Instructional guidelines for Pediatric Nurses: Improving Care of Children with Kidney Transplantation

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Abstract: **Kidney transplantation in children is the most successful treatment option for children with kidney failure. The use of evidence-based clinical instructional guideline is one means of improving and maintaining the quality of care for children with kidney transplantation So, the aim of this study was to develop instructional guidelines for Pediatric Nurses' and improve care of children with kidney transplantation. Design: A quasi-experimental study design was carried out. The subjects included all nurses (30) working at the in-patient and outpatient clinic in kidney transplantation unit affiliated to Abo Elresh Pediatric Hospital. Data collection tools: A structured questionnaire interview sheet and an observation checklist, used in pre-post testing to measure the effect of an instructional guidelines for pediatric nurses. Results: The study revealed deficiency in pre-intervention knowledge and practices. Statistically significant improvement of knowledge and practices were demonstrated at the post-intervention assessment of the studied nurses. Statistically significant relations were shown between knowledge and practices among studied nurses. The instructional guidelines were successful in correcting the deficiency of nurses' performance. The study concluded that nurses' knowledge and practice toward children with kidney transplantation improved significantly after implementation of instructional guidelines for nurses. So, the researchers recommended that instructional guidelines should be applied in similar settings to validate and improve nursing care in kidney transplantation children hospitals.**

Keywords: **Children, Instructional guidelines, kidney Transplantation & Pediatric Nurses'.**

1. INTRODUCTION

Stable kidney function can often be maintained successfully with medications and/or surgery before a kidney transplant is needed, but when kidney failure progresses it can cause growth issues, decreased school performance, bleeding issues, decreased appetite and lower energy levels of children. For these reasons, kidney transplantation is preferably performed before the child requires dialysis, which is called preemptive transplantation. In children, hemodialysis or peritoneal dialysis is considered only as a bridge to transplantation. Successful kidney transplantation can almost restore a child's normal life **(Mandel-Shorer et al., 2018).**

The potential risks and complications of kidney transplantation involved the transplanted kidney will fail to work or be rejected by the recipient's body at any time. Anti-rejection medications need to be taken for as the life of the transplanted kidney. These medications have many possible side effects, and the long-term expense of these medications is an important factor for families to consider and if a living donor is not available, there is often a long waiting period for a deceased donor Kidney in adults, but is much shorter in children **(Bogue Kerr et al., 2018).**

Nurses in the pediatric nephrology department take an active role in each stage of guidelines development and implementation. They play an integral role in identifying clinical areas to be addressed by guidelines. This is accomplished by reviewing the topics, the questions most frequently asked by families, and the most prevalent overall diagnoses amenable to standardized care in practice. Once clinical practice areas are identified, the nurses then seek out lead physicians for each topic, and jointly participate in guidelines development **(Thumfart et al., 2018).**

Once an instructional guideline has been approved for clinical use, nurses are then responsible for ensuring the guidelines are used effectively. For example, families are given both written and verbal education regarding their child's disease and the parental role in its management. The written materials outline signs and symptoms to watch for, and when to call the nephrology office. There are also flow-sheets provided for home documentation of these signs and symptoms. Nephrology nurses educate families in the proper use of these resources, field their calls, and then initiate patient care by utilizing the clinical protocol **(Ruppel et al., 2019).**

The use of evidence-based instructional guidelines is one means of improving and maintaining the quality of patient care in a variety of clinical practice settings. As nurses and nurse practitioners are regularly involved in patient education, assessment, and treatment, it is important that they participate in the development and evaluation of clinical practice guidelines. Importantly, patients and their families appear to be satisfied with the level of knowledge displayed by clinical staff and the prompt delivery of care **(Greenlee et al., 2017).**

Significance of the study:- Kidney transplantation is considered the main decision strategy for renal replacement therapy for end-stage renal disease children who had no physical contraindications, However transplantation remains the treatment choice to maximize survival, growth and development, 75 % of the children with ESRD require treatment with dialysis prior to receiving a kidney transplant **(Olowu 2013).** Therefore dialysis is a lifesaving therapy for these children. Healthcare-associated infection (HAI) prevalence survey found that there were an estimated 157,500 surgical site infections associated with inpatient surgeries in 2013. Applying universal precautions are very important for decreasing the risk of infection. So their knowledge as well as their practices toward the kidney transplantation of children affect their quality of care and their both quality of life. According to experience of researchers, it was noted that the nurse's knowledge about those measures insufficient and requirement for improvement. **(CDC, 2017).**

Aim of the study:-

This study aimed to develop instructional guidelines for Pediatric Nurses': Improving Care of Children with kidney transplantation through: Assess nurses' knowledge and practices regarding to kidney transplantation, design, implement and evaluate the effect of instructional guidelines regarding to care of children with instructional guidelines.

2. SUBJECTS AND METHOD

Research design

A quasi experimental design was used to conduct this study.

Setting

The study was conducted at the in-patient department in kidney transplantation unit affiliated to Abo Elresh Pediatric Hospital.

Subjects

All nurses (30) worked at the previously mentioned setting and given care for children with kidney transplantation from both gender and regardless of their qualifications and years of experience.

Tools of data collection:

Data were collected through used of the following tools:-

I). A Structured Questionnaire Sheet for nurses (pre and post). It was designed by the researcher in simple Arabic language after reviewing the current literatures. It comprised from two parts as following:

Part 1: Characteristics of the studied nurses that include age, gender, marital status, level of education, current position, and years of experience and attendance of previous training programs related to kidney transplantation.

Part 2: Concerned with nurses' knowledge regarding to kidney transplantation as definition, indications, contraindications, complications, treatment, diet, methods of prevention from complications and nursing care of kidney transplantation.

Scoring system: According to the responses obtained from the studied nurses, a scoring system was followed to assess the nurses' knowledge, each question scored two (2) for complete answer, and each incomplete answer scored one (1) and each incorrect answer scored zero (0). The total score of the questionnaire equals 28 grads. Nurses' knowledge scores were categorized into; good knowledge for nurses who scored 75% and more, average knowledge for nurses who scored 50% to < 75% and poor knowledge for nurses scored less than 50% of total scores.

Tool (II): Observational Checklist:

It was adopted from **Wilson and Hockenberry, 2015** and modified by the researcher to assess the nurses' actual performance regarding to care of children with kidney transplantation, it includes collection of urine specimen, intake and output chart and measurement of abdominal girth, measuring weight and taking vital signs.

Scoring system: Each procedure scored 5 to 10 according to weighting of each step that make a total score of 100 grades (equal 100%). The scoring systems of nurses' performance were classified into competent when nurses' performance scored 85 % and more and incompetent when nurses' performance scored less than 85 % of total scores.

Instructional guidelines; it was designed by the researcher after extensive revised and modified by supervisors. Guidelines are generally organized into three sections: an overview of the relevant kidney transplantation technique, a review of current evidence-based clinical practice, and a step-by-step treatment plan. The content was prepared according to nurses' educational needs regarding to improve their practices regarding to care of children with kidney transplantation such as; prevention of infection, diet, fluid balance, adherence of medication, drug regimen when withdrawal corticosteroids, and nursing care as general.

Pilot Study:

Pilot study was carried out on 10% (3 nurses) of total subject size of nurses to test the applicability and to evaluate the content validity of the study tools. Results of the pilot study helped to make modifications on the tools; some items of questionnaire were modified and unnecessary questions were omitted. The nurses in the pilot study were not excluded from the study sample.

Validity and reliability:

The developed tools were assessed by a panel five of medical and nursing professors from faculty of medicine and nursing (pediatric department) to confirm its validity before its use. The required modification was carrying out accordingly and then test-retest reliability was applied. Testing reliability of the study tools was done by Cronbach alpha, the result was 0.83.

Ethical considerations:

All pediatric nurses were knowledgeable about the aim of study in order to attain their acceptance to participate in the current study. The researchers explained to them benefits of the current study. The researchers informed the pediatric nurses that all data collected during the study were considered confidential. The researchers also informed the participants about their rights to withdraw from the study at any time without giving any reason.

Field of the Work:

The first phase; this phase started with the nurses' interview and the researcher introduces herself to nurses. At the beginning of instructional guidelines; an orientation and explanation of it for nurses, the aim and objective of the study were explained to gain their cooperation & to assure the nurses about the anonymity of their answers and that the information will be used for scientific research only and was be strictly confidential.

The data collected through interview and observation the nurses individually to identify background information and evaluate their knowledge and performance using check-lists which filled by the researcher. The collection of data was daily for three days per week using the Arabic questionnaire format and observational check-list.

The second phase: An instructional guideline was developed based on actual needs for nurses to improve their knowledge and skills regarding to kidney transplantation and to be able to give nursing management for children with kidney transplantation.

The researcher developed the written instructional guideline by Arabic language after reviewing the related literature and covers the relevant theoretical aspects of kidney transplantation; it included

Theoretical part: knowledge about definition, indications, contraindications, medical management, and nursing care, diet of child with kidney transplantation, infection control measures and withdrawal of corticosteroids.

Practical part: demonstrate the practices regarding care for children with kidney transplantation; such as vital signs, measuring weight, abdominal circumference, and intake and out put chart.

The guidelines intervention consumed for eight weeks, three days per week spent in conducting the training protocol. Consequently, the subject content has been sequenced through three sessions. The duration at each session ranged from 45 to 60 minutes including periods of discussion. At the beginning of first session, an introduction about the guidelines was done. Each session started with the summary feedback about the previous session, simple words and Arabic language were used to suit the nurses' level of understanding. Different methods of teaching were used as lectures and demonstration and re- demonstration. Suitable teaching aids were prepared and used during the instructional guidelines implementation such as real equipment, posters and pictures.

Each nurse was observed and evaluated using the observational checklist which filled by the researcher during providing care for the child with kidney transplantation post instructional guidelines intervention. Time consumed for assessing each procedure taken nearly ten to twenty minutes. In addition, the nurses were interviewed to assess their knowledge using the questionnaire format; all questions were designated in the form of open questions, and nurses took about 30 to 45 minutes to fill it.

Statistical Analysis:

The data were tested for normality using the Anderson-Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described by **number and percent** (N, %), **Chi-square test** used to compare between categorical variables where continuous variables described by mean and standard deviation (**Mean, SD**). compare between continuous variables by **t-test**, The spearman **correlation** coefficient was used to probe the relationship between Knowledge and practice scale, , A **two-tailed p < 0.05** was considered statistically significant. All analyses were performed with the **IBM SPSS 20.0** software.

3.   RESULTS

Table (1): Socio demographic characteristics of the studied nurses (n=30)

Variable	No	%
Age /Mean ±SD(range)	36.4±8.2(24-56)	
Age group		
< 30 years	8	26.7
30 < 40 years	15	50.0
≥ 40 years	7	23.3
Sex		
Male	2	6.7
Female	28	93.3
Marital status		
Married	29	96.7
Widow	1	3.3

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Education Level		
Diploma in nursing	13	43.3
Specialty diploma	11	36.7
Technical institute diploma	1	3.3
Bachelor	5	16.7
JOB		
Supervisor nurse	11	36.7
Staff nurse	19	63.3
Experience year		
< 10 years	8	26.7
10 < 20 years	14	46.7
≥ 20 years	8	26.7
Experience year/Mean ±SD(range)	16.2±7.3(6-31)	
Training courses		
No	20	66.7
Yes	10	33.3

Table (2): Comparison between nurses' knowledge (poor, average ,fair) throughout program phases (pre, post)

	Pre						Post						P. value
	Poor		Average		good		Poor		faire		good		
Variable	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1. Definition of kidney transplantation?	20	66.7	4	13.3	6	20.0	4	13.3	5	16.7	21	70.0	<0.001**
2. Causes of kidney transplantation?	18	60.0	12	40.0	0	0.0	5	16.7	8	26.7	17	56.7	<0.001**
3. Signs and symptoms?	0	0.0	19	63.3	11	36.7	0	0.0	9	30.0	21	70.0	0.010*
4. Blood analysis pre and post kidney transplantation?	12	40.0	15	50.0	3	10.0	3	10.0	10	33.3	17	56.7	<0.001**
5. Post kidney transplantation complication?	10	33.3	20	66.7	0	0.0	3	10.0	9	30.0	18	60.0	<0.001**
6. Medication for kidney transplantation control?	7	23.3	23	76.7	0	0.0	0	0.0	6	20.0	24	80.0	<0.001**
7. Nursing care for kidney transplantation?	13	43.3	15	50.0	2	6.7	0	0.0	7	23.3	23	76.7	<0.001**
8. Post kidney transplantation follow up?	15	50.0	12	40.0	3	10.0	0	0.0	9	30.0	21	70.0	<0.001**
9. Corticosteroids complications for kidney transplantation?	20	66.7	4	13.3	6	20.0	3	10.0	5	16.7	22	73.3	<0.001**
10. Nursing care in psychological support of the child?	19	63.3	10	33.3	1	3.3	4	13.3	7	23.3	19	63.3	<0.001**
11. Special types of kidney transplantation nutrition?	14	46.7	12	40.0	4	13.3	0	0.0	6	20.0	24	80.0	<0.001**
12. Signs of kidney transplantation rejection?	14	46.7	7	23.3	9	30.0	3	10.0	6	20.0	21	70.0	0.002**
13. Nursing instructions for infection control?	14	46.7	16	53.3	0	0.0	5	16.7	14	46.7	11	36.7	<0.001**

Chi-squire test. ** Highly statistically significant difference (p<0.01).

Table (3): Nursing performance in pre/ post implementation of nursing protocol

Measuring vital signs	Pre		Post		X2	P. value
	No	%	No	%		
Oral temperature						
Competent	4	13.3	29	96.7	42.088	<0.001**
Incompetent	26	86.7	1	3.3		
Axially temperature						
Competent	18	60.0	30	100.0	15.000	<0.001**
Incompetent	12	40.0	0	0.0		
blood pressure						
Competent	3	10.0	30	100.0	49.091	<0.001**
Incompetent	27	90.0	0	0.0		
Growth measurements (measuring weight)						
Competent	4	13.3	29	96.7	42.088	<0.001**
Incompetent	26	86.7	1	3.3		
Collection of specimen (Single urine samples)						
Competent	1	3.3	30	100.0	56.129	<0.001**
Incompetent	29	96.7	0	0.0		
24 hours urine samples						
Competent	0	0.0	29	96.7	56.129	<0.001**
Incompetent	30	100.0	1	3.3		
fluid intake and output						
Competent	2	6.7	23	76.7	30.240	<0.001**
Incompetent	28	93.3	7	23.3		

Chi-squire test. ** Highly statistically significant difference (p<0.01).

Table (4): Correlation between socio-demographic data of nurses and their total knowledge pre/post implementation of nursing protocol among the studied nurses regards to knowledge of kidney transplantation.

	Total Knowledge			
	Knowledge pre		Knowledge Post	
Socio-demographic	Person correlation	P	Person correlation	P
Age group	0.017	0.930	-0.204	0.280
Sex	-0.279	0.135	0.023	0.902
Marital status	0.291	0.119	-0.184	0.330
Education Level	-0.028	0.883	0.287	0.124
Job	0.193	0.307	-0.105	0.581
Experience year	-0.011	0.956	-0.226	0.229
Training courses	0.189	0.318	-.384-[*]	0.036

Table (5): Correlation between socio-demographic data of nurses and their total performance pre/post, implementation of instructional guidelines among the studied nurses

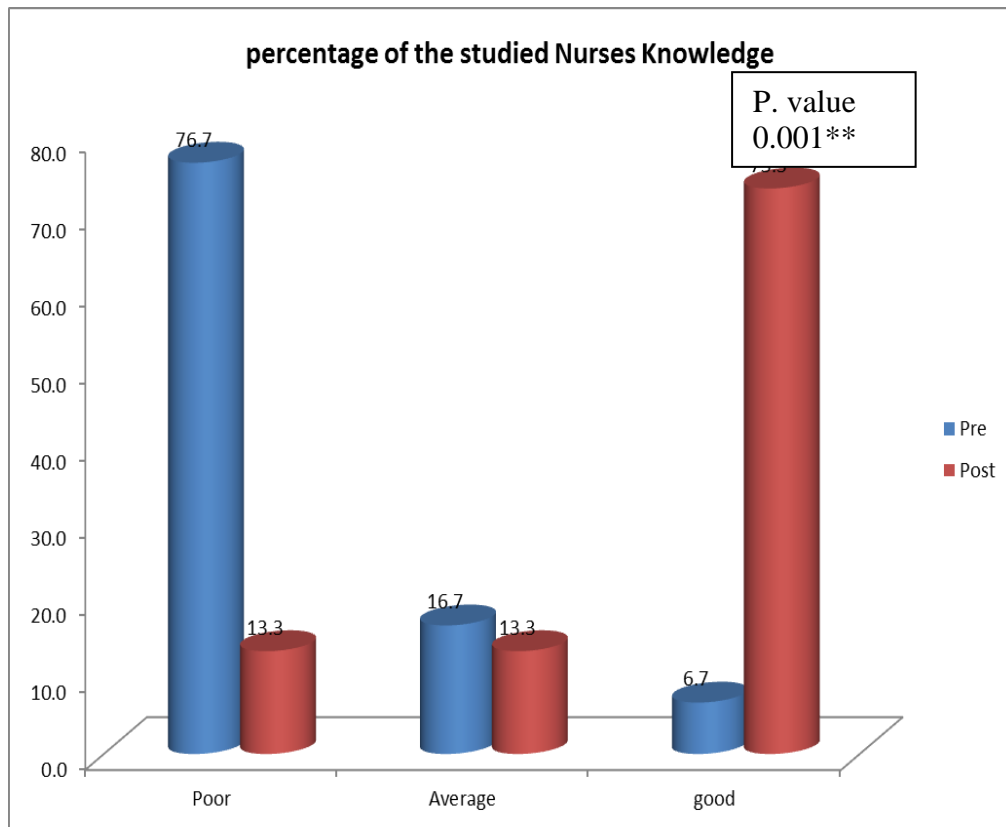|	Total practices			
	practices pre		practices Post	
Socio-demographic	Person correlation	P	Person correlation	P
Age group	-0.211	0.262	0.188	0.319
SEX	0.108	0.569	-0.340	0.066
Marital status	0.172	0.363	-0.032	0.866
Education Level	-.648-[**]	0.000	0.226	0.229
JOB	0.288	0.122	-0.108	0.570
Experience year	-0.227	0.227	0.211	0.262
Training courses	0.008	0.966	0.262	0.162

Page | 580

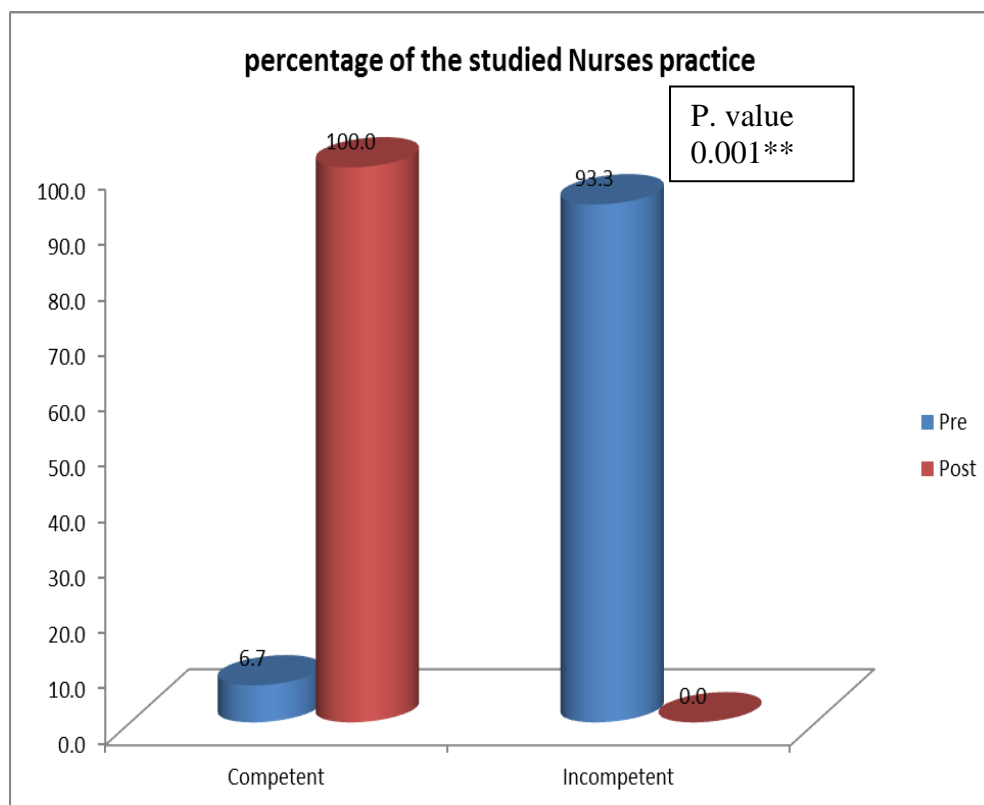**Fig (1); percentage distribution of nurses knowledge scores pre and post test.**

Fig (2); percentage distribution of nurses' practice sores pre and post- test.
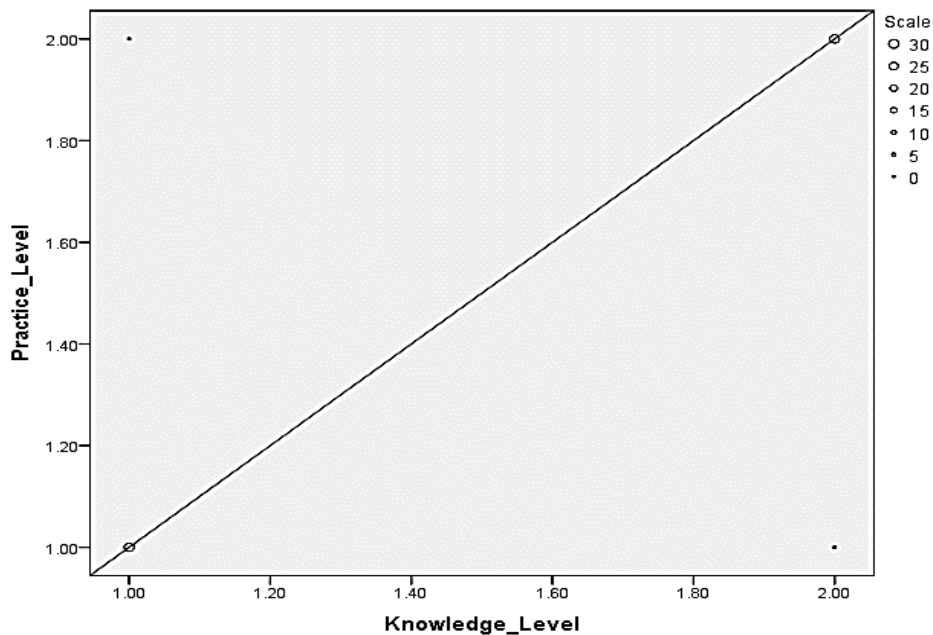
Fig (3): Relation between nurses' knowledge and practice (N=30).

Table (1): showed regarding socio demographic characteristics of the studied nurses, that majority of the nurses (93.3%) were female, married (96.7%), half of them (50%) their age were from 30 to less than 40 years, majority of them (43.3%) had diploma degree in nursing, more than half (63.3%) were staff nurses, (46.7%%) their experiences from 10-20 years with mean (16.2± 7.3), most of them (66.7%) had no previous training.

Table 2 and Fig, (1): Illustrates that a highly statistical significance difference was between pre & post knowledge, which was very low before instructional guidelines (76.7 unsatisfactory). Furthermore, the mean nurses' knowledge scores increased after the application of the instructional guidelines (73.3 Satisfactory).

Table 3 and Fig.(2): Showed that the nurses' practice scores improved after the application of instructional guidelines which was very low before instructional guidelines (93.3 incompetence). Furthermore, the mean nurses' knowledge scores increased after the application of the instructional guidelines (96.7 competent).

Table (4): showed no statistical significance between socio-demographic data of nurses and their total knowledge pre/post implementation instructional guidelines among the studied nurses regards to post test knowledge scores regarding of kidney transplantation except the previous training courses.

Table (5): showed no statistical significance between socio-demographic data of nurses and their total performance pre/post, implementation of instructional guidelines among the studied nurses except in educational level and pre- test practice scores.

Fig (3): Showed a positive correlation between nurse's knowledge and practice scores.

4. DISCUSSION

The results revealed that all of the nurses were female had deploma degree in nursing, and their experiences from (10 to 20) years. Most of their age were from(30<40) years, married, did not take any previous training.

Most of them had no in-serves training courses related to care of transplanted patient care, so their knowledge before implementation of instructional guidelines was inadequate.

In this line, **Younis et al., (2018**) emphasized on the intense need for educational interventions in the field of hospital acquired infections/safety measures regarding kidney transplantation for health care workers, especially among nurses.

In our research there were lack of all nurses' knowledge & practice about care of children undergoing kidney transplantation before the application of instructional guidelines. In this respects **Chau et al., (2010)** specified that a report by the Hong Kong government noted that hospital infection control standards were inadequate, requiring development and implementation.

All nurses should have been energized for attending educational training program, in this regard **Saffari et al., (2019)** in their study knowledge and practice of standard precautions among health care workers (nurses) emphasized that the intensive program was important to teach health care workers on different parts of standard precautions training programs and strategies.

As indicated by **Peters et al., (2019)** a continuous nursing care training sepcially infection control is very important because these type of children consider high risk for infection which the primary cause of inpatients' morbidity and mortality.

Nurses' knowledge regarding kidney transplantation nursing care was improved. this might be related to the fact that most of nurses were not young who had incredible status for adapting new things, they may had less obligations as they were married. The researchers' opinion, perhaps one of the most obvious indicators of the lack of knowledge exhibited by the nurse is the confusion that exists surrounding roles and command structure.

The researchers established that nurses' practice was enormously moved forward. The improvement in nursing performance which were found in present study results post instructional guidelines this could be due to either lack of their awareness or lack of rules enforced by the hospital. These discovered that performance can be progress with knowledge increasing. In this regard**, Eke, (2017),** reported that the in benefit preparing program had a useful impact in enhancing nurses' performance and follow up the audience's capacity to hold data and enhance their abilities.

These findings were in concurrence with those of **Kline et al., (2018)** who expressed that a lot of studies revealed that changes in nursing practice occur following the participation of persistent nursing educational programs increase knowledge and skills and can likewise change attitudes.

Attari et al., (2017), bolstered that in service program beneficially affected enhancing the nurses' performance. These researchers prescribed that educational programs should be organized according to the need of the nurses with constant evaluation.

This study revealed that no relationship between nurse's sex, years of experience and residence with their knowledge and practice scores, pre and posttest of implementation of the nursing teaching protocol except previous training and level of education. This result was concurred with **Randall et al., (2017)** who reported that, was no statistically significant relationship between nurse's knowledge and practice with the sex and residence of the nurses.

This result disagreed with that of **Detroyer et al., (2016)** who mention that nurses's knowledge affected by their years of experience observed pretest, posttest and furthermore the subsequent tests. But, **Gullick et al., (2019)** in the other hand expressed that, older nurses in one clinical specialty may require a direct measure of guidelines to secure through training program.

At long last, the researchers condensed that, the nursing teaching protocol for nurses working with kidney transplantation patients achieved its objectives**. Vanholder et al., (2017)** specified that nurse who had an extensive role in prevention/or reduction of infection and care of kidney transplantation children.

The current study demonstrated that there was a positive correlation between nurses' knowledge and their practice after giving the instructional guidelines. This study was in the line with **Thomas et al., (2019)** who expressed that the nursing care educational programs established to be effective in improving the knowledge and practice among staff nurses.

This agree with **Mohammad, (2018)** who stated that a highly statistical significant correlation between participants' scores of knowledge and practice in pre-program, post program, 1 month and 2 months following the instructional program.

Such instructional guidelines will improve the knowledge and practice of staff nurses. Suitable intervention packages need to be developed and inservice education need to be given periodically for the effectiveness of qualitative nursing services **(Coker, & Kaasalainen, 2018).**

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Also, this finding is in concordance with **Gupta et al., (2018)** who indicated that there were highly significance differences through phases of study regarding knowledge and practice of nursing management of patient on kidney transplantation . (P=0.0001**) among studied nurses.

Hassan et al., (2019) who reported opposite results regarding correlation between knowledge and practice, there was no correlation between nurses' knowledge and practice. As well **Al-Jubouri, & Jaafar, (2018)** who found that there was no correlation between knowledge and practice.

The higher the nurses' knowledge the more they used the safety measures in their practices. Literature reports that there was a gap between the nurses' knowledge and their actual behavior with respect to the use of standard of care **(Murray et al., 2018).**

Generally the present study concluded that; the nurses' knowledge and practice need an improvement so the study aim was achieved this in the same line with **Marques & Freitas, (2018)** who reported that; there is a need to improve nurses' knowledge and practices related to kidney transplantation nursing care.

Finally, the findings of the present study supported the research hypothesis that; there will be significance difference between post test knowledge score to the pre-test knowledge score following implementation of instructional guidelines. A positive relation will exist between knowledge and practice score will be obtained by nurses who will receive the instructional guidelines.

5. CONCLUSION

- Nurse's information and skills about care of children undergoing kidney transplant at Abo Elresh Pediatric Hospital were insufficient.

- Nurses were potentially ready to upgrade their knowledge and practice after receiving instructional guidelines in addition to have great effect in the patients' outcome.

6. RECOMMENDATIONS

- There is a need for continued education and training programs about require safety measures to diminish complication regarding kidney transplantation children.

- Written standards for kidney transplantation children should be available in all departments.

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