

Knowledge, Attitude and Practice towards Infection Prevention Measures among Healthcare Workers in Areza Sub-Zone, Eritrea

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Abstract

Background: Healthcare professionals are constantly exposed to microorganisms. Many of which can cause serious or even lethal infections. Hospital-acquired infection prevention standardized guidelines contain a multitude of protocols that need to be implemented by healthcare workers to reduce hospital-acquired infections.

Objective: To assess knowledge, attitude and practice towards infection control measures among healthcare workers in 7 health facilities of Areza Sub-Zone.

Methods: A cross-sectional study design was employed. All HCWs (56) were included in the study. A self-administered questionnaire was used to collect data. Collected data was checked, coded and transferred to SPSS version 22 for analysis and presented in tables.

Results: 56 study subjects have participated in the study which gives a response rate of 100%. The majority of the respondents 51 (91.1%) had ever participated in the training program. Most of the participants were female; 31 (55.4%) while 25 (44.6%) were male. The study showed that 28.6% of the respondents were aged below 25 years with less than five years of clinical experience. The majority of them were from Maidma Health Center (37.5%) and Areza Health Center (35.7%). They were dominated by nurses (82.1%). The result indicates that 92.9%, 83.9% and 8.9% of respondents had good knowledge and favorable attitudes and poor practices towards health facility-acquired infection prevention respectively.

Conclusion: Most of the respondents had good knowledge and a considerable high level of attitude but the majority of respondents had poor practices *i.e.*, they do not always wear masks and glasses and wash their hands according to the recommendations of the guideline. Strengthening and integrating standard precaution with routine services through the provision of regular training and monitoring and introducing health care workers infection prevention standards of practice, protocol, rules and regulations are highly recommended.

Keywords: Knowledge; Attitude; Practice; Infection prevention; Health care workers

Abbreviations: HAIP: Hospital Acquired Infections Prevention; HAI: Hospital Acquired Infections; HBV: Hepatitis B Virus; HCV: Hepatitis C Virus; HCAs: Healthcare-Acquired Infections; HCWs: Healthcare Workers; HIV: Human Immunodeficiency Virus; IPC: Infection Prevention and Control; KAP: Knowledge, Attitude and Practices; MoH: Ministry of Health; TB: Tuberculosis; WHO: World Health Organization

Introduction

Nosocomial infections are infections acquired in the hospital or other healthcare facilities that were not present or incubating at the time of the client's admission. It is also a so-called hospital-acquired infection. It comprises those infections that become symptomatic after the client is discharged as well as infections among medical personnel. Most nosocomial infections are transmitted by healthcare personnel who fail to adhere to proper hand-washing procedures or change gloves between client contacts [1].

Standard precautions are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin and mucous membranes may contain transmissible infectious agents. The term standard precautions are replacing 'universal precautions' as it expands the coverage of universal precautions by recognizing that any fluid may contain contagious and harmful microorganisms. Standard

precautions consist of hand hygiene, use of appropriate Personal Protective Equipment (PPE), use of aseptic technique to minimize patient exposure to microorganisms and management of sharps, blood spills, linen and waste to maintain a safe environment.

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Adherence on the part of Healthcare Workers (HCWs) including nursing and medical students with standard precautions has been recognized as being an effective means to prevent and control healthcare-associated infections. Such measures not only prevent the patient but also the HCWs and the environment. Among the standard precautions advocated, hand hygiene is considered, in itself, the most essential one. Another essential measure is the adequate use of gloves, whose purpose is to protect the HCWs, as well as the patient. A preventive measure also worthy of mention is the adoption of safe practices for handling needle sticks and other sharp objects, given the possibility of outbreaks, especially of Hepatitis B and C, repeatedly associated with the offer of healthcare. However, despite the efficiency of these standard precautions, what reality shows us is very low adherence to these measures [2].

Standard precautions are practiced in high-income countries to protect HCWs from occupational exposure to blood and the consequent risk of infection with blood-borne pathogens. The situation is different in low-income countries, where standard precautions are partially practiced.

In Ethiopia, the Southern Nation Nationalities and People Region (SNNPR) reveals that 32.4% of health science students reported that they had sustained at least one form of accidental injury by needle or other sharps. Nurses and health assistants sustained the highest proportion of accidental injuries by needles or sharps.

A study done in Northern Red Sea Eritrea in 2019 revealed that 91.4% of the respondents had good knowledge and positive attitude but only 77.1% reported good practice in infection prevention measures.

HAIP which is the backbone of reducing Hospital Acquired Infections (HAIs) didn't get enough attention in Eritrea. Moreover, in our study area, there is a scarcity of studies on healthcare workers' Knowledge, Attitude and Practice (KAP) towards HAIPs. So, the purpose of this study was to assess the knowledge, attitude and practice of infection prevention measures among healthcare workers in Areza sub-zone. The study will have significant input in identifying and improving the pattern of standard precaution at the health facility level in the study area and beyond. It also helps to provide information for both governmental and private healthcare workers regarding standard precautions [3].

Materials and Methods

Study design, setting and period

A health-facility-based cross-sectional study was conducted in Areza sub-zone. Areza sub-zone is one of the 12 sub-zones of the southern region, which is located 42 km to the west away from Mendefera. The study was carried out from February 2023 to April 2023 [4].

Study population: All HCWs (nurses, laboratory technicians, clinical laboratory science, pharmacy technicians, public health officers) working in Areza sub-zone were considered as the study population.

Sample size: All healthcare workers of Areza sub-zone, 56 in total, were included during the study period. A total enumerative method of all healthcare workers working in 7 health facilities of the sub-zone namely Areza Health Center, Maidma Health Center, Adigureto

Health Station, Adigulti Health Station, Zbandebri Health Station, Obel Health Station and Adiwsik Health Station was selected [5].

Inclusion and exclusion criteria

Inclusion criteria: All health professionals who are working in Areza sub-zone who are qualified nurses, pharmacy, public health and laboratory personnel were included.

Exclusion criteria: Non-medical personnel and healthcare workers who were on annual breaks and educational leave as well as health workers who had less than two months of work experience were excluded from this study [6].

Study variables

Dependent variables

- Knowledge, attitude, and practice towards Infection Prevention Measures.

Independent variables

- Socio-demographic characteristics such as sex, age, marital status etc.

Data collection instrument

A self-administered questionnaire was used for data collection. It includes four parts; the first section contains socio-demographic characteristics such as age, sex, marital status, educational status, work experience and profession. The second part elicits about knowledge, the third part includes questions concerning attitude and the last part includes practice assessment questions towards infection prevention [7].

Data quality control

The data collectors were oriented on standardized data collection, particularly in the proper filling of the questionnaire. The questionnaire was prepared in English. To improve the quality of the data, it was collected by the trained data collectors under close supervision of principal investigators, each completed questionnaire was also checked to ascertain whether all questions properly filled or not. To be reliable data, the practice of the health workers was checked under close observation by the data collectors [8].

Operational definitions

Good knowledge: Health workers who answered $\geq 70\%$ of knowledge questions correctly.

Poor knowledge: Health workers who answered $<70\%$ of knowledge questions correctly.

Favourable attitude: Health workers who answered $\geq 70\%$ of attitude questions.

Unfavourable attitude: Health workers who answered $<70\%$ of attitude questions.

Good practice: Health workers who have properly practiced $\geq 70\%$ of practice questions.

Poor practice: Health workers who have practiced $<70\%$ of practice questions.

Data analysis procedure

Upon completion of data collection, data was coded and captured on CSPro and the resultant data was analyzed through SPSS (statistics package for social sciences) Version 22 at 95% CI. Descriptive statistics are used to analyze and present descriptive data [9].

Results

Socio-demographic characteristics

A total of 56 HCWs with a response rate of 100% were found complete and included in the analysis. Among 56 respondents 25

(44.6%) were males and 31 (55.4%) were females. Twenty-nine (51.8%) of HCWs were in the age group of 31 and above years. Concerning the professional categories of respondents 46 (82.1%) were nurses. Twenty-nine (51.8%) of the respondents had more than 10 years working experience. 100% of infection prevention guidelines is available in the health facilities and 91.1% of the HCWs have taken IP guidelines (Table 1) [10].

Characteristics		Frequency	Percent
Health facilities	Areza HC	20	35.7
	Maidma HC	21	37.5
	Obel HS	5	8.9
	Zbandebri HS	3	5.4
	Adi Gulti HS	2	3.6
	Adi Wusik HS	2	3.6
	Adi Gureto HS	3	5.4
Age	19-25	15	26.8
	26-30	12	21.4
	31 and above	29	51.8
Sex	Male	25	44.6
	Female	31	55.4
Marital status	Single	19	33.9
	Married	30	53.6
	Divorced	5	8.9
	Widow	2	3.6
Religion	Orthodox	50	89.3
	Catholic	2	3.6
	Muslim	4	7.1
Educational status	Certificate	36	64.3
	Diploma	14	25
	Degree	6	10.7
Work experience	<5 years	16	28.6
	5-10 years	11	19.6
	>10 years	29	51.8
Profession	Nurse	46	82.1
	Lab technician	3	5.4

	Pharmacy technician	3	5.4
	Public health	4	7.1
Had taken IP training	Yes	51	91.1
	No	5	8.9
IP guideline available	Yes	56	100
	No	0	0

Table 1: Socio-demographic characteristics of the respondents.

Knowledge

Only 50% of respondents correctly believed that gloves do not provide complete protection against acquiring or transmitting infection. Only 26.8% knew that people who have received BCG

vaccine can still develop active TB. All respondents remarked that every equipment needs decontamination before sterilization (Table 2) [11].

Characteristics		Frequency	Percent
Gloves provide complete protection against acquiring/transmitting infection	Yes	28	50
	No	28	50
Healthcare-associated pathogens can be found on normal, intact patient skin	Yes	53	94.6
	No	3	5.4
If my hands are not visibly dirty, there is no need to wash my hands prior to patient contact	Yes	2	3.6
	No	54	96.4
There is no need to wash hands before doing procedures that do not involve bodily fluids	Yes	3	5.4
	No	53	94.6
Patients with pulmonary TB are infectious and may transmit TB to other patients or HCWs	Yes	54	96.4
	No	2	3.6
People who have received BCG vaccination do not develop active TB	Yes	15	26.8
	No	41	73.2
Every equipment need decontamination before sterilization	Yes	56	100
	No	0	0
Protective device minimizes healthcare-acquired infection	Yes	56	100
	No	0	0
There is PEP for HIV after exposure	Yes	54	96.4
	No	2	3.6
All staff and patient should be considered potentially infectious	Yes	56	100
	No	0	0

Table 2: Participants' knowledge towards infection prevention.

Attitude

The majority of HCWs 53 (94.6%) disagreed with the statement that they do not have to wash their hands after using gloves. Most of

the participants 39 (69.6%) agreed that the workload affects their ability to apply infection prevention guidelines (Table 3) [12].

Characteristics	Agree N (%)	Neutral N (%)	Disagree N (%)
I do not have to wash hand if I used gloves	2 (3.6%)	1 (1.8%)	53 (94.6%)
Policies and procedures for infection control should be adhered to at all times	55 (98.2%)	1 (1.8%)	0 (0%)
I should attend in-service training/ workshop related to infection prevention and control regularly	53 (94.6%)	3 (5.4%)	0 (0%)
The workload affects my ability to apply infection prevention guidelines	39 (69.6%)	8 (14.3%)	9 (16.1%)
I am aware that patients expect me to wash hands before touching them and after touching them	37 (66.1%)	9 (16.1%)	10 (17.9%)
I feel that the infection control policies and guidelines are enough in the hospital	13 (23.2%)	39 (69.6%)	4 (7.1%)
It is not my responsibility to comply with the hospital acquired infection guidelines	1 (1.8%)	0 (0%)	55 (98.2%)
Infection prevention guidelines are important to this hospital	56 (100%)	0 (0%)	0 (0%)
I believe that following the prevention guidelines will reduce rates of hospital acquired infection	56 (100%)	0 (0%)	0 (0%)
I feel that needles should be recapped after use and before disposal	8 (14.3%)	1 (1.8%)	47 (83.9%)

Table 3: Participants attitude towards infection prevention.

Practice

One-tenth (10.7%) of the HCWs agreed that they always wash their hands before and after direct contact with the patients. 12.5% of the HCWs agreed that they always put on a mask and glasses when

performing invasive and body fluid procedures. 10.7% of the HCWs agreed that screening of patients is being done to detect colonisation even if no evidence of infection. 100% of the HCWs agreed that vaccination is not provided to staff (Table 4) [13].

Characteristics	Frequency		Percent
I always wash hands before and after direct contact with the patient	Yes	6	10.7
	No	50	89.3
I always put on a mask and glasses when performing invasive and body fluid procedures	Yes	7	12.5
	No	49	87.5
Knowledge of infection prevention and control are being monitored in the hospital	Yes	46	82.1
	No	10	17.9
I attend in-service training/workshop related to infection prevention and control yearly	Yes	41	73.2
	No	15	26.8
Screening of patients are being done to detect colonisation even if no evidence of infection	Yes	6	10.7
	No	50	89.3
Personal protective equipments are always accessible	Yes	36	64.3
	No	20	35.7
Infection prevention does not improve patient outcome	Yes	1	1.8

	No	55	98.2
We shake linens out to release dust from the linen	Yes	13	23.2
	No	43	76.8
Vaccination is provided to staff	Yes	0	0
	No	56	100
Our hospital monitors patients with urinary catheters for infection and gives feedback on urinary tract infection rates	Yes	5	8.9
	No	51	91.1
We wear PPE when handling linens	Yes	45	80.4
	No	11	19.6

Table 4: Participants practice towards infection prevention.

The majority 52 (92.9%) of the respondents were considered to have a good level of knowledge, whereas, the rest 4 (7.1%) were considered to have a poor level of knowledge about infection prevention. The majority 47 (83.9%) of the participants had positive

attitudes towards infection prevention. The majority 51 (91.1%) of the respondents were considered to have a poor level of practice, whereas, the rest 5 (8.9%) were considered to have a good level of practice in infection prevention (Table 5) [14].

Characteristics		Frequency	Percent
Knowledge	Poor	4	7.1
	Good	52	92.9
Attitude	Poor	9	16.1
	Good	47	83.9
Practice	Poor	51	91.1
	Good	5	8.9

Table 5: Cross tabulation among KAP.

Discussion

In Eritrea, there is scarce data on infection prevention measures and related topics. This study contributes to determine knowledge, attitude and practice of healthcare workers toward infection prevention in health facilities of Areza sub zone. The majority of the respondents 51 (91.1%) had ever participated in a training program for infection prevention [15].

In this study 92.9% of health workers had good knowledge which was higher than the study conducted in Bahirdar city, Gondar, Debre Markos referral hospital and Egypt, Cairo University hospital which was reported as 84.2%, 81.6%, 84.7% and 90% of health workers had good knowledge respectively. Fifty-four (96.4%) of the respondents consider the presence of post-exposure prophylaxis after sustaining needle stick injury. This finding was much better than the result of North Wollo which indicated 31.3% of the participants considered the presence of PEP after sustaining needle stick injury.

More than two third (83.9%) of the respondents had favorable attitudes about HAIP which was higher than a study conducted in Bahirdar City 55.6% and Gondar (64.2%). The possible explanation for the difference might be due to differences in methodology, work experience, educational level, training opportunity and personal characteristics of the study participants between various studies.

Less than one-tenth (8.9%) of HCWs had good practice towards HAIP. This showed that HCW's practice regarding to HAIP needs immediate attention. This finding was much lower than similar studies conducted in different areas like Bahirdar city (54.2%), Gondar

university referral hospital (57.4%), Debre Markos (57.3%) and Mekele (42.9%). Our study showed that 10.7% of respondents wash their hands before and after handling new patients which extremely lower than similar studies conducted in Mizan Aman General Hospital and Saudi Arabia reported that 68.7% of study subjects and 88.5% of nurses and 68% of doctors wash their hands always before handling new patients respectively but higher than a study conducted in Addis Ababa Ethiopia reported only 7% of respondents wash their hands before handling new patients.

It is evident that, during the current study, all HCWs 56 (100%) indicated that they did not receive vaccination regarding infection prevention and control. Hence a policy has to be developed which will indicate the transmission of hepatitis B, the doses of Hepatitis B Vaccine and complications of Hepatitis B infection. This standard operating procedure should be made known and available to all health care workers.

Overall, this study result indicates poor practice towards HAIP, so the health system and the policymakers should put their effort to improve the quality of healthcare about infection prevention. Even if the majority of healthcare providers had good knowledge and favorable attitudes towards HAIP, still it needs improvement. Therefore, the health system and the policy makers should increase the KAP of the healthcare workers towards HAIP, so that the community will benefit [16].

Conclusion

Most of the respondents had good knowledge and a considerable high level of attitude but the majority of respondents had poor practices *i.e.*, they do not always wear masks and glasses and wash their hands according to the recommendations of the guideline. Strengthening infection prevention and control practice through regular in-service training/workshops; ensuring that members of staff receive appropriate vaccinations regarding infection prevention and control; ensuring that resources, e.g. personal protective equipment are available all the time; observing HCWs practices (hand hygiene auditing and during invasive procedures) and provide feedback. Therefore, health workers of Areza sub-zone should strictly follow HAIP guidelines and the hospital administrators should fulfill the necessary supplies for infection prevention. Researchers should also do further study by using mixed qualitative and quantitative methods to address the unreached problems of the health facilities.

Implications for clinical practice

The health care workers play a significant role in preventing infection among the health facility patients and themselves. The finding of this study alerts health workers to follow the infection prevention guideline to prevent infection and consequently enhance the quality of health facility care. Regarding research, the study findings also provide the basis for other researchers who would want to carry out further research on infection prevention and control principles.

Ethical Considerations

The ethical issue was dealt first by obtaining a permission letter from MoH and the Southern Region ethical and research committee. Secondly, a written consent was attached on to the questionnaire which was given to each study participant. The respondent's right to refuse or withdraw from the study also was respected fully. And all health workers who were able to give informed consent were invited to participate in the study. Anonymity and confidentiality were ensured in that the respondents' names did not appear on the questionnaire and information was not shared with people known to participants.

Declarations

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Availability of data and materials: The complete data set supporting the conclusions of this article is available from the corresponding author and can be accessed upon reasonable request.

Authors' contributions: All authors participated in all phases of the study including topic selection, design, data collection and

interpretation. Samuel Jirom designed the data entry tool and entered the data in CSPro and analyzed the data by SPSS software. Samuel Jirom contributed to critical revision of the manuscript. All the authors read and approved the manuscript.

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