

IMPACT OF NURSING INTERVENTION ON CARE OF CHILDREN UNDERGOING LIVER SURGERIES

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ABSTRACT

Aim: The study aims to evaluate the effectiveness of nursing intervention on knowledge and practice towards care of children undergoing liver surgeries. **Research design:** A quasi-experimental design was used. **Setting:** The study was conducted at Pediatric Surgery Unit in the Children's Hospital that affiliated to Ain shams university hospitals and Liver Surgeries Unit that affiliated to Air Force Specialized Hospital / Cairo/ Egypt. **Sample:** A purposive sample of 50 nurses, from the previously mentioned setting during the period of six months. **Tools:** two tools were used to collect data namely: A structured interviewing questionnaire and standardized observational checklists (pre & post) to assess nurses' knowledge and practice regarding care of children undergoing liver surgeries. **Results:** There was highly statistically significant improvement in posttest compared to the pretest results regarding the nurses' knowledge and practice about care of children undergoing liver surgeries where $P < 0.001$. **Conclusion:** Nursing intervention was effective in improving nurses' knowledge and practice regarding care of children undergoing liver surgeries. **Recommendations:** Adopt nursing intervention based on actual need assessment of nurses regarding care of children undergoing liver surgeries.

KEYWORDS: Liver surgeries, Pediatric, Nursing practices

INTRODUCTION

Pediatric liver disorders are particularly important since a number of childhood illnesses are risk factors for adult chronic liver diseases such cirrhosis and hepatocellular carcinoma. Children's hepatobiliary disorders commonly go undiagnosed due to a general lack of awareness of the symptoms, which increases the risk of morbidity and mortality as the condition develops to end-stage liver disease (**Della Corte et al., 2016**).

Liver illness can affect anyone, regardless of their age, gender, location, or race. Cirrhosis is a frequent result of several liver diseases and can have a wide range of clinical signs and effects, but many circumstances are urgent. The information that was available indicated that around 15,000 children in the USA are hospitalized each year due to liver issues (**D'Antiga, 2019**).

Pediatric patients who are seriously impaired and immune compromised require treatment from a qualified multi-professional team as well as a complete hospital infrastructure. One of the trickiest operations in modern surgery is liver surgery (these from researcher point view). In an effort to enhance their quality of life and achieve an activity and health level comparable to that of a child of the same age who does not have liver disease, pediatric patients with end-stage liver disease (ESLD) undergo liver surgeries (**Subramaniam & Sakai, 2017**).

Nursing interventions, which span all facets of preoperative, postoperative, and follow-up care, are thought to be the most crucial management method for pediatric liver surgeries. The pediatric patient's preparation for surgery is essential, and the nursing staff's input impacts how successfully the procedure proceeds. Therefore, the nurses are in responsible of planning and executing the care provided to pediatric patients and their families during the liver surgery process (**Mendes et al., 2015**).

Significance of the study

Nurses play a crucial role in recognizing physiological and psychological needs, which are essential skills for the pediatric surgical nurse who should interpret them in the form of nursing intervention through providing care both preoperatively and postoperatively. So, it is important to assess nursing performance for the care of pediatric patients undergoing liver surgeries (**Robin et al., 2017**).

Aim of the study:

The present study aimed to evaluate the effect of nursing intervention on care of children undergoing liver surgeries through:

- Assess nurses' knowledge and practice regarding care of children undergoing liver surgeries.
- Design, implement and evaluate nursing intervention based on the actual need assessment of the studied nurses regarding care of children undergoing liver surgeries.

Research hypothesis: Nursing intervention will be effective in improving nurses' knowledge and practices regarding care of children undergoing liver surgeries.

Research design: A quasi-experimental design was used in the current study.

Setting: This study was conducted at Pediatric Surgery Unit in the Children's Hospital affiliated to Ain shams university hospitals and Liver Surgeries Unit affiliated to Air Force Specialized Hospital / Cairo/ Egypt.

Sample: A purposive sample that consisted of 50 nurses, who employed in the previously mentioned setting and were responsible for care of the children undergoing liver surgeries pre and post operatively regardless their characteristics. Nurses were assessed twice pre/ post nursing intervention using same tools.

Tools for data collection:

1- A predesigned interviewing questionnaire format (pre & post): It was developed by the researcher based on related literature review and covered the following parts:

Part 1: Characteristics of the nurses (age, educational level, years of experience and previous training program related to pediatric liver surgeries).

Part 2: Nurses' knowledge regarding liver diseases, liver surgeries and nursing care for children undergoing liver surgeries.

Scoring system: As regards the scoring system for questionnaire format that composed of 56 questions in the form of open and close ended questions: According to nurses' answers a scoring system was followed to estimate the level of nurses' knowledge. Where each complete correct knowledge was scored 2, and each incomplete correct knowledge was scored 1 and wrong or don't know was scored zero. Then the total knowledge was classified into two levels: Satisfactory knowledge (>85%) or unsatisfactory knowledge (<85%).

2- Standardized observational checklists (pre & post): Observational checklists were used to assess nurses' practices for caring of children undergoing liver surgeries as regards to infection control precautions, caring of the urinary catheter, central venous catheter care, post-operative care and wound care.

Scoring system: Where each complete correct practice was scored 2, and each incomplete correct practice was scored 1 and not done was scored zero. Then the total practices were classified into two levels: competent level (> 90%) or incompetent level (< 90%).

Content validity and reliability: The study tools were assessed by 5 jury of experts in the field prior its actual use in data gathering phase to confirm its validity. Reliability was tested by Cronbach alpha test.

Protection of ethical and human rights: The ethical research committee, the nursing faculty, and Ain Shams University all approved the study. The study's objective and purpose are made apparent to each subject by the researcher, and it is safe. The researcher protects the subjects' privacy and anonymity. Subjects have the freedom to participate or not at any time without consequence.

Procedure: The actual field work started from the beginning of January 2021 up to the end of June 2021. The researcher was available 2 days weekly (Sunday, Monday) in Ain Shams University hospital and 2 days weekly (Tuesday, Thursday) in Air Force Specialized hospital. The researcher started the data collection by introducing herself to each nurse and giving them clear and brief idea about the aim of the study and its expected outcome. The program intervention was prepared in the light of actual need assessment of studied nurses. Intervention was implemented either individual or in groups using different teaching method. Then evaluation was done using same pre assessment tools.

Results:

Table 1: Distribution of the studied nurses regarding to their characteristics (n=50).

Nurses' characteristics	No.	%
Age in years:		
20-≤ 25	10	20.0
25-≤ 30	16	32.0
30-≤ 35	24	48.0
$\bar{X} \pm SD$	29.40±5.59	
Gender:		
Male	33	66.0
Female	17	34.0
Educational level:		
Technical nursing diploma	19	38.0
Technical nursing diploma and specialist in nursing	5	10.0
Bachelors in nursing science	23	46.0
Postgraduate studies	3	6.0
Years of experience:		
≤1	11	22.0
1-≤ 5	24	48.0
5-≤10	15	30.0
Previous training program related to pediatric liver surgeries		
Yes	12	24.0
No	38	76.0

Table 1 showed that, 48% of the studied nurses were aged 30-≤ 35 years. Regarding their gender, it was found that 66% of them were males. In relation to qualifications, it was found that 46 % of them had bachelor in nursing science, 48 % of them had experience ranged from 1-≤ 5 and 76% hadn't previous training program related to pediatric liver surgeries.

Table 2: Distribution of the studied nurses' satisfactory total knowledge regarding liver diseases and its surgeries pre & post nursing intervention (n=50).

Total nurses' knowledge	Pre-intervention				Post intervention				Test of significance	
	Satisfactory >85%		Unsatisfactory <85%		Satisfactory >85%		Unsatisfactory <85%		χ^2	P-Value
	No.	%	No.	%	No.	%	No.	%		
A-Liver diseases:										
- Definition	13	26	37	74	45	90	5	10	16.838	<0.001**
- Causes	10	20	40	80	43	86	7	14	20.734	<0.001**
- Complications	8	16	42	84	41	82	9	18	14.478	<0.001**
- Management	7	14	43	86	44	88	6	12	22.947	<0.001**
B-Liver surgeries:										
- Indications	14	28	36	72	47	94	3	6	14.475	<0.001**
- Complications	18	36	32	64	45	90	5	10	22.740	<0.001**
- Preoperative care	12	24	38	76	44	88	6	12	13.094	<0.001**
- Postoperative care	15	30	35	70	43	86	7	14	20.220	<0.001**
Total knowledge	12	24	38	76	44	88	6	12	23.605	<0.001**

Using: Chi-square test

p-value >0.05 NS; **p-value* <0.05 S; ***p-value* <0.001 HS

Table 2 showed that there were marked improvement in nurses' knowledge regarding liver diseases and its surgeries post nursing intervention with highly statistical significance difference $\chi^2 = 23.605$ and $P < 0.001^{**}$.

Figure 1: Distribution of the studied nurses' total practices regarding care of children undergoing liver surgeries pre & post nursing intervention (n=50).

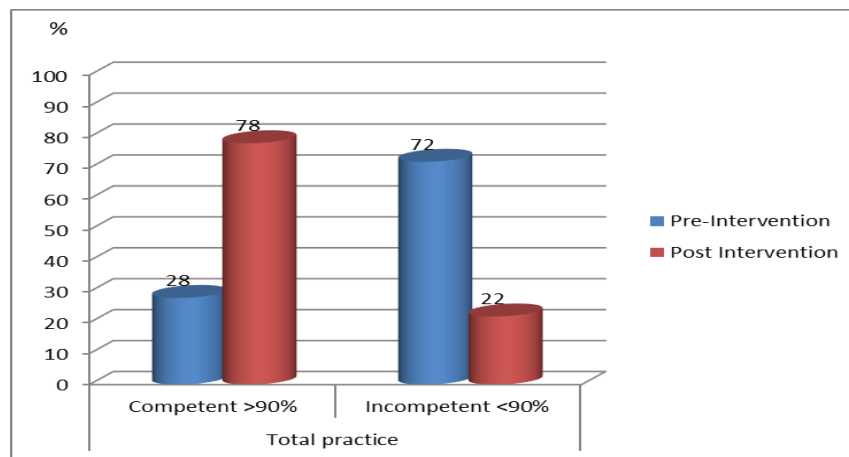


Figure 1 showed that 28 % of studied nurses had competent total practices pre - nursing intervention, while 78 % of them had competent total practices post nursing intervention. It was observed from this figure that there was marked improvement in nurses' total practices post nursing intervention with $\chi^2 = 23.123$ and $P < 0.001^{**}$.

Table 3: Relation between studied nurses' total knowledge regarding care of children undergoing liver surgeries and their socio-demographic characteristics pre & post nursing intervention (n=50).

Characteristics data	Pre-intervention (n=50)				Post intervention (n=50)			
	Satisfactory (n=12)		Unsatisfactory (n=38)		Satisfactory (n=44)		Unsatisfactory (n=6)	
	No.	%	No.	%	No.	%	No.	%
Age (years):								
20-≤ 25	3	25.0	7	18.4	9	20.5	1	16.7
25-≤ 30	4	33.3	12	31.6	14	31.8	2	33.3
30-≤ 35	5	41.7	19	50.0	21	47.7	3	50.0
χ^2	0.338				0.047			
p-value	0.845				0.977			
Gender:								
Male	8	66.7	25	65.8	30	68.2	3	50.0
Female	4	33.3	13	34.2	14	31.8	3	50.0
χ^2	0.086				0.179			
p-value	0.769				0.673			
Qualification								
Technical nursing diploma	4	33.3	15	39.5	15	34.1	4	66.7
Technical nursing diploma and specialist	1	8.3	4	10.5	3	6.8	2	33.3
Bachelor in nursing science	6	50.0	17	44.7	23	52.3	0	0.0
Postgraduate studies	1	8.3	2	5.3	3	6.8	0	0.0
χ^2	0.333				8.333			
p-value	0.954				0.040*			
Years of experience								
≤1	3	25.0	8	21.1	7	15.9	4	66.7
1-≤ 5	6	50.0	18	47.4	23	52.3	1	16.7
5-≤10	3	25.0	12	31.6	14	31.8	1	16.7
χ^2	0.209				7.982			
p-value	0.901				0.019*			
Attending training program related to pediatric liver surgeries:								
Yes	3	25.0	9	23.7	12	27.3	0	0.0
No	9	75.0	29	76.3	32	72.7	6	100.0
χ^2	0.087				4.632			
p-value	0.768				0.047*			

Using: Chi-square test

p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table 3 showed the relation between total nurses' knowledge and their socio-demographic characteristics. It is clear that there was no statistically significant difference between nurses' total knowledge and their socio-demographic characteristics namely (age, gender, qualification, years of experience and attending training program related to paediatric liver surgeries) regarding care of children undergoing liver surgeries ($\chi^2 = 0.338, 0.086, 0.209, 0.333, 0.087$ and $P\text{-value} = 0.845, 0.769, 0.954, 0.901$ and 0.768) pre- nursing intervention respectively. While there was statistically significant difference between total nurses' knowledge regarding care of children undergoing liver surgeries and their socio-demographic characteristics namely (qualification, years of experience and attending training program) where ($\chi^2 = 8.333, 7.982$ and 4.632 and $P\text{-value} = 0.040^*, 0.019^*$ and 0.047^*) post nursing intervention.

Table 4: Relation between the studied nurses' total practice regarding care of children undergoing liver surgeries and their socio-demographic characteristics pre & post nursing intervention (n=50).

Characteristics data	Pre-intervention (n=50)				Post intervention (n=50)			
	Competent (n=14)		Incompetent (n=36)		Competent (n=39)		Incompetent (n=11)	
	No.	%	No.	%	No.	%	No.	%
Age (years):								
20-≤ 25	3	21.4	7	19.4	8	20.5	2	18.2
25-≤ 30	4	28.6	12	33.3	12	30.8	4	36.4
30-≤ 35	7	50.0	17	47.2	19	48.7	5	45.5
χ^2	0.107				0.126			
p-value	0.948				0.939			
Gender:								
Male	9	64.3	24	66.7	26	66.7	7	63.6
Female	5	35.7	12	33.3	13	33.3	4	36.4
χ^2	0.03				0.03			
p-value	0.863				0.863			
Qualification								
Technical nursing diploma	5	35.7	14	38.9	12	30.8	7	63.6
Technical nursing diploma and specialist	2	14.3	3	8.3	2	5.1	3	27.3
Bachelor in nursing science	6	42.9	17	47.2	22	56.4	1	9.1
Postgraduate studies	1	7.1	2	5.6	3	7.7	0	0.0
χ^2	0.468				11.669			
p-value	0.926				0.009*			
Years of experience								
≤1	3	21.4	8	22.2	3	7.7	8	72.7
1-≤ 5	7	50.0	17	47.2	22	56.4	2	18.2
5-≤10	4	28.6	11	30.6	14	35.9	1	9.1
χ^2	0.032				21.163			
p-value	0.984				<0.001**			
Attending training program related to pediatric liver surgeries:								
Yes	3	21.4	9	25.0	12	30.8	0	0.0
No	11	78.6	27	75.0	27	69.2	11	100.0
χ^2	0.011				5.924			
p-value	0.918				0.037*			

Using: Chi-square test

p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table 4 showed the relation between total nurses' practices and their socio-demographic characteristics. It is clear that there was no statistically significant difference between nurses' total practices and their socio-demographic characteristics namely (age, gender, qualification, years of experience and attending training program) regarding care of children undergoing liver surgeries ($\chi^2 = 0.107, 0.03, 0.468, 0.032, 0.011$ and $P\text{-value} = 0.948, 0.863, 0.926, 0.984$ and 0.918) pre- nursing intervention respectively. While there was statistically significant difference between total nurses' practices and their socio-demographic characteristics namely (qualification, years of experience and attending training program) regarding care of children undergoing liver surgeries ($\chi^2 = 11.669, 21.163, 5.924$ and $P\text{-value} = 0.009^*, <0.001^{**}$ and 0.037^*) post nursing intervention.

Table 5: Correlation between total score of nurses' knowledge and practices about liver diseases and its surgeries pre & post intervention (n=50).

	Total score of Knowledge			
	Pre		Post	
	r	P. value	r	P- value
Total score of Practices	0.183	0.219	0.622	<0.001**

r-Pearson Correlation Coefficient.

p-value >0.05 is insignificant; *p-value <0.05 is significant; **p-value <0.001 is highly significant

Table 5 illustrated that there was a positive correlation between total nurses' knowledge and their total practices regarding liver diseases and its surgeries pre & post nursing intervention ($r=0.183$ and $P\text{-value} = 0.219$ pre- implementing of nursing intervention compared with ($r= 0.622$ and $P\text{-value} <0.001^{**}$) post nursing intervention.

DISCUSSION

The current quasi-experimental study aimed to evaluate the effect of nursing intervention on care of children undergoing liver surgeries through: assessing nurses' knowledge and practice regarding care of children undergoing liver surgeries.

In the present study, the socio-demographic characteristics of the studied nurses revealed that near half of them were in age group of 30 to 35 years. These results agreed with that of a study done by **Abo El-Ata et al. (2021)**, about " Nurses' knowledge and practice regarding nursing care of patients with liver cirrhosis " in Egypt, and found that more than half of the studied nurses were in age group older than 30 years. Also, agreed with **Ibrahim & Khudhair's (2022)**, who studied the "Effectiveness of an instructional program for nurses about nursing documentation at pediatric surgical wards" in Baghdad and reported that near half of the studied nurses were between the ages of 30 and 39 years.

Concerning the gender of the studied nurses, the current study revealed that about two thirds of them were males. This result was inconsistent with the study of **Karalyi & Abo**

Elfetoh (2019), "Effect of an educational guideline on nurses' performance caring for patients post liver transplantation" in Egypt which illustrated that the majority of the studied nurses were females.

Regarding the nurses' qualification, it was found that near half of them had bachelor in nursing science. This result disagreed with that of a study carried out by **Karaly & Abo El-Fetoh (2019)**, who reported that most of the studied nurses graduated from secondary school nursing.

Regarding the years of experience, the current study showed that near half of the studied nurses had 1-≤ 5 years of experience in pediatric surgical unit. This finding was similar to the findings of **Ibrahim & Khudhair's (2022)**, who found that near half of nurses had years of experience from 6 -10 years, while less than quarter of them had 1 - 5 years of experience.

Regarding attendance of previous training program related to pediatric liver surgeries, the current study results showed that the majority of the studied nurses did not attend any training program related to pediatric liver surgeries. These findings were supported by **Abo El-Ata et al. (2021)**, who found that the majority of the studied nurses did not attend any training courses related to liver cirrhosis. Also, this result is in the same line with that of **Karaly & Abo El -Fetoh (2019)**, who reported that the majority of the studied nurses did not attend training courses about liver transplantation. From the researcher point of view the causes of this results may be due to the lack of staff development and in-service training in our hospitals, which may have a detrimental impact on enhancing and assessing the standard of nursing care given to children with liver illnesses.

Regarding nurses' total knowledge about liver diseases and its surgeries, the results of this study clarified that the majority of them had unsatisfactory knowledge regarding liver diseases. These results in the same line with **Abo El-Ata et al. (2021)**, who found that more than half of nurses had unsatisfactory knowledge regarding liver cirrhosis.

The current study's results showed that the majority of the studied nurses had unsatisfactory total knowledge regarding pre & post-operative nursing care for children undergoing liver surgeries pre- nursing intervention that may be due to the most of them were diploma graduates and did not attend any training program, while the satisfactory score improved post nursing intervention and in the follow-up phase. These findings were in the same line with **Vlaisavjevic et al. (2014)**, who emphasized the importance of presence of knowledgeable nurses to provide continuous nursing care post liver transplantation as patients at this period are intubated, need close monitoring, receive immunosuppressive therapy, with significant postoperative complications, and require several care procedures.

Furthermore, **Lameira (2014)**, stated that the nurse caring for the patients in early post-transplant period needs specialized knowledge to reduce the problems, prevent, and intervene immediately to maximize the result of long-term graft and provide quality care throughout the hospitalization period.

Concerning level of nurses' total practices regarding infection control precautions, the present study results clarified that most of them had incompetent levels of practices regarding infection control precautions pre - nursing intervention. These results agreed with **Eskander et al. (2013)**, who conducted a study about "Intensive care nurses' knowledge and practice regarding infection control standard precautions" at a selected Egyptian Cancer Hospital. They study revealed that the studied sample had an unsatisfactory level of knowledge regarding infection control precautions.

Regarding nurses' total practices about caring of urinary catheter, the present study showed that more than half of studied nurses had incompetent practices. These results agreed with **Algarni et al. (2019)**, who studied " Nurses' knowledge and practices toward prevention of catheter-associated urinary tract infection" in King Abdul-Aziz university/Jedda/Saudi Arabia Kingdom and revealed that the majority of nurses had a poor level of practices. While these results were contradicted with **Vlaisavjevic et al. (2014)**, who studied "Attitudes and knowledge of nurses on organ legacy and transplantation" in Clinical Center of Serbia / Belgrade, and mentioned that all the studied nurses had satisfactory practice regarding routine nursing procedures as urinary catheter care at postoperative period for patients undergoing liver transplantation.

More than half of the studied nurses had incompetent total practices regarding central venous catheter care at pre - nursing intervention. While the satisfactory score was improved post nursing intervention. This result is in an agreement with **Karaly & Abo El-Fetoh (2019)**, who reported that more than one third of the nurses under the study had unsatisfactory score of practice regarding central venous catheter care at pre-educational guidelines implementation.

From the researcher point of view, these results may be related to that the majority of the studied nurses had unsatisfactory knowledge regarding care of central venous catheter care. While the satisfactory score was improved post its implementation, while this improvement lowered slightly in the follow up phase. This could be attributed to the effectiveness of the conducting the educational guidelines.

The present study showed that more than half of studied nurses had incompetent practice regarding postoperative care pre- nursing intervention while the satisfactory score was improved post nursing intervention. This result is not in the same line with **Chaney et al. (2016)**, who studied "Role development of nurse practitioners and physician assistants in liver transplantation" and revealed that the majority of nurses under the study had a satisfactory level of practice regarding immediate care of patients with liver transplantation in the postoperative period.

Furthermore, **De Oliveira Serra (2015)**, who studied "Nursing care in the immediate postoperative period: A cross sectional study" in Brazil and revealed that nursing care is not fully offered, lack of resources and nurses have difficulties in using nursing care systematization postoperatively.

Concerning studied nurses' total practices regarding wound care post- liver surgeries, the finding of the present study revealed that about two third of them had incompetent practices pre - nursing intervention. This result is not in the same line with **Tegegne, et al. (2022)**, in a study entitled "Knowledge and practice of wound care and associated factors among nurses working in South Wollo Zone Government Hospitals" in Ethiopia. They found that more than half of the nurses had good practices about wound care.

There were no statistically significant relation between nurses' total knowledge and their socio-demographic characteristics regarding liver diseases and its surgery's pre implementing of nursing intervention. These results were disagreed with **Youssef & Ali (2022)**, findings from their study "Assessment of nurses knowledge regarding management of patients post liver transplantation" in Egypt whose found there were statistically significant relation between total nurses' knowledge and their socio-demographic characteristics.

Also, there were no statistically significant relation between nurses' total practices and their socio-demographic characteristics in pediatric surgery unit pre- nursing intervention. These results were agreed with **Mohamed (2016)**, who conducted a study about "assessment performance of nurses caring for patients with kidney transplantation" on nurses who had been working in unit of transplantation affiliated to Ghonim Center at Mansoura University in Egypt and found that there were no statistically significant differences between educational level and total level of practical knowledge among nurses under the study.

There was statistically significant correlation between total nurses' knowledge and practices regarding care of children undergoing liver surgeries post nursing intervention. This might be due to the implementation of nursing intervention which improved level of nurses' knowledge and effected positively on their practices. This finding was conducted previously by **Hosseini et al. (2015)**, who conducted a study on "Critical care nurses' knowledge, attitude, and practice toward their role in the organ donation process from brain-dead patients and factors influencing it" in Iran and mentioned that there were significant direct correlations between knowledge and practice of the study nurses.

CONCLUSION:

Nursing intervention was effective in improving nurses' knowledge and practice regarding care of children undergoing liver surgeries.

Recommendation: Adopt nursing intervention based on actual need assessment of nursing regarding care of children undergoing liver surgeries.

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