

# Health Care Workers' Knowledge, Attitude and Practice Towards Infection Prevention in Dubti Referral Hospital, Dubti, North East Ethiopia

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## To cite this article:

Suoud Jemal, Mulusew Zeleke, Simachew Tezera, Suleyman Hailu, Ahmedzakir Abdosh, Mensur Biya, Seida Abduljelil. Health Care Workers' Knowledge, Attitude and Practice Towards Infection Prevention in Dubti Referral Hospital, Dubti, North East Ethiopia.

*International Journal of Infectious Diseases and Therapy*. Vol. 3, No. 4, 2018, pp. 66-73. doi: 10.11648/j.ijidt.20180304.11

Received: June 1, 2018; Accepted: January 11, 2019; Published: February 26, 2019

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**Abstract:** Background: In the past 20 years, the overall incidence of health care associated infections has increased by 36%. It is estimated that more than 1.4 million people worldwide are suffering from infections acquired in hospitals. Sub Saharan Africa harbors the largest population of people living with infectious disease mainly with HIV/ AIDS including Ethiopia. Methodology: -Institution-based cross sectional study was employed; and data was collected using self-administered questionnaires. Data analysis was carried out manually by using tally and calculator, and descriptive summaries were used to describe the study variables like frequency tables and charts. Result:- 50.55% of health care workers had good knowledge; 69.23% had positive attitude and 48.35% had safe practice of infection prevention. Above half (51.65%) of them had unsafe practice of infection prevention. Conclusion: - Health care workers' knowledge, attitude and practice towards infection prevention in Dubti Referral Hospital were not sufficient, favorable and safe enough to the expected standard. There were gaps regarding infection prevention practice like proper utilization of personal protective equipments.

**Keywords:** Nosocomial Infections, Practice, Hand Washing, Knowledge, Attitude, Infection Prevention

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## 1. Introduction

Infection control means minimizing the acquisition and transmission of infectious agents. Attention to infection control practices is important, especially with the emergence of multi-drug resistant organisms [1].

Control of nosocomial infections is important for three main reasons: to prevent spread of infections from patient to health care workers and vice versa; to prevent bacterial resistance and to avoid wastage of financial resources [2, 3]. Transmission of nosocomial infections in hospitals can occur in three ways; patient to patient, patients to health care workers and health care workers to patients [4]. Nosocomial

infections are significant problems throughout the world and are increasing; for example, the rate of nosocomial infections range from as low as 1% in few countries in Europe and America to more than 40% in parts of Asia, Latin America and Sub-Sahara Africa [5].

In the past 20 years, the overall incidence of health care associated infections has increased by 36%; they occur worldwide and affect both developed and developing countries. [6]

It is estimated that more than 1.4 million people worldwide are suffering from infections acquired in hospitals [7].

At least 40 different pathogens are transmitted by sharp instruments and needle stick injuries. According to data from expanded program of immunization Net system, hospital

workers incur approximately 30 needle stick injuries per 100 beds per year an alarming figure by no exaggeration [8]. The greatest risk of infection transmission is associated with percutaneous exposure to blood, followed by exposure of mucous membrane to blood [9, 10].

A study conducted on medical students in Birmingham, England demonstrated that consistent ongoing efforts to educate health care workers can greatly increase awareness of the dangers of percutaneous exposure and ways to avoid it [11].

Education efforts must emphasize solely on needle stick injuries, providing mentoring and competency training to surgeons, residents, nurses, medical students and other staffs, including workers who do not have a role of the OR (Operating Room) but handle supplies and dispose wastes [12, 13]. Without adequate infection prevention practice like proper use of gloves or proper hand washing, health care workers are at higher risk of acquiring infectious diseases, most commonly HBV, HCV and HIV as well as other common bacterial and viral infections [14]. In African setting, Sub Saharan Africa harbors the largest population of people living with infectious disease mainly with HIV/ AIDS [15].

According to a study conducted in acute care Hospitals of Kathmandu, Nepal, 27% of nurses and doctors had received infection control training and only 16% and 0.3% of them achieved maximum scores of knowledge and practice items respectively [16].

Descriptive study conducted in selected government hospitals at Kabul showed that 72.65% reported sharp injuries in the preceding 12 months. Most at risks were gynecologists/obstetricians (96.1%) followed by surgeons (91.1%), nurses (80.2%), dentists (75.9%), midwives (62.0%), technicians (50%), pediatricians (47.5%) [17].

According to a cross sectional study conducted in Anhui, China the rate of non-compliance with glove utilization was 61%, the rate of non-compliance with hand hygiene was 40%, and the rate of non-compliance with both was 67% [10].

According to a study conducted in Abeokuta, Ogun state, Nigeria, about a third (33.3%) of all respondents always recapped used needles. Compliance with non-recapping of used needles was high among trained nurses and worst with doctors. 63.8% of the respondents always used personal protective equipments, and more than half (56.5%) of them had never worn goggles during deliveries and at surgeries [18].

Institution-based cross-sectional study was conducted on knowledge, attitude and practice of health care workers on infection prevention in health institutions in Bahir-Dar city administration. Overall knowledge score of respondents was 84.5%, and about 55.6% had positive attitude and 54.2% of respondents had safe infection prevention practice [19].

A study conducted on the standard precaution practice among health care workers in public health facilities of Mekele special zone, Northern Ethiopia indicates that there is inconsistent practice of standard precautions in the healthcare

settings that increases the likelihood of acquiring nosocomial infections. Of all 483 Health care workers, 207 (42.9%) of them had good practice of standard precautions. Young health care workers had good practice when compared to older ages. The odd of good practice among males is likely to be reduced by 50% than females. The study found that when compared to laboratory technicians, doctors and nurses had 80% and 70% reduced odd of good practice respectively [20].

This study will answer the question “what is the level of knowledge, attitude and practice of HCWs towards infection prevention in Dubti Referral Hospital?”. Answering this question is very crucial because infectious diseases are major challenges for health sectors in developing countries like Ethiopia.

## 2. Methodology

### 2.1. Study Area and Period

The study was conducted in Dubti referral hospital from March to May, 2016. Dubti referral hospital is found in Dubti town, which is located in north eastern Ethiopia, in Afar National Regional state, zone 1, at a distance of 598km from Addis Ababa, and 10 km from Samara, the regional capital. Dubti hospital is the referral hospital of afar region. Currently there are a total of more than 400 workers who are actively working in the hospital. The workers are composed of nurses, laboratory technicians, pharmacists, physicians, midwives and others. Among these, 109 are health care workers.

### 2.2. Design

Institution-based descriptive cross sectional study was employed to assess knowledge, attitude and practice towards infection prevention in Dubti referral Hospital

### 2.3. Source Population

All health care workers in Dubti referral hospital.

### 2.4. Eligibility Criteria

#### 2.4.1. Inclusion Criteria

All health care workers in Dubti referral hospital who were in direct care of patients and available during data collection were included.

#### 2.4.2. Exclusion Criteria

Health care workers who were not interested to participate in the study in Dubti referral hospital.

### 2.5. Sample Size Determination and Sampling Technique

The sample size was determined by using single population proportion formula as:-

$$n = \frac{Z^2 p(1-p)}{d^2}$$

Where n=single population sample size

Z=confidence level (1.96)

P=prevalence of KAP of Health care workers (0.69) from a survey done in black lion hospital in 2010/2011

d=degree of error (0.05)

$$n = \frac{(1.96)^2 0.69(0.31)}{(0.05)^2} = 329$$

Since the study population is less than 10,000, correction formula was used and final sample size was founded as

$$nf = no / (1 + no/N)$$

$nf = 329 / (1 + \frac{329}{109}) = 82$ ; Then non-response rate of 10% was added

$$nf = 90.2 \approx 91$$

Thus, 91 Health care workers were study subjects.

## 2.6. Operational Definitions

Knowledge-is clear awareness and understanding of healthcare workers on infection prevention activities when caring for patients.

Good knowledge: - Earning a score above 75% on the Knowledge questions.

Fair knowledge:- Earning a score 50-75% on the knowledge questions

Poor knowledge: - Earning a score below 50% on the knowledge questions.

Attitude-is s personal view of health care workers on infection prevention activities when caring for patients.

Positive attitude: study participants who responded 60% and above to the attitude questions were said to have positive attitude.

Negative attitude: study participants who responded below 60% to the attitude questions were said to have negative attitude.

Practice-is an act/skill of health care workers on infection prevention activities when caring for patients.

Safe practice: study participants who responded to the practice questions  $\geq 50\%$  in line with observation were said to have safe practice.

Unsafe practice: study participants who responded to the practice questions  $< 50\%$  in line with observation were said to have unsafe practice.

## 2.7. Data Collection Tools and Method

Structured self-administered questionnaires prepared in English were used to collect data. The questionnaires included questions of knowledge, attitude and practice towards infection prevention and socio-demographic characteristics of respondents. Then the collected data was checked for completeness and accuracy.

## 2.8. Data Processing and Analysis

After data collection, each questionnaire collected was checked for completeness, missed values and unlikely responses. Data analysis was carried out manually by using tally and calculator, and the result was presented by using frequency tables and charts.

## 2.9. Data Quality Control

Before the actual data collection a pre-test was done on 5% of the sample size on Health care workers in Aysayta hospital and necessary correction was done after the pretest and prior to the actual data collection. The data was checked for its completeness, accuracy and missed information at each point.

## 2.10. Ethical Consideration

Before the actual data collection, permission was asked from DRH administrators. Once obtained the necessary permission, the purpose of the study was explained to the study participants. In order to secure these ethical issues of trust and confidentiality, they were asked not to disclose their names during filling the questionnaires.

## 3. Results

### 3.1. Socio-Demographic Characteristics

Out of 91 health care workers, 51 (56.04%) were males; 59 (64.83%) were single; 45 (49.45%) were Orthodox Christians and 41 (45.05%) were in the age of 21-25. Majority, 41 (45.05%) were nurses and 44 (48.35%) were diploma.

**Table 1.** Socio-demographic characteristics of health care workers in Dubti referral Hospital.

| S. N | Variable       | Characteristics  | Frequency | Percent (%) |
|------|----------------|------------------|-----------|-------------|
| 1    | Age            | <21              | 8         | 8.79        |
|      |                | 21-25            | 41        | 45.05       |
|      |                | 26-30            | 29        | 31.86       |
|      |                | 31-35            | 5         | 5.49        |
|      |                | >35              | 8         | 8.79        |
| 2    | Sex            | Male             | 51        | 56.04       |
|      |                | Female           | 40        | 43.96       |
| 3    | Marital status | Single           | 61        | 67.03       |
|      |                | Married          | 28        | 30.77       |
|      |                | Divorced         | 2         | 2.20        |
| 4    | Religion       | Muslim           | 41        | 43.95       |
|      |                | Orthodox         | 46        | 49.45       |
|      |                | Protestant       | 4         | 4.40        |
|      |                | Physicians       | 12        | 13.2        |
| 5    | Profession     | Pharmacists      | 10        | 11.00       |
|      |                | Lab. Technicians | 2         | 2.20        |
|      |                | Nurses           | 41        | 45.05       |

| S. N | Variable           | Characteristics | Frequency | Percent (%) |
|------|--------------------|-----------------|-----------|-------------|
| 6    | Educational status | Midwives        | 14        | 15.38       |
|      |                    | Health Officers | 7         | 7.70        |
|      |                    | Anesthetists    | 3         | 3.30        |
|      |                    | X-ray           | 2         | 2.20        |
|      |                    | Degree          | 41        | 45.05       |
|      |                    | Diploma         | 50        | 54.95       |

### 3.2. Knowledge of Health Care Workers Towards Infection Prevention

Knowledge about infection prevention was assessed by using 12 questions. Respondents who answered less than 6 (<50%) were considered as having poor knowledge, those who answered 6-9 (50-75%) were considered as having fair knowledge whereas those who answered above 9 (>75%) were considered as having good knowledge about infection prevention. Knowledge scores for each individual were calculated and summed up to give the total knowledge score. Out of 91 participants, 46 (50.55%) had good knowledge, 10 (10.99%) fair knowledge and 35 (38.46%) had poor knowledge about infection prevention. Majority, 83 (91.21%)

knew that HIV has post-exposure prophylaxis; but 67 (73.63%) of Health care workers didn't know disposing of sharp material and left over specimens together don't minimize contamination.

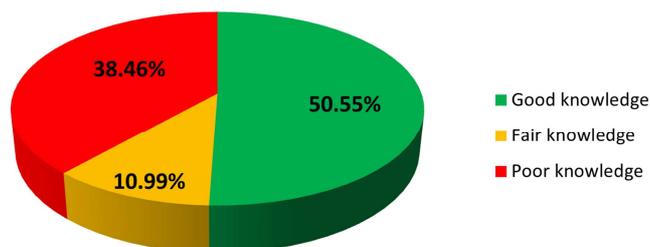


Figure 1. Level of knowledge of Health care workers towards infection prevention in Dubti referral hospital.

Table 2. Knowledge of Health care workers towards infection prevention in Dubti referral hospital.

| Knowledge question  | Response     | Frequency | Percent |
|---|--------------|-----------|---------|
| disinfection prevents Hospital associated infections                                  | Yes          | 77        | 84.62   |
|   | No           | 4         | 4.40    |
|   | I don't know | 10        | 10.99   |
| Antiseptic prevents Hospital associated infections                                    | Yes          | 80        | 87.91   |
|   | No           | 8         | 8.79    |
|   | I don't know | 3         | 3.30    |
| Chemical sterilization technique can be used for every equipment                      | Yes          | 53        | 58.24   |
|   | No           | 27        | 29.67   |
|   | I don't know | 11        | 12.09   |
| Physical sterilization technique can be used for every equipment                      | Yes          | 53        | 58.24   |
|   | No           | 24        | 26.37   |
|   | I don't know | 14        | 15.38   |
| All micro organisms including spores are distracted by autoclaving                    | Yes          | 71        | 78.02   |
|   | No           | 10        | 10.99   |
|   | I don't know | 10        | 10.99   |
| Berekina is effective in stock form   | Yes          | 77        | 84.62   |
|   | No           | 6         | 6.59    |
|   | I don't know | 8         | 8.79    |
| Every equipment needs decontamination before sterilization                            | Yes          | 81        | 89.01   |
|   | No           | 10        | 10.99   |
|   | Yes          | 71        | 78.02   |
| Personal Protective devices minimize Hospital associated infections                   | No           | 12        | 13.19   |
|   | I don't know | 8         | 8.79    |
|   | Yes          | 67        | 73.63   |
| Disposing of sharp material and left over specimens together minimize contamination   | No           | 22        | 24.18   |
|   | I don't know | 2         | 2.20    |
|   | Yes          | 81        | 89.01   |
| Proper handling of working equipment decreases risk of Hospital associated infections | No           | 10        | 10.99   |
|   | Yes          | 83        | 91.21   |
| there is post-exposure prophylaxis for HIV  | No           | 8         | 8.79    |
|   | Yes          | 16        | 17.58   |
| drug resistance micro-organisms are restricted to health institution                  | No           | 75        | 82.42   |

### 3.3. Attitude of Health Care Workers Towards Infection Prevention

Attitude about infection prevention was assessed by using 10 questions. Respondents who answered less than 6 (<60%) were considered as having negative attitude whereas those who answered 6 and above ( $\geq 60\%$ ) were considered as having positive attitude about infection prevention. Attitude

scores for each individual were calculated and summed up to give the total attitude score. Out of 91 participants, 63 (69.23%) had positive attitude whereas 26 (30.77%) had negative attitude about infection prevention. Majority, 65 (71.43), of the study participants did not consider that all health care workers, patients and the community are at risk of infection from their health facility wastes.

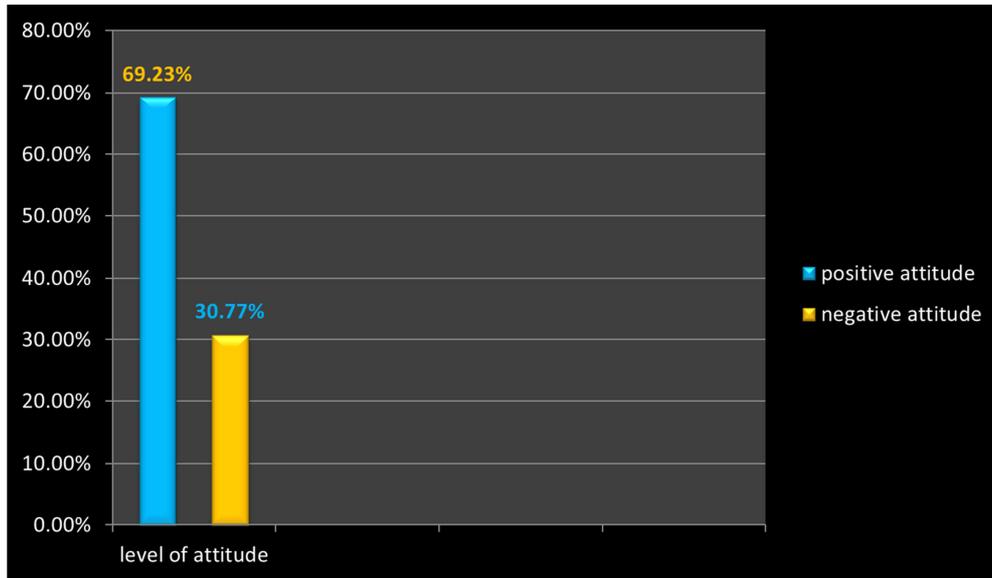


Figure 2. Level of attitude of Health care workers towards infection prevention in Dubti referral hospital.

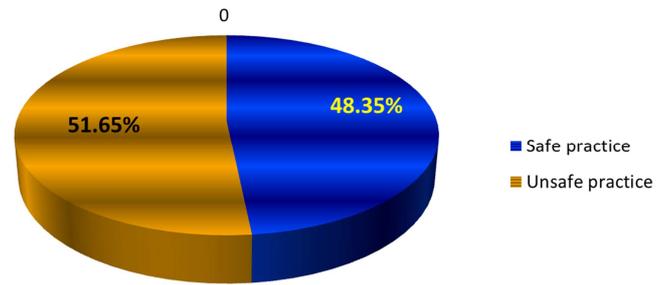
Table 3. Attitude of health care workers towards infection prevention in Dubti referral hospital.

| Attitudes questions   | Response                      | Frequency | Relative frequency |
|---|-------------------------------|-----------|--------------------|
| Wearing gloves, mask and protective eyewear are used to controls Hospital associated infections                   | Agree                         | 85        | 93.41              |
|   | Disagree                      | 4         | 4.40               |
|   | I do not know                 | 2         | 2.20               |
| following standard precautions reduces the risk of infection  | Agree                         | 89        | 97.80              |
|   | Disagree                      | 2         | 2.20               |
| Following infection prevention guidelines for professional practice reduces the risk of infection                 | Agree                         | 83        | 91.21              |
|   | Disagree                      | 2         | 2.20               |
|   | I don't know                  | 6         | 6.59               |
| Who could you think at risk of infection from your health facility waste  | Health care workers only      | 33        | 36.26              |
|   | clients/patients only         | 12        | 13.19              |
|   | The community                 | 20        | 21.98              |
|   | All                           | 26        | 28.57              |
| When do you think standard precaution should be observed  | For HIV patients              | 2         | 2.20               |
|   | In the operation              | 4         | 4.40               |
|   | At all time, for all patients | 85        | 93.41              |
| In the absence of standard precaution, health care facilities can be the source of infection and epidemic disease | Agree                         | 53        | 58.24              |
|   | Disagree                      | 34        | 37.36              |
|   | I do not know                 | 4         | 4.40               |
| Use of gloves for all patient care is a useful strategy for reducing risk of transmission of organisms            | Agree                         | 87        | 95.60              |
|   | Disagree                      | 4         | 4.40               |
|   | Lack of facility              | 18        | 19.78              |
| What do you think the reason for poor adherence to standard precaution  | Shortage of time              | 12        | 13.19              |
|   | Lack of awareness             | 9         | 9.89               |
|   | All                           | 40        | 43.96              |
|   | I do not know                 | 12        | 13.19              |
| Do you think needles should be recapped   | Yes                           | 55        | 60.44              |
|   | No                            | 32        | 35.16              |
|   | I do not know                 | 4         | 4.40               |
| Glove use for all patient care contacts is a useful strategy for reducing risk of transmission of organisms       | Agree                         | 73        | 80.22              |
|   | Disagree                      | 12        | 13.19              |
|   | I don't know                  | 6         | 6.59               |

### 3.4. Practice of Health Care Workers Towards Infection Prevention

Practice of infection prevention was assessed by using 16 questions in line with observation. Respondents who answered less than 8 (<50%) in line with observation were considered as having unsafe practice whereas those who answered 8 and above ( $\geq 50\%$ ) in line with observation were considered as having safe practice of infection prevention. practice scores for each individual were calculated and summed up to give the total practice score. Out of 91 participants, 44 (48.35%) had safe practice whereas 46 (51.65%) had unsafe practice of infection prevention. Only 34 (37.36%) of the study participants always wash their hands. Less than half (48.35%) always dispose sharp materials in a safety box. 57 (62.62%) of them had never given health education for patients about hospital associated

infections. 33 (36.26%) encountered Needle Stick Injuries. 69 (75.82%) of them recapped used needle before disposing.



**Figure 3.** Level of practice of Health care workers towards infection prevention in Dubti referral hospital.

**Table 4.** Practice of respondents towards infection prevention in Dubti referral hospital.

| Variables  | Response  | Frequency | Relative frequency |
|--|-----------|-----------|--------------------|
| Wash hands with soap and water before and after patient care   | Always    | 34        | 37.36              |
|  | Sometimes | 47        | 51.65              |
|  | Never     | 10        | 10.99              |
| Wash hands immediately when encountered unwanted contact with blood, fluids or contaminated items                      | Always    | 87        | 95.60              |
|  | Sometimes | 4         | 4.40               |
|  | Never     | 0         | 0.00               |
| Dispose sharp materials in a safety box  | Always    | 44        | 48.35              |
|  | Sometimes | 32        | 35.16              |
|  | Never     | 15        | 16.48              |
| Wear goggles to protect the eye during procedures that generate spray of blood or body fluids                          | Always    | 35        | 38.46              |
|  | Sometimes | 36        | 39.56              |
|  | Never     | 20        | 21.98              |
| wear mask to protect nose and mouse  | Always    | 5         | 5.49               |
|  | Sometimes | 36        | 39.56              |
|  | Never     | 50        | 54.95              |
| Recap used needle before disposing   | Always    | 61        | 67.03              |
|  | Sometimes | 8         | 8.79               |
|  | Never     | 22        | 24.18              |
| Put on protective devices during collection and transportation of hospital waste                                       | Always    | 79        | 86.81              |
|  | Sometimes | 8         | 8.79               |
|  | Never     | 4         | 4.40               |
| Wear gown properly for every procedure   | Always    | 83        | 91.21              |
|  | Sometimes | 9         | 9.89               |
| Give health education for patient about Hospital Associated Infections   | Sometimes | 34        | 37.36              |
|  | Never     | 57        | 62.64              |
|  | Always    | 12        | 13.19              |
| Use black and yellow containers properly   | Sometimes | 41        | 45.05              |
|  | Never     | 38        | 41.76              |
|  | Always    | 17        | 18.68              |
| Eat or drink in working area   | Sometimes | 14        | 15.38              |
|  | Never     | 60        | 65.93              |
|  | Always    | 17        | 18.68              |
| Encountered needle stick injuries  | Yes       | 33        | 36.26              |
|  | No        | 58        | 63.74              |
| Frequency of availability of containers where needles or other sharps are used   | Always    | 75        | 82.42              |
|  | Sometimes | 16        | 17.58              |
| Those containers emptied or disposed of when they are three quarters full  | Always    | 53        | 58.24              |
|  | Sometimes | 38        | 41.76              |
|  | Never     | 0         | 0.00               |
| Frequency that needles bent or broken prior to disposal  | Sometimes | 69        | 75.82              |
|  | Never     | 22        | 24.18              |
|  | Always    | 0         | 0.00               |
| Double gloves worn during surgery in deep body cavities or other procedure in which glove rips or punctures are likely | Always    | 48        | 52.75              |
|  | Sometime  | 18        | 19.78              |
|  | Never     | 25        | 27.47              |

## 4. Discussion

This study assessed important information regarding knowledge, attitude and practice of health care workers about infection prevention in Dubti referral hospital. About half (50.55%) of the health care workers had good knowledge regarding infection prevention. This finding was relatively higher than the study finding in North Wollo (44.4%) [21]. This difference might be due to time gap; infection prevention training has been given for health care workers now than the previous time. However this finding was lower than the study finding in Zambia, Lusaka (62.9%). [22]. Possible justification could be due to time gap, socio economic difference, and high turnover of staffs. 83 (91.2%) of the health care workers knew the presence of post exposure prophylaxis for HIV after exposure. This finding was much better than the result of North Wollo which indicated 31.3% of the participants consider the presence of post-exposure prophylaxis. [21]

According to this study, 89.01% of health care workers knew that every equipment needs decontamination. This was approximately equal to the study conducted in Debremarkos referral hospital which was 89.55%. In this study 84.62% of health care workers knew that disinfection prevents Hospital associated infections and 87.91% knew that antiseptic prevents hospital associated infections. This was relatively lower than the result obtained from the study conducted in Debremarkos referral hospital which was 94% and 97.76% respectively. The study showed that 78.02% of study participants knew protective devices minimize hospital associated infections and 73.63% knew that disposing of sharp materials and left over specimens don't minimize contamination. But the study conducted in Debremarkos referral hospital shows 90.3% and 52.98% respectively. [23]

Positive attitude about infection prevention is pillar to prevent cross infections. More than half of the respondents (69.23%) had positive attitude about infection prevention. This finding was lower than the study finding in Maldives Indian tertiary hospital in which the reported level of attitude was 97%. [23]. This difference might be attributed by the differences in academic background of the study respondents; because this study included various health care professionals, but the study in India included only physicians and professional nurses.

Of 91 health care works, 37.36% respondents always wash their hands before and after patient care. This was much lower than the previous studies done in Mizan-Aman General Hospital and North Wollo that showed 68.7% and 74.1% of health care workers wash their hands before examining patients respectively [21, 25]. But comparative to the study conducted in Anhui, china which was 40%. [26]. According to this study, 48.35% of the health care workers dispose sharp materials in safety box; this was lower than the previous study done in Mizan-Aman General Hospital in which 79.2% used safety box to collect needle and sharp materials. [25]. This was an indicative of

improvement on supply of safety box to collect sharp materials in health care facilities.

This study showed 38.46% of health care workers always wear goggles to protect the eye during procedure that generates spray of blood or body fluids. This was higher when compared to the study conducted in Debremarkos referral hospital which was 28.35%. [23]

Of 91 health care workers, 61 (67.03%) always recap used needles prior to disposal. This was more than twice that of the result of the study conducted in Abeokuta Nigeria which was 26.32%. (18). 36.26% of health care workers ever had needle stick injury. This was lower than that of Mizan-Aman General Hospital which showed 29.6% of health care workers ever had needle stick injury; but lower than that of North Wollo which showed needle stick injury of 53.0% and south Ethiopia which had needle stick injury of 32.4%. [22]. This difference could be the result carelessness of health care workers.

## 5. Conclusion

Majority of health care workers' knowledge, attitude and practices towards infection prevention in Dubti referral Hospital were not sufficient to the expected standard. Although the Health care workers responded most of practice questions, they had unsafe practice when observed. There were gaps regarding infection prevention practice like washing hands, following standard precautions, disposing garbage etc. Health care workers were not properly handling, and disposing used needles/sharp materials in the study area; and did not consistently use personal protective devices. The risk of health institution acquired infection was high.

## 6. Recommendation

Provision of training and educating health care workers, and educating patients and their attendants about infection prevention are recommended.

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