Effect of Designed Nursing Guidelines on Nursing Intervention to Reduce Complications for Cirrhotic Patients Undergoing Paracentesis

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Abstract

Paracentesis defined as remove excess fluid from the abdominal cavity. The aim of the study: assess nurses' knowledge about paracentesis, design and implement nursing guidelines about paracentesis for nurses, evaluate the effect of designed nursing guidelines on nurses' knowledge about paracentesis and to evaluate patient's complications after applying designed nursing guidelines. Research design: A quasi-experimental research design was utilized on a convenient sample of 30 nurses and 60 patients divided in two group (study and control group), (30) for each. The study was conducted in internal medicine unit, radiology unit and intermediate care unit of Al-Rajhy Liver Hospital. Tools: a) Questionnaire sheet. b) Patients' complications assessment sheet. Results: a good improvement in the mean knowledge scores were found after the implementing of designed nursing guidelines (39.43±7.73 post and 61.5±5.46 pre) with a statistically significant difference and the complications of paracentesis were lesser among study group patients about (33.3% in the study group and 83.3 in the control group). Conclusion: patients undergoing paracentesis exposed for several complications. Improving nursing guidelines can favorably affect the incidence of these complications. Recommendation: Continous training programs to improve their knowledge which will reflect into their practice.

Keywords: Designed Nursing Guidelines, Nurses Knowledge, Paracentesis & Complications.

Introduction

The World Health Organization(WHO) defined cirrhosis as a diffuse process characterized by fibrosis and the conversion of normal liver architecture into structurally abnormal nodules that lack normal lobular organization **(Friedman & Keeffe, 2012)**.

Cirrhosis is an increasing cause of morbidity and mortality in more developed countries, being the 14th most common cause of death worldwide. The death rate of liver cirrhosis is 41.6% in Egypt **(WHO, 2014)** and there was an increase in incidence and prevalence of liver cirrhosis. Increasingly, cirrhosis has been seen to be not a single disease entity, but one that can be sub-classified into distinct clinical prognostic stages, with 1-year mortality ranging from 1% to 57% depending on the stage **(Wolf, 2014)**.

Ascites is the most common major complication of cirrhosis and it is an important landmark in the natural history of the chronic liver disease. It observed for 10 years. Approximately (60%) of patients with cirrhosis develop ascites requiring therapy **(Cessario et al., 2011)**.

Abdominal paracentesis is the removal of fluid from peritoneal cavity through sterile cannula or needle**,** it performed by a medical practitioner using an aseptic technique **(Orman et al., 2014)** paracentesis is more commonly used as a diagnostic tool to examine ascetic fluid and may be used as a therapeutic to remove a large amount of fluid that is causing pain or trouble breathing or that is affecting how the kidneys or the intestines (bowel) are working into the abdomen to remove and drain ascetic fluid from the peritoneal **(Kim et al., 2011)**.

Complications of paracentesis are decreased in blood pressure, an accidentally punctured blood vessel, bowel, or bladder, kidney failure, infection, persistent leaking, post-paracentesis circulatory dysfunction (occur after > 5 L of fluid is taken off), intra-abdominal wall hemorrhage, and intra-abdominal organ injury **(Runyon, 2009)**.

The nurse should have a role to decrease these complications, the role includes pre, during and post procedure planning. Pre-procedure should check laboratory tests for the patient, hand washing to prevent cross infection, measure the vital signs especially blood pressure, ask the patient to empty his or her bladder to avoid perforation when the trocar is inserted **(Kim et al., 2014)**.

During the procedure, the nurse should help to collect and prepare the equipment, for good use of time and resources, put the patient in correct position, assist the physician in performing the procedure, measure and record the abdominal girth and measure the vital signs **(Cadranel et al., 2013).**

After paracentesis: place immediately sterile dressing after disconnection of the trocar and advise patient to remove dressing after 48 hours, vital signs measurement and recorded it in the patient chart, send the ascetic fluid specimen to lab immediately if ordered, observe any oozing from the puncture site monitor drainage on the fluid balance chart, record and report the procedure (time, date, characteristics of ascetic fluid (color, amount, and consistency) Albumin or other volume replacer is given after high-volume paracentesis to avoid hypotension **(Nottingham University Hospital, 2011)**.

The guideline is defined as systematically derived statements that help practitioners to make decisions about care in specific clinical circumstances. These should be research or evidence based **(Field & Lohr, 1992)**.

Significance of the study

According to the experience of the researcher, it was noted that the nurse' knowledge about paracentesis procedure are not adequate and need for improvement. This study will be the first study that will provide nursing guidelines for nurses about paracentesis in this geographical location which will help such groups of nurses. About 70 cases in internal medicine, radiology unit, and intermediate care unit were done at Al-Rajhy Liver Hospital during 6 months according to hospital record 2015.

The aim of the study

The aims of the study are

- To assess nurses' knowledge about paracentesis.
- To design and implement nursing guidelines about paracentesis for nurses.
- To evaluate the effect of designed nursing guidelines on nurses' knowledge about paracentesis.
- To evaluate patient's complications after applying designed nursing guidelines.

Hypothesis

1-The post mean knowledge scores of nurses who will be exposed to a designed nursing guideline will be higher than their pre mean knowledge scores.

2-The complications will be lesser among study group patients compared to those among control group ones.

2- Subjects and Method:

Research design:

The quasi-experimental research design was utilized in this study.

Setting of the study

The study was conducted in the internal medicine unit, radiology unit and intermediate care unit of Al-Rajhy Liver Hospital.

Study variables

The independent variable in this study is the designed nursing guidelines while the dependent variables are: nursing intervention as well as minimize patient's complications.

Study subjects

Sample

- All nurses working at internal medicine unit, radiology unit, and intermediate care unit (about 30).
- Sixty adult cirrhotic patients undergoing paracentesis were included and had the following criteria (the age ranged between (18-65) years old, both male and female). Those (60) subjects were equally divided on random basis into study group and control group, (30) for each.

Study tools

There are three tools were utilized to collect data for this study:

Tool (I): An interview questionnaire sheet for level of nurses' knowledge:

This sheet developed by the researcher based on literature review.

An interview questionnaire sheet for level of nurses' knowledge was used prior to implementation of the designed nursing guidelines to measure the exact knowledge level of nurses about paracentesis procedure. The same tool was used after two weeks after the implementation of the designed nursing guidelines (after two weeks post-test).

It consists of two main parts

- Socio-demographic variables of study sample (30 nurses), including unit, age, sex, education, training courses, marital status and years of experience. It includes 8 items (from 1 to 8)
- Nurses' knowledge about paracentesis, care before, during and after paracentesis which includes47 questions.

Scoring system

The total number of question are 47 questions, each question have three responses from 0:2.

- 0→incorrect.
- 1→incomplete correct.
- 2→complete correct.

The total score of interview questionnaire sheet for level of nurses' knowledge was 94 degree:

- Less than 60% Unsatisfactory.
- More than or equall 60% satisfactory.

Tool (II): Patient complications assessment sheet

This sheet aims to assess complication of patient's undergoing paracentesis before and after implementing nursing guidelines. The complications assessment sheet includes 16 items and covers the following areas

- Socio-demographic data about the patient such as patient's name, age, sex, level of education, occupation, marital status, residence, and diagnosis, it includes 9 items.
- The severity of liver disease, it includes 2 items.
- Assessment of paracentesis complications signs and symptoms which include hypotension and hypovolemia, persistent leakage of ascetic fluid, abdominal bruises or localized infection at the puncture site within one week, bleeding, intestinal perforation and hepato renal syndrome.

Methods

Ethical approval

An official letter was issued from the Dean of the Faculty of Nursing to the Head of internal medicine department soliciting the necessary approval to conduct the present research. Each patient and nurse were informed of the purpose of the study. The investigator emphasized that the participation is voluntary and confidentially and anonymity of subjects will be assured through coding of all data and protection of the patient from the hazard. Verbal consent was obtained from each patient and nurse prior to his/her contribution in the present study. Confidentiality of any obtained information was secured.

Technique for data collection

A review of current and past, local and international related literature in the various aspects of the problems using books, articles, periodicals, and magazines was done.

Content validity

The content validity of this tool was checked by expert professors in fields of medicine and nursing and correction were carried out accordingly. It was established by a panel of five expertises (3lecturer of Medical Surgical Nursing, Faculty of Nursing, Adult Nursing Department, Assiut University and 2 doctors in Tropical Medicine and Gastroenterology Department in Assiut University Hospital.) Who reviewed the instruments for clarity, relevance, comprehensiveness, understanding, and easiness for administrative minor modifications were required.

Pilot study

A pilot study carried out in September 2015 that conducted on 10% of the sample in a selected setting to evaluate the applicability & clarity of the tools it was 3 nurses who added to the study later. It had also provided an estimate of time needed to fill out the tools, and 6 patients who added to the study later.

Procedure

Once permission was granted to proceed with the proposed study, the investigator-initiated data collection.

- At the initial interview, the researcher introduces herself to initiate communication, explain the nature and purpose of the study.
- Each nurse involved in the study was assessed for his or her knowledge pre and post test after two weeks (a tool **I**). The tools filled through interviewing. The study was carried out at morning, and afternoon shifts.
- The researcher explained nature and purpose of the research to the selected patients who are willing to participate in the study and assessed for paracentesis complications as a control group (tool **II**).
- The application of designed nursing guidelines was performed by researcher then by nurses; researcher prepared the training places, teaching aids and media (pictures, handouts).Nurses divided into groups according to shifts and time available, each group contain 2 to 4 nurses. Each group of nurses chooses the optimal time for receiving the teaching sessions whenever they have a minimal workload. About 10 minutes taken to fulfill tool (I), and two teaching sessions to explain the designed nursing guidelines, each session takes around 30 minutes. Each nurse obtained a copy of the designed nursing guidelines that included all the training contents. Data were collected through the period from 10/9 /2015 to 10/3/2016.
- After two weeks after implementation of the designed nursing guidelines. The nurses` knowledge had been evaluated by the researcher through filling the tool (**I**). As well as the researcher filled the patient complication assessment sheet (tool **II**) on 15 minutes.

Statistical design

The data analysis was carried out using computer program SPSS (version, 16.0).The collected data were tabulated and analyzed by using frequency, percentage, distribution, mean, range, and standard deviation. The level of statistically significant was considered at $P \leq 0.05$. T test was used to determine the differences between study and control group in knowledge in relation to socio-demographic characteristics of nurses.

Results

Table (1): Descriptive of socio-demographic and training courses data of studied nurses (n=30).

Item	No.	%
Unit		
Radiology unit	8	26.7
Internal medicine unit	12	40.0
Intermediate care unit	10	33.3
Sex		
Male	4	13.3
Female	26	86.7
Age, mean±SD	23.77±1.14	
Marital status		
Single	16	53.3
Married	14	46.7
Education		
Nursing technical Institute	20	66.7
Bachelor of Nursing	10	33.3
Years of experience		
<5 years	30	100.0
5 – 10 years	0	0.0
>10 years	0	0.0
Have training courses		
Yes	13	43.3
No	17	56.7
Numbers of training courses		
One	5	16.6
Two or more	8	26.7
Attended two or more training courses		
Basic life support, advanced life support	1	7.7
C.P.R	2	15.4
Infection control	4	30.8
Quality	1	7.7
First aid	1	7.7
Diabetes, cardiac disease	1	7.7
Paracentesis procedure	8	61.5

Table (2): Socio-demographic characteristic of patients in study and control group.

	Control group No = 30		Study group No = 30		*P. value
	No.	%	No.	%	
Mean age ± SD	52.5±11.6		53.7± 9.3		0.650
Gender					
Male	23	76.7	19	63.3	0.260
Female	7	23.3	11	36.7	
Marital status					
Single	2	6.7	1	3.3	0.431
Married	23	76.7	20	66.7	
Widow	5	16.6	9	30.0	

	Control group No = 30		Study group No = 30		*P. value
	No.	%	No.	%	
Level of education					
Illiterate	18	60.0	14	46.7	0.525
Primary education	2	6.7	5	16.6	
Secondary education	3	10.0	2	6.7	
University	7	23.3	9	30.0	
Occupational status					
House wife	7	23.3	6	20.0	0.539
Employer	6	20.0	7	23.3	
Farmer	4	13.3	5	16.7	
Student	2	6.7	1	3.3	
Unemployed	11	36.7	8	26.7	
Retired	0	0.0	3	10.0	
Residence					
Urban	12	40.0	13	43.3	0.793
Rural	18	60.0	17	56.7	

Table (3): Assessment of nurse's knowledge about paracentesis pre and post implementing of designed nursing guidelines.

Item	Pre		Post		P. value
	No.	%	No.	%	
Definition of paracentesis					
Incorrect	5	16.7	2	6.7	0.151
Incomplete correct	2	6.7	0	0.0	
Complete correct	23	76.7	28	93.3	
Types of paracentesis					
Incorrect	20	66.7	1	3.3	<0.001**
Incomplete correct	2	6.7	0	0.0	
Complete correct	8	26.7	29	96.7	
Indication for paracentesis					
Incorrect	3	10.0	0	0.0	0.045*
Incomplete correct	24	80.0	9	30.0	
Complete correct	3	10.0	21	70.0	
Contraindications of paracentesis					
Incorrect	11	36.7	1	3.3	<0.001**
Incomplete correct	16	53.3	1	3.3	
Complete correct	3	10.0	28	93.3	
Complications of paracentesis					
Incorrect	4	13.3	0	0.0	<0.001**
Incomplete correct	19	63.3	3	10.0	
Complete correct	7	23.3	27	90.0	
Nurses role if the patient feel dizzy during paracentesis					
Incorrect	3	10.0	0	0.0	<0.001**
Incomplete correct	14	46.7	0	0.0	
Complete correct	13	43.3	30	100.0	
Investigations from ascitic fluid					
Incorrect	8	26.7	1	3.3	0.003**
Incomplete correct	15	50.0	10	33.3	
Complete correct	7	23.3	19	63.3	

Table (4): Comparison between pre and post program according to knowledge level (figure).

	Pre		Post		P. value
	No.	%	No.	%	
Knowledge of nurses about paracentesis					
Satisfactory	9	30.0	30	100.0	<0.001**
Unsatisfactory	21	70.0	0	0.0	
Knowledge of nurses before paracentesis					
Satisfactory	25	83.3	30	100.0	0.020*
Unsatisfactory	5	16.7	0	0.0	
Knowledge of nurses during paracentesis					
Satisfactory	4	13.3	27	90.0	<0.001**
Unsatisfactory	26	86.7	3	10.0	
Knowledge of nurses after paracentesis					
Satisfactory	15	50.0	29	96.7	<0.001**
Unsatisfactory	15	50.0	1	3.3	
Total level of nurses' knowledge about paracentesis					
Satisfactory	13	43.3	30	100.0	<0.001**
Unsatisfactory	17	56.7	0	0.0	

Table (5): Complications rates according to the type of paracentesis in both study and control group of patients.

	Therapeutic (n=43)		Diagnostic (n=17)		P. value
	No.	%	No.	%	
Hypotension and hypovolemia	10	23.3	0	0.0	0.029*
Persistent leakage of ascitic fluid	9	20.9	0	0.0	0.041*
Abdominal bruises or localized infection at the puncture site (within 1 week)	4	9.3	2	11.8	0.774
Bleeding	6	14.0	3	17.6	0.718
Intestinal perforation	-	-	-	-	-
Hepato renal syndrome	1	2.3	0	0.0	0.526
Total complications	30	69.8	5	29.4	0.010**

Table (6): Relation between socio-demographic data and nurse's knowledge before implementing of designed nursing guidelines.

	Knowledge of nurses about paracentesis				Knowledge of nurses before paracentesis				Knowledge of nurses during paracentesis				Knowledge of nurses after paracentesis				Evaluation of nurses knowledge on paracentesis as general			
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Age	24.44±1.33		23.48+0.93		23.8+1.12		23.6+1.34		24.75+1.5		23.62+1.02		24.13+1.3		23.4+0.83		24.31+1.32		23.35+0.79	
P. value	0.030*				0.726				0.061				0.076				0.020*			
Sex																				
Male	2	50.0	2	50.0	4	100.0	0	0.0	2	50.0	2	50.0	3	75.0	1	25.0	4	100.0	0	0.0
Female	7	26.9	19	73.1	21	80.8	5	19.2	2	7.7	24	92.3	12	46.2	14	53.8	9	34.6	17	65.4
P. value	0.348				0.337				0.020*				0.283				0.014*			
Marital status																				
Single	7	43.8	9	56.3	13	81.3	3	18.8	3	18.8	13	81.3	9	56.3	7	43.8	9	56.3	7	43.8
Married	2	14.3	12	85.7	12	85.7	2	14.3	1	7.1	13	92.9	6	42.9	8	57.1	4	28.6	10	71.4
P. value	0.079				0.743				0.351				0.464				0.127			
Education																				
Nursing technical Institute	3	15.0	17	85.0	16	80.0	4	20.0	1	5.0	19	95.0	7	35.0	13	65.0	5	25.0	15	75.0
Bachelor of Nursing	6	60.0	4	40.0	9	90.0	1	10.0	3	30.0	7	70.0	8	80.0	2	20.0	8	80.0	2	20.0
P. value	0.011*				0.488				0.058				0.020*				0.004**			
Have training courses																				
Yes	4	30.8	9	69.2	13	100.0	0	0.0	4	30.8	9	69.2	9	69.2	4	30.8	9	69.2	4	30.8
No	5	29.4	12	70.6	12	70.6	5	29.4	0	0.0	17	100.0	6	35.3	11	64.7	4	23.5	13	76.5
P. value	0.936				0.032*				0.014*				0.065				0.012*			

Table (7): **Relation between socio-demographic data of patients and Study group complications**.

	Study group complications												**P. value**
	Hypotension and hypovolemia		**Persistent leakage of ascitic fluid**		**Abdominal bruises or localized infection at the puncture site (within 1 week)**		**Bleeding**		**Intestinal perforation**		**Hepato renal syndrome**		
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	
Age groups													
18-<30	0	0.0	0	0.0	0	0.0	1	3.3	0	0.0	0	0.0	0.072
30-<50	0	0.0	0	0.0	1	3.3	0	0.0	0	0.0	0	0.0	
50-65	2	6.7	3	10.0	0	0.0	3	10.0	0	0.0	0	0.0	
gender													
Male	1	3.3	2	6.7	0	0.0	2	6.7	0	0.0	0	0.0	0.721
Female	1	3.3	1	3.3	1	3.3	2	6.7	0	0.0	0	0.0	
marital status													
Single	0	0.0	0	0.0	0	0.0	1	3.3	0	0.0	0	0.0	0.776
Married	1	3.3	2	6.7	1	3.3	1	3.3	0	0.0	0	0.0	
Widow	1	3.3	1	3.3	0	0.0	2	6.7	0	0.0	0	0.0	
level of education													
Illiterate	0	0.0	1	3.3	0	0.0	3	10.0	0	0.0	0	0.0	0.145
Secondary education	0	0.0	0	0.0	0	0.0	1	3.3	0	0.0	0	0.0	
Primary education	2	6.7	1	3.3	0	0.0	0	0.0	0	0.0	0	0.0	
University	0	0.0	1	3.3	1	3.3	0	0.0	0	0.0	0	0.0	
Occupational status													
House wife	1	3.3	1	3.3	0	0.0	1	3.3	0	0.0	0	0.0	0.45
Employer	0	0.0	1	3.3	1	3.3	0	0.0	0	0.0	0	0.0	
Farmer	1	3.3	1	3.3	0	0.0	0	0.0	0	0.0	0	0.0	
Student	0	0.0	0	0.0	0	0.0	1	3.3	0	0.0	0	0.0	
Unemployed	0	0.0	0	0.0	0	0.0	2	6.7	0	0.0	0	0.0	
Retired	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Residence													
Urban	1	3.3	2	6.7	1	3.3	1	3.3	0	0.0	0	0.0	0.506
Rural	1	3.3	1	3.3	0	0.0	3	10.0	0	0.0	0	0.0	

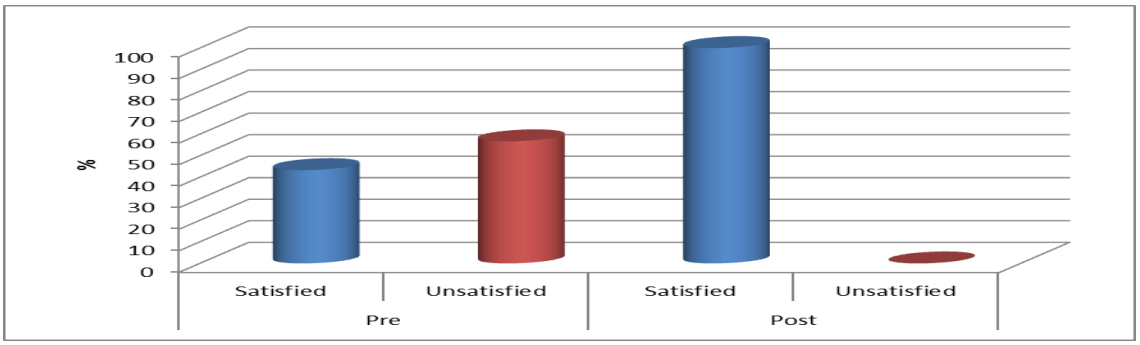

Figure 1: Distribution of nurse's knowledge about paracentsis as general pre and post implementing of designed nursing guidelines.

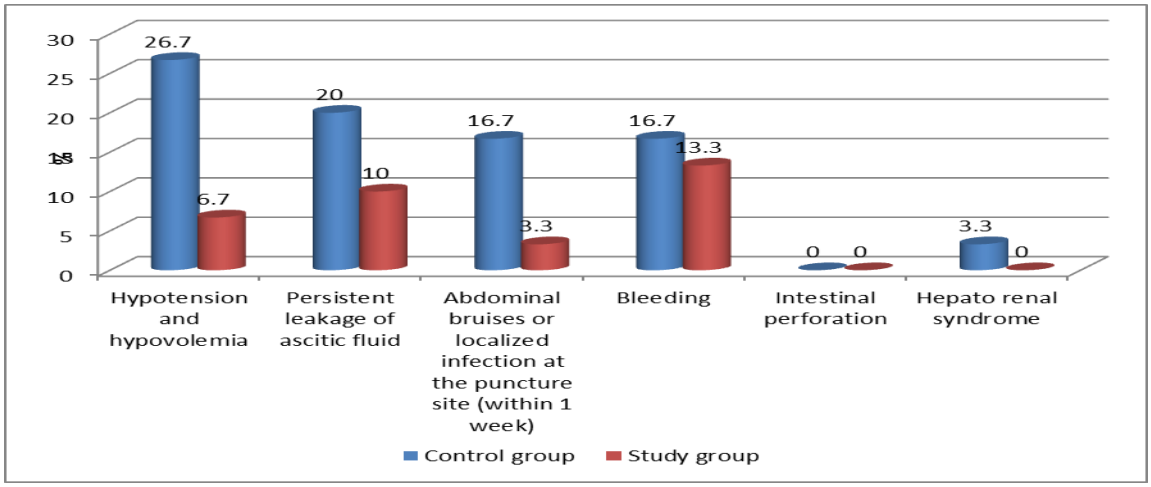

Figure (2): Distribution of study and control groups of patients as regards complications of paracentesis

Table (1): Shows that less than half of (40.0%) studied nurses were from internal medicine unit. The majority (86.7%) of studied nurses were female. As regard, marital status, education and training courses more than half of studied nurses are single (53.3%), (66.7%) had nursing technical institute and (56.7%) had not trained courses. All of the studied nurses had the same experience less than 5 years of experience.

Table (2): Shows that the majority of both study (63.3%) and control group (76.7%) were males, married. As regarding the level of education and residence, more than half of control group (60.0%) was illiterate and (60.0%) live in rural area.

Table (3): Shows that there was statistically significant difference between pre and post implementing of designed nursing guidelines in relation to nurse's knowledge about paracentesis in most items with p-value<0.01.

Table (4): Shows that there was statistically significant difference between pre and post implementing of designed nursing guidelines as regard nurse's knowledge before paracentesis with p-value<0.05.

Table (5): Shows that there was statistically significant difference between diagnostic and therapeutic paracentesis in relation to hypotension and hypovolemia and persistent leakage of ascitic fluid with p-value <0.05.

Figure (1): Shows that all of the nurses have satisfactory level after implementing of designed nursing guidelines.

Figure (2): Shows that complications of paracentesis lesser among study group than control group.

Table (6): Shows that there was statistically significant difference between education and nurses' knowledge on paracentesis as general with p-value<0.01, in which knowledge of nurses about paracentesis satisfactory in most items in who had high education level.

Table (7): Shows that there was no statistically significant difference between socio-demographic data of patients and study group complications.

Discussion

The present study had four aims: the first: to assess nurses' knowledge about paracentesis, the second: to design and implement nursing guidelines about paracentesis for nurses, the third: to evaluate effect of designed nursing guidelines on nurses' knowledge about paracentesis, and the fourth: to evaluate patient's complications after applying designed nursing guidelines.

The term paracentesis is a procedure in which a needle or catheter is inserted into the peritoneal cavity to obtain ascitic fluid for diagnostic or therapeutic purposes **(Thomsen et al., 2006)**. Nurse's role in paracentesis is divided into three steps: before paracentesis, during paracentesis, and post-paracentesis.

The majority of nurses in the current study is single, female, and has Nursing Technical Institute. More than half of them had not in-service training courses but less than one-third of them had in-service training courses related to paracentesis procedure. The experiences of all of them less than 5 years.

But **Ahamed, (2011)**; conducted a study in hemodialysis unit of Assiut University Hospital, entitled developing the designed protocol regarding the care offered to hemodialysis patients which revealed that the majority of nurses their ages were from 20 - 40 years. The majority of nurses were female and nursing diploma was the highest proportion, less than half of them have an experience more than ten years and all of them have no in-service training courses related to dialysis **Marquis, & Huston, (2009)**: stated that education and training are two components of staff development that occur after an employees' indoctrination (which refers to planned, guided adjustment of employee to the organization and work environment). The staffs' knowledge level and capabilities are a major factor in determining the number of staff required to carry out unit goals. The better trained and more competent the staff, the fewer staff required, which in turn saves the organization money and rise reproductively.

In the present study, the results revealed that most of the nurses had an unsatisfactory level of knowledge before implementation of designed nursing guidelines. The majority of them showed the unsatisfactory level of knowledge about paracentesis (types, indication, contraindication, complications, nurses' role if the patient feels dizzy and investigations from ascitic fluid). This may be attributed to one hand to insufficient courses related to paracentesis included in their undergraduate curriculum of nursing education and in the other hand to the lack of continuous education and in-service training program. This result in the same line with **Abd Al-Magid, (2011)** who documented that data collected before the designed nursing protocol implementation (pre-test) showed the unsatisfactory level of knowledge about cancer and chemotherapy which reflects the lack in their scientific preparation. Also, our results were in accordance to **Thabet, (2012)** who documented that data collected before the designed nursing protocol implementation (pre-test) showed the unsatisfactory level of knowledge about intravenous therapy which reflects the lack in their knowledge.

The present study showed a statistically significant difference in the nurse's knowledge about paracentesis items including types, indications, contraindications, complications, nurses role if the patient feels dizzy and investigations from ascitic fluid on pretest and post test. This result was supported by **Abd-Allah, (2000)** who documented that the in-service training program had a beneficial effect in improving the nurse's knowledge and skills. They also recommended that educational programs should be organized according to the needs of nurses with continuous evaluation. The results of the current study were in concordance with **Khalil, (2013)** who documented that there was statistically significant difference in level of nurses' knowledge about blood and blood transfusion on pre and post test, also there was a statistically significant difference in level of nurses' knowledge about complications of blood transfusion on pre and post test.

As regards nurse's knowledge before paracentesis the results revealed that there was a statistically significant difference in the majority of items on pre and post-test. Also regarding nurse's knowledge during and after paracentesis, there was a statistically significant difference in the majority of items on pre and post-test. These results were in line with **Ahmed, (2011)** who documented that data collected before the designed nursing protocol implementation (pre-test) showed the unsatisfactory level of knowledge about renal failure, hemodialysis and care of patients undergoing hemodialysis, which reflected the lack in their scientific preparation. The implementation of the designed protocol showed an improvement in the nurses' level of knowledge regarding the care offered to hemodialysis patients. The findings indicated a good improvement in the mean knowledge scores after the application of the designed nursing protocol.

The current study revealed a great improvement in knowledge score about paracentesis in general, before, during and after paracentesis after implementation of designed nursing guidelines with a statistically significant difference. These results were in line with **Khalil, (2013)** who documented that a great improvement in knowledge scores about blood, blood transfusion and complications of blood

transfusion after application of nursing intervention protocol.

A significant relation between nurses' knowledge scores according to age, sex, education and training courses was observed during the pre-test. These results were in agreement with those of **Mostafa, (2012)** who noted that there was a significant difference between nurses' knowledge scores with age, and having training courses. However, the current study results disagreed with those of **Khalil, (2013)** who documented no significant difference during the pre-test between nurses' knowledge and their age group, sex, years of experience and previous training in medical surgical nursing.

In the present study, the majority of both study and control group were males, married. As regarding the level of education and residence more than half of control group were illiterate and live in rural area. This result in line with **Khalil, (2013)**; conducted a study in in the general medical departments (B and C) and blood diseases unit at Assiut University Hospital, entitled Impact of Implementing a Design Nursing Intervention Protocol to Minimize Patient's Complications, which revealed that that the majority of patients were male, married, their age was above 30 years, not working, illiterate, and from rural area.

In the present study, more than half of study and control groups are Child-Pugh grade C. This study finding disagree with **Rossie et al. (2000)** who reported that in a study including 60 patients with cirrhosis and refractory ascites; 42 patients were Child-Pugh grade B and 18 patients were grade C.

The results of the present study revealed that the majority of study and control groups were subjected to therapeutic paracentesis. This study finding was supported by **Dooley et al., (2011)** who reported that therapeutic paracentesis was done for Child-Pugh grade C with tense ascites.

Refractory ascites may be treated in several ways and the choice of treatment depends on the severity of the liver disease, the speed of ascites reaccumulation and the presence of any comorbidity. Therapeutic paracentesis in cirrhotic patients with refractory ascites is the recommended first line treatment **(Ginés et al., 2004).**

As regard paracentesis complications in the present study, it was found that the frequency of paracentesis complications after implementation of the designed nursing guidelines was lesser than pre-implementation of the designed nursing guidelines. The most common complications which occurred pre-implementing the designed nursing guidelines were hypotension and hypovolemia, bleeding, abdominal bruises or localized infection at the puncture site (within 1 week) and persistent leakage of ascitic fluid, with statistically significant difference between study and control group regarding hypotension and hypovolemia.

This result in disagrees **Pache, & Bilodeau, (2005)** reported that severe bleeding was observed in only 9 of 4729 paracenteses.

In the present study, the majority of complications occur during therapeutic paracentesis with a statistically significant difference between diagnostic and therapeutic paracentesis in relation to hypotension; hypovolemia and persistent leakage of ascitic fluid.This result in agree with **Runyon (1998)** reported that diagnostic paracentesis is a safe procedure with a very low incidence of serious complications. Also, **De Gottardi et al., (2009)** reported that the most common complications following paracentesis are an ascitic fluid leak, which occurred in 5 percent of patients in one study.

The results of the present study revealed that, the majority of complications occurred more in Child-Pugh grade C but with no statistically significant difference except in persistent leakage of ascitic fluid, but **De Gottardi et al., (2009)** reported that major complications, mostly bleeding, have been associated with therapeutic but not diagnostic procedures and tend to be more prevalent in patients with low platelet count 0(<50 000) and Child – Pugh class C.

Porth, (2000); Storch, & Rice, (2005) stated that professional nurses have a large role to play in the minimization and prevention of paracentesis complications and should be clinically well versed in all aspects of the condition to address risk minimization and for patient safety. This statement was reinforced and supported by our results as the designed nursing guidelines for nurses working with patients undergoing paracentesis had achieved its objectives by improving nursing interventions.

Conclusions

Based on the result of the present study, it can be concluded that

- Patient undergoing paracentesis exposed for several complications.
- Nurse's knowledge regarding paracentesis in internal medicine unit, radiology unit and intermediate care unit of Al-Rajhy Liver Hospital are inadequate. Nurses are potentially capable of improving their knowledge after exposure to designed nursing guidelines.

Recommendations

Based on results of the present study it can be recommended that

- Continued nursing education and inservice training programs in internal medicine unit, radiology unit

and intermediate care unit of Al-Rajhy Liver Hospital should be well organized and equipped with the necessary educational facilities and materials necessary to upgrade the knowledge and skills of practicing nurses, which will be reflected on better outcome and service for the inpatients.

- Periodic monitoring of nurses knowledge and practice to evaluate the level of nurses.

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