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Impact of Infection Control Guideline on Health Care Workers' Knowledge Caring for Hepatitis C Patients in Egypt: One Arm Study.

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Abstract
Background: *Hepatitis C is a disease of significant global impact. Chronic HCV infection is a serious, progressive, and potentially life-threatening disease.*
Objectives: *the aim of this study was to evaluate the effect of implementing infection control guideline on health care workers' knowledge.*
Design: *quasi-experimental research design was used in this study.*
Setting: *The study was conducted at the Egyptian Liver Institute in Sherbein Dakahlia.*
Sample: *A convenience sample of 61 health care workers was selected.*
Tools of the study: *Two tools were used to collect the necessary data for this study: Tool I: Health care workers knowledge questionnaire: divided into 3 parts: Part 1: Socio-demographic data, Part 2: Hepatitis C knowledge assessment questionnaire, Part3: Infection control precautions knowledge assessment questionnaire. Tool II: Infection control guideline.* ***Result:*** *There was a statistically significant differences between overall knowledge and qualificationin pre implementation phase were (p<0.009).*
Conclusion: *There was improvement in health care workers' knowledge in immediate and after 3 months of implementation of infection control guideline.*
Recommendation: *Periodic refreshing training courses should be provided in order to keep the health care workers of updating knowledge regarding universal infection control precautions.*
Keywords: *Infection Control Guideline, Health Care Workers, Knowledge, Hepatitis C*

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What is already known about the topic?
Guidelineimplementing is an approach that has established increasing attention in recent years, mainly in the context of higher education. Self-learning is essential in assisting health care workers to meet the challenges presented in today's health care environment.

What this paper adds?
This paper provide insight about improvement in health care workers' knowledge in immediate and after 3 months of implementationof infection control guideline accepted with the research hypothesis.

I. Introduction

Hepatitis C is a disease of significant global impact. The Hepatitis C virus (HCV) is a small-enveloped virus of the Flaviridae family and genus Hepacivirus, with a single-stranded positive RNA molecule of approximately 9.6 kb. The main problem is that, following exposure to HCV, only a minority of patients clears the acute infection, whereas 80% persist with life-long chronic viremia. Chronic HCV infection is a serious, progressive, and potentially life-threatening disease [1],[2].

Hepatitis C virus (HCV) infection is a main contributor to chronic liver diseases worldwide, currently affecting 170-200 million individuals (3% of the world's population). Long-term HCV infection translates to a heavy burden of liver-related morbidity and mortality, mainly due to liver complications such as liver cirrhosis, liver failure and hepatocellular carcinoma (HCC), causing about 350,000- 500,000 deaths yearly worldwide.

Despite the tremendous morbidity and mortality of chronic HCV infection, about 50% of the affected individuals are unaware of their infection, irrespective of its stage [3]**.**

Hepatitis C virus (HCV), and its long-term resultant consequences, is a major endemic medical health problem in Egypt. Having taken a representative sample of the country, from both urban and rural areas, an Egyptian demographic health survey conducted in 2008 concluded that 14.7% of the population have been infected, making this the highest prevalence in any population in the world [4], [5].

In 2015, the seroprevalence of HCV infection in Egypt has declined to 6.3% among the studied population with an overall estimated 30% decrease in HCV prevalence in Egypt between 2008 and 2015. HCV transmission is still ongoing, and incidence rates have been estimated at 2.4 per 1000 person-years (close to 165 000 new infections annually) [6].

Although risk factors commonly associated with transmission of HCV infection include blood transfusion from unscreened donors, unsafe therapeutic injections, and other health-care related procedures, the majority of new and existing infections in most countries have occurred as a result of injection drug use [7]**.**

The main risk factors for transmission in Egypt historically have included the now archaic parenteral antischistosomal therapy, shared or reused needles, poorly sterilized surgical or dental equipment, and blood transfusions. While currently, Egypt is still seeing a few new cases of hepatitis C presenting in practice, poor infection control and equipment sterilization procedures used in medical and dental settings also continue to lead to iatrogenic HCV infections to the present day [4], [8].

Healthcare workers (HCWs) are potentially exposed to blood and body fluids (BBF) in the course of their work and therefore are at risk of infection with blood-borne pathogens. Worldwide, three million HCWs experience percutaneous exposure to blood-borne viruses each year (two million hepatitis B, 900,000 hepatitis C and 300,000 human immunodeficiency virus). Exposure to BBF can occur through a percutaneous injury (needlestick injury, NSI) or mucocutaneous incident (BBF splash)[9]**.**

Healthcare-associated infection (HCAI) is a major health problem today. The impact of HCAI implies prolonged hospital stay, long-term disability, increased resistance of microorganisms to antimicrobials, massive additional financial burden, high costs for patients and their families, and excess death [10].

The most effective and simple way to prevent infection in the hospital is to follow standard precautions, which are a set of recommendations designed to prevent or minimise exposure to infectious agents by hospital staff, patients and their visitors [11]**.**

These precautions are the basic level of infection control precautions which are to be used, as a level of precautions**.** The fact is that "standard precautions" are recommended when delivering the care to all patients, regardless of their presumed infection status. It is also recommended that when handling equipment and devices that are contaminated or suspected of contamination, and in situations of contact risk with blood, body fluids, secretions and excretions except sweat, without considering the presence or absence of visible blood and skin with solution of continuity and mucous tissues [12].

II. Aim Of The Study

This study aimed to:

- Assess health care workers' knowledge regarding infection control precautions.
- Establish infection control guideline for health care workers who provide care to patient with hepatitis C.
- Implement infection control guideline for health care workers who provide care to patient with hepatitis C.
- Evaluate the effect of implementing infection control guideline on health care workers' knowledge.

Research hypothesis: Health care workers who provide care for hepatitis C patients and involved in infection control guideline will have improvement in knowledge regarding infection control measures.

III. Subject And Methods

Design: Quasi-experimental research design was used in this study.
Setting: The study was conducted at the Egyptian Liver Institute in Sherbein, Dakahlia, Egypt.
Subjects: A convenience sample of 61 health care workers, who were available at the time of collection, were selected from the above mentioned setting, (18 physicians, 29 nurses, 14 laboratory technicians).

Tools of data collection:
Two tools were used to collect the necessary data for this study:

- Health care workers knowledge Questionnaire sheet.
- Infection control guideline.

Tool I: Health care workers knowledge questionnaire:

It was developed by the researcher to assess knowledge of health care workers who caring patients with hepatitis C to identify health care workers learning needs as pre-requisites for planning the infection control guideline. It consists of 59 main questions divided into 3 parts:

Part 1:*Socio-demographic data:* Demographic data containing participants' age, sex, working history (years which health care workers had worked for health care service), occupation (doctor, nurse, laboratory technician), needle stick injury (NSI) history and training courses regarding infection control.

Part 2: It included 21 closed questions related to study subjects' knowledge about hepatitis C such as causes, modes of transmission, complications, and treatment. It was designed by [13] and modified by the researcher.

Part 3: It included 38 closed questions related to study subjects' knowledge about infection control precautions such as concept of standard precaution, hand hygiene, personal protective equipment, sharp disposal and environment sanitation, care of health care workers. It was designed by [14]and modified by the researcher.

Scoring system: scoring was as: a correct answer=1 while incorrect answer= zero. Rating scale of all questions was collected total score was 59 grades. Total score represented 100%. It was evaluated as:Total good knowledge > 75.Satisfied knowledge 65 – 75.Poor knowledge < 65.

Tool II- Infection control guideline:

Infection control guideline was developed by the researcher based on the opinion of experts, the result of health care workers' knowledge, the related literature and available structure guideline.

Phases of the Study:

Three main phases were used for data collection:-

1- Preparatory phase:

An official permission was taken from the research ethics committee of the faculty of nursing at Mansoura University to conduct the study.

Validity: The tool was developed by the researcher after reviewing the relevant literature and tested for its validity by jury of 5 expertises in the field (3 nursing professors and 2 medicine professors).

Reliability: Reliability test was made by using Cronbach's Alpha and was (alpha= .77). For the purposes to ascertain the clarity and applicability of the tool and to estimate the time needed to answer the questionnaire.

Pilot study:was conducted on 10 health care workers. They were then excluded from the study. The results of the pilot study were as follow: Reviewing the tool was made, some questions were modified and tool was reconstructed and made ready for use.

2- Operational phase:

Included assessment, planning and implementation phases.

Assessment phase: Assessment of health care workers knowledge:

- The purpose of the study was explained to the health care workers.
- Verbal consent was obtained from Health care workers.
- Reassurance was given to health care workers about confidentiality of their responses.
- The researcher assessed health care workers' knowledge using tool I.
- Complete instructions regarding answering the questionnaire sheet were given to health care workers.
- Each interview lasted for 30minutes.

Planning phase:Infection control guideline: Based on work completed in assessment phase, the investigator designed the guideline based on assessment of the studied health care workers through reviewing the related literature. Teaching materials was prepared as audiovisual materials, video tape and booklet.

Implementation phase:

- Health care workers divided into small groups (8-12 participant/ session) according to their time schedule.
- Three sessions were conducted weekly. Each session lasted for (30minutes).
- Session conducted by using power point presentation, discussion and audiovisual materials.
- Discussion offered during sessions and summery offered at the end of each session.
- Infection control guideline(booklet) was given to health care workers to be a reference for them.

3- Evaluation phase:

- Evaluation the effect of guideline on health care workers' knowledge by using tool I.
- The health care workers were evaluated immediately and after three months following the session of guideline.
- Data collection took a period of 9 months (started from first of January 2016 to end of September 2016).

IV. Result

Table (1): Shows that bout two third of the studied health care workers (63.9%) were between 20-25, more than half of them (59%) were female and most of them (80.3%) had 1-5 years of experience.

Only more than third of the studied health care workers (37.3%) had training courses regarding infection control and only (26.2%) of the studied health care workers had needle stick injury history.

Table (2): Represents that there was a statistically significant difference between pre, immediate and after 3 months of implementation phases in the health care workers' overall knowledge ($p<0.001$).

The mean± SD percent score of the studied health care workers' overall knowledge, in pre implementation phase was (78.30 ± 6.50) compared to (92.91 ± 3.90) and (89.02± 5.21) in their overall knowledge in immediate and after 3 months of implementation phases.

Figure (1): Clarifies that in pre implantation phase, near two third (60.7%) of the studied health care workers had a good overall knowledge, while all of them (100%) had a good overall knowledge in immediate and after 3 months of implantation phases.

Figure (2): Represents that only less than half of the studied nurses had a good overall knowledge (41.4%) in pre implementation phase, while all of the studied nurses (100%) had a good overall knowledge in immediate and after 3 months of implementation phases.

All the studied physicians and technicians (100%) had a good overall knowledge in immediate and after 3 months of implementation phase.

Table (3): Represents that there was a statistically significant between overall knowledge and age ($p= 0.045$) in pre implementation phase.There was a statistically significant between overall knowledge and years of experience ($p= 0.003$) in pre implementation phase where.There was a statistically significant between overall knowledge and qualification ($p= 0. 009$) in pre implementation phase.There was a statistically significant between overall knowledge and health care group ($p= 0. 008$) in pre implementation phase.

Table (1): Distribution of the studied sample according to demographic data pre, immediately post and after 3 months of implementing guideline (n=61):

Socio- demographic characteristics items	**Total (n= 61)**		**Physician (n= 18)**		**Nurse (n= 29)**		**Technician (n= 14)**	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**
Age								
20 – 25years	39	63.9	1	5.6	29	100.0	9	64.3
>25 – 30years	15	24.6	10	55.6	0	0.0	5	35.7
>30 years	7	11.5	7	38.9	0	0.0	0	0.0
Min. – Max.	21.0 – 36.0		25.0 – 36.0		21.0 – 24.0		24.0 – 28.0	
Mean ± SD.	25.28±3.41		29.50±2.79		22.66±0.97		25.29±1.20	
Sex								
Male	25	41.0	14	77.8	4	13.8	7	50.0
Female	36	59.0	4	22.2	25	86.2	7	50.0
Years of experience								
1 – 5	49	80.3	8	44.4	29	100.0	12	85.7
6 – 10	12	19.7	10	55.6	0	0.0	2	14.3
Qualification								
Diploma	25	41.0	0	0.0	25	86.2	0	0.0
Baccalaureate	28	45.9	10	55.6	4	13.8	14	100.0
Master	8	13.1	8	44.4	0	0.0	0	0.0
Doctorate	0	0.0	0	0.0	0	0.0	0	0.0
Training courses regarding infection control								
No	38	62.3	14	77.8	10	34.5	14	100.0
Yes	23	37.7	4	22.2	19	65.5	0	0.0
Number of Training courses								
0	38	62.3	14	77.8	10	34.5	14	100.0
1	18	29.5	4	22.2	14	48.3	0	0.0
2	4	6.6	0	0.0	4	13.8	0	0.0
3	1	1.6	0	0.0	1	3.4	0	0.0
Needle sticks injury history								
No	45	73.8	9	50.0	23	79.3	13	92.9
Yes	16	26.2	9	50.0	6	20.7	1	7.1

Table (2): Comparing knowledge pre, immediately post and after 3 months of implementing guideline among the studied group (n=61):

Overall knowledge score	No. items	Score	Pre (n= 61)	Immediately post (n= 61)	After 3 months (n= 61)	P- value Pre/immediately post	P value Pre/after 3 months
Total score	59	0 - 59				<0.001**	<0.001**
Min. – Max.			38.0 – 55.0	47.0 – 59.0	46.0 – 59.0		
Mean ± SD			46.20 ± 3.83	54.82 ± 2.30	52.52 ± 3.07		
Percent score							
Min. – Max.			64.41 – 93.22	79.66 – 100.0	77.97 – 100.0		
Mean ± SD			78.30 ± 6.50	92.91 ± 3.90	89.02 ± 5.21		

p: p-value for Post Hoc Test (LSD) for ANOVA with repeated measures for comparison between pre with each of post and after 3 months of program.
**: Highly statistically significant at $p \leq 0.001$

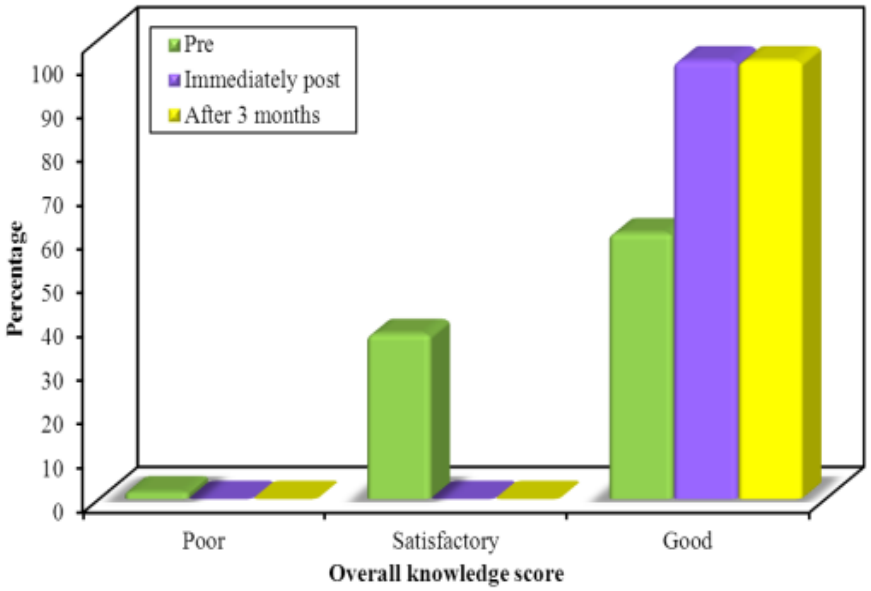

Figure (1): Comparing knowledge pre, immediately post and after 3 months of implementing guideline regarding total overall knowledge (n=61).

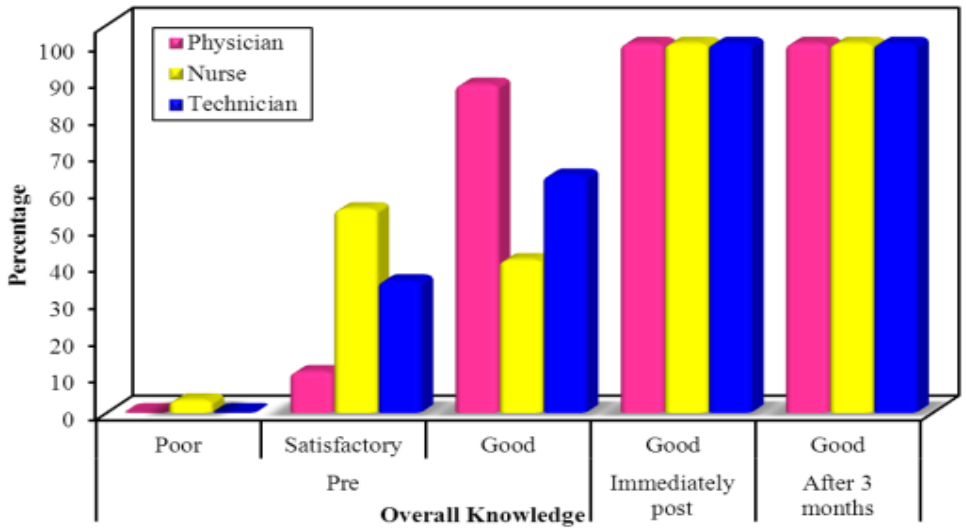

Figure (2): Comparing health care workers' total overall knowledge (n=61).

Table (3): Relation between socio-demographic data with overall knowledge (n=61):

	Pre (n= 61)				Immediately post (n=61)						After 3 months (n= 61)			
	Poor (n = 56)		Satisfactory (n= 5)		Poor (n = 20)		Satisfactory (n= 24)		Good (n = 17)		Poor (n = 49)		Satisfactory (n= 12)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Age														
20 – 25 years	37	66.1	2	40.0	8	40.0	20	83.3	11	64.7	33	67.3	6	50.0
>25 – 30 years	14	25.0	1	20.0	9	45.0	2	8.3	4	23.5	11	22.4	4	33.3
>30 years	5	8.9	2	40.0	3	15.0	2	8.3	2	11.8	5	10.2	2	16.7
χ^2(MC p)	3.768 (0.133)				9.589* (0.038*)						1.657 (0.497)			
Sex														
Male	23	41.1	2	40.0	11	55.0	7	29.2	7	41.2	20	40.8	5	41.7
Female	33	58.9	3	60.0	9	45.0	17	70.8	10	58.8	29	59.2	7	58.3
χ^2(FE p)	0.002 (1.000)				2.975 (0.250)						0.003 (1.000)			
Years of experience														
1 – 5	46	82.1	3	60.0	14	70.0	22	91.7	13	76.5	41	83.7	8	66.7
6 – 10	10	17.9	2	40.0	6	30.0	2	8.3	4	23.5	8	16.3	4	33.3
χ^2(FE p)	1.424 (0.252)				3.570 (0.168)						1.764 (0.229)			
Qualification														
Diploma	23	41.1	2	40.0	4	20.0	12	50.0	9	52.9	19	38.8	6	50.0
Baccalaureate	26	46.4	2	40.0	11	55.0	11	45.8	6	35.3	24	49.0	4	33.3
Master	7	12.5	1	20.0	5	25.0	1	4.2	2	11.8	6	12.2	2	16.7
χ^2(MC p)	0.740 (0.831)				7.555 (0.103)						1.180 (0.593)			
Training courses regarding infection control														
No	35	62.5	3	60.0	14	70.0	15	62.5	9	52.9	30	61.2	8	66.7
Yes	21	37.5	2	40.0	6	30.0	9	37.5	8	47.1	19	38.8	4	33.3
χ^2(p)	0.012 (FE p= 1.000)				1.139 (0.566)						0.122 (FE p= 1.000)			
Health care group														
Physician	15	26.8	3	60.0	11	55.0	3	12.5	4	23.5	15	30.6	3	25.0
Nurse	27	48.2	2	40.0	4	20.0	14	58.3	11	64.7	23	46.9	6	50.0
Technician	14	25.0	0	0.0	5	25.0	7	29.2	2	11.8	11	22.4	3	25.0
χ^2(MC p)	2.488 (0.239)				12.967* (0.009*)						0.255 (1.000)			
Number of Training courses														
0	35	62.5	3	60.0	14	70.0	15	62.5	9	52.9	30	61.2	8	66.7
1	17	30.4	1	20.0	6	30.0	6	25.0	6	35.3	16	32.7	2	16.7
2	3	5.4	1	20.0	0	0.0	2	8.3	2	11.8	2	4.1	2	16.7
3	1	1.8	0	0.0	0	0.0	1	4.2	0	0.0	1	2.0	0	0.0
χ^2(MC p)	2.120 (1.000)				3.538 (0.991)						4.491 (0.210)			
Needle sticks injury history														
No	42	75.0	3	60.0	13	65.0	19	79.2	13	76.5	35	71.4	10	83.3
Yes	14	25.0	2	40.0	7	35.0	5	20.8	4	23.5	14	28.6	2	16.7
χ^2(p)	0.534 (MC p= 0.599)				1.220 (0.543)						0.706 (FE p= 0.490)			

χ_2: Chi square test
MC: Monte Carlo for Chi square test
FE: Fisher Exact for Chi square test
*: statistically significant at $p \leq 0.005$

V. Discussion

Health care workers (HCWs) are at increased risk of occupationally acquired infection transmitted from both blood borne pathogens, such as hepatitis C&B and Human Immune Deficiency Virus as well as respiratory infection. The most effective and simple way to prevent infection in the hospital is to follow standard precautions, which are a set of recommendations designed to prevent or minimize exposure to infectious agents by hospital staff, patients and their visitors [15],[11].

Infection control is a key component of knowledge for all healthcare professionals, not only for their health but also to reduce nosocomial infections and thus improve the patient safety. Therefore, the present study aimed to first: Assess health care workers' knowledge regarding infection control precautions. Second: Evaluate the effect of implementing infection control guideline on health care workers knowledge.

1-Demographic characteristics of the studied sample:

The result of the present study revealed that most of the studied samples were nurses and the least number were laboratory technicians. That is may be due to large numbers of the nursing staff working in hospitals. That is in the same line with the study done by[16]who reported that most of the respondents were nurses and minority of them were laboratory technicians. The same the study done by[11]who reported that half of the participants were nurses and minority of them were laboratory technicians. But in contrast with done by[17]who reported that most of the studied subject were doctors. Also study done by[18]who reported that two third of the studied participant were physicians.

In the current study, only one quarter of the studied health care workers reported that they had a history of needle stick injury. Needle stick injury was high in physician as half of them had a history of needle stick injury. That is may be due to stress of work and lack of knowledge of physician regarding sharp disposal. In the same line with study done by[19]who told that near half of the studied HCWs had a needle stick injury in the past and frequency of injury was high in physicians. In contrast with the study done by[20]and study done by [21]who reported that more than three quarter of the health care workers have a history of needle stick injury.

In my study, more than one third of the studied sample had training courses regarding infection control. More than three quarter nurses attained courses of infection control. That is may be due to work load that hinder them to attain courses. In the same line study done by[16]who reported that near two third of the participant had training on blood born disease and universal precaution. Also near three quarter of nurses attained training.In contrast the study done by[15] who showed that majority of the studied participant had a training about infection control.

2- Health care workers' knowledge about infection control measures

In the present study, there was improvement regarding modes of transmission of hepatitis C pre and post guideline implementation. That is may be due to clear and simple information of guideline. That is in the same line with the study done by[22]who reported improvement pre and post-test education in knowledge of participant regarding modes of transmission of hepatitis C. while in the study done by[23]near two third of the participant had a good knowledge about modes of transmission.

In relation to vaccination and treatment of hepatitis C, there was improvement in knowledge of the studied HCWs pre and post guideline implementation. That is may be due to clear and simple information of guideline. That is agree with study done by[22]who reported improvement pre and post-test education in knowledge of participant regarding treatment, care and vaccination of hepatitis C. while the study done by[23]only minority of the studied sample had a good knowledge about treatment of hepatitis C and more than half of them had a good knowledge regarding vaccination.

In the current study, only more than one third of the studied health care workers had a good knowledge regarding infection control measures in pre implementation of guideline.There was obvious improvement as all of the entire studied subject had a good knowledge regarding infection control post immediately and after 3 months of implementation of guideline. There was highly statistically significant improvement of knowledge between pre, immediately post and after 3 months of implementation of infection control guideline while ($p<0.001$). That is may be due to obvious information in simple manner that improved their knowledge. This is in the same line with the studydone by[15]only more than one third of the respondent had a good knowledge pre implementation and majority of them had a good knowledge post implementation of guidelines. There was significant improvement in knowledge of general measures of infection control post guidelines while ($p< 0.002$).

Also study done by[22]who showed higher statistically significant differences between knowledge about standard precautions from pre and post education while ($p<0.01$). As there was improvement on participants' knowledge regarding standard precautions post implementation of guidelines from more than two third of the studied sample pre implementation of guideline to majority of thempost implementation of guideline.

Regarding personal protective equipment, in my study, there was highly statistically significant improvement in relation to personal protective equipment knowledge, between pre, immediately post and after 3 months of implementation of infection control guideline while ($p<0.001$). In pre implementation, near two third of the studied subject had a good knowledge regarding personal protective equipment, while majority of them had a good knowledge post implementation of the guidelines. That is may be due to clear and simple information of guideline. This is in the same line of the study done by[15]there was significant improvement in knowledge of general measures of infection control post guidelines while ($p< 0.001$). As there was improvement on participants personal protective equipment knowledge post implementation of guidelines from near one quarter of them to near three quarter of the studied sample.

Regarding prevention of hepatitis B during working with blood and body fluids, majority of the studied sample told that immunization for all health care workers pre implementation and improved to all of them post implementation of guideline. This may be due to continuous education about hepatitis B immunization. In agreement with the study done by[24]who reported that more than three quarter of the studied participant told that vaccination is very effective against hepatitis B in pre educational program and improved to majority of them post educational program.

Regarding recapping needle, more than half of the studied health care workers knew that used needless should not be recapped after use to prevent injuriesin pre implementation of guidelinesphase. The knowledge highly improved post implementation of guidelines to majority of them. That is may be due to lack of training on sharp disposal and then improved after guideline. Also study done by[18]only near one quarter of the studied sample did not re-sheath needles. And study done by[25]who reported that more than half of the studied employees had recapped the contaminated syringes after using them and had thrown them in a safety box. While study done by [11]who reported that only one third of the studied healthcare workers usually recap sharps with two hands.

Regarding bending of needle before disposal, majority of the studied health care workers knew that used needles should not be bent after use to prevent injuries pre implementation of guideline and highly improved post implementation. That is may be due to good knowledge about dangerof needle bending. In the

same line the study done by [24]who showed that near two third of the studied respondent did not bend needle before disposal pre educational program and improved to majority of them post educational program. Also study done by [22]who showed that near all of them did not bent needle before disposal pre-program implementation and improved to all of them post-program implementation.

3- Relationship between socio demographic variables with knowledge:

Regarding relation of knowledge and age, there was relationship between knowledge and age of the studied sample while (p=0.045) before guideline implementation. In the same line with study done by [10]who showed relationship between the studied sample's knowledge and their age before receiving of educational booklet. Also study done by [24]who showed positive statistically significant correlation between pretest of knowledge with age while (P value 0.013).

Regarding relation of knowledge and qualification, there was relationship between knowledge and qualification of the studied sample while (p=0.009) before guideline implementation. In agreement with study done by[24]who showed positive statistically significant correlation between knowledge and level education pre-educational program implementation while (P=0.002).

VI. Conclusion

Based on the findings of the present study, it could be concluded that:

There was improvement in health care workers' knowledge in immediate and after 3 months of implementation of infection control guideline.

VII. Recommendation

Based Upon The Findings of The Current Study:

- Periodic refreshing training courses should be provided in order to keep the health care workers of updating knowledge regarding universal infection control precautions.
- Providing training programs for newly joined health care workers about infection control standard precautions and at regular intervals.
- Continuous educational programs for health care workers about hepatitis C to keep them up to date with hepatitis C virus (HCV) and other blood borne diseases.
- Periodic checkup for health care workers should be done to identify any occupational hazards as HCV to manage it early and to prevent additional infection for both health care workers and patients.

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References

[1] M.A.Blomé, P.Björkman, V. Molnegren, P. Höglund, and A. Widell, Hepatitis C viremia patterns in incident hepatitis C infection and one year later in 150 prospectively tested persons who inject drugs,*Plos One, 9(5),* 2014,e97022.

[2] A. Gi, A.M. Matos, and C. Luxo, Hepatitis C Treatment: What to Expect in 2017,*ARC Journal of Hepatology and Gastroenterology, 1(1),* 2016, 9-12.

[3] L. Gheorghe, L. Sporea, S. Iacob, R. Şirli, A. Trifan, D. Dobru, M. Diculescu, C. Stanciu, O. Pascu, M. Acalovschi, C. Brisc, C. Cijevschi, C. Gheorghe, Z. Spârchez, I. Rogoveanu,and D. Dumitrascu, Position Paper on Treatment of Hepatitis C in Romania, 2017,*J Gastrointestin Liver Dis., 26 (2),*2017, 171-181.

[4] A. Elgharably, A.I. Gomaa, M.M. Crossey, P.J. Norsworthy, I. Waked, and S.D. Taylor-Robinson, Hepatitis C in Egypt – past, present, and future,*Int J Gen Med., 10,* 2017, 1–6.

[5] A. Kandeel, M. Genedy, S. El-Refai, A.L. Funk, A. Fontanet,and M. Talaat, The prevalence of hepatitis C virus infection in Egypt 2015: implications for future policy on prevention and treatment, *Liver Int., 37(1),* 2017, 45-53.

[6] W.El-Akel, M.H.El-Sayed, M.El Kassas, K.Elsaeed, K·Kabil, M., Shawky A.Hassany, A.Yosry, M.K. Shaker, Y.ElShazly, I.Waked, G.Esmat, andW.Doss, National treatment programme of hepatitis C in Egypt: Hepatitis C virus model of care,*J Viral Hepat, 24(4),* 2017,262-267.

[7] P. Bruggmann, andJ. Grebely, Prevention, treatment and care of hepatitis C virus infection among people who inject drugs,*Int J Drug Policy, 26 (Suppl 1),* 2015, S22-6.

[8] A. Gomaa, N.A. Elsharkway, M. El Kassas, and I. Waked, Hepatitis C infection in Egypt: prevalence, impact and management strategies, *Hepat Med,9,* 2017, 17–25.

[9] S. Singh, A. K. Malhotra, S.K. Verma, R. Yadav, and S. Gupta, A Study on Prevalence of Practice of Universal Precautions Among Health Care Workers in Medical College, Jhansi (U.P),*International Journal of Interdisciplinary and Multidisciplinary Studies (IJIMS), 2 (9),* 2015, 121-124.

[10] E.R. Ahmad, M. Khamis, E.M. Younis,and S.A. Alrady, Effect of a Developed Educational Booklet about Standard Infection Control Precautions on Nurses' Knowledge and Practices at Woman's Health Center-Assiut University Hospital, Egypt,*Med. J. Cairo Univ., 80(1),* 2012, 435-445.

[11] D. Ogoina, K. Pondei, B. Adetunji, G. Chima, C. Isichei, and S. Gidado, Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria,*Journal of Infection Prevention, 16(1),* 2015, 16– 22.

[12] A. Ayed, M. Eqtait, I. Fashafsheh, and G.A. Ali, Knowledge & Compliance of Nursing Staff towards Standard Precautions in the Palestinian Hospitals,*Advances in Life Science and Technology J; 36,* 2015, ISSN 2224-7181.

[13] J.A. Richmond, T.L. Dunning, and P.V. Desmond, Health professionals' attitudes toward caring for people with hepatitis C, *Journal of Viral Hepatitis, 14(9),* 2007, 624-632.

[14] T. Amin and A. Al Wehedy, Healthcare providers' knowledge of standard precautions at the primary healthcare level in Saudi Arabia, *Healthcare Infection Journal, 14*, 2009, 65–72.
[15] S.A. Al Yousef, Effect of Nursing Guidelines Regarding Infection Control Measures on Performance of Internship Students in Applied Medical Science College at Hafr Al-Batin,*IOSR Journal of Nursing and Health Science (IOSR-JNHS), 3(Issue 4),* 2014, 37-46.
[16] M. Zhang, H. Wang, J. Miao, X. Du, T. Li, and Z. Wu, Occupational Exposure to Blood and Body Fluids Among Health Care Workers in a General Hospital, China,*American Journal of Industrial Medicine, 52,* 2009, 89–98.
[17] K. Siddique, S. Mirza, S.F. Tauqir, I. Anwar, A.F. Malik, Knowledge Attitude and Practices Regarding Needle Stick Injuries amongst Healthcare Providers, *Pakistan journal of surgery, 24(Issue4),*2008, 243-248.
[18] T.M. Foster, M.G. Lee, C.D. McGaw, and M.A. Frankson, Knowledge and Practice of Occupational Infection Control among Healthcare Workers in Jamaica, *West Indian Med J, 59 (2),*2010, 147-152.
[19] A. Zafar, N. Aslam, , N. Nasir, R. Meraj, V. Mehraj, Knowledge, attitude and practices of health care workers regarding needle stick injuries at a tertiary care hospital in Pakistan,*J Pak Med Assoc., 58(2),* 2008, 57-60.
[20] S. Muralidhar, P.K. Singh, and R.K. Jain, Needle stick injuries among health care workers in a tertiary care hospital of India, *Indian J Med Res, 131,* 2010, 405-410.
[21] A. Sultana, A. Kulsoom, andR. Iqbal, Needle Stick/Sharp Injuries in Health Care Workers, *Journal of Rawalpindi Medical College (JRMC), 18(1),* 2014, 133-135.
[22] S.A. Mohamed, and A.M. Wafa, The Effects of an Educational Program on Nurses Knowledge and Practice Related to Hepatitis C Virus: A Pretest and Posttest Quasi-Experimental Design,*Australian Journal of Basic and Applied Sciences, 5(11),* 2011, 564-570.
[23] S. Kaur, P. Kaur, A. Prabhakar, Amisha, A. Kumari, and A. Kumari,Assessment of Knowledge and Attitude Regarding Hepatitis B and C among Nursing Students, *Int. J. Nurs. Midwif. Res., 2(2),*2015, 1-5.
[24] S.A. Abdulla, and Z. Abdulla, Effect of an educational program on nurses' knowledge and practices toward Hepatitis B virus in emergency hospitals in Erbil City, *Zanco J. Med. Sci., 18(1),* 2014, 618-624.
[25] M. Amini, M.J. Behzadnia, F. Saboori, M. Bahadori, and R. Ravangard, Needle-Stick Injuries among Healthcare Workers in a Teaching Hospital,*Trauma Mon., 20(4),* 2015, e18829.

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