Migration Letters

Volume: 19, No: S8 (2022), pp. 366-379

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)

www.migrationletters.com

Factors Effected of the Patient Satisfaction with Clinical Laboratory Services among Infection Safety Precautions at Government Hospitals Care Services in Makkah City, Saudi Arabia in 2022

Mona Mokbel Alhabardi[1], Yasser Suliman Alhelio[2], Abeer Rakan Alenazi[3], Baraa Mohammed Alsubhi[4], Saud Fahad Alqurashi[5], Naif Nidhal Alshareef[6], Hani Mohammed Alqurashi[7], Saeed Hassan Musa Alzhrani[8], Ayman Mohsen Hussen Alsroani[9], Mohammed Adwan Asiri[10], Turkey Saeed Saeed Alqahtani[11]

Abstract

Background: Monitoring patient satisfaction is an important and useful quality improvement tool for clinical laboratories in particular and health care organizations in general. Especially, in today's intensely competitive health care environment, it is not just a matter of choice that clinical laboratories need to satisfy the expectations of their customers. They do not even have to rely on or wait for somebody outside to carry out the patient satisfaction survey for them. Any laboratory should have a written policy focusing on customer's satisfaction and should periodically measure and evaluate their customer's satisfaction. First to fulfill the moral obligations expected from them, second in order to thrive for a better service and remain in competition with other hospitals, and last but not least, to get recognition and accreditation. Aim of study: To assess the factors affected of the patient satisfaction with clinical laboratory services among infection safety precautions at Saudi Arabia Specialized Hospitals the Makah Saudi Arabia 2022. Methods: This cross sectional study included (200) health care professionals in Makah City clinical laboratory services at Saudi Arabia Specialized Hospitals at Saudi Arabia 2022. Self-administrated questionnaire was constructed by the researcher and was used for data collection. Results: shows there were 300 participants, and the majority age was(37.0%) in (30-39)years, majority of them were males (56.0%) while female(44.0%), Nationality most of participants Saudi were(89.0%), marital status the majority of participant married were(44.0%)followed by single were(37.0%) followed by divorced were(12.0%), profession the majority of participant are nurse were(41.0%), qualification the majority of participant are bachelor were (46.0%) followed by master were(25.0%), Conclusion: The whole availability of requested tests, availability of place in blood drawing room to put personal things, and waiting time for specimen collection were found to have a statistically significant association with the overall satisfaction of patients toward clinical laboratory

[1] MD. Laboratory, MOH, Saudi Arabia.
[2] Laboratory specialist, Prince Mohammed bin Abdulaziz hospital in Riyadh, Saudi Arabia.
[3] Laboratory specialist, Prince Mohammed bin Abdulaziz hospital in Riyadh, Saudi Arabia.
[4] Laboratory Specialist, King Faisal Hospital in makkah, Saudi Arabia.
[5] Laboratory Specialist, King Faisal Hospital in makkah, Saudi Arabia.
[6] Laboratory Specialist, King Faisal Hospital in makkah, Saudi Arabia.
[7] Laboratory Specialist, King Faisal Hospital in makkah, Saudi Arabia.
[8] Laboratory Technician, King Faisal Hospital in makkah, Saudi Arabia.
[9] Laboratory Technician, King Faisal Hospital in makkah, Saudi Arabia.
[10] Laboratory Technician, King Faisal Hospital in makkah, Saudi Arabia.
[11] Laboratory specialist, Durma general hospital, Saudi Arabia.

services. Therefore, these could be the possible determinants among others that account for the dissatisfaction of patients with clinical laboratory services.

Key words: *factors, affected, patient satisfaction, clinical laboratory, services, Specialized Hospitals, Makah, Saudi Arabia.*

Introduction

Patient satisfaction has been defined as the degree of congruency between a patient's expectations of ideal care and his/her perception of the real care(s) he receives.[1] A component of effective health care services is the measurement of patient satisfaction .[2] Patient satisfaction assists in the evaluation of health care services from the patients' point of view. It also facilitates the identification of problem areas and generates ideas for resolving these problems.[3,4] Monitoring patient satisfaction is an important and useful quality improvement tool for clinical laboratories in particular and healthcare organizations in general. [5] Most clinical laboratories in the Saudi Arabia are required to assess their customers' satisfaction in order to maintain their accreditations.[6.7]

In the recent past, studies on patient satisfaction gained popularity and usefulness as it provides the chance to health care providers and managers to improve the services in the public health facilities.[8,9]

Patient satisfaction survey should not just be carried out for academic evaluation purposes only but for periodically aiming the bigger picture of better customer service.[10,11] Measuring patient satisfaction plays an increasingly important role in the growing push toward health care provider accountability. [12] Repeating studies at six monthly intervals is a useful managerial intervention aimed at delivering and maintaining quality health care.[13]

In the face of increasing demand and resource constraints, the challenge that exists today is to reach the whole population with adequate health services and ensure their utilization.[14] The problem with health care providers and programs in developing countries is that they have overwhelming emphasis on quantitative aspect of service delivered, which means that, in a quest to chase runaway targets, we neglect the concept of quality of care, which is also a right of clients.[15] In providing health care services, the patients' satisfaction cannot be neglected, as it is important as much as the treatment and even the cure of the disease.8 Patients' perception is also an important factor in utilizing the available health care delivery services, which seems to have been largely ignored by health care managers in developing countries. [16,17]

Despite the availability of these low-cost IPC strategies, compliance with standard IPC practices remains very low, especially in low- and middle-income countries.[18]

Globally, HCAIs affect hundreds of millions of people each year.[19] Over 90% of these infections occur in resource- limited countries, mostly in Africa, where infections are more prevalent and adherence to infection safety precautions weak.[20] In addition, 15% of healthcare wastes are considered hazardous,16 which subsequently results in adverse healthcare outcomes such as prolonged PHC stays, long-term disability, increased antimicrobial resistance, massive additional financial burden on healthcare systems, high costs to patients and their families, and unnecessary deaths.[21]

Literature review

Faith , et al.(2019) study in Nigeria about good and fair knowledge among participants was reported as 50% and 44% respectively.[22] In Ethiopia, Yakob et al. showed that all

participants had acceptable knowledge about contaminated needles and sharp materials that transmit disease causative agents, while 70.4% knew that gloves and gowns were required for any contact with patients.[23] In Brazil, Oliveria et al. identified a gap between knowledge of standard precautions and the practical applications among physicians.[24] In Ethiopia (2019) Beyamo et al assessed the compliance of health care workers with standard precaution practices and identified its determinants in public health institutions. The study included 250 HCWs. Nearly two-thirds (65%) of them had complied with standard precaution practices. Factors significantly associated with compliance to standard precaution practices were experience of ≤5 years, training on standard precaution, having good hand hygiene and availability of (personal protective equipment's)[25]

Online searching for studies exploring the knowledge and practices of health care workers infection safety precautions among primary healthcare workers yielded relatively few studies as most studies conducted in this field were among healthcare workers in hospitals and future health care workers. In addition, relatively limited studies were carried out in Saudi Arabia. [26]

In Al-Kharj, Alotaibi et al assessed the knowledge of as well as compliance of health care students with standard precautions. Results revealed that among surveyed 353 students, 70% had previously attended an infection control course. The knowledge and compliance with SPs levels were high. The commonest source of information self-learning while the current curriculum was the least reported one. Female students were more knowledgeable and compliant with SPs compared to males. Student`s specialty and academic level were significantly associated with knowledge and compliance regarding SPs. [26]

In Al-Qassim (2018), Al Ra'awji et al evaluated in a multicenter cross-sectional study among 354 HCWs the knowledge, attitudes, and practices regarding guidelines of hand hygiene. The average knowledge score was 63%. Health-care workers aged over 30 years had higher scores than those younger than 30 years. Those at tertiary care hospitals had higher scores than those at secondary hospitals. Almost all had positive attitudes toward hand hygiene as well as adhering to the guidelines regularly. This study concentrated on only hand hygiene as a component of standard precautions. [27]

In Makkah, Alkot et al (2016) assessed the knowledge, attitude, and practice of health care workers toward Middle East respiratory syndrome coronavirus (MERS-CoV) among HCWs in primary health-care centers after an interventional education program. The level of satisfactory knowledge, positive attitude, and good practice of studied HCWs were significantly improved after exposure to the program, as it increased from 43.3%, 45%, and 57.4% before intervention to 67.9%, 63.8%, and 64.8% after intervention, respectively ($P < 0.001$). Older age, previous training, and experience were positively correlated with higher scores of knowledge.[28]

In Hofuf (2013), Amin et al (2013) evaluated in a cross-sectional study the knowledge of clinical years medical students about standard precautions of infection control' and explored their attitudes toward the current curriculum and training in providing them with effective knowledge and needed skills with this regard. The study included 251 students. Approximately one-quarter of them (26.7%) scored ≥ 24 (out of 41points) which was considered as an acceptable level. The least knowledge score were in the areas of sharp injuries, personal protective equipment and health care of the providers. The main sources of information were self-learning, and informal bed side practices. The majority of the participants believed that the current teaching and training regarding standard precautions are insufficient in providing them with the required knowledge and skills. These studies targeted future healthcare workers. [29]

Rationale

The Previous study found that almost half of the health care workers had poor towards infection safety precautions. The finding underlines the importance of good towards infection safety precautions knowledge and the accessibility of towards infection safety precautions guidelines to improve towards infection safety precautions practices among healthcare workers staff. The findings of this study also assessment of knowledge and practices of health care workers towards infection safety precautions and associated factors in health care facilities in the Makah AL-Mukarramah, Saudi Arabia. Effective knowledge and practices of health care workers towards infection safety precautions and associated factors in health care facilities as well as practicing them properly is very critical in controlling the transmission infections among HCWs, The difficult challenge faced by the Saudi Ministry of Health is the healthcare services. Services that are provided free of charge to all Saudi citizens, increasing awareness of health and disease..

Aim of the study

To assess the factors affected of the patient satisfaction with clinical laboratory services among infection safety precautions at Saudi Arabia Specialized Hospitals the Makah Saudi Arabia 2022

General objective:

To assess the factors affected of the patient satisfaction with clinical laboratory services at Saudi Arabia Specialized Hospitals the Makah Saudi Arabia 2022.

Materials and methods .

Study design:

This study is descriptive cross-sectional study

Study sitting:

The study has been carried out in the city of Specialized Hospitals the Makah Saudi Arabia. There are 300 primary health care centers belonging to Ministry of health (MOH) distributed as North (20) and South (19)

Study population:

Specialized Hospitals the Makah Saudi Arabia health care professionals (n=300) Study duration: September to October 2022 .

Sample size:

Sample size was calculated using open Epi online sample size calculator at 95% confidence level with bound on error of 5% regarding standard infection control precautions max sample size required is 300 participants.

Sample technique:

Sample technique was two stages.

At first stage: simple random sampling method will be collect from Specialized Hospitals the Makah Saudi Arabia.

Inclusion criteria:

Specialized Hospitals the Makah Saudi Arabia, male and female, Saudi and non-Saudi, all ages, those who agreed to participate in the research .

Exclusion criteria:

No specific exclusion criteria .

Data collection tool and technique:

Data were collected by self-administrated questionnaire.

First part of the questionnaire includes questions about Demographic data of the physicians (gender, age, nationality, job title)

Second part about knowledge, and practice of towards infection safety precautions which including hand will be assessed covering hand hygiene obtained from WHO injection safety, and protective equipment utilization with barriers of adherence to towards infection safety precautions .

Data analysis:

Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) software, version 24. Descriptive analysis was carried out as the mean and standard deviation (SD) were calculated for quantitative variables, frequency and proportion were calculated for categorical variables.

For comparisons, chi-square and t-test was used for categorical and quantitative variables respectively. p –value ≤0.05 was considered significant for all inferential analysis.

Ethical approval:

- The ethical approval was taken from the Regional Research Ethics committee. A permission letter was obtained from the regional director of the city of Makah Al-Mokarramah Makkah MOH before starting the data collection.
- A written Informed consent was obtained from each participant from commencing the data collection.
- The researcher preserved the confidentiality of the participants at all steps of the study for the data collection, analysis and result.

Budget: Self-funded.

Result

Table 1 Distribution of Socio-demographic characteristics of Personal characteristics of the participants (n=300)

	N	%
Age		
<20 years	57	19
30-39 years	111	37
40 -49 years	87	29
< 50	45	15
Gender		
Female	132	44
Male	168	56
Nationality		
Non-Saudi	33	11
Saudi	267	89
Marital status		
Single	111	37

Married	132	44
Divorced	36	12
Widowed	21	7
Profession		
Physician	63	21
Dentist	39	13
Nurse	123	41
Lab technician	33	11
Dental assistant	42	14
Qualification		
PhD/MD/equivalent	51	17
Master	75	25
Bachelor	138	46
Diploma	36	12
Experience in PHC		
<5 years	48	16
5-10 years	135	45
>10 years	117	39
Ever taken training on safety precautions		
Yes	237	79
No	63	21
Presence of safety precautions committee		
Yes	243	81
N o	57	19
Availability of safety precautions guidelines in the working department		
Yes	207	69
No	93	31

Table 1 shows there were 300 participants, and the majority age was(37.0%) in (30-39)years, while the age 40-49 years were(29.0%) followed by <20 years were (19.%) the majority of them were males (56.0%) while female(44.0%), regarding the Nationality most of participants Saudi were(89.0%) but the non- Saudi were (11.0%), regarding marital status the majority of participant married were(44.0%)followed by single were(37.0%) followed by divorced were(12.0%), regarding profession the majority of participant are nurse were(41.0%) followed by Physician were(21.0%) followed by dentist were(14.0%), regarding qualification the majority of participant are bachelor were (46.0%) followed by master were(25.0%) followed by PhD/MD/equivalent were(17.0%), regarding experience in PHC the majority of participant are 5-10 years were (45.0%)followed by >10 years were(39.0%) followed by <5 years were(16.0%), regarding the ever taken training on safety precautions most of participants answer Yes were(79.0%) followed by No

were(21.0%), regarding the presence of safety precautions committee the majority of participant answer Yes were (81.0%) followed by No were(19.0%), regarding the Availability of safety precautions guidelines in the working department the majority of participant answer Yes were (69.0%) followed by No were(31.0%) .

Table 2: Distribution of the patient knowledge regarding infection safety precautions .

Knowledge items	Yes		No		Chi-Square	
	N	%	N	%	X^2	P-value
I have heard about infection safety precautions	282	94	18	6	232.320	<0.001*
Gloves cannot provide complete safety protection against transmission of infections	216	72	84	28	58.080	<0.001*
Washing hands with soap or use of an alcohol based antiseptic decreases the risk of transmission of healthcare acquired infections	87	29	213	71	52.920	<0.001*
Use of an alcohol based antiseptic for hand hygiene is as effective as soap and water if hands are not visibly dirty	207	69	93	31	43.320	<0.001*
Gloves should be worn if blood or body fluid exposure is anticipated	264	88	36	12	173.280	<0.001*
Hand washing is necessary before procedures are performed	279	93	21	7	221.880	<0.001*
Tuberculosis (TB) is carried in airborne particles that are generated from patients with active pulmonary tuberculosis	240	80	60	20	108.000	<0.001*
There is no need to change gloves between patients as long as there is no visible contamination	291	97	9	3	265.080	<0.001*
Do you know how to prepare 0.5% chlorine solution	273	91	27	9	201.720	<0.001*
Safety box should be closed/sealed when three quarters filled	264	88	36	12	173.280	<0.001*

Table 2 shows the distribution of the Healthcare workers knowledge regarding I have heard about infection safety precautions, the majority of participant answer Yes were (94.0%) while answer No were (6.0%), while is a significant relation were P-value=0.001 X^2 232.320, regarding Gloves cannot provide complete safety protection against transmission of infections, the majority of participant answer Yes were (72.0%) while answer No were (28.0%), while is a significant relation were P-value=0.001 X^2 58.080, regarding washing hands with soap or use of an alcohol based antiseptic decreases the risk of transmission of healthcare acquired infections, the majority of participant answer No were (71.0%) while answer Yes were (29.0%), while is a significant relation were P-value=0.001 X^2 52.920, regarding Use of an alcohol based antiseptic for hand hygiene is as effective as soap and water if hands are not visibly dirty the majority of participant answer Yes were (69.0%) while answer No were (31.0%), while is a significant relation were P-value=0.001 X^2 43.320, regarding gloves should be worn if blood or body fluid exposure is anticipated, the majority of participant answer Yes were (88.0%) while answer No were (12.0%), while is a significant relation were P-value=0.001 X^2 173.280, regarding hand washing is necessary before procedures are performed the majority of participant answer Yes were (93.0%) while answer No were (7.0%), while is a significant relation were P-value=0.001 X^2 108.000, regarding Tuberculosis (TB) is carried in airborne particles that are generated from patients with active pulmonary tuberculosis the majority of participant answer Yes were (80.0%) while answer No were (2.0%), while is a significant relation were P-value=0.001 X^2 108.000, regarding There is no need to change gloves between patients as long as there is no visible contamination the majority of participant answer Yes were (97.0%) while answer No were (3.0%), while is a significant relation were P-value=0.001 X^2 265.080, regarding Do you know how to prepare 0.5% chlorine solution the majority of participant answer Yes were (91.0%) while answer No were (9.0%), while is a significant relation were P-value=0.001 X^2 201.720, regarding Safety box should be closed/sealed when three quarters filled the majority of participant answer Yes were (88.0%) while answer No were (12.0%), while is a significant relation were P-value=0.001 X^2 173.280,

Table 3: Distribution of the patient Practice towards infection safety precautions .

Practice items	Yes		No		Chi-Square	
	N	%	N	%	X^2	P-value
Do you apply antiseptic hand rub to clean hands?	225	75	75	25	75.000	<0.001*
Did you practice high-level disinfection where sterilization is not applicable?	216	72	84	28	58.080	<0.001*
Do you use all Personal Protective Equipment's (PPE) to prevent the risk of acquiring and /or transmitting infection?	198	66	102	34	30.720	<0.001*
Did you mix dry and liquid Healthcare wastes?	201	67	99	33	34.680	<0.001*
Do you incinerate or bury used sharp materials?	207	69	93	31	43.320	<0.001*
You change disinfectant chlorine solutions?	225	75	75	25	75.000	<0.001*
Do you know how long it takes to soak reusable medical instruments in chlorine Solution?	213	71	87	29	52.920	<0.001*

Do you use gloves more than once (both hands)?	207	69	93	31	43.320	<0.001*
Do you wear the necessary personal protective equipment (PPE) such as gloves, apron, goggles and mask, if splashes and spills of any body fluids are likely?	243	81	57	19	115.320	<0.001*
Where do you usually put sharp disposal boxes?	237	79	63	21	100.920	<0.001*

Table 3 shows the distribution of the healthcare workers Practice towards infection safety precautions regarding you apply antiseptic hand rub to clean hands the majority of participant answer Yes were (75.0%) while answer No were (25.0%), while is a significant relation were P-value=0.001 X^2 58.080, regarding you practice high-level disinfection where sterilization is not applicable the majority of participant answer Yes were (72.0%) while answer No were (28.0%), while is a significant relation were P-value=0.001 X^2 58.080, regarding you use all Personal Protective Equipment's to prevent the risk of acquiring and /or transmitting infection the majority of participant answer Yes were (66.0%) while answer No were (34.0%), while is a significant relation were P-value=0.001 X^2 30.720, regarding you mix dry and liquid Healthcare wastes the majority of participant answer Yes were (67.0%) while answer No were (33.0%), while is a significant relation were P-value=0.001 X^2 34.680, regarding you incinerate or bury used sharp materials, the majority of participant answer Yes were (69.0%) while answer No were (31.0%), while is a significant relation were P-value=0.001 X^2 43.320, regarding you change disinfectant chlorine solutions the majority of participant answer Yes were (75.0%) while answer No were (25.0%), while is a significant relation were P-value=0.001 X^2 52.920, regarding you know how long it takes to soak reusable medical instruments in chlorine Solution the majority of participant answer Yes were (71.0%) while answer No were (29.0%), while is a significant relation were P-value=0.001 X^2 52.920, regarding you use gloves more than once (both hands) the majority of participant answer Yes were (69.0%) while answer No were (31.0%), while is a significant relation were P-value=0.001 X^2 43.320, regarding you wear the necessary personal protective equipment (PPE) such as gloves, apron, goggles and mask, if splashes and spills of any body fluids are likely the majority of participant answer Yes were (81.0%) while answer No were (21.0%), while is a significant relation were P-value=0.001 X^2 100.920, regarding Where do you usually put sharp disposal boxes the majority of participant answer Yes were (79.0%) while answer No were (21.0%), while is a significant relation were P-value=0.001 X^2 100.920,

Table 4: Distribution the knowledge of patient towards infection safety precautions .

	Knowledge		Score	
	N	%	Range	Mean±SD
Weak	63	21	2-9.	7.12±1.99
Average	165	55		
High	72	24		
Total	300	100		
X^2	63.78			
P-value	<0.001*			

This table 4 shows the majority of participant (55.0%) have average of the Knowledge about infection safety precautions , followed by (24.0%) of participant high but weak were (21.0%) while Range(2-9) and Mean ±SD(7.12 ±1.99), while a significant relation were P-value=0.001 X^2 63.78 .

Figure (1): Distribution the knowledge of patient towards infection safety precautions

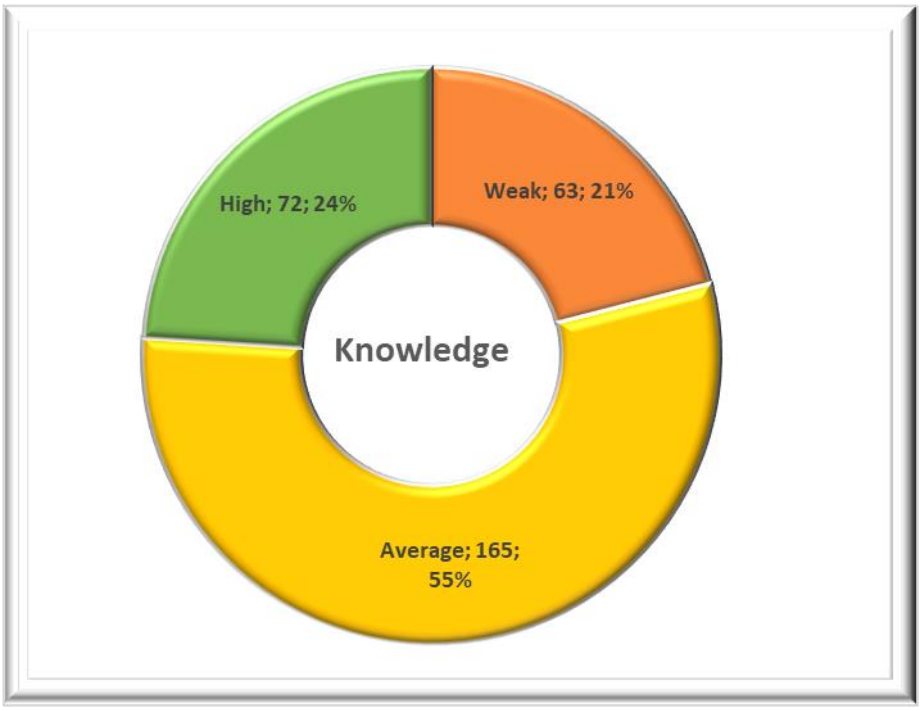


Table 5: Distribution the Practices of Healthcare workers towards infection safety precautions

	Practices		Score	
	N	%	Range	Mean±SD
Weak	117	39	1-9.	5.64±1.75
Average	132	44		
High	51	17		
Total	300	100		
X^2	37.14			
P-value	<0.001*			

regarding the practice the majority of participant (44. 0%) have average of the practice about infection safety precautions, followed by (39.0%) of participant weak while high were(17.0)while Range(1-9) and Mean ±SD(5.64 ±1.75) While a significant relation were P-value=0.001 X^2 37.14

Figure (2): Distribution the Practices of patient towards infection safety precautions

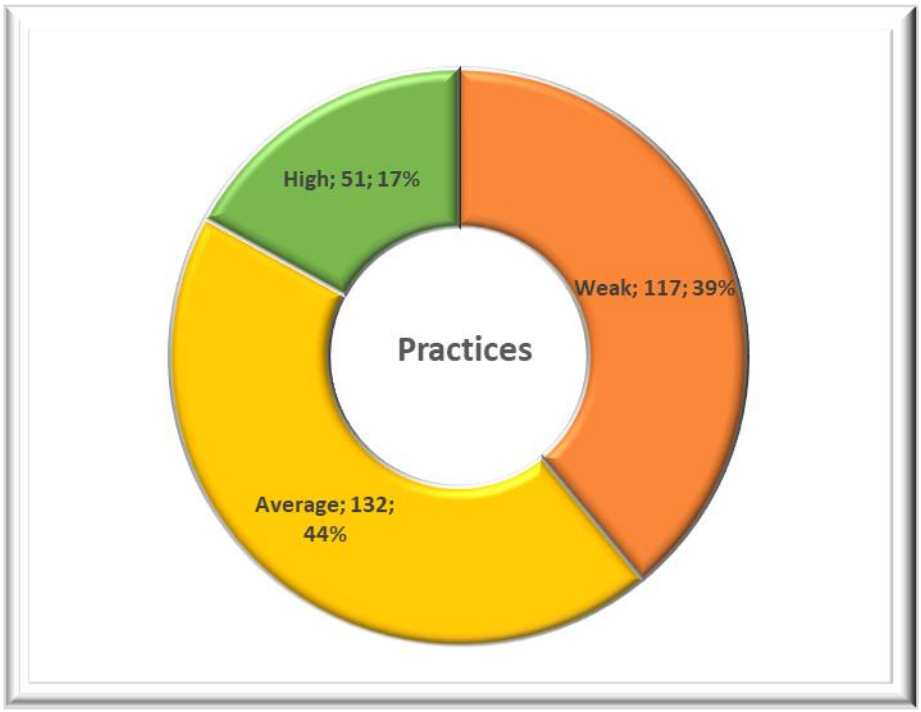
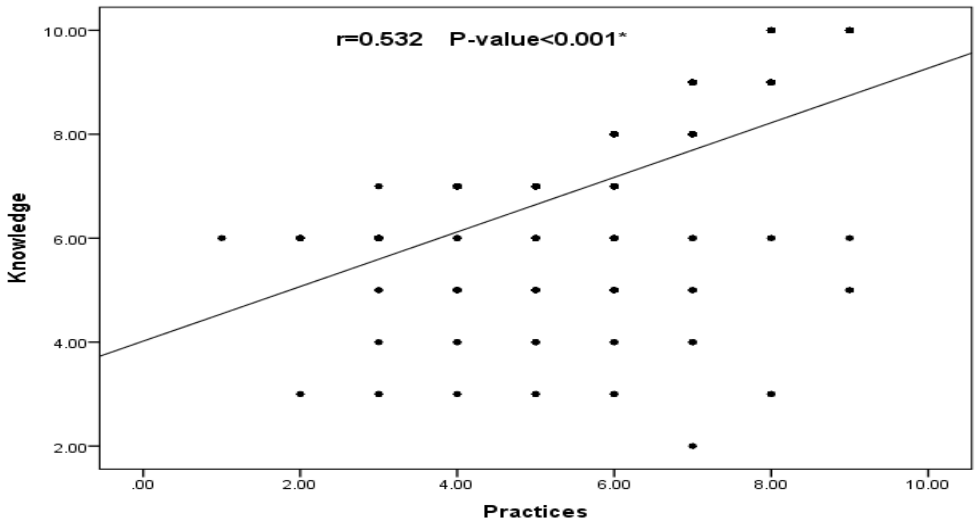


Table 6: Distribution of the Correlations between Knowledge and Practices of Healthcare workers towards infection safety precautions

Correlations		
		Knowledge
Practices	r	0.532
	P-value	<0.001*
	N	300

This table 6 shows the heave correlations between Knowledge and Practices while r were 0.532 and a significant relation were P-value=0.001 and N(300)

Figure (3): Distribution of the Correlations between Knowledge and Practices of Healthcare workers towards infection safety precautions



Discussion

Reducing the risk of HAIs and using infection safety precautions principles are in the control of healthcare workers; therefore, healthcare workers must have correct, up-to-date and appropriate scientific information and practice accordingly [30]. Without knowledge infection safety precautions and patient safety practices both healthcare workers and patients are at risk of acquiring serious infections such as HIV, HBV, HCV, and Methicillin Resistant Staphylococcus aureus (MRSA) infection as well as other bacterial and viral infections [27]. Recent studies also suggest that proper and consistent application of infection safety precautions and infection safety practices can lead to up to a 70% reduction in certain HAIs [31]. This study was conducted to assess the factors affected of the patient satisfaction with clinical laboratory services among infection safety precautions at Saudi Arabia Specialized Hospitals the Makah Saudi Arabia . The of knowledge and practices of health care workers towards infection safety precautions is an essential step in starting and implementing a successful infection safety precautions in any healthcare facility.[32] Worldwide, many studies have shown that healthcare workers expressed variable levels of knowledge regarding infection safety precautions, with relatively limited studies have been carried out in the Kingdom of Saudi Arabia.[33] Therefore, the present study was conducted the present study. One of the most important characteristics of Makah is its location, which is characterized by proximity to Makah. In our study showed were 300 participants, and the majority age was(37.0%) in (30-39)years, males (56.0%) most of participants Saudi were(89.0%), profession the majority of participant are nurse were(41.0%). regarding experience in PHC the majority of participant are 5-10 years were (45.0%), regarding the presence of safety precautions committee the majority of participant answer Yes were (81.0%) (see Table 1) Also showed that most of participants had high knowledge regarding infection safety precautions. In this study, the proportion of healthcare workers who were knowledgeable about infection safety precautions majority are average was found to be 55.0%. similar studies in Ethiopia [30]]This finding indicated that a large percentage of respondents (46.3%) in the healthcare infection safety precautions and associated factors in health care facilities inadequate knowledge about infection prevention, a finding in line with similar studies in Africa [31]. (See table 4,5)

On the other hand, the proportion of knowledgably participants is lower than studies in facilities in Bahir Dar city and Addis Ababa which reported 69% and 84.2% of healthcare workers had good infection safety precautions knowledge [33]

This discrepancy may be due to difference in study setting and study variables since the former study focused only the two components of infection prevention (hand hygiene and tuberculosis infection control) and includes only two university hospitals in Addis Ababa the later includes private healthcare facilities. Similarly, the result is inconsistent with that. [34].

Conclusion

The present study revealed that a significant proportion of healthcare workers were knowledgeable about infection safety precautions. The overall level of safe infection safety precautions practice among healthcare workers is considered to be weak. The current study also detected that there was a high prevalence of occupational needle stick injury and blood and body fluid splashes among healthcare workers. Factors such as the presence of infection prevention guidelines in the work place and training were independent predictors of infection safety precautions practice and better knowledge. Providing on job continuous educational training on infection safety precautions is essential as well as ensuring the availability of infection safety precautions guidelines in working department should be effective and important interventions to improve healthcare workers infection safety precautions and knowledge. In the future researchers should consider stronger observational study designs to validate the self-reported practice of healthcare workers and

to determine actual practices, as well as the actual prevalence of HAIs as result of poor infection safety precautions practice

References:

1. Abebe, D. D., Temesgen, M. M., Abozin, A. T., Zeleke, A. E., Hassen, S. L., & Gebremichael, H. B. (2022). Patients' satisfaction and quality of clinical laboratory services provision at public health facilities in northeast Ethiopia. medRxiv, 2022-01.
2. Tesfaye, T. (2014). Assessments of Patients' Satisfaction towards Clinical Laboratory Services Received at Uniformed Service Hospitals in Addis Ababa, Ethiopia (Doctoral dissertation, Addis Ababa University).
3. Etukudoh, N. S., & Obeta, U. M. (2021). Patients'(clients) satisfaction with medical laboratory services contributes to health and quality improvement. In Healthcare Access. IntechOpen.
4. Alhumaid, S., Al Mutair, A., Al Alawi, Z., Alsuliman, M., Ahmed, G. Y., Rabaan, A. A., ... & Al-Omari, A. (2021). Knowledge of infection prevention and control among healthcare workers and factors influencing compliance: a systematic review. Antimicrobial Resistance & Infection Control, 10(1), 1-32.
5. Alelign, A., & Belay, Y. A. (2019). Patient satisfaction with clinical laboratory services and associated factors among adult patients attending outpatient departments at Debre Markos referral hospital, Northwest Ethiopia. BMC research notes, 12, 1-6.
6. Sahiledengle, B., Tekalegn, Y., & Woldeyohannes, D. (2021). The critical role of infection prevention overlooked in Ethiopia, only one-half of health-care workers had safe practice: A systematic review and meta-analysis. PloS one, 16(1), e0245469.
7. AlJohani, A., Karuppiah, K., Al Mutairi, A., & Al Mutair, A. (2021). Narrative review of infection control knowledge and attitude among healthcare workers. Journal of epidemiology and global health, 11(1), 20.
8. Sabetian, G., Moghadami, M., Hashemizadeh Fard Haghighi, L., Shahriarirad, R., Fallahi, M. J., Asmarian, N., & Moeini, Y. S. (2021). COVID-19 infection among healthcare workers: a cross-sectional study in southwest Iran. Virology journal, 18, 1-8.
9. Tsegaye, D., Shuremu, M., Oljira, D., Dubale, S., Befekadu, G., & Bidira, K. (2021). COVID–19 related knowledge and preventive practices early in the outbreak among health care workers in selected public health facilities of Illu aba Bor and Buno Bedelle zones, Southwest Ethiopia. BMC Infectious Diseases, 21(1), 1-11.
10. Ilesanmi, O. S., Afolabi, A. A., Akande, A., Raji, T., & Mohammed, A. (2021). Infection prevention and control during COVID-19 pandemic: realities from health care workers in a north central state in Nigeria. Epidemiology & Infection, 149, e15.
11. Abuduxike, G., Vaizoglu, S. A., Asut, O., & Cali, S. (2021). An assessment of the knowledge, attitude, and practice toward standard precautions among health workers from a hospital in northern cyprus. Safety and health at work, 12(1), 66-73.
12. Lai, T. H., Tang, E. W., Chau, S. K., Fung, K. S., & Li, K. K. (2020). Stepping up infection control measures in ophthalmology during the novel coronavirus outbreak: an experience from Hong Kong. Graefe's Archive for Clinical and Experimental Ophthalmology, 258(5), 1049-1055.
13. Ochie, C. N., Aniwada, E. C., Uchegbu, E. K., Asogwa, T. C., & Onwasoigwe, C. N. (2022). Infection prevention and control: knowledge, determinants and compliance among primary healthcare workers in enugu metropolis, south-east nigeria. Infection Prevention in Practice, 4(2), 100214.
14. Chigurupati, R., Panchal, N., Henry, A. M., Batal, H., Sethi, A., D'innocenzo, R., ... & Roser, S. M. (2020). Considerations for oral and maxillofacial surgeons in COVID-19 era: can we sustain the solutions to keep our patients and healthcare personnel safe?. Journal of Oral and Maxillofacial Surgery, 78(8), 1241-1256.
15. Curry, S. R., & Salgado, C. D. (2021). When hospitals harm: multimodal entry of SARS-CoV-2 into inpatient healthcare. Clinical Infectious Diseases, 72(4), 694-696..
16. Asdaq, S. M. B., Alshrari, A. S., Imran, M., Sreeharsha, N., & Sultana, R. (2021). Knowledge, attitude and practices of healthcare professionals of Riyadh, Saudi Arabia towards covid-19: A cross-sectional study. Saudi Journal of Biological Sciences, 28(9), 5275-5282.
17. Al-Ahmari, A. M., AlKhaldi, Y. M., & Al-Asmari, B. A. (2021). Knowledge, attitude and practice about infection control among primary care professionals in Abha City, Kingdom of Saudi Arabia. Journal of Family Medicine and Primary Care, 10(2), 662

18. Haines, A., de Barros, E. F., Berlin, A., Heymann, D. L., & Harris, M. J. (2020). National UK programme of community health workers for COVID-19 response. The Lancet, 395(10231), 1173-1175.
19. Kung, S., Doppen, M., Black, M., Hills, T., & Kearns, N. (2021). Reduced mortality in New Zealand during the COVID-19 pandemic. The Lancet, 397(10268), 25.
20. Lancet, T. (2020). COVID-19: learning from experience. Lancet (London, England), 395(10229), 1011.
21. Albarrak, A. I., Mohammed, R., Al Elayan, A., Al Fawaz, F., Al Masry, M., Al Shammari, M., & Miaygil, S. B. (2021). Middle East Respiratory Syndrome (MERS): Comparing the knowledge, attitude and practices of different health care workers. Journal of infection and public health, 14(1), 89-96.
22. Faith, I., Harrison, E., Aigbiremolen Alphonsus, O., Ekundare, F. O., Rowland-Udoh Eloho, A., Ogeyemhe Charles, O., & Okudo Ifeanyi, O. A. B. (2019). Knowledge, attitude and infection prevention and control practices regarding Lassa fever among healthcare workers in Edo State, Nigeria. Hospital, 2, 2.
23. Faria, L. B. G. D., Santos, C. T. B. D., Faustino, A. M., Oliveira, L. M. D. A. C., & Cruz, K. C. T. D. (2019). Knowledge and adherence of the nurse to standard precautions in critical units. Texto & Contexto-Enfermagem, 28.
24. Oliveira, A. C., Marziale, M. H. P., Paiva, M. H. R. S., & Lopes, A. C. S. (2009). Knowledge and attitude regarding standard precautions in a Brazilian public emergency service: a cross-sectional study. Revista da Escola de Enfermagem da USP, 43, 313-319.
25. Beyamo, A., Dodicho, T., & Facha, W. (2019). Compliance with standard precaution practices and associated factors among health care workers in Dawuro Zone, South West Ethiopia, cross sectional study. BMC health services research, 19(1), 1-6.
26. Alotaibi, M. M., Almasari, S. M., Alkadam, A. N., Alanazi, Y. A., & Al Gahtani, K. A. (2017). Knowledge and compliance with standard isolation precautions among healthcare students in Al-Kharj Governorate, Saudi Arabia. J Health Spec, 5(3), 162-70.
27. Al Ra'awji, B. A., Almogbel, E. S., Alharbi, L. A., Alotaibi, A. K., Al-Qazlan, F. A., & Saquib, J. (2018). Knowledge, attitudes, and practices of health-care workers regarding hand hygiene guidelines in Al-Qassim, Saudi Arabia: A multicenter study. International journal of health sciences, 12(2), 3.
28. Alkot, M., Albouq, M. A., Shakuri, M. A., & Subahi, M. S. (2016). Knowledge, attitude, and practice toward MERS-CoV among primary health-care workers in Makkah Al-Mukarramah: an intervention study. Int J Med Sci Public Health, 5(5), 952-60.
29. Amin, T. T., Al Noaim, K. I., Saad, M. A. B., Al Malhm, T. A., Al Mulhim, A. A., & Al Awas, M. A. (2013). Standard precautions and infection control, medical students' knowledge and behavior at a Saudi university: the need for change. Global journal of health science, 5(4), 114.
30. Dalton, K. R., Rock, C., Carroll, K. C., & Davis, M. F. (2020). One Health in hospitals: how understanding the dynamics of people, animals, and the hospital built-environment can be used to better inform interventions for antimicrobial-resistant gram-positive infections. Antimicrobial Resistance & Infection Control, 9, 1-17.
31. Hosseinialhashemi, M., Kermani, F. S., Palenik, C. J., Pourasghari, H., & Askarian, M. (2015). Knowledge, attitudes, and practices of health care personnel concerning hand hygiene in Shiraz University of Medical Sciences hospitals, 2013-2014. American journal of infection control, 43(9), 1009-1011.
32. Tan, C., Kallon, I. I., Colvin, C. J., & Grant, A. D. (2020). Barriers and facilitators of tuberculosis infection prevention and control in low-and middle-income countries from the perspective of healthcare workers: A systematic review. PloS one, 15(10), e0241039
33. ALjohani, H. S., & Sulaiman, A. A. (2021). Assessment of Health Care Workers' Knowledge and Practice Toward Infection Standard Precautions in Primary Health Care setting, Buraidah, Saudi Arabia. Middle East Journal of Family Medicine, 7(10), 81.
34. ElBadry, S., Ghaleb, M. A., & Abou Zeid, N. A. (2019). Healthcare Personnel Opinion and their Implementation Obstacles Regarding the Standard Precautions in Hemodialysis Unit. Evidence-Based Nursing Research, 1(4), 13-13.