

Effect of Nursing Instructions on Esophageal Varices Recurrence after Endoscopic Band Ligation

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Abstract:

Back ground: Esophageal varices that are at risk of rupturing can be treated with variceal banding. **Aim of the study:** Design and implement nursing instructions for patients undergoing endoscopic band ligation for esophageal varices at Assiut University in Al-Rajhi Hospital. **Research design:** Quasi experimental research design, study and control was utilized in this study. **Subjects:** The sample of 60 adult patients with esophageal varices 30 patients in each group. **Setting:** The study was conducted in Gastrointestinal Endoscopy Unit and Gastroenterology Departments at Al-Rajhi Hospital. **Tools: (I):** Patient assessment sheet. **(II):** Patients, knowledge questionnaire regarding esophageal varices band ligation and Nursing instructions for patient undergoing esophageal varices band ligations. **Results:** Recurrent of esophageal varices among studied group was 36.7% compared 93.3% for control group after application of nursing instructions. **Conclusion:** Esophageal varices recurrence after band ligation was reduced after provided nursing instructions for the patient, **Recommendation:** Continuous follow up programs and compliance of instructions to reduce recurrence esophageal varices after endoscopic band ligation.

Keywords: *Band ligation, Esophageal varices, Nursing instruction & Recurrence*

Introduction

The esophagus is the tube that joins the throat to the stomach; varices are enlarged or bulging veins. Esophageal varices are swollen veins that develop on the lining of the esophagus. When a clot or scar tissue in the liver blocks normal blood flow to the liver, it develops. In order to get around the obstructions, blood flow into tiny blood vessels that aren't intended to carry high quantities of blood. These vessels may leak blood or even rupture, which can cause life-threatening bleeding. (Merkel et al., 2017)

Endoscopic varices banding is the preferred therapy. banding offers better bleeding control and has fewer negative side effects. When performing a band ligation is technically challenging, endoscopic injection sclerotherapy is utilized. Band ligation is less expensive overall than sclerotherapy. (Barbu et al., 2017)

One way of treating esophageal varices that are at danger of rupturing is variceal banding. The technique is safe since it doesn't harm the esophagus wall or increase pressure in the portal system. Banding the vein will stop blood flow through the vein, causing the banded tissue to develop into a small ulceration that swiftly heals after a few days or weeks. (Hinkle & Cheever, 2018).

The patient should be admitted to hospital. Even minor hematemesis may be followed by massive bleeding Resuscitation. A wide bore cannula is

inserted. Blood sample is taken for complete blood picture, liver function testes. Coagulation studies and for cross-matching for at least 4 units of blood. Correct coagulopathy. Vitamin k is administered intravenously. Nurses play a vital role in caring for patients undergoing esophageal varices banding. Careful monitoring can detect early signs of cardiac dysrhythmias, and hemorrhage. Most important role for the nurse is to maintain patient safety through the right position to avoid suffocation and careful observation of oxygen saturation. (Morales et al., 2018)

After procedure assess level of consciousness, vital signs, oxygen saturation, pain level. Patient after band ligation should be instructed to nothing per mouth for first two hours, start with sips of water or cool clear liquids, have soft foods, do not drink hot liquids, do not lie in flat position at night and do not lift heavy objects (Hinkle & Cheever, 2017) .

When compared to patients receiving sclerotherapy, patients having endoscopic ligation have a higher risk of early recurrence and multiple recurrence of esophageal varices; nevertheless, the recurrence did not increase the risk of rebleeding or necessitate additional endoscopic treatment. After endoscopic esophageal variceal eradication therapy, the return of esophageal varices is particularly prevalent in patients with hepatic portal hypertension. In order to avoid esophageal varices from rebleeding, it would be

necessary to find the independent risk factor linked to their recurrence even though the underlying pathogenic mechanisms have not yet been fully understood (Garcia et al., 2019).

Significance of the study

From the clinical experiences as a nursing supervisor of endoscopy unit at **Al-Rajhi Hospital**, it has been observed that patients undergoing esophageal varical banding experience recurrence of esophageal varices after band ligation. Total patients admitted to Hospital with esophageal varices from **2019 to 2021** were **692 (Al-Rajhi Assuit University Hospital records, 2021)** and applying band ligation for 150 patients .So, those patients need special instructions to reduce esophageal varices recurrence after band ligation.

Aims of the study

The aims of this study were to:

1. Assess patients knowledge regarding esophageal varices and endoscopic band ligation.
2. Design and implement nursing instructions for patients undergoing endoscopic band ligation for esophageal varices
3. Evaluate the effect of the nursing instructions on reducing esophageal varices recurrence after band ligation.

Hypotheses:

- H1:** Patients knowledge will be improved after implementing the nursing instructions
- H2:** Esophageal varices recurrence after band ligation will be reduced after implementing the nursing instruction for the study group

Subjects and Method:

Research design;

A quasi experimental research design with one group (study and control) approach was used to evaluate the effectiveness of nursing instruction for the patient's undergoing esophageal varices band ligation. Thus, only one group is observed twice (before and after introducing the independent variable).

Technical design

Study variables:

The independent variable is the nursing instruction, the dependent variables are patient's knowledge and recurrence of esophageal varices.

Setting:

This study carried out in Gastro-intestinal Endoscopy Unit and Gastroenterology Departments. Al rajhi Hospital at Assuit University Hospitals.

Sample:

The sample size was (60) adult patients included in the study with esophageal varices, 30 patients in each group. Undergoing esophageal band ligation. Patients was divided equally into two groups (study group) and (control group) 30 in each group the study group

was receive nursing instructions. Patients was followed up during the first month after esophageal varices band ligation.

The sample inclusion criteria grade varices 2, 3, 4

Sample size:

The sample size calculated by using the following equation according to Steven. Thompson (2017).

$$n = \frac{N \times p(1 - p)}{[(N - 1) \times (d^2 \div z^2)] + p(1 - p)}$$

N=total patient population size of 150 during year 2021 who attended in Al-Rajhi of Assuit university hospital.

Z=confidence level is 0.95 and is equal to 1.96

D=the error ratio is =0.50P=the property availability ratio and neutral =0.05

Study tools:

Three tools were used in this study:

Tool (I): Patient assessment sheet: This tool was developed by the researcher based on the national and international literature to assess the personal data of the patients, medical data.

This tool consisted of three parts:

Part one: Demographic data which include (age, sex, marital status, educational level, and occupation).

Part two: -Medical diagnosis

History of chronic disease as Diabetes Mellitus, Hypertension, heart disease, kidney disease, pulmonary disease.

Last diagnostic test results as Complete Blood Count % Hematocrit, Prothrombin time (PT&PTT) & International Normalized Ratio(INR), Liver function test (Alanine transaminase (ALT) & Aspartate transaminase (AST), Gamma-glutamyltransferase (GGT),Total Bilirubin-Direct Bilirubin, A/G Ratio, Alkaline phosphatase (ALP), Albumin Reactive protein (CRP), Protein Total-Serum, Creatinine-Urea.

Part three: Follow up of patients for recurrence of esophageal varices after band ligation according to number of recurrence.

Tool (II): Patients knowledge regarding band ligation to the esophageal varices:

The patient asked about esophageal varices, causes of esophageal varices, risk factors about esophageal varices, signs and symptoms of esophageal varices, information about endoscopic band ligation, complication of esophageal varices, complication resulting from endoscopic band ligation ,exercise after endoscopic band ligation ,proper nutrition needed for patient with esophageal varices ,treatment need for patient with esophageal varices, the patient information about follow up after discharge from the hospital.

Scoring system: Include (11) question and total scoring (22), Response options was scored as (2) for

correct answer, (1) for incomplete correct answer and zero for incorrect or I don't know. Total score was categorized as satisfactory (< 60), unsatisfactory (> 60).

Tool (III): Nursing instructions for patient undergoing band ligation to the esophageal varices: this tool was developed by the researcher based on review of literature (Balart et al, 2019).

It include (definition of esophageal varices recurrence, causes of esophageal varices recurrence, risk factors of recurrence, signs and symptoms of esophageal varices recurrence and complication, esophageal varices management, nursing instructions about (rest-medication-healthy nutrition-exercise after endoscopic band ligation) for patient undergoing band ligation procedure pre/during and post band ligation).

General objective

Reduce recurrence of esophageal varices after implementing nursing instructions for band ligation

Specific objectives:

By the end of the study the patients will be:

1. Acquire knowledge about esophageal varices and band ligation, diet, medication, exercise, rest and follow up endoscopy.
2. Reduce recurrence of esophageal varices

Research design

Quasi experimental research design (study and control) was utilized in this study.

Methods

Administrative Approval

To conduct the study the approval was obtained from the hospital responsible authorities after explanation of the aim and nature of the study.

Tool Development:

Nursing instructions was developed by the researcher, after reviewing the relevant literature in the various aspects using books, articles, periodicals, magazines, and references were done.

Validity:

Once the tools of data collection were prepared, the face validity and content validity were judged by a panel of five experts professors of medical surgical nursing staff and professors of tropical medicine and gastroenterology (staffs) who reviewed the tools for clarity, relevance and applicability, comprehensiveness and ease of implementation. In the light of their assessments, minor modifications were applied. Test reliability of the tools was confirmed by Cronbach's alpha (0.97) for tool II. Permission for voluntary participation was obtained from patients moreover; the nature and purpose of the study were explained.

Reliability of the study tool:

The reliability of the test was calculated by using correlation coefficient and it was estimated by Alpha Cronbach's test for this study.

Ethical consideration

- Research proposal was approved from Ethical committee in the faculty of Nursing.
- There is no risk for the studied subjects during application of the research.
- The study was follow common ethical principles in clinical research.
- Written consent was obtained from patient or guidance who are willing to participate in the study after explaining the nature and purpose of the study.
- Confidentiality and anonymity was assured.
- The study subject had the right to refuse to participate and or withdraw from the study without any rational any time.
- Study subject privacy was considered during the collection of data

A pilot study

- A pilot study was conducted on 10% of the study subjects (6 patients) to test the feasibility and applicability of the tool and the necessary modification was done.

Assessment of knowledge was done twice as follows:

- At the beginning of study was considered as pre-test assessment and as base line data for latter comparison with future post-test.
- Administration of questionnaire was carried out after implementation of nursing instruction to identify its effect on patients.

Data collection

Data collection from the Gastrointestinal Endoscopy Unit and Gastroenterology Departments in Al-Rajhi Hospital at Assuit University during the period from June 2022 to November 2022.

The study was conducted on three phases (preparatory phase, implementation and evaluation phase).

Preparatory phase:

During this phase the researcher assess the sitting of the study for possibility of meeting patients for assessment and give the studied patients the nursing instructions. Tools were developed after reviewing of related literature. The needed administrative permissions were obtained

Implementation phase:

- During this phase the studied patients were interviewed individually for assessment using pre-mentioned study tools.
- Patient in the study group received the nursing instructions
- Once permission was granted to proceed with the proposed study, the researcher initiated data collection
- Data was collected from the gastrointestinal endoscopy unit and gastroenterology departments in Al-Rajhi hospital at Assuit University

- At the initial interview, the researcher greeted the patients, introduced herself and purpose of study was explained to patients who agreed to participate in the study prior to any data collection.
- Each studied patient who took part in the research was interviewed too much individually to obtain data that were established using an interview questionnaire (patient assessment sheet) and the researcher gathered the data. Every session took about 10-15 min.
- The nursing instructions were administered in 2 session (before and after band ligation).

Session one (before band ligation) that include:

- Explain all package of care to patients attending for band ligation for esophageal varices as (routine physical preparation for endoscopy procedure by asking patient history and physical examination the day before the procedure
- Also explain procedure to both patient and caregiver, using accepted written documentation
- Be sure that the patient (NPO) nothing per mouth for 8 hours prior to the examination
- Assure psychological support before band ligation to reduce the patient level of anxiety or stress.

Session two included:

- Ask the patient about the degree of pain (mild - moderate –sever).
- Assess the studied patient for any signs or symptoms as (melena-hematemesis- diarrhea or constipation).
- Ask patient about nutrition or loss appetite and examine for weight gain.
- The researcher documented the results in each sheet according to the result or patient condition.
- Assessment of the patient's knowledge about esophageal varices using tool (II) that filled by researcher.

The evaluation phase:

This phase was conducted after one month for tool (I) part 3 and tool (II) for all studied sample “both control and study group in gastrointestinal endoscopy unit and gastroenterology departments in Al-Rajhi hospital at Assuit University.

Statistical design:

- Data entry and statistical analysis were done using SPSS computer program “version 23.0” software. The data was 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, %). continuous variables described by mean and

standard deviation (Mean, SD) chi square test used to compare between categorical variables. T- Test used to compare between continuous variables used for the numeric variable. N.s $P > 0.05$ is no significant, and $P \leq 0.05$ was considered statistically significance.

Result**Part (1): Demographic characteristics of the studied patient:****Table (1): Studied patients (control and study Group) as regarding to demographic characteristics for the patients participant (n=60).**

Demographic characteristics	Study Group n=(30)		Control group n=(30)		p. Value
	N	%	N	%	
Sex					
Male	17	56.7%	16	53.3%	1.000
Female	13	43.3%	14	46.7%	
Age					
18 <30	2	6.7%	0	0.0%	.254
30 < 40	3	10.0%	3	10.0%	
40 < 50	9	30.0%	15	50.0%	
50 - 65	16	53.3%	12	40.0%	
Marital status					
Single	2	6.7%	0	0.0%	.266
Married	20	66.7%	24	80.0%	
Widow	8	26.7%	6	20.0%	
Education level					
Illiterate	17	56.7%	15	50.0%	.549
Read and write	4	13.3%	7	23.3%	
Primary education	3	10.0%	3	10.0%	
Secondary education	4	13.3%	5	16.7%	
High education	2	6.7%	0	0.0%	
Occupation					
Not work	25	83.3%	26	86.7%	.500
Working	5	16.7%	4	13.3%	
Living situation					
Rural area	14	46.7%	13	43.3%	.500
Urban area	16	53.3%	17	56.7%	

Part II: Medical data:**Table (2): Medical data history of the studied patients according to their medical data (n=60):**

Medical data Chronic disease	Study Group		Control group		Sig.
	N	%	N	%	
Diabetes mellitus	2	6.7%	5	16.7%	.212
Hypertension	2	6.7%	3	10.0%	1.000
Heart disease	1	3.4%	0	0.0%	.492
GIT bleeding	27	90.0	22	73.3%	0.47
Hepatocellular carcinoma	5	16.7	3	10%	0.47
Viral hepatitis					
Hepatitis B	2	20.0	6	20.0	.588
Hepatitis C	17	56.7	20	66.7	
Family history for liver disease	1	3.4	1	3.4	1.000
Previous endoscopy	25	83.3	26	86.7	1.000
Recurrent esophageal varices	27	90.0	28	93.3	1.000

Table (3): Distribution of recurrence of esophageal varices post nursing instructions

Recurrent esophageal Varices		Study	Control	P.value
No	N.	19	2	
	%	63.3%	6.7%	
Yes	N.	11	28	
	%	36.7	93.3%	

Table (4): Comparison between pre and post nursing instructions regarding patient knowledge among study group (n=30)

Knowledge	Study group	Pre test		Post test (after one month)		Sig.
		N	%	N	%	
Q1: What do you know about esophageal varices	Complete.	1	3.3	7	23.3	.003*
	Incomplete	2	6.7	8	26.7	
	Dont know	27	90.0	15	50.0	
Q2: what are the causes of esophageal varices	Complete.	0	0.0	6	20.0	.036*
	Incomplete	21	70.0	17	56.7	
	Dont know	9	30.0	7	23.3	
Q3: What are the risk factors about esophageal varices	Complete.	0	0.0	7	23.3	.017*
	incomplete	10	33.3	9	30.0	
	Dont know	20	66.7	14	46.7	
Q4: What are signs and symptoms of esophageal varices	Complete.	4	13.3	6	20.0	.030*
	Incomplete	26	86.7	22	73.3	
	Dont know	0	0.0	2	6.7	
Q5: What do you know endoscopic band ligation	Complete.	0	0.0	5	16.7	.063
	Incomplete	0	0.0	2	6.7	
	Dont know	30	100.0	23	76.7	
Q6: What is the complication of esophageal varices	Complete.	0	0.0	6	20.0	.028*
	Incomplete	11	36.7	11	36.7	
	Dont know	19	63.3	13	43.3	
Q7: Do you know what is complication resulting from endoscopic band ligation	Complete.	0	0.0	6	20.0	.036*
	Incomplete	16	53.3	13	43.3	
	Dont know	14	46.7	11	36.7	
Q8: Permissible exercise after endoscopic band ligation	Complete.	0	0.0	7	23.3	.010*
	Incomplete	5	16.7	7	16.7	
	Dont know	25	83.3	16	23.3	
Q9: What is the proper nutrition needed for patient with esophageal varices	Complete.	0	0.0	2	6.7	.338
	Incomplete	17	56.7	17	56.7	
	Dont know	13	43.3	11	36.7	
Q10: What is the treatment need for patient with esophageal varices	Complete.	0	0.0	7	23.3	.001**
	Incomplete	0	0.0	4	13.3	
	Don know	30	100.0	19	63.3	
Q11: What is the patient information about follow up after discharge from the hospital	COmplete	0	0.0	6	0.20	.019*
	Incomplete	6	20.0	8	26.7	
	Dont know	24	80.0	16	53.3	

Table (5): Total score of patient's knowledge for both groups (control and study) about esophageal varices after nursing instructions.

Items	Study		Control		Sig.
	N	%	N	%	
Satisfactory	19	63.3	0	0.0	.001**
Unsatisfactory	11	36.7	30	100.0	
Means ±SD	8.90±4.04		2.43±1.56		

Chi-Square and independent t-test

*=Significant difference * $p \leq 0.05$ **= highly significance * $p \leq 0.01$ Ns=Non significant difference $p > 0.05$

Table (1): Demonstrated that the age of patients was (50%) of the control group aged 40-50yrs and 53% aged 50 < 65 yrs. old for the study group. As regard marital status, more than half were married in both group (80% ,66.7% respectively), The majority of them (86.7%,83.3%) didn't work. As regard the residence the majority of patient come from urban

area in both group (56.7%, 53. %) respectively. and most of the patient (23.3%, 56.7%) more than half were illiterate...

Table (2): This table shows that as regard medical data, 16.7% in control group had diabetes mellitus, regarding the etiology of esophageal avarices, more than half of the patients (66.7%) had liver disease in

both group (73.3%, 90.0%), respectively and complain GIT bleeding . moreover,(66.7%, 56.7%,) respectively had hepatitis C in both group the majority of patients (86.87% and 83.3%,respectively) had previous endoscopy, and (93.3%,90.0%, respectively) in both group had recurrent esophageal. There are no statistically significance differences between study and control group $p \leq .05$

Table (3): Shows the recurrent esophageal varices among study group was 36.7% and control group was 93.3% post nursing instruction.

Table (4): This table shows that there are statistically significance differences between pre and post instructions for study group regarding patient knowledge except q9 ($p \leq .0$).

Table (5): This table shows that more than half (63.3%) of study group had satisfactory level of knowledge after nursing instructions and there are statistically significance differences between study and control group regarding patient Knowledge ($p \leq .05$).

Discussion:

Esophageal varices are enlarged or bulging veins on the lining of the esophagus. If they bleed they can be fatal, So, treatment focuses on avoiding liver damage, avoiding bleeding from varices and managing existing bleeding. (Hall et al., 2018)

Demographic Characteristics:

Regarding the studied patient's demographic characteristics, the results of the present study revealed that half of the study group and control group patients' aged were from forty to fifty years old and more than half of the study group were males. This is supported with by Yang et al., 2019 who conducted the study which entitled "The effectiveness of standard non selective β -blockers plus endoscopic variceal ligation versus carvedilol plus endoscopic variceal ligation in cirrhosis patients for the prevention of variceal rebleeding was compared in a meta-analysis" who stated that in their study; esophageal varices occurs more often in patients between the ages of fifty five and fifty seven years. The researcher opinion that due to aging ,the veins valves, which help control blood flow, become worn down with age, and eventually this wear results in the valves allowing some blood to flow back into the veins where it accumulates .

There were no significance difference between the study and control group regarding age, sex and educational level. In this respect, Alarfaj et al., 2022 studied the prevalence of infection in patients with portal hypertensive gastrolatry owing to liver cirrhosis in Upper Egypt and stated that no significance relation between demographic characteristics between both groups. This confirmed

by Boonchoo et al., 2019 who documented that it is of paramount importance to prevent bias based on a variable known to affect results, such as baseline reading ability or gender, make sure the groups are equal before the experiment begins.

Regarding marital status, the current study found that all of the studied patients were married. This finding is similar to Abd Elkader et al., 2020, who reported that the most of patients were married. This finding was also in the same line with Groz et al., 2017, the majority of patients were married, this study finding revealed that half of the patients were illiterate which conflicted with Abd El-ftah, 2018, who claimed that two thirds of the patients were illiterate. The findings of this study show that while the majority of patients are uneducated, they experienced the problems of esophageal varices. According to the presented study, it showed how important health education is for prevention disease and raising patient's understanding of their condition, its complications, and recommended treatments.

The current study found that the majority of the analyzed patients didn't work. Considering their occupation, despite didn't work or being expose to physical activity, the study subjects still had EVB. This outcome is not comparable to Taha et al., (2017), the current study found that less than two thirds of analyzed patients lived in urban regions, which may be related to the lack of educational resources for patients in rural areas, contrary to the previous reports that said that more than half of the patients were farmers. Regarding patients' lived in urban regions residence; the current study found that less than two thirds of analyzed patients lived in urban areas. It might be related to lack of availability of educational resources for patients in rural areas. This finding is not similared with Mahmoud (2019), who reported that more than half of the patients were from rural area.

Medical data:

Pertaining to medical background the findings of the current study indicated that the majority of patients had GIT bleeding, caused by with esophageal varices Hemorrhage being the most frequent cause in Egypt, Lee et al., 2020 indicated due to the high occurrence of schistosomiasis and viral hepatitis, it represents the devastating effects of portal hypertension. Making it a major public health problem in Egypt.

The researcher point of view that when a clot or scar tissue in the liver block normal blood flow to the liver. Esophageal varices from smaller blood veins that didn't intend to carry high volumes of blood can leak blood or even burst, producing life-threatening bleeding, in order to circumvent the blockages.

According to the present study more than half of the patients had liver disease and diabetes Miletus,

hepatocellular carcinoma (hepatitis C virus). Also, results from the third national health and nutrition examination ultrasound (US) survey conducted by **Olatunde et al., 2021** identified that, among a representative sample of the US population, hepatitis C is independently allied with albuminuria among adults over the age of 40 and HCV appears to be most frequently accompanied with diabetes mellitus. As well as, **Hall et al., 2018** stated that diabetic's patients are more likely than the general population to get liver damage.

In this regard diabetes mellitus (DM) has been linked to higher chance of survival and liver cirrhosis consequences of any etiology. However, it is still unknown who diabetes mellitus effects how gastro esophageal variceal bleeding (GEVB) develops (**Coman et al., 2021**).

Regarding the hepatocellular carcinoma, **Chen et al., (2022)** and, **Allaire & Thabut, (2023)** found that more than half of the patients with HCC have esophageal varices and Suggested that clinically meaningful portal hypertension may affect the therapeutic intervention and prognosis of cirrhotic patients with hepatocellular carcinoma (HCC).According to the study, the existence of esophageal varices is a separate factor that effect the patient's prognosis and is linked to a higher chance of bleeding death.

Regarding **etiology of esophageal varices**, there were no statistically significant differences between the study and control group regarding causes. The researcher opinion that the etiology and its means pre-guidelines intervention did not effect on the educational guidelines outcome. These results are similar to **Wang et al., 2021** who studied causes of esophageal varices patients who emphasized that the majority of subjects had melena and liver disease. Moreover, **Shah et al., 2017** stated in his study entitled "Management options in decompensated cirrhosis" that all of liver cirrhosis patients with portal hypertension suffered from melena.

The role of the nurse in management of upper GIB is focused on risk assessment, emergency management and evaluation of responses to therapy. Care for upper GIB. Patients with esophageal varices (EV) always need frequent follow up and adherence to instructions given by doctors and nurses regarding their diet, medication and activities to prevent life threatening re-bleeding. Rapid decision –making is needed since the patient is intensive (**Dewitt et al., 2020**).

Regarding laboratory data, the present study revealed that there were no statistically significant differences between the study and control group regarding of all laboratory data pre- the nursing instructions. While, there were statistically significant differences between both groups regarding PT and creatinine

post- the nursing instructions. It is supported with **Khalil et al., 2015** who study titled "Liver Cirrhosis: Impact of Nutritional Regimen on Patients' Outcome" and mentioned that there was improvement in study the group hemoglobin .According to the researcher. PT and creatinine improved post- the nursing instructions intervention after the program was implemented with a .statistically significant difference in the study group after one and three months, while there was no statistically significant difference in the control group after one and three months.

As concerning to the recurrence of esophageal varices post- the nursing instructions, more than one third of the study group and majority of the control group readmitted after the nursing instructions implementation. It is consistent with a research study of **Mašalaitė et al., (2019)** entitled " Endoscopic band ligation is linked to increased rate of esophageal varices recurred, with half of these cases being classified as an early variceal recurrence. According to a single center study that found that after endoscopic band ligation, forty five of cases had recurrent esophageal varices. Of esophageal varices with early variceal recurrence being the diagnosis in half of these cases.

Zheng et al., (2019) stated that, it is unknown why some patients experience recurrence of varices following endoscopic ligation while others do not. The timing of esophageal varices recurrence varies significantly among patients.

As regarded patients knowledge, more than half of patients had satisfactory level of knowledge after nursing instructions and result was in agreement with **Thomas & Sugirtha, 2021**) research study entitled "Effectiveness of Structured Teaching Programmed on Knowledge and Anxiety of Patients Undergoing Endoscopy at a Gastroenterology Centre" who mentioned that the total knowledge score of the patients increased significantly after the structured teaching program. This may explain the positive effect of implemented the nursing instructions. Also, **Wang et al., 2021** showed that the recurrence and fluctuation of the condition may be influenced by variations in the collateral veins surrounding the esophagus venous structures.as well as esophageal varices and related hemodynamics variables.

Conclusion

Esophageal varices recurrence after band ligation was reduced after implementing the nursing instruction for the studied group.

Recommendation

Continuous follow up programs about nursing instructions and compliance of medications to reduce recurrence esophageal varices after endoscopic band ligation.

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