Results

The results obtained from the study were presented in the following sequences.

Part I:

Distribution of nurses according to general characteristics of the sample Tables (1-3).

Part II:

Nurses' knowledge related to infection control Tables (4-6)

Part III:

Nurses' practice related to infection control Tables (7-12)

Part IV:

Correlation between knowledge & demographic data Table (13)

Part V:

Correlation between practice & duration of training Table (14)

Part V1:

Correlation between knowledge & practice Table (15).

Part (I) : **Distribution of nurses according to general characteristics of the sample.**

Table (1): Distribution of nurses among two hospitals according to their demographic characteristics

Items	Teaching hospital n=16		university hospital n =17		Total		Test of significant
	N	%	N	%	No	%	
1- Age/year							
< 20	2	12.5	3	17.6	5	15.2	
20-	4	25	6	35.3	10	30.3	
25-	3	18.8	4	23.5	7	21.2	
30-	5	31.2	2	11.8	7	21.2	
> 35	2	12.5	2	11.8	4	12.1	
$\overline{X} \pm SD$	28 ± 6.1		27 ± 6.1				t = 0.05 P > 0.05
2- Qualification							
• Diploma	15	93.8	15	88.2	30	90.9	$X^2 = 0.4$
• Diploma & specialist	1	6.2	2	11.8	3	9.1	P > 0.05
3- years of experience							
• < 3	2	12.5	3	17.7	5	15.2	
• 3 –	3	18.8	4	23.5	7	21.2	
• 5 –	2	12.5	2	11.8	4	12.1	
• 10 – 14	5	31.2	4	23.5	9	27.3	
• > 14	4	25	4	23.5	8	24.2	
$\overline{X} \pm SD$	21 ± 10.0		18 ± 10.6				t = 0.8 P > 0.05

Table (1): Shows that the mean ± SD of the nurses age in the study groups at teaching hospital was 28 ± 6.1, 27 ± 6.1 at university hospital. Slightly more than half 56.3% were in the age category less than 30 years at the teaching hospital, as compared to slightly more than three quarters (76.4%) were in the university hospital. Also the same table indicates that the majority (93.8%, 88.2%) of the nurses' had diploma, meanwhile the minority (6.2%, 11.8%) of them had "diploma + specialty". Also it represents (43.8% , 53%) of nurses who their years of experience were less than 5 years, 43.7 % , 35.3% of them who their years of experience were 5-14 year. Meanwhile one quarter or slightly less, their years of experience were more than fourteen years at both teaching and university hospitals. Insignificant differences were observed between two hospitals regarding demographic characteristics.

Table (2): Distribution of nurses according to training session obtained among two hospitals

Items	Teaching hospital n=16		university hospital n =17		Total		X^2 & P/value
	N	%	N	%	N	%	
1- Training session regarding infection control at hospital							
• Yes.	6	37.5	2	11.8	8	24.2	$X^2 = 2.9$
• No.	10	62.5	15	88.2	25	75.8	$P > 0.05$
2- Time of last training sessions:							
• < 1	1	6.2	0	0.0	1	12.5	1.73
• 1	2	12.5	1	5.9	3	37.5	> 0.05
• 2	1	6.2	1	5.9	2	25	
• ≥ 3	2	12.5	0	0.0	2	25	
3- Duration of training:							
• One week	1	6.2	1	5.9	2	25	1.4
• Two weeks	3	18.8	1	5.9	4	50	> 0.05
• Four weeks	2	12.5	0	0.0	2	25	
4- Number of training:							
• 1 Time	1	6.2	1	5.9	2	25	
• 2 Times	3	18.8	0	0.0	3	37.5	4.7
• 3 Times	0	0.0	1	5.9	1	12.5	> 0.05
• > 3 Times	2	12.5	0	0.0	2	25	

Table (2): Reveals that only 37.5% of nurses at teaching hospital received training sessions as compared to 11.8% of nurses at university hospital. Also it shows that the lasting time of training sessions was less than three years for 24.9% out of 37.5% of nurses at teaching hospital as compared to all (11.8%) nurses' who well trained at university hospital. Also, cleared that the duration of training was two weeks for the majority of nurses at teaching hospital as compared to all (11.8%) nurses' at university hospital with insignificant difference observed.

Table (3): Distribution of nurses according to their assessment of knowledge & practice about infection control at hospitals

Items	Teaching hospital n=16		university hospital n =17		Total		X^2 test & P value
	N	%	N	%	No	%	
1- Obstacles during application of infection control:							
• Yes.	8	50	15	88.2	23	69.7	$X^2 = 5.9$
• No.	8	50	2	11.8	10	30.3	P < 0.05
2- Obstacles includes:							
- Inadequate supplement.	7	43.8	13	76.4	20	60.6	
- No support/ helping of health team.	1	6.2	2	11.8	3	9.1	$X^2 = 6.0$ P < 0.05
- No training session	8	50	2	11.8	10	30.3	
3- vaccination against viral hepatitis							
• Yes.	10	62.5	1	5.9	11	33.3	$X^2 = 12.2$
• No.	6	37.5	16	94.1	22	66.7	P< 0.001
4- Periodic examinations before & during work							
• Yes.	5	31.2	1	5.9	6	18.2	$X^2 = 3.5$
• No.	11	68.8	16	94.1	27	81.8	P > 0.05

Table (3): Shows that the majority of nurses at university hospital (88.2%) have obstacles during application of infection control measures (ICM) as compared to half of nurses at teaching hospital. As well was illustrates that (43.8%, 76.4%) respectively at both teaching and university hospitals reported inadequate supplies. Also half of nurses at teaching hospital reported that they not obtained training session related ICM as compared to 11.8% at university hospital meanwhile the minority (6.2%, 11.8%) of them reported that no support from health team. It was noticed that two thirds (62.5%) of nurses at teaching hospital had vaccinate for viral hepatitis as compared to the minority (5.9%) at university hospital. Regarding examination before and during work, the same table shows that 31.2%, 5.9% of them at two hospitals had periodic examination. Concerning three items related "assessment of the obstacles during application of infection control, type obstacles, and vaccination against viral hepatitis", revealed significant differences between two hospitals meanwhile insignificant difference was observed between them regarding periodic examination.

Part (II): Nurses knowledge related infection control

Table (4) : Distribution of nurses according to their knowledge regarding nosocomial infection, disinfection and sterilization at both teaching & university hospitals.

items	Teaching hospital n=16		university hospital n =17		Total		t &p value
	N	%	N	%	N	%	
1- nosocomial infection							
- Correct (9-15)	6	37.5	8	47.1	14	42.4	
- Incorrect (< 9)	10	62.5	9	52.9	19	57.6	
$\overline{X} \pm SD$	7.6±3.5		8.3 ± 3.6				0.58 p > 0.05
2-disinfection							
- Correct (8.5-14)	12	75.0	13	76.5	25	75.8	
- Incorrect (< 8.5)	4	25.0	4	23.5	8	24.2	
$\overline{X} \pm SD$	9.6 ± 2.9		9.7 ± 2.8				0.10 p > 0.05
3- sterilization							
- Correct (8.5-14)	11	68.8	13	76.5	24	72.7	
- Incorrect (< 8.5)	5	31.2	4	23.5	9	27.3	
$\overline{X} \pm SD$	7.2±2.4		7.6 ±2.2				0.5 P > 0.05

Table (4):-reveals that the mean score of nurses knowledge regarding nosocomial infection (8.3 ±3.6) ,disinfection (9.7±2.8) and sterilization(7.6 ±2.2) is slightly higher for nurses at university hospital than nurses at teaching hospital (7.6±3.5) ,(9.6 ± 2.9) and (7.2±2.4) with insignificant difference between them.

Table (5) : Distribution of nurses according to their knowledge regarding chemical disinfectant, infection precaution and infection control at both teaching & university hospitals.

items	Teaching hospital n=16		university hospital n =17		Total		t &p value
	N	%	N	%	N	%	
1- chemical disinfectant							
- Correct (2.4- 4)	10	62.5	11	64.7	21	63.6	
- Incorrect (< 2.4)	6	37.5	6	35.3	12	36.4	
$\overline{X} \pm SD$	2.56 $\pm$ 0.9		2.60 $\pm$ 0.8				0.13 p > 0.05
2- infection precaution							
- Correct (3.6- 6)	2	12.5	6	64.7	8	24.2	
- Incorrect (< 3.6)	14	87.5	11	35.3	25	75.8	
$\overline{X} \pm SD$	2.6 $\pm$ 0.9		3.2 $\pm$ 1.2				1.5 p > 0.05
3- infection control							
- Correct (7.2-12)	10	62.5	12	70.6	22	66.7	
- Incorrect (< 7.2)	6	37.5	5	29.4	11	33.3	
$\overline{X} \pm SD$	7.3$\pm$3.1		7.8 $\pm$2.9				0.5 P > 0.05

Table (5):-shows that the mean score of nurses knowledge regarding chemical disinfectant (2.60 $\pm$ 0.8) , infection precaution(3.2 $\pm$ 1.2)and infection control (7.8 $\pm$2.9) is slightly higher for nurses at university hospital than nurses at teaching hospital (2.56 $\pm$ 0.9), (2.6 $\pm$ 0.9) and (7.3$\pm$3.1) with insignificant difference between them.

Table (6): distribution of nurses according to their total level of knowledge related to all infection control measures among two hospitals.

Total level of knowledge	Teaching hospital n=16		university hospital n =17		Total N = 33		t & P value
	N	%	N	%	No	%	
- correct (37.2-62)	9	56.2	11	64.7	20	60.6	
- incorrect(<37.2)	7	43.8	6	35.5	13	39.4	
$\overline{X} \pm SD$	34.9 ± 17.2		37.7 ± 16.6				0.5 P > 0.05

Table (6): It was noticed that the total mean score of nurses knowledge regarding all infection control measures was insignificant (t = 0.5, P > 0.05), higher at university hospital (37.7± 16.6) than teaching hospital (34.9 ± 17.2).

Part (III): Nurses practice related to infection control

Table (7): Distribution for self protection and precaution practiced by nurses at both teaching & university hospitals.

Self protection & precaution	Teaching hospital n=16		university hospital n =17		Total		Test of significant
	N	**%**	**N**	**%**	**N**	**%**	
1- hand washing							
- Correct (23-38)	3	18.7	2	11.8	5	15.2	
- Incorrect (<23)	13	81.3	15	88.2	28	84.8	
$\overline{X} \pm SD$	15.5 $\pm$ 7.5		14.2 $\pm$ 6.1				0.54 > 0.05
2- Gowning							
- incorrect(< 8)	16	100	17	100	33	100	Identical
3- Gloving							
- correct (15.6- 26)	2	12.5	8	47.1	10	30.3	
- incorrect (< 15.6)	14	87.5	9	52.9	23	69.7	
$\overline{X} \pm SD$	9.9 $\pm$ 3.1		13.04 $\pm$ 4.6				2.2 < 0.05
4- Masking							
- incorrect (< 13.2)	16	100	17	100	33	100	Identical
5- Eyewear, face shield							
- incorrect (< 4.8)	16	100	17	100	33	100	Identical

Table (7): shows that the mean nurses practice score related to hand washing is slightly higher in teaching than university hospital. Meanwhile the mean nurse's practice score related to gloving is slightly higher in the university than teaching hospital. It was noticed that all nurses in two hospitals had incorrect practice related to gowning, masking & eye wear face shield with insignificant difference between them. Also the majority of nurses at two hospitals had incorrect practice related to hand washing (81.3%, 88.2%) with insignificant difference. Also the same table clears that the majority of nurses had incorrect practice related to gloving (87.5%, 52.9%) in the teaching and university hospital and reveals that slightly less than half (47.1%) of nurses had correct practice related to gloving in university hospital as compared to less than quarter(12.5%) at teaching hospital with significant differences.

Table (8) : Distribution of nurses according to their practice regarding to infection control for injection.

Infection control for injection	Teaching hospital n=16		university hospital n =17		Total		Test of significant
	N	%	N	%	N	%	
1- Vein puncture							
- correct (32.5 – 54)	4	25	12	70.6	16	48.5	
- incorrect (<32.5)	12	75	5	29.4	17	51.5	
$\overline{X} \pm SD$	23.2 ± 12		35.5 ± 12.5				5.3 < 0.05
2- I.M injection							
- correct(23 -38)	3	18.7	7	41.2	10	30.3	
- incorrect (< 23)	13	81.3	10	58.8	23	69.7	
$\overline{X} \pm SD$	25.8 ± 14.4		19.6 ± 9.4				0.94 > 0.05
3- Recapping of needles							
- correct (13.2 -22)	0	0	2	11.8	2	6.1	
- incorrect (<13.2)	16	100	15	88.2	31	93.9	
	7.1 ± 0.0		8.3 ± 3.5				0.79 > 0.05
4-Disposal of needles & sharp instruments:							
- correct (7.5-12)	0	0	2	11.8	2	6.1	
- incorrect (<7.5)	16	100	15	88.2	31	93.9	
$\overline{X} \pm SD$	7.5 ± 0.0		5.4 ± 1.8				1.8 > 0.05

Table (8): reveals that the mean nurses practice score related to vein puncture & recapping of needles is slightly higher in university hospital than teaching hospital, meanwhile the mean nurse's practice score related to I.M injection & disposal of needles & sharp instruments is slightly higher in teaching than university hospital. And also illustrates that the majority of nurses at two hospitals (teaching & university) had incorrect practice related to recapping of needles and disposal of needles & sharp instruments (100%, 88.2%) with insignificant difference between two hospitals. Also it was observed that the majority of nurses at teaching hospital had incorrect practice (75% , 81.3%) related to vein puncture & I.M injection, meanwhile the majority of nurses had correct practice related to the same procedure at the university hospital. And also the table indicates significant difference (5.3 < 0.05) in the vein puncture.

Table (9) : Distribution of nurses according to their practice regarding skin disinfection.

Skin disinfection	Teaching hospital n=16		university hospital n =17		Total		Test of significant
	N	%	N	%	No	%	
1- Perineal care.							
- Incorrect(< 23)	16	100	17	100	33	100	Identical
2- Vaginal examination							
- Incorrect (< 18)	16	100	17	100	33	100	Identical
3- Preparing and maintaining sterile field							
- Correct(24-40)	4	25	0	0	4	12.1	
- Incorrect (< 24)	12	75	17	100	29	87.9	
$\overline{X} \pm SD$	17.4 ± 8.7		12.5 ± 0.0				$2.6 < 0.05$

Table (9): demonstrated that all nurses in the two hospitals had incorrect practice related to perineal care & vaginal examination (100%) with insignificant difference, and also showed that the mean score practice related to preparing and maintaining sterile field is higher in the teaching hospital than university hospital with significant difference (2.6 < 0.05).

Table (10) : Distribution of nurses according to their practice Regarding instrument & equipment processing

Instrument & equipment processing	Teaching hospital N = 16	University hospital N = 17	Significant test
1- Decontamination	0.0 ± 0.0	0.53 ± 0.8	2.7 Sig.
2- Cleaning	0.38 ± 0.5	0.47 ± 0.6	0.5 In Sig.
3- High level disinfection by boiling	0.0 ± 0.0	0.0 ± 0.0	Identical
4- Sterilization a- By chemical b- Dry heat c- Autoclave	0.0 ± 0.0 0.0 ± 0.0 1.7 ± 0.7	0.06 ± 0.2 0.0 ± 0.0 0.0 ± 0.0	1.2 In sig. Identical 8.5 Sig.

Table (10): Shows that all nurses had incorrect practice (0.0 score) related to decontamination, sterilization by chemical substance at the teaching hospital as compared to (0.53 ± 0.8) (0.06 ± 0.2) in the university hospitals. Regarding to cleaning procedure, the table indicates insignificant difference between two hospitals. Concerning high level of disinfection by boiling and sterilization by dry heat, the table illustrates that all nurses at two hospitals had incorrect practice. Also it indicates that sterilization by autoclave is significant higher in the teaching hospital (1.7 ± 0.7) than university hospital (0.0 ±0.0).

Table (11) : Distribution according to nurses performance regarding traffic flow of personals and articles at both teaching and university hospitals.

Traffic flow of personals and articles	Teaching hospital n=16		university hospital n =17		Total		Test of significant
	N	%	N	%	No	%	
I- Personals							
- incorrect (< 6)	16	100	17	100	33	100	Identical
2- Articles							
- correct(4.8-8)	14	87.5	7	41.2	21	63.6	
- incorrect(<4.8)	2	12.5	10	58.8	12	36.4	
$\overline{X} \pm SD$	6.0 ± 1.2		4.3 ± 1.8				$6.9 < 0.05$

This table (11): clears that all nurses at two hospitals had incorrect practice related to traffic flow for personals with insignificant difference between two hospitals. Also shows that the majority (87.5%) of nurses at teaching hospital had correct practice related to traffic flow for articles, meanwhile more than half (58.8%) of nurses at university hospital had incorrect practice with significant difference between two hospitals.

Table (12) : Distribution of nurses according to the total
level of practices in both teaching &
university hospital.

Total level of practice	Teaching hospital n = 16		University hospital n = 17		Total		t & P value
	No	**%**	**No**	**%**	**No**	**%**	
- correct(274.8-458)	3	18.7	4	23.5	7	21.2	
- incorrect(<274.8)	13	81.3	13	76.5	26	78.8	
$\overline{X} \pm SD$	180.7 ± 92.1		191.7 ± 99.9				0.252 P > 0.05

This table (12): illustrates that the majority (81.3 % & 76.5%) of
nurses at the two hospitals had incorrect practice regarding infection
control with insignificant difference (t = 0.252/ > 0.05) between them.

Part (IV): correlation between knowledge &demographic data

Table (13): Correlation between nurses level of knowledge regarding infection control and their demographic data.

Demographic data	Level of knowledge				Total		Test of sig.
	Correct N = 20		incorrect N = 13		N=33		
	N	%	N	%	No	%	
* Age / year							
< 20	3	15	2	15.4	5	15.2	
20-	9	45	7	53.8	16	48.4	
> 30	8	40	4	30.8	12	36.4	r =- 0.76
* Years of experience:							
< 5	8	40	4	30.8	12	36.4	
5-	9	45	5	38.4	14	42.4	
> 14	3	15	4	30.8	7	21.2	r =- 0.75
* Qualification:							
- Diploma	17	85	12	92.3	29	87.9	
- Dep. & special.	3	15	1	7.7	4	12.1	r = - 0.93

Table (13) reveals a negative correlation between level of nurses knowledge regarding infection control and their age (r=-0.76), years of experience (r=-0.75) and qualification (r =-0.93).

Part (V): Correlation between practice &duration of training

Table (14): Correlation between total nurses practice and their duration of training.

Duration of training	Level of practice				Total		Test of significant
	correct N = 7		incorrect N = 26				
	No	%	No	%	No	%	
one week	1	14.3	1	3.8	2	6.1	
2 weeks	3	42.8	1	3.8	4	12.1	r = 0.68
4 weeks	2	28.6	0	0	2	6.1	
no training	1	14.3	24	92.4	25	75.7	

Table (14) shows that there is a positive correlation between nurses practice and their duration of training (r = 0.68).

VD: **Correlation between knowledge &practice**

Table (15): Correlation between total level of nurses knowledge and their total level of practice.

Total level of knowledge	Total level of practice				Test of sig.
	Correct N = 7		Incorrect N = 26		
	No	%	No	%	
-correct (n=20)	5	71.4	15	57.7	
-Incorrect (n=13)	2	28.6	11	42.3	r =-0.6

Table (15): Reveals that there is a negative correlation between nurses knowledge and their practice (r =- 0.6).