associated with anesthetists knowledge towards infection prevention

In the bivariate analysis, age, presence of an infection prevention committee, availability of infection prevention guidelines, and had training on infection prevention were factors significantly associated with anesthetist's knowledge towards infection prevention. However, only presence of IP guidelines, IP training and presence of IP committee were found to be significantly associated with multivariable logistic regression analysis. This study points out that anesthetists who had training on infection prevention were 4.7 times more likely to have knowledge (AOR=4.7, 95%, CL= [1.49-14.87]) about infection prevention than counterpart. Furthermore, multivariable logistic regression showed that the presence of infection prevention committee was strong predictors of association with knowledge towards infection prevention, which showed that 3.5 times more likely to have knowledgeable (AOR=3.5, 95%, CL= [1.07-11.29) than counterpart. Presence of infection prevention guideline was 4 times more likely to have knowledge towards infection prevention than counterparts IP.

Table 5.Bivariate and multivariable analysis of factors associated with anesthetists knowledge towards infection prevention in Addis Ababa public hospitals, Addis Ababa Ethiopia,2021

		Knowledgeable				
Variables		Yes **n** (%)	No **n** (%)	COR(95 CI)	AOR(95CI)	*P*
Age	20-25	37(16.8)	15(6.8)	4.1(0.84-19.5)	1.5(0.36-6.92)	0.545
	26-30	100(45.5)	20(9.1)	2(0.43-9.2)	1.4(0.37-5.89)	0.570
	31-35	25(11.4)	1(0.5)	0.4(0.03-4.7)	1.5(0.27-8.90)	0.608
	>35	20(9.1)	2(0.9)	1	1	
IP committee	Yes	97(44.1)	4(1.8)	9.7(3.30-28.45)	3.5(1.07-11.29)	**0.038**
	No	85(38.6)	34(15.5)	1	1	
IP Guideline	Yes	92(41.8)	3(1.4)	11.8(3.54-40.17)	4.6(1.23-16.93)	**0.023**
	No	90(40.9)	35(15.9)	1	1	
IP Training	Yes	92(41.8)	4(1.8)	8.7(2.96-25.5)	4.7(1.49-14.87)	**0.008**
	No	90(40.9)	34(15.5)	1	1	

5.5. Factors associated with anesthetists practice towards infection prevention

In the bivariate analysis, presence of an infection prevention committee, availability of infection prevention guidelines, ever had taken training on infection prevention and availability of adequate personal protective equipment were factors which were significantly associated with anesthetist's practice towards infection prevention. However, only presence of IP guidelines, availability of PPE and presence of IP committee were found to be significantly associated with multivariable logistic regression analysis. This study found out that anesthetists who had an adequate supply of personal protective equipment were 19 times had safe practice towards infection prevention compared to those who do not had an adequate supply of PPE (AOR=19 ,95% of Cl=8.70-42.41).Regards to the presence of infection prevention committee and guidelines, this study points out that those who had infection prevention committee and guideline towards IP were 3.3 and 2.7 times more likely to have safe practice on infection prevention than counterparts.

Table 6.Bivariate and multivariable analysis of factors associated with anesthetists practice of towards infection prevention in Addis Ababa Public Hospitals, Addis Ababa Ethiopia,2021

		Level of IP Practice				
Variables		Safe **n** (%)	Unsafe **n** (%)	COR(95 CI)	AOR(CI)	*P*
IP committee	Yes	72(32.7)	29(13.2)	6.2(3.45-11.2)	3.3(1.49-7.48)	0.003
	No	34(15,5)	85(38.6)	1	1	
IP Guideline	Yes	69(31.4)	26(11.8)	6.3(3.49-11.4)	2.7(1.21-6.02)	0.015
	No	37(16.8)	88(40)	1	1	
IP Training	Yes	59(26,8)	37(16.8)	2.6(1.5-4.5)	0.99(0.45-2.21)	0.990
	No	47(21,4)	77(35)	1	1	
PPE supply	Yes	83(37.7)	14(6.4)	25(12.4-53.3)	19(8.70-42.41)	000
	No	23(10.5)	100(45.5)	1	1	

CHAPTER SIX: DISCUSSION

Health care-associated infection (HCAI) risk in the operation rooms is higher with 7% of surgical patients suffering from one or more infections. A wealth of literature points out that anesthesia providers can have a direct impact on perioperative infection risks because of poor hand hygiene, workplace contamination, contaminated endotracheal tubes, iv catheters, syringes, or IV injection ports, uses of multi-dose vial, not timely administer antibiotics, and duration of anesthesia(14). Infection prevention and control is a central component of safe and high-quality service delivery at health facility(4).Anesthetists are ethically obligated to follow all recommended safety and infection control measures whenever possible. Because prevention and control of HCAI are one of the key pillars of an ideal anesthetic practice(8).

In this study, 82.7 % [95% CL: 77.7, 87.7) of anesthetists were found to have a good knowledge towards infection prevention. This finding suggested that the majority of anesthetists had adequate knowledge of infection prevention. This result is in line with the result expressed by Kebede B. et al(2015) (43,47), Yazie et al(2019) (44), Desta M. et al (2018) (2), and Bekele I. et al (2018) (43)which were 82.35%, 81.6%, 84.7%, and 83.08% respectively.

This study points out that the proportion of anesthetists who had safe practice towards infection prevention were 48.2 %(CI= 44.4%-55.4%). This finding indicated that a larger proportion 51.8% of respondents was performing unsafe practices towards IP. This study is comparable to a study done by 36.8%, Zenbaba D et, al (2020) (40) ,Unakal CG et al(2017),46.7%,(38),and 36.8%,Naderi et al(2017)(42).This study shows much lower than a study done by Kebede B. et al (2015),70.58% (47), Alemayehu A.et al(2016),87.5%(45) and Biniam S.et al (2018), 61.8% (4). This discrepancy might be due to a lack of infection prevention supply, lack of training ,lack of mentoring by IP committee, variables used to assess practice, sample size, and study unit.

This study also found that a few 70(31.8%) number of anesthetists had hand hygiene before patient contact. This study comparable to the study done by Kim et al ,30.3%, (2018)(36). This study is much lower than study determined by Yakob et al(2015) ,68.1%,(46) and Gebremariam et al(2018),56.1%,(18). The possible explanation for this is lack of training and supervision.

But, this study also found that hand washing after patient contact or procedure was 82.7% .This finding in line with the study done by Ghodraty et al (2014),89.9% (39). Regarding the uses of glove, this finding showed that all anesthetists wear glove during tracheal extubation (100%) and 88% wear glove during IV line canulation. This study is comparable to the finding determined

by Kredi A et al (2011),100%(35) and Ryan A et al(2006), 85.7% (34) respectively. This study also point out that only 39.1% of respondents were used all necessary PEE during patient care. This finding is comparable to the study done by Desita et al(2018),33.3%,(2). This might be due to lack of PPE, lack of training and due to negligent.

Regarding work related conditions, this study showed that high prevalence of needle stick injury to anesthetists which were 70.9%.This finding higher than study done by Kebede et a l(2015),29%.4%(47), This discrepancy might be sample size, study unit and work load.

This study also point out that 17.7% ,35.5% and 46.8% of study participants were soak laryngoscope in 0.5% chlorine solution for less than five minute,5-10 minute and > 11minute respectively. This finding is not comparable to study done by Bebede B et al (2015), 70.5%, 23.5% and 5.8% of anesthetists were soaked laryngoscope for 10 minute,5 minute and 20 minute respectively. This discrepancy might be as a result of lack of clear guideline specific to anesthesia work area, sample size and lack of training.

This study also suggested that presence of infection prevention committee was strongly associated with knowledge towards infection prevention. Anesthetists who had infection prevention committees and guidelines in their organization were 3 and 4 times more likely to have a good knowledge towards infection prevention respectively (AOR=3.5, 95% of CL=1.07-11.29, and AOR=4.6,95% of CL=1.23-16.9).This study is in line with a study done by Gebremariam et al (2018)(p=<0.005)(18). Furthermore, training on infection prevention is also significantly associated with knowledge towards infection prevention. It was four times more likely have knowledgeable than those who hadn't taken training on infection prevention. This finding in line with a related study done by Desta K.et al (2018) (2) and Biniam S.et al (2018)(4).

This study also suggested that the presence of infection prevention guidelines had a significant association with safe practices towards infection prevention. Safe practice towards IP was 2 times higher for those who had guidelines than counterparts. This study is comparable to the study done by D.Zenbaba et.al (2020),(42.1%&p<0.01)(40),and Gebremariam et al, (p<0.005)(2018) (18).

Another factor strongly associated with safe practice towards infection prevention was the presence of an IP committee; due to this 32.7% of anesthetists perform safe practices towards infection prevention. Presences of IP committee 3 times more likely to have a safe practice towards infection prevention than those do not have IP committee (AOR=3.3, 95% of CL=.

(1.49-7.48). This study also found that for those who do not have an IP committee, only 15.5% of them practicing safe infection prevention. This finding is not in line with the study done by Gebremariam et al (2018) (18) and Desta K.et al (2018) (p<0.045)(2).This discrepancy might study group characteristics, sample size, methodology, and study unit.

In addition, this study revealed that presence of guideline towards infection prevention had strongly associated with safe practice towards infection prevention. It was 2.7 times more likely to have safe infection prevention than those who did not have guidelines towards infection prevention. This study is comparable to the study done by Gebremariam et al(2018),P=<0.05) (18)

This study also revealed that, anesthetists those who had training on infection prevention were only 43.6%.This is comparable to the study done by Biniam sahiledingle(2019) (P<0.01)(32) and Rajbhanderi AK et al(44.3%)(2018)(41)

This study found that training on infection prevention is not statistically significant with safe practice in multivariable analysis. However, in bivariate analysis training on infection prevention was two times more likely to have a safe practice towards infection prevention than counterparts. This study in line with study done by zenbaba D et al(2020),(P>0.14)(40) and Hussein. et al(2017)(49).This study has discrepancy with a study done by Gebremariam et al (2018)(p<0.05) (18) and Desta et al (2018),P<0.05(2). The possible explanation for the discrepancy might be study group characteristics and sample size.

Moreover, available personal protective equipment is one of significant factors associated with safe infection prevention practice. The odds of safe practice were likely to be 19 times higher in anesthetists who had an adequate supply of PPE. This also strengthens by anesthetists those who have an adequate supply of PPE had 37.7% of good practice towards infection prevention when compared to 10.5% of those who do not have supply. This study comparable to a study done by Zenbaba D et al(2020) (40),Desita et al (2018) (2) and Biniam S.et al (2018)(4).The possible explanation might be an adequate supply of PPE is directly related to safe practice towards infection prevention.

CHAPTER SEVEN: LIMITATION AND STRENGTH

7.1 Strength

This study was assessed existing anesthetists knowledge, practice and associated factors towards infection preventions. Therefore, it can help as a baseline data for researchers and stake holders on infection prevention

7.2 Limitations

This study has several limitations due to cross-sectional study design; it is difficult to establish temporal relationships between explanatory and outcome variables. There is no similar study done in the country on anesthesia profession because of this comparison of the finding with other health worker setup, unit and policy are quite different.

Since this study has conducted only at public hospitals, generalization of the output confined to public hospitals.

Since self administers questioners were used to assess level of practice towards infection prevention is another limitation because of recall and response bias. Respondents may not give a genuine response on existing practice which make under or over-inflate the result of the study.

CHAPTER EIGHT: CONCLUSION AND RECOMENDATION

Conclusion

This study suggests that a high proportion of anesthetists were knowledgeable about infection prevention. However, the overall level of safe practice towards infection prevention was very low when compared to knowledge level. This is due to the fact that high proportion 60.9% of respondents had not worn all necessary personal protective. Factors like the presence of available personal protective equipment strongly associated with practice towards infection prevention. Training on infection prevention also strongly associated with knowledge towards infection prevention. Other factors which significantly affect both knowledge and safe practice towards infection prevention were the presence of IP committee and IP guidelines. Moreover this study suggests that high attention should be given to those factors strongly associated with knowledge and practice towards infection prevention

Recommendation

1. To Anesthesia Unit

Anesthetists should have written document on how to disinfect re-used and singe used airway equipment. They should have actively involved in infection prevention committee and adequate supply of infection prevention materials

2. To Hospital Managements

Hospitals should strengthen IP committee and provide adequate and consistent supply of infection prevention material and continuous mentoring should be needed.

3. To Ethiopian Anesthetist Association (EAA)

EAA should have to develop training manual for control and prevention infection for anesthesia Practice. Prepare National IP guideline focus on overall anesthesia practice. Infection prevention training program should be implemented in training curriculum for anesthetist and strengthen continuous in service training on infection prevention

4. To Minster Health and Addis Ababa Health Bureau

Infection prevention and control issue is not one time activity, rather an ongoing issue in anesthesia practice. So ministry health and AA health bureau should have actively involved in updated and continuous initiation on control and preventions of infection

Lastly, I suggest for researchers to focus on qualitative and observational study in order to identify behavioral and clinical factors towards infection prevention.

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ANNEXES

ANNEX I: 1 English version information sheet and consent

Information Sheet and Consent Form Prepared for subjects who are going to participate in the research project

Title of the Research Project:

Assessments of anesthetist's knowledge, practices and associated factors towards infection prevention in Addis Ababa public Hospitals, Ethiopia: a cross-sectional study

Introduction

I am Terefe Alemayehu, a final year MSc student in Anesthesia at Addis Ababa University.

I am conducting a study on anesthetists' knowledge, practice and associated factors towards infection prevention at Addis Ababa public hospitals as part of my post-graduate program requirements. I will try to answer any queries that may arise before and during the intended study

Purpose of Research Project

The objective of this study is to assess the knowledge and practices of anesthetists towards infection prevention and identify associated risk factors in Addis Ababa public Hospitals. The study will help determine the risk factors of infection prevention among anesthetists working at Addis Ababa public Hospitals and. It will also serve as baseline information for subsequent studies in the country.

Procedure

To assess anesthetists knowledge,practices and associated risk factors towards infection prevention and we invite you to take part in this project randomly. If you have willingness to participate in this project, you need to understand and sign the agreement form. Then, self administered structured questioner will be distributed to you by the data collector and you will fill it. You do not need to tell your name to the data collector or write on the questionnaire and all your responses and the results obtained will be kept confidential by using a coding system whereby no one will have access to your response.

Risk/ Discomfort

By participating in this research project, you may feel that it has some discomfort especially on wasting your time. I will hope if you participate in this study, you will get benefit from the research result. There has no risk to you for participating in this research project.

Benefits

There are no known benefits from the study to participants however knowledge gathered will be helpful in understanding practice in the prevention of perioperative transmission of infection at Addis Ababa public Hospitals. The study findings will be presented to the AAU research committee and the department of anesthesia and used to make recommendations on the prevention of perioperative infections. Ultimately, this will help us to work on prevention and intervention strategies.

Confidentiality

The information collected from this research project will be kept confidential and information about you that will be collected by this study will be stored in a file, without your name, but, a code number assigned to it and it will not be disclosed to anyone except the principal investigator and will be kept locked with key.

Right to refuse or withdraw

You have the full right not to participate in this study .You have also the full right to withdraw from this study at any time you wish, without losing any of your rights.

Whom to Contact

This research project will be approved by the ethical committee of Addis Ababa University.If you have any questions you may ask them now, during the period of the study, or even after the study is over. If you wish to ask questions later, please use the contacts below

Addis Ababa University
College of health science
Department of anesthesia

	Cell phone:	Email Address
Principal Investigator: =	phone: 0910296410	E-mail: **terealex60@gmail.com**
Primary Advisor =	phone: 0910508963	E-mail:**bkakabura12@gmail.com**
Co-advisor	**phone:** 0928114926	E-mail **dzewege@yahoo.com**

INFORMED CONSENT FORM

I do agree to take part in this study as explained to me above. I have fully understood what the study is about and my role in it. I also understand that if I change my mind, I can withdraw from the study at any time.

Serial No_____ signature_____ Date_____

Annex: II Questionnaires

ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

DEPARTMENT OF ANESTHESIA

Questionnaire to assess knowledge and practices of anesthetists towards infection prevention and associated factors in Addis Ababa governmental Hospital

General questions:

1. Code number_____

2. Date of interview __/ __ /__

3. Interviewer' signature_____

4. Result of data collection

4.1 complete_____

4.2 Incomplete_____

5. Checked by investigator Signature_____ Date __/__/__

Hello, my name is----------I am here on behalf of Terefe Alemayehu, a final year MSc anesthesia student at Addis Ababa University School of medicine department of anesthesia. He is conducting an assessment of anesthetist's knowledge, practices and associated risk factors towards infection prevention at Addis Ababa Public Hospital.

You are randomly selected to participate in this study because you are currently working as an anesthesia provider in this facility. Your participation in this study will only be based on your willingness to participate. You have the right to choose not to take part in this study. If you are willing, you have the right to stop at any time or withdraw without giving any reason which you will not be subjected to any ill-treatment. There will be no direct benefit by participating in this study but in the future information gathered by this study will helps the Anesthesia department, hospital managers, policymaker, programmers, and researchers to give appropriate attention to the issue of infection prevention.

There is no risk if you agree to participate in the interview. All the information that you give to me will be kept confidential by using only code numbers and locking the data. Only the member of the study team will have the access to the non-code data and the data will not be used for other than the study, this questioner should take approximately 10 min to complete.

If you need any further information or explanation regarding the study, you can have this address to contact the principal investigator

Name: Terefe Alemayehu

Tel-+251910296410/0982597977

Email-:terealex60@gmail.com

Based on the understanding of the above information, you will participate in this study?

A) Yes

B) No

If yes, Signature _____Date _____/_____/_____

All questionnaires are completed anonymously. We would appreciate it if you answer all the questions and answer as honestly as possible. Please circle on the number you select that best answers. Kindly make only one Selection unless otherwise instructed

PART ONE .SOCIO DEMOGRAPHIC CHARACTERISTICS

S.NO	Socio-Demographic	Response
101	Sex	1. Male 2. Female
102	Age	_____year
103	Marital status	1.Married 2. Single 3. Divorced
104	Educational background	1.Diploma 2) BSC 3) MSC
105	Service year	_____Year
106	Needle stick injury	1.Yes 2.No
107	History of HBV vaccination	1) No 2) 2 doses 3) 3 dose
108	Availability of Personal protective equipment	1.Yes 2.No
109	Does your facility have an infection prevention committee?	1) Yes 2) No
110	Does your health facility have available guidelines and materials on IP in the anesthesia working area?	1) Yes 2) No
109	Do you have training on infection prevention?	1) Yes 2) No

PART TWO: Knowledge related Questionnaire on infection prevention

S. No	Knowledge related Questionnaire	Response
201	Are you heard about infection prevention principles?	1. Yes 2. No
202	Gloves cannot provide complete protection against acquiring/transmitting infection?	1.Yes 2. No
203	Healthcare-associated pathogens can be found on normal, intact patient skin	1. Yes 2. No
204	Washing your hands with soap or an alcohol-based antiseptic decreases HCAI	1. Yes 2. No
205	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
206	Gloves should be worn if blood or body fluid exposure is anticipated	1. Yes 2. No
207	TB is carried in airborne particles that are generated from patients with active pulmonary TB	1. Yes 2. No
208	Hand washing is always necessary after every patient contact	1. Yes 2. No
209	Hand washing affect the clinical outcome of patients	1. Yes 2. No
301	Hand wash prevent transmission of infection even when glove worn	1.Yes 2.No
302	The disease can be transmitted through contaminated needle and sharps	1. Yes 2. No
303	There is prophylaxis after exposure to contaminated sharps	1. Yes 2. No

PART TREE: Practice related questioner on infection prevention

S.N	Practical related Questionnaire	Response
401	When do you wash your hands before Patient Contact?	1. Never 2. Rarely 3.Always
402	Do you clean your hand after touching patients?	1.Never 2. Rarely 3.Always
403	Do you use hand antiseptic in operation room?	1.Never 2. Rarely 3.Always
404	Do you use all necessary personal protective equipment to prevent infection to prevent the risk of acquiring or transmitting infection?	1.Never 2. Rarely 3.Always
405	Do you soak laryngoscope soaked in the chlorine solution	1.Never 2. Rarely 3.Always
407	Do you wear pair of gloves before Patient contact?	1.Always 2. Rarely 3. Never
408	When do you wear gloves during tracheal intubation?	1.Never 2. Rarely 3.Always
409	Do you wear pair of glove during NGT insertion	1.Never 2. Rarely 3.Always
501	Do you wear pair of glove during tracheal extubation?	1.Never 2. Rarely 3.Always
502	Do you wear pair of glove during Peripheral Iv line catheterization	1.Never 2. Rarely 3.Always
504	Do you use the same tray for holding syringes for >1 patient?	1. Never 2. Rarely 3.Always
505	Do you scrub your hand before conducting spinal or epidural anesthesia	1.Never 2. Rarely 3.Always
506	Do you use an aseptic technique when placing an indwelling cannula?	1. Never 2. Rarely 3.Always

507	Do you wipe the rubber septum of a multi dose vial with alcohol before use?	1. Never 2. Rarely 3.Always
508	Do you use breathing circuit filters and humidifiers during General anesthesia?	1.Never 2. Rarely 3.Always
509	Do you re-use one ETT, airway, and suction tube for more than one patient?	1.Never 2. Rarely 3.Always
601	Do you give surgical antibiotic prophylaxis?	1.Never 2. Rarely 3.Always
602	Do you disinfect your stethoscope after every use?	1.Never 2. Rarely 3.Always
603	Is the anesthesia machine ever wiped with disinfectant after the procedure?	1.Never 2. Rarely 3.Always
604	You did not recap needle before disposing	1.Never 2. Rarely 3.Always
406	For how long Laryngoscope soaked in the chlorine solution?	A) <5 minute B) 5-10 minute C) >11 minute