

# Evaluation of Nurses' Practices Toward the Application Standard Precaution Measures in Children Hemodialysis Unit

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## Abstract

**Objectives:** This study aims to evaluate nurses' practices toward the application of standardized precaution measures in pediatric hemodialysis unit.

**Methodology:** A descriptive analysis study conducted from 1st July to 20th March 2023. A non-probability purposive sample of nurses participated in the study who were working in pediatric hemodialysis units. To evaluate nurses' practices toward application of standardized precaution measures in pediatric hemodialysis unit in items (Before Beginning Routine Disinfection of the Dialysis Station Arteriovenous fistula/graft cannulation, Arteriovenous fistula/ graft Dec annulation, Hemodialysis catheter exit site, Hemodialysis injectable medication preparation, Hemodialysis injectable medication administration, Routine Disinfection of the Dialysis Station – After patient has left station according to standardized precaution measures in hemodialysis unit of standardized precaution measures for children in hemodialysis unit). a self-administered questionnaire and checklist were constructed depend upon Centers for Disease Control and Prevention (CDC) audit tool and checklist who was formally published for the same purpose. The questionnaire was applied as a mean of data collection. The validity of the questionnaire was determined by presenting it to (16) specialist experts and its reliability was determined through a pilot study The reliability was practices (0.880). The data analysis through using statistical analysis procedures by using SPSS

**Results:** The results of the study shows that nurses had poor practices about the application of standardized precaution measures for children in hemodialysis unit. include practice before Beginning Routine Disinfection of the Dialysis Station(M=0,13) Arteriovenous fistula/graft cannulation (M=0,20) Arteriovenous fistula/ graft Dec annulation(M=0,25), *Hemodialysis catheter exit site*(M=0,35), Hemodialysis catheter disconnection M=0,53), Hemodialysis injectable medication preparation(M=0,52), Hemodialysis injectable medication administration(M=0,49), Routine Disinfection of the Dialysis Station – After patient has left station according to standardized precaution measures in hemodialysis unit (M=0,70).

**Conclusion:** the study concluded that nurses have poor practices about the application of application of standardized precaution measures in pediatric hemodialysis unit in all items

**Recommendation:** The study recommended the necessity of applying programs of the same topic to improve nurses' practices.

**KEYWORDS:** Nurses' practice, precaution measures, hemodialysis unit.

## INTRODUCTION

The kidneys are extraordinary organs that keep our bodies in balance. The kidneys govern acid/base balance, electrolytes and minerals, blood pressure, fluids, RBC production, and bone development (1)

End-Stage kidney disease (ESRS) is a global health concern that necessitates long-term care while also

being extremely expensive. The prevalence of chronic renal failure is rising in a number of nations (10).

Hemodialysis (HD): Using a machine with a 'artificial kidney'. Blood is pumped from the body to the prosthetic kidney, where it is cleansed before being returned to the body. Each dialysis treatment lasts three to four hours and is performed three or more times each week. Hemodialysis is normally performed

in a hospital, however some children can get it at home (2)

Standardized Precaution (SP) are a series of infection control practices recommendations that describe the latest and most comprehensive guidelines for the prevention of infectious risk (3). It also acts as the body's initial line of defence against fluids such as mucous membranes, blood, and secretions that don't involve direct skin contact (4). Indeed, several international groups, such as the CDC, the European Best Practise Guidelines (EPBG), the United States, the World Health Organisation (WHO), and the Association for Professionals in Infection Control (APIC) (5,6), all reference these needs. Standard precautions include practises such as hand hygiene (frequent hand washing, hand antisepsis, and surgical hand scrub) and the use of PPE (cap, gowns, masks, aprons, drapes, closed boots or shoes, goggles or glasses, sterile drapes). Clinical laboratory services, as well as those related to preventing needle sticks and other injuries caused by sharp objects, managing trash, processing instruments (decontaminating, cleaning, and sterilising), processing linen, and keeping the facility clean are all accessible (7)

Nurse's understanding and application of conventional precautions were lacking, she was at increased risk of contracting blood-borne and other infections during direct patient contact (9) On a regular basis, infection control practices should be revised and enhanced. It should be one of the top priorities of any facility that provides health care (8).

Nurses are recognized as the driving force behind good dialysis unit management and issue prevention. Because their experience has been demonstrated to be the most often linked cause of hand washing, education nurses should be devoted to following and applying personal protective equipment requirements (20) In order to reduce the likelihood of blood-borne pathogen transmission in dialysis units, nurses take precautions and implement appropriate practices (19). Evidence-based guidelines for the prevention of healthcare-associated infections (HAIs) have been published by organisations such as the Centres for Disease Control and Prevention (CDC), the Active Pharmaceutical Ingredients Committee (APIC) in all HD contexts so that information can be shared globally, and so that everyone can benefit from the work being done to eradicate infections in HD (15). After a patient has completed a dialysis session, the entire dialysis unit, including the user interface, should be considered polluted (12) Iraqi officials The overall number of patients on regular hemodialysis with

ESRD was 2,445; a point prevalence of 74/Million. The male-female ratio was 1.28:1. Iraq has the greatest number of ESRD patients. A total of 81% of the patients tested negative for viral hepatitis B and C. There were 557 hemodialysis machines in total, with a patient-to-machine ratio of 4.4: 1. The population to hemodialysis unit ratio was 1.08:1,000,000, whereas the population to hemodialysis machine ratio was 16.7:1,000,000. The working staff to patient ratio was 3.3: 10 (21).

The study found that the prevalence of paediatric chronic renal failure in Egypt is 225 cases per 1,000,000 individuals [13] The nurse can help by involving the adolescent in their own care as much as possible, explaining all available courses of therapy, and stressing the importance of self-care. There are times when nursing units are required. Nursing interventions for nurses about infection control of various procedures in hemodialysis units are extremely required and helpful in terms of care quality, and should be developed and implemented as soon as possible (10). due to a lack of understanding, fail to provide modern or latest nursing care to children undergoing hemodialysis (11). in hospitals are not being implemented sufficiently in accordance with infection control standards practice, with hand hygiene being poor, despite the fact that there is almost correct practice for utilizing personal protective equipment. Additionally in Iraq Many nurses' procedures during cannulation and Dec annulation of vascular access care on both shifts were subpar (16).

There was a gap in the nurses' practice that should have been applied to the patient during the course of hemodialysis therapy. There was no significant link identified between nurses' practice and their gender, education level, or years of experience in hemodialysis units. (17 ) Because some of the nursing staff did not adhere to personal hygiene norms, the nurses' knowledge of healthcare-related diseases did not meet this goal. (18).

## METHODOLOGY

A non-probability purposive sample of nurses participated in the study who were working in hemodialysis units. The study conducted at Ibn Al-Balady Children & Maternity Hospital, Welfare Teaching Hospital, Central Teaching Hospital of Pediatric, Al karama Teaching Hospital, and Kadhimiya Teaching Hospital. These hospitals were the designated agency for data collection.

The period of the data collection was from 1st July to 20th March. To evaluate nurses' practices toward

application of standardized precaution measures in pediatric hemodialysis unit in items (Before Beginning Routine Disinfection of the Dialysis Station Arteriovenous fistula/graft cannulation, Arteriovenous fistula/graft Dec annulation, Hemodialysis catheter exit site, Hemodialysis injectable medication preparation, Hemodialysis injectable medication administration, Routine Disinfection of the Dialysis Station – After patient has left station according to standardized precaution measures in hemodialysis unit of standardized precaution measures for children in hemodialysis unit), a self-administered questionnaire and checklist was constructed depend upon Centers for Disease Control and Prevention (CDC) audit tool and checklist who was formally published for the same purpose. The

questionnaire was applied as a mean of data collection, mainly it consisted of items to evaluate nurses’ practices about application of standardized precaution measures for children in hemodialysis unit, which consists of (82) items.

The reliability was practices (0.880)

The data were analyzed and interpreted through use of the application of Statistical

Package for Social Sciences (SPSS), version

26.0. And using frequency, percentage, mean of score and standard deviation, Cronbach Alpha, Spearman’s rank correlation coefficient, and Point Biserial Correlation.

**Results of the Study**

**Table (1):** Evaluation of Nurses’ Practices related to “*Before Beginning Routine Disinfection of the Dialysis Station*” (N=45)

**Items M Eval.**

• takedown used blood tubing and dialyzer	Disconnect and	
Poor .07	from the dialysis machine	
• dialyzers in a leak-proof container	Discard tubing and	.47 Poor
• visible soil or blood on surfaces	Check that there is no	.00 Poor
• priming bucket has been emptied	Ensure that the	.02 Poor
• patient has left the dialysis station	Ensure that the	.00 Poor
• supplies. Move any reusable supplies	Discard all single-use	
to an area where they will be cleaned and disinfected before		
being stored or returned to a dialysis station		.27 Poor
• perform hand hygiene	Remove gloves and	.07 Poor

.13

Poor

M: Mean, Eval: Evaluation

Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

This table (1) presents the items of nurses’ practices related to “Before Beginning Routine Disinfection of the Dialysis Station”; the findings indicate that nurses show poor practices about precaution measures about disinfection routine of dialysis station for children in hemodialysis unit (Mean= 0.13).

**Table (2):** Evaluation of Nurses’ Practices related to “Arteriovenous fistula/graft cannulation” (N=45)

Arteriovenous fistula/graft cannulation		M	Eval.
1.	Perform hand hygiene (staff)	2. .47	3. Poor
4.	Clean site with soap and water	5. .44	6. Poor
7.	Put on new, clean gloves	8. .00	9. Poor
10.	Apply skin antiseptic and allow it to dry	11. .02	12. Poor
13.	Do not contact site (after antiseptis)	14. .00	15. Poor
16.	Insert needles aseptically	17. .40	18. Poor
19.	connect to blood lines aseptically	20. .00	21. Poor
22.	remove gloves	23. .24	24. Poor
		<b>0.20</b>	<b>Poor</b>

M: Mean, Eval: Evaluation      Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

This table presents the items of nurses’ practices related to “Arteriovenous fistula/graft cannulation”; the findings indicate that nurses show poor practices about precaution measures arteriovenous graft cannulation for children in hemodialysis unit (Mean= 0.20).

**Table (3):** Evaluation of Nurses’ Practices related to “Arteriovenous fistula/ graft Dec annulation” (N=45)

Arteriovenous fistula/ graft Dec annulation		M	Eval.
1.	Perform hand hygiene (staff)	2. .07	3. Poor
4.	Put on new, clean gloves	5. .00	6. Poor
7.	Disconnect from blood lines aseptically	8. .02	9. Poor
10.	Remove needles aseptically and activate needle retraction device	11. .02	12. Poor
13.	clean gloves worn (patient and/or staff) to compress site	14. .33	15. Poor
16.	Apply clean gauze/bandage to site	17. .13	18. Poor
19.	Remove gloves (staff and/or patient)	20. 1.40	21. Fair
22.	Perform hand hygiene (staff and/or patient)	23. .00	24. Poor
		<b>.25</b>	<b>Poor</b>

M: Mean, Eval: Evaluation      Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

This table presents the items of nurses’ practices related to “Arteriovenous fistula/ graft Dec annulation”; the findings indicate that nurses show poor practices about precaution measures of arteriovenous graft Dec annulation for children in hemodialysis unit (Mean= 0.25).

**Table (4):** Evaluation of Nurses’ Practices related to “Hemodialysis catheter exit site” (N=45)

Hemodialysis catheter exit site		M	Eval.
1.	Wear mask (if required) and remove dressing	2. .02	3. Poor
4.	Perform hand hygiene	5. .00	6. Poor
7.	Put on new, clean gloves	8. .00	9. Poor
10.	Apply skin antiseptic	11. .00	12. Poor

13.	Allow skin antiseptic to dry	14.	.00	15.	Poor
16.	Do not contact exit site (after antiseptics)	17.	.00	18.	Poor
19.	Apply antimicrobial ointment	20.	1.89	21.	Fair
22.	Apply dressing aseptically	23.	1.47	24.	Fair
25.	Remove gloves	26.	.07	27.	Poor
28.	Perform hand hygiene	29.	.04	30.	Poor

.35

**Poor**

M: Mean, Eval: Evaluation

Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

The table (4) presents the items of nurses' practices related to "*Hemodialysis catheter exit site*"; the findings indicate that nurses show poor practices about precaution measures regarding catheter exit site for children in hemodialysis unit (Mean= 0.35).

**Table (5): Evaluation of Nurses' Practices related to "*Hemodialysis catheter disconnection*" (N=45)**

<b>Hemodialysis catheter disconnection</b>	<b>M</b>	<b>Eval.</b>
Wear mask (if required)	. 11	Poor
Perform hand hygiene	1.60	Fair
Put on new, clean gloves	.09	Poor
Clamp the catheter	.02	Poor
Disconnect catheter from blood lines aseptically	. 11	Poor
Scrub catheter hub with antiseptic	1.60	Fair
Allow hub antiseptic to dry	.09	Poor
Attach new caps aseptically	.02	Poor
Remove gloves	1.60	Fair
Perform hand hygiene	.09	Poor

.53

**Poor**

M: Mean, Eval: Evaluation

Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

The table (5) presents the items of nurses' practices related to "*Hemodialysis catheter disconnection*"; the findings indicate that nurses show poor practices about precaution measures regarding catheter disconnection for children in hemodialysis unit (Mean= 0.53).

**Table (6): Evaluation of Nurses' Practices related to "*Hemodialysis injectable medication preparation*" (N=45)**

<b>Hemodialysis injectable medication preparation</b>	<b>M</b>	<b>Eval.</b>
1. preparation area is clean	Ensure .11	medication Poor
2. and discard if sterility is questionable	Inspect 1.64	medication Fair
3.	Perform .09	hand hygiene Poor
4. aseptically	Prepare .02	medication Poor
5. of vial with alcohol	Disinfect .11	rubber septum Poor

6.	Withdraw medication	
using a new needle and new syringe	1.62	Fair
7.	Discard single dose	
vials and store multi dose vials appropriately	.09	Poor
	<b>.52</b>	<b>Poor</b>

M: Mean, Eval: Evaluation                      Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

This table presents the items of nurses’ practices related to “*Hemodialysis injectable medication preparation*”; the findings indicate that nurses show poor practices about precaution measures regarding injectable medication preparation for children in hemodialysis unit (Mean= 0.52).

**Table (7): Evaluation of Nurses’ Practices related to “*Hemodialysis injectable medication administration*” (N=45)**

<b>Hemodialysis injectable medication administration</b>	<b>M</b>	<b>Eval.</b>
1.	Perform hand hygiene	
	.11	Poor
2.	Put on new, clean gloves	
	1.58	Fair
3.	Scrub injection port with antiseptic	
	.09	Poor
4.	Attach syringe and administer medication aseptically	
	.02	Poor
5.	Discard syringe	.11
	Poor	
6.	Remove gloves	1.46
	Fair	
7.	Perform hand hygiene	
	.09	Poor
	<b>.49</b>	<b>Poor</b>

M: Mean, Eval: Evaluation                      Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

This table presents the items of nurses’ practices related to “*Hemodialysis injectable medication administration*”; the findings indicate that nurses show poor practices about precaution measures regarding injectable medication administration for children in hemodialysis unit (Mean= 0.49).

**Table (8): Evaluation of Nurses’ Practices related to “*Routine Disinfection of the Dialysis Station – After patient has left station*” (N=45)**

<b>Routine Disinfection of the Dialysis Station – After patient has left station</b>	<b>M</b>	<b>Eval.</b>
1.	Wear clean gloves	
	1.89	Fair
2.	Apply disinfectant to all surfaces in the dialysis station using a wiping motion (with friction)	
	1.47	Fair
3.	Ensure surfaces are visibly wet with disinfectant.	
Allow surfaces to air-dry before reconnection or reuse	.07	Poor

4. potentially contaminated items away from the disinfected surfaces.	Keep used or .04 Poor
5. perform hand hygiene.	Remove gloves and .07 Poor
<b>.70</b>	<b>Poor</b>

M: Mean, Eval: Evaluation

Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

This table presents the items of nurses' practices related to "Routine Disinfection of the Dialysis Station – After patient has left station"; the findings indicate that nurses show poor practices about precaution measures regarding routine disinfection of dialysis station after children leaving from hemodialysis unit (Mean= 0.70).

### Discussion of the Study

The current study results reported that the nurses have poor practices about precaution measures regarding disinfection routine of dialysis station for children in hemodialysis unit (Mean= 0.13). The lack of special courses for nurses to sterilize the dialysis station and sterilize all the tools and equipment that surrounds the patient before the entry the patients to the hemodialysis station and the wrong information they have and the lack of application of standard precaution measures about disinfection routine of dialysis station. Also, supported in a study done by Kadhim and Shawq (20) which shown that nurses practices were low level (percentage 73.3%). In addition, agree with Fadhil and Hassan (24).

The results perfectly come in the same line with Bakey (25) findings. Poor nurses' knowledge and practices may lead to less quality care delivered to patients. As well as improving their knowledge may improve their practices and since better care will be provided for those children in need for it.

The result of previous studies were identical with the result of the current one and Abbas and Atyiah (22) discover that the nurses' test practice revealed a poor degree of practices. Show current results nurses poor practices about precaution measures regarding routine disinfection of dialysis station after children leaving from hemodialysis unit (Mean= 0.70) Osman FK, (23) reported that after the implementation of an educational interventions, the practices of nurses are leveled off. About two-thirds of the sampled nurses exhibited "poor" overall knowledge and half did so with "bad" overall behaviour in regards to infection

prevention and control before the implementation of educational interventions but Ali (27). According to the results, the level of nursing practise concern is quite high. There is no discernible pattern in the demographics or clinical experiences of nurses, save for those who have received training outside of Iraq. The end outcome was a deviation from the norm.

According to prior research by Hassan, A (26), there are statistical disparities between the post-program study group and the post-control group, as well as between the level of education of nurses and infection control. The results showed that the work of educational programs for the knowledge and practices of nurses on infection control, as welthes the work of educational courses to develop the skills of nurses in infection control have an effective role and positive results to improve the knowledge and practices of nurses Especially courses outside the country.

The study show indicates that nurses have poor practices about precaution measures arteriovenous graft cannulation for children in hemodialysis unit (Mean= 0.20) and poor practices about precaution measures of arteriovenous graft Dec annulation for children in hemodialysis unit (Mean= 0.25). Nurses' neglect and wrong behaviors to apply standard precautions when applying any procedure to the patient or nursing care corresponding with result research Chen, Shune Liu,etal (28) Cannulation site infections were the second most prevalent complication Another sort of infection was discovered at the location of fistula formation. The most dangerous consequences were recognized as thrombosis, aneurysm, and pseudo aneurysm. Ali, Ala (21) The working staff to patient ratio was 3.3:10. The number of patients doubles the number of nurses in the pediatric dialysis unit .from my point of view The number of patients is twice the number of nurses and the low number of nurses in the dialysis ward is one of the reasons for poor practices, as well as the increase in the number of patients causes the nurses to fail to

apply standard precautionary measures when providing care to patients.

### Conclusion:

the study concluded that nurses have poor practices about the application of application of standardized precaution measures in pediatric hemodialysis unit in all items

### Recommendations:

- The study recommended that nurses should be committed to follow and apply standards of precautions, sharing in training sessions, improve practices through self-learning and training,
- Submit recommendations to the Iraqi Ministry of Health in strict follow-up to the nurses in the application of precautions and their commitment to them through accountability and the imposition of administrative penalties in the event of non-application of these standards

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