

Assessment of Patients' and Visitors' Knowledge, Practice, and Attitude Related to Preventing Infection at Aga Centralized Hospital

Hayam Mousad Elshereay Abou Saad¹, Mona Emad Eldien Hussien²,
Samar El Hosienny Abd El Raouf³

¹BSc. N -Faculty of Nursing –Mansoura University.

²Lecturer of Community Health Nursing, Faculty of nursing, Mansoura University.

³Prof. of Community Health Nursing, Faculty of Nursing, Mansoura University.

Abstract: Background: Hospital acquired infection (HAI) is considered an important public health problem. Transmission of infections in health care facilities can be prevented and controlled through the application of basic Infection Prevention and Control precautions which can be grouped into standard precautions, which must be applied to all patients at all times, regardless of diagnosis or infectious status. Aim: Assess patients' and visitors' knowledge, practice, and attitude related to preventing infection at Aga Central Hospital. This through a cross sectional study design was conducted on 384 patients and 384 visitors at 9 outpatient clinics at Aga Centralized Hospital during the researcher visit, by utilizing four tools: structured interview to assess socio demographic and economical characteristics, knowledge, subjective practice, attitude of patients and visitors. Results: This study showed that 53.6% of the studied patients reported good score level of the total knowledge and 83.7% of the studied visitors reported good score level of the total knowledge. Related to subjective practice; 98.2% and 96.9% of the studied patients and 96.6% and 99.5% of the studied visitors had proper subjective practice about hand washing and use of personal protective equipment respectively. As well 68.7% of the studied patients and 98.7% of the studied visitors had proper subjective practice about needle sticks injury. Most of the studied patients and visitors had positive attitude toward preventing infection. there was statistically significant association between level of education, residence and marital status and patients' total score of knowledge level. Conclusion: It can be concluded that, more than half of the studied patients reported good score level of the total knowledge and the majority of the studied visitors reported good score level of the total knowledge related to preventing infection. Related to subjective practice most of the studied patients and visitors had proper subjective practice about hand washing and use of personal protective equipment, further more; more than two thirds of the studied patients and the majority of the studied visitors had proper subjective practice about needle sticks injury. Finally most of the studied patients and visitors had positive attitude toward preventing infection.

Recommendations: Develop and implement health education program to patients and visitors about infection prevention at outpatients clinics. Design and facilitate alternative media about infection prevention at outpatients clinics.

Keywords: Attitude, Knowledge, Patients, Practice, Preventing Infection, Visitors.

I. INTRODUCTION

Health is a high priority for any society, as infections remain the leading cause of disease globally. Those infections, which occur among patients in hospitals and become manifest only after 48 hours of stay are called nosocomial infections (Wenzel, 2014).

Health care associated infections (HAIs) are likely to be the most common complication of hospital care. World Health Organization (WHO) estimates these infections occur among 7%-12% of hospitalized patients globally with more than 1.4 million people suffering from infectious complications acquired in the hospital at any time (Chauhan, 2017).

The burden of HAI has been already substantial in developed countries, where it affects from 5% to 15% of hospitalized patients in regular wards and as many as 50% or more of patients in intensive care units. While in developing countries, it varied from 5.7 to 19.1% (WHO, 2011).

The most common types of infections include catheter associated blood stream infections (CAUTI), central line associated bloodstream infections (CLABSI), ventilator associated pneumonia (VAP) and surgical site infections (SSI) (Khan, Baig & Mehboob, 2017).

Community based outpatient clinics (CBOCs) are full time, part time ambulatory care facilities physically separated from ACBOCs may be thought of as a simple physician office that provides primary care. Typically this care would consist of an initial assessment of patient need, acute and chronic basic care of biopsychosocial needs, health promotion and disease prevention and referral to another level of care. The primary goal of the outpatient clinic should provide high quality, comprehensive, cost effective care in a dignified manner to veteran (Liu, et al., 2010).

Patients are users of health care services; this includes service users, clients and residents. Effective IPC is a critical component of quality patient care and staff safety to reduce or prevent, where possible, HCAI. Education and training is essential to ensure that staff have the knowledge and skills to protect patients, their visitors, colleagues and themselves (Zingg, Mutters, Harbarth, & Friedrich 2015).

A shortage of registered nurses in combination with increased work load has the potential to threaten the quality of care. Increasing the nurse to patient ratio has been recommended as a means to improve patient care. Consistent evidence from observational studies suggests that an increase in registered nurse (RN) to patient ratio was associated with a reduction in hospital related mortality (Blegen, Goode, Spetz, Vaughn, & Park, 2011).

Infection prevention and control is a key pillar in the realm of patient safety due to the threats posed by HCAs to hospitalized patients. The nurse is an important collaborator of the health care team who leads in practicing prevention strategies to protect the patient from infection. Consequently, effective prevention and control of infection must be part of everyday practice and be applied consistently by everyone (Koros, 2018).

Therefore, protecting staff, patients, and visitors from infection is vital which can be done by following standard precautions. These precautions are procedures that help to prevent or reduce exposure to infections by proper use of gloves, sharp handling, disposing of wastes and washing hands. In addition, Personal Protective Equipment (PPE) is designed to protect patients, health care workers from infection (CDC, 2011).

Visits to the patient should be limited to the minimum that is necessary. Visitors should be instructed to wear appropriate Personal Protective Equipment (Poalillo, Geiling & Jimenez, 2010). Wear gown and gloves for all interactions with the patient, done before entry to the room and discarded before exiting (CDC, 2007). Prior to entering the patient isolation rooms areas, ensure that all visitors and health care workers rigorously use personal protective equipment (PPE) and perform hand hygiene (WHO, 2014).

So, it is important to assess patients' and visitors' knowledge, practice and attitude regarding infection prevention. Based on this assessment interactive health education programs should be developed, such as: hand hygiene compliance, adherence to contact precaution, isolation precaution, prevention of needle stick injuries (Madeo, Shields & Owen, 2008). So, this study will assess patients' and visitors' knowledge, practice, and attitude related to prevent infection at Aga Central Hospital.

II. METHOD

The present study was conducted in order to:

Assess patients' and visitors' knowledge, practice, and attitude related to preventing infection at Aga Central Hospital. To fulfill this aim the following research questions were developed:

1. What are the patients' and visitors' knowledge regarding preventing infection?
2. What are the patients' and visitors' subjective practice related to preventing infection?
3. What are the patients' and visitors' attitude regarding preventing infection?

Research design:

Cross sectional design was used to accomplish this study.

Setting:

This study was conducted at outpatient clinics at Aga Central Hospital affiliate to Ministry of Health and Population. Outpatient clinics which composed of 14 clinics.

Participants:

A convenient sample composed of 384 patients and 384 visitors was used after determining the required number who agreed to participate in the study at time of data collection.

Tools for data collection:

To achieve the aim of the present study data was collected using four tools was developed by the researcher.

Tool I: A structured interview questionnaire to assess patients' and visitors' socio demographic and economical characteristics

A structured interview was used to assess socio demographic and economic characteristics of patients and visitors such as; age, gender, residence, occupation, level of education, marital status, income/month.

Tool II: A structured interview questionnaire to assess patients' and visitors' knowledge regarding infection prevention

This tool was used to assess patients' and visitors' knowledge toward preventing infection by 27 questions (multiple choice questions).

Scoring system:

The total score of knowledge ranged from 0 to 102, one mark for each correct answer. Based on the researcher cut of point, knowledge level was consisted of three categories:

- Poor <(51) of the total score
- Fair = (51% -61.2) of the total score.
- Good =(>61.2) of the total score

Tool III: A structured interview questionnaire to assess patients' and visitors' subjective practice

A structured interview was used to assess patients' and visitors' subjective practice related to infection prevention by 25 questions. This questionnaire consisted of: washing hands, wearing personal protective equipment and dispose it, dealing with needle brick.

Scoring system:

The total score of the practice ranged from 0 to 24, one mark for each proper step. Based on the researcher cut of point, the practice level consists of two categories:

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- Proper more than >60% of total score (>14.4)
- Improper less than <60% of total score (14.4)

Tool IV: A structured interview scale to assess patients' and visitors' attitude toward infection prevention

This tool was used to assess patients' and visitors' attitude toward infection prevention. It consisted of 27 statements requiring a response in a liker's- rating scale with four continuums (strongly agree, agree, disagree, and strongly disagree)

Scoring system:

A scoring system was used to quantify the patients' and visitors' attitude as following:

- Strongly agree = 4 marks
- Agree = 3 marks
- Disagree = 2 marks
- Strongly disagree = 1 marks

If statements were negative, the scoring was reversed in SPSS as 1 mark was given to strongly agree, 2 marks were given to agree, 3 marks were given to disagree and 4 marks were given to strongly disagree.

Tools validity and reliability:

- Face validity: Study tools were tested for appropriate and have relevant items, by five experts in the field of “community health nursing, in addition to statistics” their recommended modifications were made.
- Reliability of the tool by Cronbach alpha test (r alpha) were .618.
- A pilot study was carried out on 10% of the study sample (38 patients and 38 visitors) were selected conveniently from outpatient clinics, who was excluded from the main study sample accordingly. to evaluate the clarity, applicability, and reliability of the research tools and estimate the approximate time required for data collection. Accordingly the necessary modification was done, some questions were added and others were clarified or omitted.

Ethical consideration:

- An approval was obtained from Research Ethics Committee of Faculty of Nursing, Mansura University.
- Prior to the initial interview, verbal explanation of the nature and the aim of the study had been explained to the patients and the visitors included in the study sample, clarification of the nature and purpose of the study was done in the interview with each subject. They were given an opportunity to refuse or participate ,and they were assured that their information will be confidentially utilized and used for the research purpose only.

Administrative process:

- An official letter was issued from the Faculty of Nursing, Mansoura University to the Director of Aga Centralized Hospital to permit for the researcher conducting the current study. The purpose and the process of study were clarified, to gain their cooperation and support during data collection.
- During data collection the investigator used a structured interview to collect data. The time spent with them ranged between 15-25 minutes. Data was collected in a period of three months from January to march 2018.

Statistical design:

Data entry and statistical analysis were done using computer software the statistical package for social studies (SPSS),version 18 Data was presented by using descriptive statistics in the form of frequencies, percentage.

III. RESULTS

Part (1): Descriptive tables

Table (1) shows that 32.6% of the studied patients' age ranged from 30 to less than 40 with a mean age of 35.37 (10.45), In relation to visitors age, 42.1% of the studied visitors' age ranged from 20 to less than 30 with a mean age of 32.42 (14.22). As regard to the studied patients gender 58.5% were male, and 51.0% of the studied visitors were male. Regarding the educational level, 39.9% of the studied patients had university educated, and 44.0% of the studied visitors had technical educated. Concerned with residence, 57.5% of the studied patients and 51.6% of the studied visitors residence at urban area. As for the marital status 80.6% of the studied patients, and 53.4% of the studied visitors were married. Finally 65.6% of the studied patients' monthly income were enough, and 73.3% of the studied visitors' monthly income not enough.

Table (1): Socio-demographic and economic characteristics of patients and visitors (n=384 patients and 384 visitors)

Items	Patients		Visitors		
	No=384	%	No=384	%	
Age category	20 or less	22	5.7	70	18.1
	20:>30	124	32.1	163	42.2
	30:>40	126	32.6	41	10.6
	40:>50	70	18.1	47	12.2
	More than 50	44	11.4	65	16.8
	Mean(SD)	35.37(10.45)		32.42(14.22)	
Gender	Male	226	58.5	197	51.0
	Female	160	41.5	189	49.0
Level of education	Illiterate	15	3.9	4	1.0
	Primary	12	3.1	42	10.9
	Preparatory	25	6.5	30	7.8
	Secondary	84	21.8	45	11.7
	Technical institute	96	24.9	170	44.0
Residence	University	154	39.9	95	24.6
	Rural	163	42.2	187	48.4
	Urban	222	57.5	199	51.6
Marital status	Single	60	15.5	173	44.8
	Married	311	80.6	206	53.4
	Divorced and widow	14	3.6	7	1.8
Monthly income	Enough	253	65.5	99	25.6
	Enough and save	43	11.1	3	.8
	Not enough	87	22.5	283	73.3

Table(2) shows that 73.2% of the studied patients and 77.5% of the studied visitors showed good score level of knowledge related to meaning of infection. In relation to knowledge about types of infection 61.7% of the studied patients and 75.4% of the studied visitors showed good score level of knowledge. In addition 58.5% of the studied patients and 63.5% of the studied visitors showed poor score level related to knowledge about grades of infection. Regarding knowledge about ways of infection transmission, 57.8% of the studied patients, and 44.8% of the studied visitors showed good score level. Moreover, 47.2% of the studied patients and 51.3% of the studied visitors showed poor score level related to knowledge about portal of entry.

Table (2): Patients' and visitors' knowledge related to meaning, types and grades of infection and ways of infection transmission and portal of entry of infection (n=384 patients and 384 visitors)

Items	Patients		Visitors	
	No=384	%	No=384	%
Meaning of infection				
Poor	103	26.7	86	22.3
Good	281	73.2	298	77.6
Min(Max)Range	.00(1.00)1.00		.00(2.00)2.00	
Types of infection				
Poor	148	38.2	93	24.2
Good	236	61.5	291	75.4
Min(Max)Range	.00(3.00)3.00		.00(3.00)3.00	
Grades of infection				
Poor	224	58.3	243	63.3
Good	160	41.5	141	36.5
Min(Max)Range	.00(4.00)4.00		.00(4.00)4.00	
Ways of infection transmission				
Poor	124	32.1	97	25.1
Fair	38	9.8	-	-
Good	222	57.8	173	44.8
Min(Max)Range	.00(15.00)15.00		1.00(5.00)4.00	
Portal of entry of infection				
Poor	182	47.2	197	51.3
Fair	40	10.4	131	33.9
Good	162	42.0	54	14.06
Min(Max)Range	.00(9.00)9.00		.00(7.00)7.00	

Table (3) reveals that 53.9% of the studied patients showed good score level however, 68.5% of the studied visitors showed poor score level related to knowledge about factors increase probability of infection at hospital. Regarding knowledge about high risk persons for infection 44.8% of the studied patients showed good score level however, 53.1% of the studied visitors showed poor score level. In relation to knowledge about infection cycle 53.9% of the studied patients and 88.3% of the studied visitors showed good score level. In addition to ways of infection transmission at hospital 63.5% of the studied visitors and 97.6% of the studied patients showed good score level. Moreover, 62.4% of the studied patients and 88.5% of the studied visitors showed good score level related to knowledge about signs and symptoms of infection.

Table (3): Patients' and visitors' knowledge related to factors increase probability of infection at hospital, high risk persons for infection, infection cycle, ways of infection transmission at hospital and signs and symptoms of infection (n=384 patients and 384 visitors)

Items	Patients		Visitors	
	No=384	%	No=384	%
Factors increase probability of infection at hospital				
Poor	177	45.9	263	68.5
Good	207	54.1	121	31.3
Min(Max)Range	.00(4.00)4.00		1.00(4.00)3.00	
High risk persons for infection				
Poor	123	31.9	205	53.1
Fair	89	23.1	109	28.2
Good	172	44.8	70	18.2
Min(Max)Range				
Infection cycle				
Poor	177	45.9	43	11.7
Good	207	53.9	341	88.3
Min(Max)Range	.00(3.00)3.00		1.00(3.00)2.00	
Ways of infection transmission at hospital				
Poor	140	36.3	9	2.3
Good	244	63.5	375	97.6
Min(Max)Range	.00(3.00)3.00		1.00(3.00)2.00	
Signs and symptoms of infection				
Poor	143	37.0	44	11.4
Good	241	62.4	340	88.5
Min(Max)Range	.00(14.00)13.00		1.00(13.00)12.00	

Table (4) shows that 60.9% of the studied patients and 67.6% of the studied visitors showed poor score level related to knowledge about portal exist of infection. In relation to knowledge about meaning of incubation period 59.6% of the studied patients showed poor score level however, 57.3% of the studied visitors showed good score level. Regarding knowledge about methods of infection prevention 66.14% of the studied patients and 100% of the studied visitors showed good score level. In addition to 66.3% of the studied patients and 70.83% of the studied visitors showed good score level related to knowledge about blood born disease. Moreover, 45.3% of the studied patients and 39.6% of the studied visitors showed poor score level to knowledge related to diseases transmitted through droplet at hospitals.

Table (4): Patients' and visitors' knowledge related to portal exist of infection, meaning of incubation period, methods of infection prevention, blood born disease and diseases transmitted through droplet at hospitals (n=384 patients and 384 visitors)

Items	Patients		Visitors	
	No=384	%	No=384	%
Portal exist of infection				
Poor	234	60.9	261	67.6
Good	150	38.9	123	32.03
Min(Max)Range	.00(16.00)16.00		1.00(6.00)5.00	
Meaning of incubation period				
Poor	230	59.6	164	42.5
Good	154	40.1	220	57.3
Min(Max)Range	.00(2.00)2.00		.1.00(2.00)1.00	
Methods of infection prevention				
Poor	130	33.7	-	-
Good	254	66.14	384	100
Min(Max)Range	.00(3.00)3.00		2.00(3.00)1.00	
Blood born disease				
Poor	130	33.7	112	29.0
Good	256	66.3	272	70.83
Min(Max)Range	.00(3.00)3.00		1.00(3.00)2.00	
Diseases transmitted through droplet at hospitals				
Poor	175	45.3	152	39.6
Fair	68	17.6	161	41.7
Good	141	36.7	71	18.4
Min(Max)Range	.00(5.00)5.00		.00(5.00)5.00	

Table (5) shows that 59.6% of the studied patients had good score level of knowledge related to moments of hand washing on the opposite 59.6% of the studied visitors had poor score level. In relation to knowledge about solution used for hand washing, 43.2% and 77.2% of the studied patients and visitors showed good score level. Regarding knowledge related to duration of hand washing, 68.75% of the studied patients and 90.9% of the studied visitors showed good score level. It was found that 93.48% of the studied patients and 99.2% of the studied visitors showed good score level related to knowledge about drying methods after hand washing. In addition to 64.5% of the studied patients and 81.3% of the studied visitors showed good score level related to knowledge about personal tools for personal use only. Moreover, 43.3% of the studied patients and 41.5% of the studied visitors showed poor score level related to knowledge about dealing with wound.

Table (5): Patients and visitors knowledge related to moments of hand washing, solutions used for hand washing, duration of hand washing, drying methods after hand washing, personal tools and dealing with wound (n= 384 patients and 384 visitors)

Items	Patients		Visitors	
	No=384	%	No=384	%
Moments of hand washing				
Poor	154	40.1	230	59.6
Good	230	59.6	154	40.1
Min(Max)Range	.00(8.00)8.00		3.00(8.00)5.00	
Solutions used for hand washing				
Poor	218	56.5	86	22.4
Good	166	43.2	298	77.2
Min(Max)Range	.00(3.00)3.00		.00(12.00)12.00	
Duration of hand washing				
Poor	118	30.6	33	8.5
Good	264	68.75	351	90.9
Min(Max)Range	.00(1.00)1.00		.00(11.00)11.00	
Drying methods after hand washing				
Poor	25	6.5	1	.3
Good	359	93.48	383	99.2
Min(Max)Range	.00(1.00)1.00		.00(11.00)11.00	
Personal tools				
Poor	13	3.4	1	.3
Fair	120	31.3	66	17.1
Good	249	64.5	314	81.3
Min(Max)Range	2.00(15.00)13.00		2.00(15.00)13.00	
Dealing with wound				
Poor	167	43.3	160	41.5
Fair	83	21.5	133	34.5
Good	134	34.7	91	23.7
Min(Max)Range	.00(14.00)14.00		.00(5.00)5.00	

Table (6) shows that 63.2% of the studied patients and 76.56% of the studied visitors had poor score level related to knowledge about dealing with needle brick. In relation to knowledge about moments of wearing gloves, 54.9% of the studied patients and 51.3% of the studied visitors showed good score level. Moreover,

Table (6): Patients and visitors knowledge related to dealing with needle brick, moments of wearing gloves, dealing with waste infected by body fluids, dealing with sharp wastes, dealing with linen infected by blood and cleaning contaminated surfaces by blood (n=384 patients and 384 visitors)

Items	Patients		Visitors	
	No=384	%	No=384	%
Dealing with needle brick				
Poor	244	63.3	292	76.56
Good	140	36.6	92	23.8
Min(Max)Range	.00(4.00)4.00		1.00(4.00)3.00	
Moments of wearing gloves				
Poor	173	44.8	186	48.4
Good	211	54.9	198	51.3
Min(Max)Range	.00(4.00)4.00		1.00(4.00)3.00	
Dealing with waste infected by body fluids				
Poor	138	35.8	25	6.5
Good	246	64.06	359	93.5
Min(Max)Range	.00(3.00)3.00		1.00(3.00)2.00	
Dealing with sharp wastes				
Poor	154	39.9	31	8.0
Good	230	59.9	353	91.9
Min(Max)Range	.00(3.00)3.00		.00(3.00)3.00	
Dealing with linen infected by blood				
Poor	127	33.07	20	5.2
Good	257	66.6	363	94.5
Min(Max)Range	.00(3.00)3.00		1.00(3.00)2.00	
Cleaning contaminated surfaces by blood				
Poor	130	33.7	133	34.5
Fair	80	20.7	149	38.6
Good	174	45.3	104	26.9
Min(Max)Range	.00(14.00)14.00		1.00(5.00)4.00	

Poor < (51) of the total score

Fair = (51% -61.2) of the total score

Good = (>61.2) of the total score

Table (7) shows that 53.6% of the studied patients reported good level score of the total knowledge and 83.7% of the studied visitors reported good level score of the total knowledge related to preventing infection.

Table (7): Total score knowledge levels of studied patients and visitors related to preventing infection (n=384 patients and 384 visitors)

Knowledge	Patient=384						Visitor=384					
	Poor		Fair		Good		Poor		Fair		Good	
	No	%	No	%	No	%	No	%	No	%	No	%
	109	28.2	65	16.8	207	53.6	-	-	60	15.6	323	83.7

Table (8) presents that 98.2% and 96.9% of the studied patients and 96.6% and 99.5% of the studied visitors had proper subjective practice about hand washing and use of personal protective equipment respectively. It was found that 68.7% of the studied patients and 98.7% of the studied visitors had proper subjective practice about needle sticks injury, with a mean total score of 23.18(1.77) for the studied patients and 25.05(1.21) for the studied visitors.

Table (8): Patients' and visitors' subjective practice related to infection prevention (n=384 patients and 384 visitors)

Items	Patients				Visitors			
	Proper		Improper		Proper		Improper	
	No=384	%	No=384	%	No=384	%	No=384	%
Hand washing	379	98.2	1	.3	373	96.6	-	-
Use personal protective equipment	374	96.9	5	1.3	384	99.5	-	-
Needle stick injury	265	68.7	116	30.1	381	98.7	4	1.0
Total score	373	96.6	13	3.4	370	95.9	16	4.1
Mean (SD)	23.18(1.77)				25.05(1.21)			

Table (9) shows that 58.5% of the studied patients and 66.3% of the studied visitors reported positive attitude toward changing clothes every day better for preventing infection. It was found that 60.9%, 65.3% and 65.3% of the studied patients and 92%, 97.2% and 97.2% of the studied visitors reported positive attitude in the following attitude :changing clothes when become dirty is better for preventing infection, using tissues when coughing and sneezing is better for preventing infection respectively. Moreover, 70.7% of the studied patients and 98.2% of the studied visitors reported positive attitude toward hand washing is necessary after using paper tissues.

Table (9): Patients' and visitors' attitude related to preventing infection (n=384 patients and 384 visitors)

Attitude categories	Patients								Visitors							
	Strongly agree		Agree		Disagree		Strongly disagree		Strongly agree		Agree		Disagree		Strongly disagree	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Changing clothes every day better for preventing infection(4marks)	226	58.5	151	39.1	5	1.3	1	.3	256	66.3	130	33.7	-	-	-	-
Mean ± SD	1.43(.54)								1.34(.47)							
Changing clothes when become dirty is better for preventing infection(4marks)	235	60.9	115	29.8	20	5.2	13	3.4	355	92.	31	8	-	-	-	-
Mean ± SD	1.51(.75)								1.08(.27)							
Using tissues when coughing and sneezing is better for preventing infection(4marks)	252	65.3	125	32.4	6	1.6	--	-	375	97.2	11	2.8	-	-	-	-
Mean ± SD	1.36(.51)								1.03(.17)							
Disposal of used paper tissues safely in the trash can better to prevent infection(4marks)	252	65.3	118	30.6	13	3.4	-	-	375	97.2	10	2.6	-	-	-	-
Mean ± SD	1.38(.55)								1.05(.58)							
Hand washing is necessary after using paper tissues(4marks)	273	70.7	96	24.9	13	3.4	1	.3	379	98.2	7	1.8	-	-	-	-
Mean ± SD	1.33(.55)								1.2(.13)							

Table (9) shows 68.1%, 67.6%, 68.7%, 68.7% and 70.2% of the studied patients and 100%, 97.9%, 95.6%, 97.4% and 96.1% of the studied visitors reported positive attitude in the following items: keeping foods\ in patient's room is a source of infection, setting to eat with the patients in a group leading to spread of infection, going out the room for special cases of infectious diseases without personal protections leading to spread of infection, wearing personal protective equipment as (mask) when dealing with patients important to prevent infection, regular hand washing with soap, and antiseptic substances reduce the spread of infection respectively.

Table (9): Patients' and visitors' attitude related to preventing infection (n=384 patients and 384 visitors) Cont.,

Attitude categories	Patients								Visitors							
	Strongly agree		Agree		Disagree		Strongly disagree		Strongly agree		Agree		Disagree		Agree	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Keeping foods in patient's room is a source of infection(4marks)	263	68.1	94	24.4	23	6	3	.8	384	100	-	-	-	-	-	-
Mean ± SD	1.39(.64)								1.01(.07)							
Setting to eat with the patient's in a group leading to spread of infection(4marks)	261	67.6	98	25.4	21	5.4	3	.8	378	97.9	7	1.8	1	.3	-	-
Mean ± SD	1.39(.63)								1.02(.17)							
Going out the room for special cases of infectious diseases without personal protections leading to spread of infection(4marks)	265	68.7	92	23.8	21	5.4	5	1.3	369	95.6	16	4.1	1	.3	-	-
Mean ± SD	1.39(.65)								1.05(.22)							
Wearing personal protective equipment as (mask) when dealing with patients important to prevent infection(4marks)	265	68.7	97	25.1	20	5.2	1	.3	376	97.4	10	2.6	-	-	-	-
Mean ± SD	1.37(.59)								1.03(.16)							
Regular hand washing with soap, and antiseptic substances reduce the spread of infection(4marks)	271	70.2	95	24.6	16	4.1	1	.3	371	96.1	13	3.4	2	.5	-	-
Mean ± SD	1.34(.57)								1.04(.23)							

Table (9) shows that 67.6% of the studied patients and 95.6% of the studied visitors reported positive attitude toward ignoring hand washing with soap and water or antiseptics causes the spread of infection. Additionally 78.5% of the studied patients and 96.4% of the studied visitors reported positive attitude toward drying the hands after washing with a towel is better for preventing infection. Moreover, 81.9% and of the studied patients and 96% of the studied visitors reported positive attitude toward closing the water faucet after washing your hands using a towel or hand elbow is best to prevent the spread of infection.

Table (9): Patients' and visitors' attitude related to preventing infection (n=384 patients and 384 visitors) Cont.,

Attitude categories	Patients										Visitors					
	Strongly agree		Agree		Disagree		Strongly disagree		Strongly agree		Agree		Disagree		Strongly disagree	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Ignoring hand washing with soap ,water or antiseptics causes the spread of infection(4 marks) Mean	261	67.6	93	24.1	25	6.5	4	1	369	95.6	14	3.6	3	.8	-	-
	1.40(.66)								1.05(.25)							
Drying the hands after washing with a towel is better for preventing infection(4marks) Mean ± SD	303	78.5	53	13.7	26	6.7	1	.3	372	96.4	11	2.8	3	.8	-	-
	1.28(.60)								1.04(.24)							
Leaving hands moist after washing help spread of infection(4marks) Mean ± SD	292	75.6	55	14.2	33	8.5	3	.8	373	96.4	11	2.8	3	.8	-	-
	1.34(.67)								1.03(.18)							
Closing the water faucet after washing your hands using a towel or hand elbow is best to prevent the spread of infection(4marks) Mean ± SD	316	81.9	43	11.1	19	4.9	5	1.3	374	96.9	12	3.1	-	-	-	-
	1.25(.61)								1.03(.17)							
Touching the water faucet after washing your hands source of spreading of infection(4marks) Mean ± SD	295	76.4	57	14.8	30	7.8	1	.3	375	97.2	11	2.8	-	-	-	-
	1.31(.62)								1.03(.17)							

Table (9) shows that 80.1% and 81.1% of the studied patients and 99.7% and 97.4% of the studied visitors reported positive attitude on the following items: cutting and cleaning nails prevent spread infection, following hospital policy and instruction of visiting time is best to prevent infection respective. As well 75.9%, 78.5% and 79.3% of the studied patients and 99%, 100% and 99.5% of the studied visitors reported positive attitude on the following items: frequent ventilation of room is better for preventing infection, keeping room clean is better for preventing infection. Finally 75.4% of the studied patients and 99.5% of the studied visitors reported positive attitude toward long nails sources of microbes and transmission of infection.

Table (9): Patients' and visitors' attitude related to preventing infection (n=384 patients and 384 visitors) Cont.,

Attitude categories	Patients										Visitors					
	Strongly agree		Agree		Disagree		Strongly disagree		Strongly agree		Agree		Disagree		Strongly disagree	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Frequent ventilation of room is better for preventing infection(4marks) Mean ± SD	293	75.9	81	21	9	2.3	-	-	382	99	4	1	-	-	-	-
	1.26(.49)								1.04(.52)							
Keeping room clean is better for preventing infection(4marks) Mean ± SD	303	78.5	74	19.2	5	1.3	-	-	384	100	-	-	-	-	-	-
	1.25(.67)								1.03(.51)							
Cutting and cleaning nails prevent spread of infection(4marks) Mean ± SD	309	80.1	59	15.3	11	2.8	4	1	383	99.7	1	3	-	-	-	-
	1.24(.55)								1.00(.05)							
Long nails sources of microbes and transmission of infection(4marks) Mean ± SD	291	75.4	86	22.3	6	1.6	-	-	382	99.5	2	.5	-	-	-	-
	1.26(.47)								1.01(.07)							
Following hospital policy and instruction of visiting time is best to prevent infection(4marks) Mean ± SD	313	81.1	56	14.5	14	3.6	-	-	376	97.4	9	2.3	-	-	-	-
	1.22(.49)								1.05(.53)							
Following hospital policy and instruction of visiting time is best to prevent infection(4marks) Mean ± SD	306	79.3	55	14.2	20	5.2	2	.5	374	96.9	12	3.1	-	-	-	-
	1.26(.58)								1.03(.17)							

Table (9) showed that 82.9% and 83.4% of the studied patients and 97.2% and 98.4% of the studied visitors reported positive attitude on the following instructions as do not touch any of the tools or devices around the patients prevents the spread of infection and follow the instruction as do not smoke prevent spread of infection respectively. It was found that 79 % of the studied patients and 93.8% of the studied visitors reported positive attitude toward spitting on the floor spread the infection. Moreover, 79% of the studied patients and 72.8% of the studied visitors reported positive attitude toward using tissue paper when spitting helps to prevent the spread of infection.

In relation to negative attitude 47.9% of the studied patients reported disagree and 48.4% reported strongly disagree and 71% of the studied visitors reported strongly disagree toward sharing others in personal items such as towels, cups, spoons, etc. does not spread of infection. with mean of total attitude 37.43(6.59) for the studied patients and 31.11(1.66) for the studied visitors.

Table (9):Patients' and visitors' attitude related to preventing infection (n=384 patients and 384 visitors) Cont.,

Attitude categories	Patients								Visitors							
	Strongly agree		Agree		Disagree		Strongly disagree		Strongly agree		Agree		Disagree		Strongly disagree	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Neglecting hand wash before and after dealing with the patient's such as changing clothes and bathing helps to spread of infection(4marks) Mean ± SD	293	75.9	77	19.9	10	2.6	3	.8	379	98.2	7	1.8	-	-	-	-
Follow the instructions as do not touch any of the tools or devices around the patients prevents the spread of infection(4marks) Mean ± SD	320	82.9	61	15.8	1	.3	1	.3	375	97.2	11	2.8	-	-	-	-
Follow the instruction as do not smoke prevent spread of infection(4marks) Mean ± SD	322	83.4	60	15.5	1	.3	-	-	380	98.4	6	1.6	-	-	-	-
Using tissue paper when spitting helps to prevent the spread of infection(4marks). Mean ± SD	307	79.5	70	18.1	5	1.3	1	.3	281	72.8	105	27.2	-	-	-	-
Spitting on the floor spread the infection(4 marks) Mean ± SD	305	79	75	19.4	3	.8	-	-	362	93.8	24	6.2	-	-	-	-
Negative attitude																
Sharing others in personal items such as towels, cups, spoons, etc. does not spread of infection (4 mark) Mean ± SD	10	2.6	1	.3	185	47.9	187	48.4	-	-	-	-	11	2	29	71
Total attitude(108)	Mean (SD)37.43(6.59)								Mean (SD)31.11(1.66)							

Part 2: Association tables

Association between socio-demographic and economic characteristics of patients and visitors and their total score knowledge levels related to infection prevention

Table(10) indicates that there was statistically significant association between level of education, residence and marital status and patients' total score of knowledge level p <.001. Besides there was statistical significant association between income and marital status and visitors' total score of knowledge level p=.025 and.044 respectively. On the opposite side, there was no statistically significant association between patients' age, gender and patients' total score of knowledge level p=.411 and.122 respectively. Also there was no statistical significant association between visitors' age, gender, residence, level of education and visitors' total score of knowledge level p=.112,.784 and.895 respectively.

Table (10): Association between socio-demographic and economic characteristics of patients and visitors and their total score knowledge level related to infection prevention (n=384 patients and 384 =visitors)

Tems	Patients							Visitors									
	Poor		Fair		Good		Test of Sig		Poor		Fair		Good		Test of Sig		
	No	%	No	%	No	%	X ²	P	No	%	No	%	No	%	X ²	P	
Age category	≥20	10	2.60	4	1.04	7	1.82	8.229	.411	-	-	6	1.56	64	16.66	7.490	.112
	20≥30	29	7.55	22	5.72	73	19.01			-	-	25	6.51	138	35.93		
	30≥40	32	8.33	21	5.46	71	18.48			-	-	9	2.34	32	8.33		
	40 ≥50	23	5.98	11	2.86	35	9.11			-	-	7	1.82	40	10.41		
	More than 50	15	3.90	7	1.822	21	5.46			-	-	16	4.16	49	12.76		
Gender	Male	55	14.32	39	10.15	129	33.59	4.208	.122	-	-	31	8.07	166	43.22	.101	.784
	Female	54	14.06	26	6.77	78	20.3			-	-	32	8.33	157	40.88		
Residence	Rural	68	17.70	29	7.55	63	16.40	29.779	<.001	-	-	31	8.07	156	40.63	.017	.895
	Urban	41	10.67	36	9.37	143	14.3			-	-	32	8.33	167	43.48		
Level of education	Illiterate	12	3.125	2	0.52	1	0.26	138.421	<.001	-	-	0	0	4	1.04	6.654	.248
	Primary	8	2.08	3	0.78	1	0.26			-	-	5	1.30	37	9.63		
	Preparatory	22	5.72	2	0.52	1	0.26			-	-	3	0.78	27	7.03		
	Secondary	39	10.15	20	5.2	25	6.51			-	-	10	2.60	35	9.11		
	Above half	12	3.12	17	4.42	66	17.18			-	-	34	8.85	136	35.41		
Marital Status	University	16	4.16	21	5.46	113	29.42	-	-	11	2.86	84	21.87	8.115	.044		
	Single	26	6.77	13	3.38	21	5.46	-	-	22	5.72	151	39.32				
	Married	78	20.31	50	13.02	178	46.35	15.718	.047	-	-	38	9.89			168	43.75
Income	Divorced and widow	5	1.3	2	0.52	6	1.52	-	-	3	0.78	4	1.04	7.340	.025		
	Not enough	31	8.07	10	2.60	43	11.19	-	-	41	10.67	242	63.02				
	Enough	64	16.66	48	12.5	139	36.19	5.052	.282	-	-	20	5.20			79	20.57
	Enough and save	13	3.38	7	1.822	23	5.98	-	-	2	0.52	1	0.260				

N= Naira

Chi square test Statistically significant at P<0.05

V. DISCUSSION

Healthcare-associated infections (HAIs) affect at least 300 000 patients annually in the UK and represent a significant, yet largely preventable, burden to the healthcare system (Pittet, Panesar, Wilson, Longtin, Morris, Allan & Donaldson, 2011).The majority of HAIs result from cross transmission related to inappropriate patient-care practices (Pittet, 2004). The attitude was perceived as the most useful interventions by both patients, visitors and HCWs (Pittet et al., 2011).

Health care–associated infections (HAIs) still a concern for staff, patients, visitors and health care organizations. A relevant literature on patients' opinions of infection control services is too little (Madeo, Shields & Owen, 2008). Many studies have focused on health care have assessed the patients' opinion about practices against cross infection (Al Agil & Bin Mubayrik, 2017).

It is important to come in mind that in addition to financial expense to the health care facility. It includes increased duration of stay because of HCAI and many people readmitted to hospital, leading to loss of chance to treat other patients. Profound impacts on the delivery of health services include more cost of surveillance, isolation measures and environmental hygiene; inadequate isolation facilities lead to increase the risk of cross infection to others, like patients, staff and visitors (Damani, 2019).

AlAgil and Bin Mubayrik, (2017) stated infectious diseases are common among patients who lack the knowledge about infection prevention measures. The diseased patients might themselves be reservoirs of pathogens and cause their spread, posing a risk to others. The importance of patients' knowledge and awareness was acknowledge by Centers for Disease control and Prevention (CDC), which developed many educational materials to educate the community. Patients and visitors' safety is an important discipline that aims at improving quality of patients' and visitors' care, decreasing mistakes during treatment and improving safety (Yamalík & Van Dijk, 2013).

Hospital visitors may play an important role in the ecology of hospital-acquired infections. Visitors have been involved in nosocomial outbreaks and they can transmit the infection with an unknown role in the hospital environment. Visitors'

adherence to infection control precautions seen in few studies that report compliance. Evidence from many studies suggest educational interventions to encourage visitors cooperation with infection control precaution to improve adherence (**Munoz-Price, Banach, Bearman, Gould, Leekha, Morgan & Wiemken, 2015**).

Infection control is every person's responsibility. Infection control committees and education specialists are challenged every day to make health care facilities safe for the patients, visitors, families, and employees (**Motacki, 2011**). Successful infection control requires a multidisciplinary team, which include patients, health care workers and visitors. In order to decrease and prevent the incidence of infectious disease and transfer from person to person, there is a need for teaching patients, visitors, and their families about isolation precaution and showing how to do and use Personal Protective Equipment in appropriate manner(**Al Abdullah, Alamri, Daghistani & All Wairiqi, 2016**).

Regarding patients' and visitors' knowledge score level related to infection prevention, less than three fourths of the studied patients and almost the majority of the studied visitors have good knowledge about meaning of infection. These results are slightly in line with **Baseer, Rahman and Yassin, (2013)**, who reported that majority of the patients (301) attending dental clinics of Riyadh Colleges of Dentistry, Pharmacy, Saudi Arabia have good knowledge about meaning of infection.

Regarding patients' and visitors' knowledge score level related to ways of infection transmission. More than half of the studied patients and less than half of the studied visitors have good knowledge about it. These results are in opposite with **Madeo, Shields and Owen, (2008)**, who investigated patients' knowledge, practice and belief about HCAs, they reported poor knowledge of 110 patients on route of infection transmission and how infection spread one.

Regarding patients' knowledge related to moment of hand hygiene, the present study shows that more than half of the studied patients have good score level of knowledge related it. These results in consistent with **Walaszek, Kolpa, Wolak, Róźańska and Wójkowska-Mach, (2018)**, who revealed that more than half of the studied patients confirmed that their practice of hand disinfection before take blood samples and the majority of them showed interest in hand hygiene during their hospital stay. On the other hand, this study reveals more than half of the studied visitors have a poor score level of knowledge related to moment of hand hygiene.

As shown the present study reflects that more than half of the studied patients have higher score level of knowledge than the studied visitors about moments of hand hygiene. This is in contrast with **Ibrahim, Alwafi, Sangoo, Turkistani and Alattas, (2017)** who revealed that the level of patients' education about health is rising as their concern for protection during receiving treatment increasing. This present study presents that the age of the studied patients and visitors range from 20 to more than 50 years with mean age 35.37(10.45) for patients and 32.42(14.22) for the visitors, one third of the studied patients aged 20-30 years and less than half of the studied visitors aged 20-30 years, the studied patients belonged to younger age than the studied visitors accordingly they updating their knowledge.

As regards to the level of knowledge related to the solution used for hand hygiene, the present study shows that more than half of the studied patients have poor score level of knowledge about it. This is similar to **Busby, Kennedy, Davis, Thompson and Jones, (2015)** study, who reflected that, patients did not know or understand the different between soap and water and alcohol based hand rub at 25 bed inpatient unit admitting adult general medical patients South Eastern United States. However, more than three fourths of the studied visitors had good knowledge about hand washing solutions. Although the current and the discussed study carried out in different circumstances but reflect similar results.

As regards to studied patients' and visitor's level of knowledge related to using paper tissue as a drying method after hand hygiene. The current study represents that most of the studied patients and almost all of the studied visitors have good score level of knowledge about it. These are similar to **Huang and Stack (2012)**, study who reflect that, most studies suggest that paper towel can dry hands efficiently, remove bacteria effectively, and cause less contamination of the washroom environment.

The current study represents that some area of studied patients' and visitors' knowledge need to be improved based on they have poor score level of knowledge in comparison with other items (i.e.,) the studied patients' and visitors' knowledge related to portal of entry of infection, high risk persons to infection, portal exists of infection, diseases transmitted through droplet in hospitals, solutions used for hand washing, dealing with wound, dealing with needle brick,

and cleaning contaminated surfaces by blood. These results propose that it is essential for infection control experts to publish information to patients and visitors in the background of routine medical care.

In general, the total score level of knowledge illustrates; more than half of the studied patients and the majority of the studied visitors had a good score level of knowledge related to infection prevention. This study is in agreement with two studies, which revealed good knowledge regarding infection prevention among patients **Sunkesula, Knighton, Zabarsky, Kundrapu, Higgins and Donskey, (2015)**, who conducted the first study. The second study, conducted by **Bashar and Yoong, (2019)**, survey which conducted on 184 infected patients admitted to University Malaya Medical Center (UMMC) in Malaysia. Probably their knowledge was due to the infection control strategies and hospital's education program for patients and their visitors. It is notable in the present study one of the main sources of information was achieved through the media.

Social Media is considered nowadays an effective and accessible method to spread information and raise awareness about health information. Patient main source of information about infections were newspaper and T.V (**Madeo, Shields & Owen, 2008**).

As regards to patients' and visitor's subjective practices, related to infection prevention. The present study shows that most of the studied patients are washing their hands properly. This in opposite with **Sunkesula et al., (2015)**, who stated that while most of the patients were found to be knowledgeable about practicing hand hygiene, practice observed were low (6%) during moment of hand hygiene. In addition, this study shows most of the studied visitors were washing their hands. This is similar to **Munoz-Price, et al., (2015)**, who reflected that, most of the studied visitors had hand hygiene compliance.

Few studies have investigated the use of strategies to improve patient hand hygiene in the acute care setting. Hand hygiene is considered a learned behavior during childhood, which becomes a habit of daily care because of lifestyle (**Nico**). Hand washing with soap and water was effective in reducing contamination provenance (**Burton, Cobb, Donachie, Judah, Curtis & Schmidt, 2011**).

An observational study showed that most of the patients practicing hand hygiene if staff-initiated patient hand hygiene events, were significantly higher than patient self-initiated hand hygiene (37.5%), (**Chen, Sheng, Wang, Chang, Lin, Tien & Tsai, 2011**).

As regards to patients' and visitors' subjective practices, related to using personal protective equipment, the present study finds that most of the studied patients and visitors are using it properly. While **Seibert, Ewers, Barker, Slavick, Wright, Stevens and Safdar, (2018)**, study that carried out on 31 visitors of clostridium difficile infection(CDI), University of Wisconsin Hospital, revealed that less than half of the studied visitors were fully compliant with gown and gloves.

This is opposite to two studies. The first study was conducted by **Roidad and Khakoo, (2014)**, in Tertiary Care Center on 20 patients, revealed that while, patients, visitors response rate were low to contact isolation but, visitors had an overall positive perception and understanding of contact isolation. The second one was conducted by **Munoz-Price et al., (2015)**, prior to entering of patients on contact precaution, adherence among visitors almost half wearing gowns, only one third of the visitors wear gloves when touching patient and two thirds of the visitors use gloves with contact with blood.

Nursing staff are the main source of PPE information, but PPE messages to visitors vary, health care staff contact precaution behavior(i.e.) modeling PPE use impacts visitors compliance. Most of visitors were family, low perceived risk to family was used as roughly half of reasons for no PPE. Emphasizing that PPE protecting both visitors and other patients may motivate visitors to comply(**Seibert et al., 2018**).

As for patients' subjective practice, concerning needle stick injury, more than two thirds of the studied patients, and almost all of the studied visitors properly practiced when exposed to needle stick injury. It is important to apply infection prevention policies at all times to decrease the risk of spread from known and unknown sources of infection. The patient receiving health care service is often more susceptible to infection because of their need for treatment, especially, when this involves invasive procedure. Visitors may also be at risk of exposure to infection. So, It is very important to recognize the measures required to protect patients and visitors (**Loveday, Wilson, Pratt, Golsorkhi, Tingle, Bak & Wilcox, 2014**).

Regarding the total score of subjective practice related to infection prevention the current study reveals that, almost all of the studied patients and visitors had proper subjective practice. This probably due to fact that more than half of the studied patients and visitors were living at urban area and more than one third of the studied patients and one quarter of the studied visitors highly educated.

Regarding patients' and visitors' attitude toward infection prevention, more than half of the studied patients and two thirds of the studied visitors reports positive attitude toward changing clothes every day better for preventing infection. It was found that less than two thirds of the studied patients and most of the studied visitors reported positive attitude toward the following attitude: changing clothes when become dirty is better for preventing infection, using tissues when coughing and sneezing is better for preventing infection respectively. Moreover, almost three fourths of the studied patients and almost all of the studied visitors reported positive attitude toward hand washing is necessary after using paper tissues.

Hospital patients and visitors represent an important factor in infection prevention. A great effort is needed to increase patients and visitor HHC, including, education of patients and visitors on the benefits of HHC, an evaluation of the AHS sites and evaluation of changes in hand hygiene behavior. A lot of effort has been made to improve health care workers' hand hygiene compliance (HHC) and few less has been done in order to maintain high levels of HHC among patients and visitors to increase HHC from 52% to 11.67%. Reports regarding hand hygiene compliance (HHC) between hospital patients and visitors are limited. Although there is an assumption that the presence of alcohol-based hand sanitizer (AHS) promotes patients and visitor HHC (**Birnbach, Nevo, Barnes, Fitzpatrick, Rosen, Everett-Thomas & Arheart, 2012**).

Regarding patients' and visitors' attitude toward keeping foods in patient's room is a source of infection, more than two thirds of the studied patients and most of the studied visitors reports positive attitude toward this item. More than two thirds of the studied patients and almost all of the studied visitors reported positive attitude toward setting to eat with the patients in a group leading to spread of infection, The present finding was in agreement with **AlAgil and Bin Mubayrik, (2017)** who reported that, infection can transfer through direct contact with infected individual.

More than two thirds of the studied patients and almost all of the studied visitors reports positive attitude toward wearing personal protective equipment as (mask) when dealing with patients important to prevent infection and regular hand washing with soap, and antiseptic substances reduce the spread of infection. The present findings are slightly in agreement with **AlAgil and Bin Mubayrik, (2017)** who reported that wearing gloves and mask protect the patient from contracting an infection as well stated that "I feel more ease seeing my dentist wash his/her hands".

Regarding patients' and visitors' attitude related to sharing others in personal items such as towels, cups, spoons, etc., does not spread of infection, almost half of the studied patients and less than three fourths of the studied visitors reports negative attitude toward this item.

In general, regarding patients' and visitors' attitude toward infection prevention, the present study reported positive attitude toward infection prevention. These findings were similar to **Sunkesula et al., (2015)**, who reported that patients had positive attitudes towards infection prevention in dentistry.

However, from the researcher point of view, studied patients' and visitors' positive attitude toward infection prevention could be attributed to health talk given, poster hanged in outpatient clinics and information obtained from social media and patients and visitors high education .

As regards to the association between socio-demographic and economic characteristics of patients and visitors and their total score knowledge level related to infection prevention. The present study indicates that, there was a statistically significant association between education level and knowledge level related to infection prevention as $P < 0.001$. This finding is consistent with **AlAgil and Bin Mubayrik, (2017)** and **Ibrahim, Alwafi, Sangoof, Turkistani and Alattas, (2017)**, study who revealed that the educational level of the patients was significantly associated with their knowledge about infection prevention as $P < 0.001$. On the other hand **Ward, (2011)** study concluded that there is no evidence that education improves compliance with infection control precaution or reduce infection rates.

V. CONCLUSION

It can be concluded that, more than half of the studied patients reported good score level of the total knowledge and the majority of the studied visitors reported good score level of the total knowledge related to preventing infection. Related to subjective practice most of the studied patients and visitors had proper subjective practice about hand washing and use of personal protective equipment, further more; more than two thirds of the studied patients and the majority of the studied visitors had proper subjective practice about needle sticks injury. Finally most of the studied patients and visitors had positive attitude toward preventing infection.

VI. RECOMMENDATIONS

The following recommendations were made based on the findings and conclusion drawn from the study.

1. Develop and implement health education program to patients and visitors about infection prevention at outpatients clinics.
2. Design and facilitate alternative media about infection prevention at outpatients clinics.

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