

Evaluation of Nurses Practices toward the Prevention of Hepatitis C Virus among Children at Hemodialysis Units

Ayaat Hassan Abd Qahtan¹, Al-Mosawi, Khatam M.²

¹MSN, Pediatric Nursing Department, College of Nursing, University of Baghdad, Baghdad, Iraq.

ayat.abd2104m@conursing.uobaghdad.edu.iq

²Ph.D., Professor, Pediatric Nursing Department, College of Nursing, University of Baghdad, Baghdad, Iraq.

dr.khatam@conursing.uobaghdad.edu.iq

ABSTRACT

This study aims to Evaluate Nurses Practices toward the Prevention of Hepatitis C Virus among Children at Hemodialysis Units. A pre-experimental design used in the present study with the application of a pre-test, post-test I and post-test II approach for the study after the implementation of instructional program. Data collection was done before instruction was provided to the study, then post-test I after 7 days of starting to give the instructional program in the study, and post-test II after 2 months from post-test I of starting to give the instructional program. The period of the study was from December 19th, 2022 to March 19th, 2023. sample is carefully chosen which consists of (30) nurses. This table displays the overall evaluation of nurses' practices about prevention of viral hepatitis C in children; the findings reveals that nurses in the study group are showing poor level of practices during the pre-test time (53.3%, $M \pm SD = 59.93 \pm 9.362$) while they are show good level of practices during the post-test 1 (100%, $M \pm SD = 99.07 \pm 3.432$) and post-test 2 (100%, $M \pm SD = 96.76 \pm 2.795$) that indicate the significant changes in level of practices among nurses after applying the program. Nurses' practices about prevention of viral hepatitis C in children; in the study group showing poor level of practices during the pre-test time while they are showing good level of practices during the post-test 1 and post-test 2 that indicate the significant changes in level of practices among nurses after applying the program. Planning for health education programs that aim to raise awareness regarding the importance of the prevention of viral hepatitis C in children who undergoing hemodialysis.

Keywords: Evaluation, Nurses, Practices, Prevention, Hepatitis C Virus, Children, Hemodialysis Units.

INTRODUCTION

It is essential to take measures to halt the spread of HCV within the pediatric population of hemodialysis facilities, and nurses play an essential part in this prevention effort. The current study will provide useful insights into the knowledge and practice of nurses, and it will assist in informing the development of successful measures for avoiding the spread of HCV in these settings [1].

The HCV virus is quite varied and might be one of six major genotypes or one of numerous subtypes. This genetic diversity makes it difficult to build a vaccine, and it also means that the progression of the disease, response to therapy, and the development of complications can vary depending on the genotype of the virus. This means that it is difficult to generate a vaccine [2].

The progression of HCV infection is typically a chronic process that can result in major liver consequences such as cirrhosis of the liver and cancer of the liver. However, due to the relatively recent development of direct-acting antiviral medicines, it is

now possible to successfully treat the vast majority of patients who have HCV [3].

The identification of antibodies to the virus in the patient's blood is the standard method for making an HCV diagnosis. After a diagnosis of HCV has been made, a liver biopsy or non-invasive testing may be carried out in order to ascertain the degree of liver damage and to direct decisions for treatment [4,5,6,7,8].

Dialysis's long and storied past is inextricably entwined with the development of pediatric nephrology and RRT generally. Pediatric hemodialysis (HD) was initially limited to a few pediatric clinics, especially for the treatment of acute intoxication, whereas the use of peritoneal dialysis (PD) in AKI has been institutionalized in many children's hospitals for many decades. Despite the fact that the use of pediatric hemodialysis (HD) was at first limited to a few pediatric clinics, the number of such facilities has increased [9,10,11,12,13].

Inadequate disinfection medical equipment, the high prevalence of HCV in the general population, the lack

of standard infection precautions, and the spread of infection from one patient to another, especially in dialysis centers with a high percentage of infected patients all contribute to the high incidence of HCV infections [14,15,16,17].

Patients undergoing hemodialysis are at an increased risk of contracting blood-borne viruses because of the possibility that they would be exposed to blood-contaminated equipment. There is a broad range of variation in the prevalence of HCV infection in HD patients, ranging from 5% to 60%. This variation is due to a number of factors, including the prevalence of HCV in the patient's region, infection control methods, and the screening practices of previous blood transfusions [18].

Despite this, new infections are continually being reported, and HBV infection remains a major factor in the development of liver disease across the globe [19]. The key to further lowering the burden of disease is to gain an understanding of the present modes of disease transmission and the device, as well as to put suitable preventative measures into place [20].

METHODOLOGY

Design of the study: A pre-experimental design used in the present study with the application of a pre-test, post-test I and post-test II approach for the study after the implementation of instructional program. Data collection was done before instruction was provided to the study, then post-test I after 7 days of starting to give the instructional program in the study, and post-test II after 2 months from post-test I of starting to give the instructional program. The period of the study was

from December 19th, 2022 to March 19th, 2023. sample is carefully chosen which consists of (30) nurses.

Setting of the Study: The study was conducted in Ibn Al-Baladi Teaching Hospital, Al-Karamah Teaching Hospital. These hospitals were the designated agency for data collection, because of the specialized hospitals for hemodialysis units for children, which facilitated the data collection process.

Sample of the Study: An appropriate, non-probability sample selected from nurses working in the pediatric hemodialysis unit. The sample is a study group consisting of (30) nurses:

1. Ibn Al-Baladi Teaching Hospital (15) nurses.
2. Al-Karamah Teaching Hospital (15) nurses, and the study group was subjected to an educational program in Ibn Al-Baladi Teaching Hospital.

Implementation of the educational program: Implementing the educational programme, the study group was subjected to a pre-test. The educational program was implemented and delivered through five hospital lectures related to basic information related to nurses' needs regarding nursing knowledge and practices about the prevention of viral hepatitis in blood delivery units. The lectures were designed and scheduled for approximately 60 minutes. In five lectures, two methods of program management were presented in Ibn al-Baladi Education; Booklets rich in all information related to nursing interventions for hiatal hernia and lectures that relate to key topics and focus on the objectives of each lecture.

RESULTS

Table 1
Evaluation of Nurses' Practices about "Preventing Viral Hepatitis Type C among Children in Hemodialysis Units" among Study and Control Group

List	Preventing Viral Hepatitis Type C among Children in Hemodialysis Units	Study Group (N=15)						Control Group (N=15)					
		Pre-test		Post-test 1		Post-test 2		Pre-test		Post-test 1		Post-test 2	
		M	Eval.	M	Eval.	M	Eval.	M	Eval.	M	Eval.	M	Eval.
1	The nurse wears gloves when connecting the dialysis patient to the hemodialysis machine.	2.00	Fair	2.93	Good	2.87	Good	1.73	Fair	1.47	Poor	1.67	Fair
2	The nurse wears gloves when separating the dialysis patient from the hemodialysis machine.	1.87	Fair	2.93	Good	2.80	Good	1.73	Fair	1.47	Poor	1.67	Fair
3	The nurse wears gloves when providing health care	1.87	Fair	2.87	Good	2.87	Good	1.73	Fair	1.53	Poor	1.07	Poor

	to the patient.												
4	The nurse wears gloves when setting up the dialysis machine.	1.67	Fair	3.00	Good	2.87	Good	1.40	Poor	1.27	Poor	1.07	Poor
5	The nurse changes gloves for each patient.	1.27	Poor	2.87	Good	2.33	Fair	1.20	Poor	1.07	Poor	1.27	Poor
6	The nurse changes gloves after handling non-disposable equipment.	1.33	Poor	2.60	Good	2.53	Good	1.47	Poor	1.53	Poor	1.40	Poor
7	The nurse wears a face mask when possible blood splatters on the face.	1.47	Poor	2.93	Good	2.80	Good	1.47	Poor	1.73	Fair	1.07	Poor
8	The nurse wears glasses when it is possible to splatter blood into the eye.	1.27	Poor	2.07	Good	2.07	Good	1.07	Poor	1.00	Poor	1.20	Poor
9	The nurse wears protective clothing when blood may splatter on the clothing.	1.33	Poor	2.87	Good	2.73	Good	1.13	Poor	1.07	Poor	1.00	Poor
10	The nurse wears a head cap when blood may splatter on the head.	1.20	Poor	2.47	Good	2.60	Good	1.07	Poor	1.07	Poor	1.13	Poor
Total average		1.52	Poor	2.75	Good	2.65	Good	1.40	Poor	1.32	Poor	1.25	Poor

M: Mean, Poor= 1 – 1.66, Fair= 1.67– 2.33, Good= 2.34 – 3

The table 1 presents the evaluation of nurses' practices related to "Preventing Viral Hepatitis Type C among Children in Hemodialysis Units"; the findings reveal that nurses in the study group show **poor** level of practices during the pre-test time (Mean= 1.52), while

they show **good** level of practices during post-test 1 (Mean= 2.75) and post-test 2 (Mean= 2.65). The nurses in the control group show **poor** level of practice during the pre-test time (Mean=1.40), post-test 1 (Mean= 1.32), and post-test 2 (mean= 1.25).

Table 2
Evaluation of Nurses' Practices about "Health Precautions that Prevent Transmission of Viral Hepatitis in Hemodialysis Units" among Study and Control Group

List	Health Precautions that Prevent Transmission of Viral Hepatitis in Hemodialysis Units	Study Group (N=15)						Control Group (N=15)					
		Pre-test		Post-test 1		Post-test 2		Pre-test		Post-test 1		Post-test 2	
		M	Eval.	M	Eval.	M	Eval.	M	Eval.	M	Eval.	M	Eval.
1	The nurse washes hands with soap or an antiseptic hand lotion with water before touching the patient.	1.73	Fair	2.73	Good	2.87	Good	1.47	Poor	1.33	Poor	1.20	Poor
2	The nurse washes hands with soap or an antiseptic hand lotion with water after coming into contact with the patient.	1.80	Fair	2.80	Good	2.87	Good	1.60	Poor	1.47	Poor	1.07	Poor
3	The nurse always changes gloves for	1.33	Poor	2.87	Good	2.60	Good	1.20	Poor	1.20	Poor	1.47	Poor

	each patient, before administering medication.												
4	The nurse wears gloves before touching any potentially contaminated surface inside the blood transfusion unit.	1.47	Poor	2.60	Good	2.67	Good	1.33	Poor	1.40	Poor	1.20	Poor
5	The nurse asks the patients to clean their hands or use an antiseptic gel upon reaching the hemodialysis unit.	1.40	Poor	2.93	Good	2.80	Good	1.07	Poor	1.13	Poor	1.07	Poor
6	The nurse asks patients to clean their hands or use an antiseptic gel when leaving the hemodialysis unit.	1.27	Poor	2.73	Good	2.67	Good	1.20	Poor	1.20	Poor	1.13	Poor
7	The nurse wears personal protective equipment when performing procedures in which blood flow or spatter may occur, such as during the initiation and termination of dialysis.	1.87	Fair	2.87	Good	3.00	Good	1.47	Poor	1.53	Poor	1.13	Poor
8	The nurse changes personal protective equipment when moving from one patient to another.	1.60	Poor	2.93	Good	2.87	Good	1.20	Poor	1.40	Poor	2.47	Poor
9	The nurse removes gloves when leaving the blood transfusion station.	2.20	Fair	2.80	Good	2.53	Good	2.20	Fair	2.20	Fair	2.60	Good
Total average		1.63	Poor	2.78	Good	2.72	Good	1.41	Poor	1.43	Poor	1.48	Poor

M: Mean, Poor= 1 – 1.66, Fair= 1.67– 2.33, Good= 2.34 – 3

The table 2 presents the evaluation of nurses’ practices related to “*Health Precautions that Prevent Transmission of Viral Hepatitis in Hemodialysis Units*”; the findings reveal that nurses in the study group show **poor** level of practices during the pre-test time (Mean= 1.63), while they show **good** level of

practices during post-test 1 (Mean= 2.78) and post-test 2 (Mean= 2.72). The nurses in the control group show **poor** level of practice during the pre-test time (Mean=1.41), post-test 1 (Mean= 1.43), and post-test 2 (mean= 1.48).

Table 3

Evaluation of Nurses’ Practices about “Equipment and Waste Management Prevents Viral Hepatitis Infection in Hemodialysis Units” among Study and Control Group

List	Equipment and Waste Management Prevents Viral Hepatitis Infection in Hemodialysis Units	Study Group (N=15)						Control Group (N=15)					
		Pre-test		Post-test 1		Post-test 2		Pre-test		Post-test 1		Post-test 2	
		M	Eval.	M	Eval.	M	Eval.	M	Eval.	M	Eval.	M	Eval.
1	The nurse disposes of	2.73	Good	2.93	Good	3.00	Good	2.67	Good	1.67	Fair	1.68	Fair

	the single-use items required in the hemodialysis process after use on a single patient.												
2	The nurse sterilizes non-disposable materials such as (trays, blood pressure bracelets, stethoscopes, and scissors) after using them on one patient.	1.73	Fair	2.47	Good	2.60	Good	1.33	Poor	1.13	Poor	1.00	Poor
3	The nurse assigns to each patient the tools that cannot be easily disinfected, such as tape.	1.20	Poor	2.53	Good	2.53	Good	1.27	Poor	1.20	Poor	1.33	Poor
4	Do not transfer medicines between patients.	1.40	Poor	2.53	Good	2.47	Good	1.33	Poor	1.60	Poor	1.47	Poor
5	After each hemodialysis process for each patient, all potentially contaminated surface (chairs, beds, tables, etc.) are wiped with the designated disinfectant.	1.73	Fair	2.93	Good	2.73	Good	1.67	Fair	1.68	Fair	1.80	Fair
6	The nurse uses sharps containers as close as possible to the point of the dialysis machine.	2.27	Fair	3.00	Good	3.00	Good	1.67	Fair	1.87	Fair	1.80	Fair
7	The pathogen disposes of needles in closed, unbreakable containers that should not be filled more than necessary.	2.07	Fair	2.93	Good	3.00	Good	1.67	Fair	1.20	Poor	1.07	Poor
8	The pathogen uses the "no touch" technique to drop the needle into the container as the surface of the container is likely to be contaminated.	1.27	Poor	2.80	Good	2.60	Good	1.27	Poor	2.07	Fair	2.00	Fair
Total average		1.80	Fair	2.76	Good	2.74	Good	1.61	Poor	1.52	Poor	1.46	Poor

M: Mean, Poor= 1 – 1.66, Fair= 1.67– 2.33, Good= 2.34 – 3

The table 3 presents the evaluation of nurses' practices related to "*Equipment and Waste Management Prevents Viral Hepatitis Infection in Hemodialysis Units*"; the findings reveal that nurses in the study group show **fair** level of practices during the pre-test time (Mean= 1.80), while they show **good** level of

practices during post-test 1 (Mean= 2.76) and post-test 2 (Mean= 2.74). The nurses in the control group show **poor** level of practices during the pre-test time (Mean=1.61), post-test 1 (Mean= 1.52), and post-test 2 (mean= 1.46).

Table 4
Evaluation of Nurses' Practices about "Infection Control Precautions" among Study and Control Group

List	Infection Control Precautions	Study Group (N=15)						Control Group (N=15)					
		Pre-test		Post-test 1		Post-test 2		Pre-test		Post-test 1		Post-test 2	
		M	Eval.	M	Eval.	M	Eval.	M	Eval.	M	Eval.	M	Eval.
1	The nurse wears gloves when handling blood.	2.27	Fair	3.00	Good	3.00	Good	1.93	Fair	1.47	Poor	1.00	Poor
2	The nurse Wears gloves while changing dressings.	1.53	Poor	2.93	Good	2.53	Good	1.27	Poor	1.33	Poor	1.20	Poor
3	Wash hands after removing gloves, between contact with the patient, and after touching contaminated objects.	1.73	Fair	2.67	Good	2.80	Good	1.33	Poor	1.27	Poor	1.20	Poor
4	Cleans and disinfects the surfaces of hemodialysis machines and patient chairs between one patient and another.	1.67	Fair	2.93	Good	2.93	Good	1.47	Poor	1.07	Poor	1.00	Poor
5	He prepares medicines in a room or area separate from the patient's treatment area and designated for medicines only.	1.47	Poor	2.60	Good	2.67	Good	1.20	Poor	1.33	Poor	1.00	Poor
6	He delivers medicines to each patient separately and does not use regular carts to distribute medicines.	1.53	Poor	2.93	Good	2.53	Good	1.67	Fair	2.33	Poor	2.87	Good
7	Do not eat or drink in the dialysis treatment area.	2.27	Fair	2.87	Good	2.80	Good	2.40	Good	1.67	Fair	1.73	Fair
8	Cleans surfaces contaminated with blood and fluids.	2.00	Fair	2.80	Good	2.80	Good	1.67	Fair	1.00	Poor	1.00	Poor
9	Follows the manufacturer's instructions for chemical sterilizers and disinfecting agent units regarding the appropriate dilution and method of sterilization.	1.13	Poor	1.40	Poor	1.33	Poor	1.20	Poor	1.33	Poor	1.00	Poor
Total average		1.73	Fair	2.68	Good	2.56	Good	1.57	Poor	1.42	Poor	1.33	Poor

M: Mean, Poor= 1 – 1.66, Fair= 1.67– 2.33, Good= 2.34 – 3

The table 4 presents the evaluation of nurses' practices related to "*Infection Control Precautions*"; the findings reveal that nurses in the study group show **fair** level of practices during the pre-test time (Mean=

1.73), while they show **good** level of practices during post-test 1 (Mean= 2.68) and post-test 2 (Mean= 2.56). The nurses in the control group show **poor** level of practice during the pre-test time (Mean=1.57), post-test 1 (Mean= 1.42), and post-test 2 (mean= 1.33).

Table 5
Overall Evaluation of Nurses' Practices about Prevention of Viral Hepatitis C among Children in Hemodialysis Units among Study and Control Group

Levels of practices	Study Group (N= 15)										Control Group (N=15)													
	Pre-test				Post-test 1				Post-test 2				Pre-test				Post-test 1				Post-test 2			
	f	%	M	S. D	f	%	M	S. D	f	%	M	S. D	f	%	M	S. D	f	%	M	S. D	f	%	M	S. D
Poor	8	53.3	59.93	9.362	0	0	99.07	3.432	0	0	96.67	2.795	15	100	50.87	1.885	15	100	51.00	2.330	15	100	50.93	1.751
Fair	7	46.7			0	0			0	0			0	0			0	0			0	0		
Good	0	0			15	100			15	100			0	0			0	0			0	0		
Total	15	100			15	100			15	100			15	100			15	100			15	100		

f: Frequency, %: Percentage, M: Mean of total score, SD Standard deviation of total score

Poor= 36 – 60, Fair= 60.1 – 84, Good= 84.1 – 108

This table displays the overall evaluation of nurses' practices about prevention of viral hepatitis C in children; the findings reveals that nurses in the study group are showing poor level of practices during the pre-test time (53.3%, $M \pm SD = 59.93 \pm 9.362$) while they are show good level of practices during the post-test 1 (100%, $M \pm SD = 99.07 \pm 3.432$) and post-test 2 (100%, $M \pm SD = 96.67 \pm 2.795$) that indicate the significant changes in level of practices among nurses after applying the program.

The nurses in the control group are showing poor level of practices during the pre-test time (100%, $M \pm SD = 50.87 \pm 1.885$), post-test 1 (100%, $M \pm SD = 51.00 \pm 2.330$), and post-test 2 (100%, $M \pm SD = 50.93 \pm 1.751$) that indicate no significant change in nurses' practices.

DISCUSSION

The overall evaluation of nurses' practices about prevention of viral hepatitis C in children; the findings reveal that nurses in the study group are showing poor level of practices during the pre-test time while they are showing good level of practices during the post-test 1 and post-test 2 that indicate the significant changes in level of practices among nurses after applying the program. The nurses in the control group are showing poor level of practice during the pre-test time, post-test 1, and post-test 2 that indicate no significant change in nurses' practices, as shown in table (5).

The evaluation of nurses' practices related to "Preventing Viral Hepatitis Type C among Children in Hemodialysis Units"; the findings reveal that nurses in the study group show poor level of practices during the pre-test time, while they show good level of practices

during post-test 1 and post-test 2. The nurses in the control group show poor level of practice during the pre-test time, post-test 1, and post-test 2, as shown in table (1).

The evaluation of nurses' practices related to "Health Precautions that Prevent Transmission of Viral Hepatitis in Hemodialysis Units"; the findings reveal that nurses in the study group show poor level of practices during the pre-test time, while they show good level of practices during post-test 1 and post-test 2. The nurses in the control group show poor level of practice during the pre-test time, post-test 1, and post-test 2, as shown in table (2).

The evaluation of nurses' practices related to "Equipment and Waste Management Prevents Viral Hepatitis Infection in Hemodialysis Units"; the findings reveal that nurses in the study group show fair level of practices during the pre-test time, while they show good level of practices during post-test 1 and post-test 2. The nurses in the control group show poor level of practice during the pre-test time, post-test 1, and post-test 2, as shown in table (3).

The evaluation of nurses' practices related to "Infection Control Precautions"; the findings reveal that nurses in the study group show fair level of practices during the pre-test time, while they show good level of practices during post-test 1 and post-test 2. The nurses in the control group show poor level of practice during the pre-test time, post-test 1, and post-test 2, as shown in table (4).

According to the researcher, after the implementation of the educational program, the nurses in the study

group were able to apply the knowledge they had gained to their practices, resulting in significant improvements. In contrast, the control group, which did not receive the educational program, did not exhibit any significant improvement in their practices, indicating that a lack of knowledge and training may have been a significant barrier to their ability to improve their practices.

In contrast to our findings, the study of Ahmed [21,22,23,24,25] found that the mean scores of the examined nurses' practices linked to universal precaution were 100, which demonstrates that there are highly statistically significant differences between the nurses' practices before and after they participated in the program for six months. Regarding the washing of hands, the donning of gloves, the delivery of intramuscular injections, the preparation for the administration of hemodialysis injectable medication, and the administration of hemodialysis injectable medication.

Concerning nurses and their practices relating to universal precautions for infection control, the findings of the study showed that there was an improvement in knowledge score across the board for post-educational nurses. In the same area of research, Bayoumi and Mahmoud [26,27,28,29,30] investigated the impact of an educational program on nurses' knowledge and practice regarding the maintenance of central venous lines in pediatric hemodialysis patients, and they came to a conclusion that was analogous to the one presented here.

There were substantial variations in performance between the pre- and post-tests, as well as the retention test, for more than two-thirds of the nurses. In the same vein, the findings of the research conducted by Abd-ElHady and his colleagues [31,32,33,34] found that nurses are aware of the significance of hand washing as a means of preventing the spread of infection; however, they still do not wash their hands as often as they should. The author continued by saying that this result might be explained by the fact that nurses in that area used to rub their hands with alcohol due to the high volume of work in that sector.

Accordingly, it was found that there are highly significant differences between the conduct of the program before and after it, which may reflect the effect of the educational program on nurses' practices in infection control precautions on commencing the hemodialysis process. This was uncovered in connection with how nurses traditionally take pre-hemodialysis infection-prevention measures. This result was supported by E Bagheban and his co-authors [35,36,37,38,39], who came to the conclusion that

there was a substantial difference in the average score of knowledge and practices between the two groups before and after intervention.

In the same context, Ahmed [22,40,41,42,43,44] observed that most of the nurses on both shifts who were observed did not properly clean the access arm for one minute with soap and water or antiseptic soap, and they also failed to properly place the arm on a sterile drape or barrier. Both changes had the same result.

CONCLUSION

Nurses' practices about prevention of viral hepatitis C in children; in the study group showing poor level of practices during the pre-test time while they are showing good level of practices during the post-test 1 and post-test 2 that indicate the significant changes in level of practices among nurses after applying the program.

RECOMMENDATIONS

Planning for health education programs that aim to raise awareness regarding the importance of the prevention of viral hepatitis C in children who undergoing hemodialysis.

REFERENCES

1. Broskey M. Hepatitis C Virus Education for Nurse Practitioners in Primary Care. 2018;
2. Kouyoumjian SP, Chemaitelly H, Abu-Raddad LJ. Characterizing hepatitis C virus epidemiology in Egypt: systematic reviews, meta-analyses, and meta-regressions. *Sci Rep.* 2018;8(1):1–17.
3. Sood A, Suryaprasad A, Trickey A, Kanchi S, Midha V, Foster MA, et al. The burden of hepatitis C virus infection in Punjab, India: a population-based serosurvey. *PLoS One.* 2018;13(7):e0200461.
4. Ghany MG, Morgan TR, panel A hepatitis C guidance. Hepatitis C guidance 2019 update: American Association for the Study of Liver Diseases–Infectious Diseases Society of America recommendations for testing, managing, and treating hepatitis C virus infection. *Hepatology.* 2020;71(2):686–721.
5. Hermis AH, Abed RI. Effectiveness of Self-Regulation Fluid Program on Patients with Hemodialysis Self-Efficacy for Fluid Adherence in Al-Diwaniyah Teaching Hospital. *Iraqi National Journal of Nursing Specialties.* 2021;34(2):74-88.
6. Ali AI, Al-Mosawi KM. Mothers Quality of Life towards their Children with Nephrotic Syndrome at Pediatric Teaching Hospitals in Baghdad City. *Indian Journal of Forensic Medicine & Toxicology.* 2021 Sep 5;15(4):3276-82.

7. Shinjar FJ, Bakey SJ, Khudur KM. Effectiveness of an Education Program on Hemodialysis Patients, Knowledge towards Dietary Regimen at Al-Hussein Teaching Hospital in Al-Nasiriyah City. *Indian Journal of Public Health Research & Development*. 2018 Oct 1;9(10).
8. Naser AM, Mohammed WK. Effectiveness of Instructional Health Educational Vascular Access on Hemodialysis Patients' Knowledge at Al-Hussein Teaching Hospital in AL-Nasiriyah City. *Iraqi National Journal of Nursing Specialties*. 2016;29(1).
9. El-Akel W, El-Sayed MH, El Kassas M, El-Serafy M, Khairy M, Elsaeed K, et al. National treatment programme of hepatitis C in Egypt: hepatitis C virus model of care. *J Viral Hepat*. 2017;24(4):262–7.
10. Saeed M, Khatam AM. Effectiveness of Health Education Program on Nurses' Knowledge toward Hemodialysis at Pediatric Teaching Hospitals in Baghdad City. *Iraqi National Journal of Nursing Specialties*. 2020 Sep 27;33(1):73-84.
11. Abdalsada NM, Mansour KA. Effectiveness of an Educational Program on Nurses Knowledge and Practices Concerning Hemodynamic Monitoring in Intensive Care Unit at Baghdad Teaching Hospitals. *Indian Journal of Public Health Research & Development*. 2018 Oct 1;9(10).
12. Bakey S. Evaluation of Nurses' Practices throughout Hemodialysis Treatment for Patients in hemodialysis unit at Baghdad teaching hospitals. *Kufa Journal for Nursing Sciences*. 2012;2(2):23-38.
13. Assi AL, Kadhum HY. Evaluation of Nurses' practices toward the using of personal protective equipment's in haemodialysis unit at Baghdad teaching hospitals.
14. Ahmed Mohamed W, Mohamed Adly R, Abdel Fattah AbouZed S. Nurses' Performance Regarding the Application of Preventive Measures of Hepatitis C virus Infection among Children Undergoing Hemodialysis. *Egypt J Heal Care*. 2022;13(2):970–9.
15. Bakey SJ. Assessment of Nurses' knowledge toward Hepatitis B Virus in Hemodialysis Unit (Doctoral dissertation, Thesis) University of Baghdad, College of Nursing).
16. Athbi HA, Mohammed WK. Effect of Infection Control Education Program on Nurses Staff's Knowledge in Hemodialysis Units in Baghdad Teaching Hospitals. In *Tenth National Scientific Conference 2012* (pp. 529-550).
17. Rajih Q. Effectiveness of an Education Program on Nursing Staffs' Knowledge about Infection Control Measures at Intensive Care Unit in Al-Diwaniya Teaching Hospital. *Iraqi National Journal of Nursing Specialties*. 2020 Sep 27;33(1):85-92.
18. Mahmud S, Kouyoumjian SP, Al Kanaani Z, Chemaitelly H, Abu-Raddad LJ. Individual-level key associations and modes of exposure for hepatitis C virus infection in the Middle East and North Africa: a systematic synthesis. *Ann Epidemiol*. 2018;28(7):452–61.
19. Gaber MA-MPK, EL-Ata ABA, Gamal A. Effect of an educational program on chronic viral hepatitis C patients' knowledge related to Hepatitis C Virus disease. *Port Said Sci J Nurs*. 2015;2(2).
20. Metwally AM, Elmosalami DM, Elhariri H, El Etreby LA, Aboulghate A, El-Sonbaty MM, et al. Accelerating Hepatitis C virus elimination in Egypt by 2030: A national survey of communication for behavioral development as a modelling study. *PLoS One*. 2021;16(2):e0242257.
21. Ahmed SM, Mohamed AR, Ahmed SM. Effect of Educational Program about Infection Control Precautions for Nurses in Pediatric Hemodialysis Units. *Minia Sci Nurs J*. 2019;5(1):77–88.
22. Ahmed AMA, Allam MF, Habil ES, Metwally AM, Ibrahim NA, Radwan M, et al. Compliance with haemodialysis practice guidelines in Egypt. *EMHJ-Eastern Mediterr Heal Journal*, 19 (1), 4-9, 2013. 2013;
23. Thamer H. Assessment of Nurses' Knowledge regarding oxytocin administration during Labor at maternity hospitals in Al-Kut City. *Iraqi Natl J Nurs Spec*. 2014;1(27):1–10.
24. Al-Jubouri M. Assessment of Nurse's Knowledge about Nosocomial Infection at Hospitals in Baghdad City. *J Kufa Nurs Sci*. 2014;4(1).
25. Shauq AH, Obaid KB, Zaid W, Summer K, Ulaa N, Sabeeh O, et al. Nurses Knowledge about Universal Precautions in Neonatal Intensive Care Unit at Pediatric Teaching Hospitals in Baghdad City: Descriptive Study. *kerbala J Pharm Sci*. 2014;(8).
26. Bayoumi MH, Mahmoud NF. Effect of education program on nurses' knowledge and practice regarding care of central venous line in pediatric hemodialysis: evidence-based practice guidelines. *Egypt Nurs J*. 2017;14(2):87.
27. Shauq HA, Mualaa GE. Assessment Of The Pediatric Nurses Knowledge about the Nosocomial Infection in the Neonatal Intensive Care Unit of Baghdad Pediatric Teaching Hospitals. *ResearchGate*; 2008.
28. Obaid BK, Hussein A, Noori KA. Nurses' knowledge concerning neonatal sepsis in neonatal intensive care units at pediatric teaching hospitals in Baghdad city. *Asian Acad Res J Multidiscip*. 2016;3(7):56–65.
29. Obaid H, Mohammed S. Effectiveness of Educational Program on Nurses Knowledge toward Nursing Management for Patients Undergoing Percutaneous Coronary Intervention in Cardiac Center at Al-Dewaniyah City. *Iraqi Natl J Nurs Spec*. 2020;33(1):12–20.
30. Abd Ali W, Mohammad WK. Nurse's Practices toward Nursing Intervention of Diagnostic Procedures at Neuro Surgical Hospitals in

- Baghdad City. *Indian J Forensic Med Toxicol.* 2020;14(3):1508–14.
31. Abd-El Hady S, Khalifa MI, El Dein NAZ, Hemdan H. Effect of an Infection Control Competency Based Protocol on the Occurrence of Blood Borne Infection in Pediatric Hemodialysis Unit at Minofiya University Hospital. *Asian J Med Pharm Res.* 2011;1(1):26–38.
 32. Na'el K A, Mohammed WK. Nurses' Knowledge toward Care of Unconscious Adult Patients at Teaching Hospitals in Al-Hilla City. *Iraqi Natl J Nurs Spec.* 2019;32(1).
 33. Aziz AR. Nurses' Knowledge about Asthmatic Attacks in Children at Pediatric Teaching Hospitals in Baghdad City. *J Nurs Heal Sci.* 2018;7(3):67–74.
 34. Mousa AN, Aziz AR. Impact of an Intervention Program on Nurses Knowledge towards Infection Control Measures in Pediatric Surgical Wards. *Mosul J Nurs.* 2022;10(3):39–45.
 35. Bagheban Karimi E, Lakdizaji S, Zamanzadeh V, Hasankhani H. The Effects of Infection Control Teaching on the Knowledge and Performance of Hemodialysis Nurses in Tabriz. *Iran J Nurs.* 2018;31(111):1–9.
 36. Jabbar HM, Mohammed WK. Effectiveness of Education Program on Nursing Staff Knowledge toward Infection Control Measures at Hemodialysis Unit in Al-Dewaniya Teaching Hospital. *Ann Rom Soc Cell Biol.* 2021;25(6):11696–702.
 37. Ahmed SA, Jasim AH, Katea MJ, Foaad AS, Hashim HA, Noori DA. Assessment of Nurses' knowledge concerning Prevention of Central Venous Catheter Infection in Intensive Care Units at Baghdad Teaching Hospitals. *kufa J Nurs Sci.* 2019;9(1):1–7.
 38. Bakey S. Evaluation of Nurses' Practices throughout Hemodialysis Treatment for Patients in hemodialysis unit at Baghdad teaching hospitals. *Kufa J Nurs Sci.* 2012;2(2):23–38.
 39. Bakey SJ. Hemodialysis Nurses' Practices toward Hand Hygiene Performance at Baghdad Teaching Hospitals. *Indian Journal of Public Health Research & Development.* 2019 Apr 1;10(4).
 40. Issa IA. Depressive Symptoms among Hemodialysis Patients at Teaching Hospitals in Baghdad City. *SCOPUS IJPHRD CITATION SCORE.* 2018 Dec;9(12):764.
 41. Khaleel M, Hassan H. Effectiveness of an Instructional Program on Knowledge of Patients with Renal Failure Undergoing Hemodialysis Concerning Self-Care in Baghdad Teaching Hospital. *Indian Journal of Forensic Medicine & Toxicology.* 2019 Oct 1;13(4).
 42. Mohammad WK. Evaluation of pruritus self-management among hemodialysis patients in Baghdad Teaching Hospitals. *Indian Journal of Public Health Research & Development.* 2019 Jun 1;10(6).
 43. Mahmood WA, Khudur KM. Effectiveness of an Educational Program on Nurses' Knowledge, and Practices Concerning Nursing Management of patients with Vascular Access in Dialysis Centers at Baghdad Teaching Hospitals. *Indian Journal of Forensic Medicine & Toxicology.* 2020 Jul 30;14(3):2604–8.
 44. Bakey S. Evaluation of Nurses' Practices throughout Hemodialysis Treatment for Patients in hemodialysis unit at Baghdad teaching hospitals. *Kufa Journal for Nursing Sciences.* 2012;2(2):23–38.