



The Effect of Designed Nursing Guidelines on the Outcomes of Hepatic Encephalopathy Patients

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Abstract

Background: Hepatic encephalopathy is an extra hepatic complication of impaired liver function and is manifested as neuropsychiatric signs and symptoms associated with acute or chronic liver disease in the absence of other neurological disorders. **Aim:** To evaluate the effect of designed nursing guidelines on the outcomes of hepatic encephalopathy patients. **Design:** A quasi-experimental research design was utilized in this study. **Setting:** This study was conducted at the Medical Intensive Care Unit and Endemic Disease Unit (Hepatology Unit) at El-Fayoum University Hospitals. **Sample:** A purposive sample of 60 adult patients aged 18-65 years from both genders who was diagnosed as having hepatic encephalopathy. **Tools:** Four tools were used to collect study data, a structured interviewing questionnaire, evaluation sheet of hepatic encephalopathy patients, patient's knowledge assessment questionnaire and Patient's self-care checklist. **Results:** this study revealed that, there was a statistically significant difference in the patient's outcomes between study and control group in which study group showed better outcomes than control group. **Conclusion:** the study concluded that, the designed nursing guidelines improve the hepatic encephalopathy patients' outcomes. **Recommendation.** Continuous Implementation of the designed nursing guidelines for hepatic encephalopathy patients to improve patient's knowledge about hepatic encephalopathy, its prevention and early detection.

Keywords: *Designed Nursing Guidelines, Hepatic Encephalopathy, Patient Outcomes.*

Introduction:

Hepatic encephalopathy is a serious complication of liver diseases that manifests as a wide range of neuropsychological clinical findings ranging from minimal HE to coma. HE can be classified as either 'overt' or 'minimal'. Overt He (OHE) is a syndrome of neurological and neuropsychiatric abnormalities that can be detected by bedside clinical tests. By contrast, patients with minimal He (mHE) present with normal mental and neurological status upon clinical examination but specific psychometric tests yield abnormal results (Peng et al., 2021).

Early identification of precipitating factors is extremely important in diagnosis and treatment of this fatal condition. The clinical course of hepatic encephalopathy can be interrupted in majority of patients by controlling these precipitating factors. Hence early and accurate diagnosis and proper identification of

precipitating factors will help in initiating the appropriate treatment and thereby bringing down the morbidity and mortality (Nayak, Anubhaw & Nayak, 2016).

Planning short and simple educational programs has a significant effect on the patient's control of his disease and its side effects; and can improve quality of life, life satisfaction, and mechanisms of coping with treatment. Since the patient may have cognitive deficits, the family or primary caregiver should be included in all teaching. Both patient and family benefit from an education on the general overview of HE and practical pointers about integrating treatments such as lactulose administration and prevention of precipitating problems such as dehydration and infection into daily activities. The management and educational plan should be individualized to the patient and be driven by a thorough nursing assessment (Atya et al., 2019).

Improving patients' self-care practices should ultimately lead to a decreased rate of hospitalization and other involvement of health care services. In addition, self-management encourages patients to take an active role in their own healthcare. Individuals who "self-manage" tend to also make informed decisions regarding possible diagnostic and treatment options as well as follow prescribed treatment plans. Consequently, self-management encourages adherence to treatment plans, improves interaction between patients and caregivers, reduces the use of medical specialists and medical costs, and advances clinical outcomes across the lifespan (Thuy, 2019).

Significance of the study:

Hepatic encephalopathy occurs as complications of advanced liver disease 30-45% of patients with cirrhosis develop to HE. In the case of chronic liver disease, as it tends to have an insidious onset, most patients do not seek treatment until late in the course of the disease develop complications. According to the World Health Organization WHO (2017) Liver Disease Deaths in Egypt rank number one in the world. (Saad et al., 2021).

During the clinical practice of the researcher in the Intensive Care Unit it was found that patients had insufficient level of knowledge and poor level of self-care about Hepatic encephalopathy, which could reflect on the patient's outcomes. The researcher's observations were supported by literature review, whereas in literature, poor self-care and knowledge of hepatic encephalopathy patients could affect their outcomes.

Aim of the study:

The aim of the study was to evaluate the effect of designed nursing guidelines on the outcomes of hepatic encephalopathy patients through the following objectives: -

- 1- Assess hepatic encephalopathy patient's health related needs.
- 2- Design and Implement designed nursing guidelines for hepatic encephalopathy patients among the study group, according to the results of basic assessment.
- 3- Evaluate the effect of designed nursing guidelines on the outcomes of hepatic encephalopathy patients.

Research question:

What is the effect of designated nursing guidelines on the outcomes of hepatic encephalopathy patients?

Research Hypothesis

To full fill the aim of the study: - The following hypothesis was being formulated; hepatic encephalopathy Patients who will receive the designed nursing guidelines will have better outcomes than those patients who will not receive the designed nursing guidelines.

Sample and Methods:

Design:

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

Setting:

This study was carried out at the Medical Intensive Care Unit and endemic disease unit (hepatology unit) at El-Fayoum University Hospitals, it receives patients from all areas of Fayoum governorate.

Sampling:

A purposive sample of 60 adult patients aged 18-65 years from both genders was included in the study and admitted to the previously mentioned setting during the study period, met the inclusion criteria and accept to participate in the study and then divided randomly into two equal groups according to admission; 1st control, 2nd study etc... (30 patients for each group).

Inclusion criteria

Adult patients aged 18-65 years from both genders who was diagnosed as having hepatic encephalopathy, admitted to the previously mentioned setting during the study period (less than 3 days from admission to the hospital).

Exclusion criteria

The study was excluded those whom was admitted with known renal failure, head trauma, brain abscess, neurologic problem (meningitis, encephalitis) and multiple system failure.

Tools of data collection:

Four tools were utilized to collect data for this study: -

Tool I: Structured Interview questionnaire:

This tool was developed by the researcher based on literature review (Atya et al., 2019) and included two parts.

Part (I): Patient's Demographic Data:

It was concerned with demographic data of the patients such as age, gender, marital status, educational level and occupation.

Part (II): Patient's Medical data (present & past)

Which included the following items; past medical history, hepatic viral infection, ascites, any previous hospitalization due to hepatic encephalopathy and precipitating factors of hepatic encephalopathy.

Tool II: Evaluation sheet of hepatic encephalopathy patients: This tool was included two parts.

Part (I): physical Assessment Sheet:

This tool was developed by the researcher based on literature review (Mohamed et al., 2014) and was included the following: gastrointestinal assessment, skin assessment, nutrition status.

Part (II): West Haven criteria for grading mental state:

This tool was adopted from Ortiz et al., 2007, used to grade patient's mental state and assess the severity of the hepatic encephalopathy for the studied patients based on a clinical assessment.

Tool III: Patient's knowledge assessment questionnaire: appendix (III)

This tool developed by the researcher based on relevant, current literature (Atya et al., 2019). to assess patient's knowledge regarding hepatic encephalopathy (definition, risk factors, signs and symptoms, diagnostic studies, preventive measures, dietary restrictions, precautions for minimizing esophageal varices bleeding, prevention of constipation, signs and symptoms of gastrointestinal bleeding). it consists of 27 multiple choice questions (MCQ).

Tool (IV): Patient's self-care checklist:

This tool developed by the researcher based on relevant, current literature (Volk, Fisher & Fontana, 2013). to assess self-care practices of patients with hepatic encephalopathy.

Content validity and reliability:

Content Validity:

The content validity of the tools was done by a panel of 5 experts who reviewed the content of the tools for comprehensiveness, accuracy, clarity, relevance and

applicability. Suggestions were given and modifications were done.

Reliability:

Reliability of the tool was tested to determine the extent to which the questionnaire items are related to each other. The Cronbach's alpha model, which is a model of internal consistency, was used in the analysis. Reliability factor for tool (II) Evaluation sheet of hepatic encephalopathy patients (0.732). tool (III) knowledge tool (0.821), tool (IV) self-care checklist (0.791).

Pilot study:

A Pilot study was carried out with 10% (not less than 10 patients) of the sample under study to test the applicability, clarity and efficiency of the tools, then the tools modified according to the results of the pilot study. Modifications included: rephrasing and rearrangement of some questions. After refinement and modification, the final forms of the tools were developed. Patients whom shared in pilot study not included in the sample and replaced by other patients.

Field work:

Field work includes four phases:

I-Assessment phase:

Firstly; The researcher visited the selected setting regularly to collect data related to the demographic characteristics, health relevant data and patient's condition. Data collection was held through structured interviews and medical record chart. During this phase each patient was assessed individually in the first and fifth day, and data collection was filled by the researcher, by using 2 tools (I), tool (II) for both study and control groups as follows:

Tool I: was utilized to assess patients' demographic characteristics, medical data, that filled for the study and control groups by the researcher in the first day, it took around 10 minutes.

Tool II to assess the grade of hepatic encephalopathy and patient's general condition. It used in the first and fifth day this step took about 10 minutes for each patient.

Secondly; assessment of patient's knowledge and self-care regarding hepatic encephalopathy prevention and management, this assessment done whenever the patient is fully conscious, oriented and hemodynamic stable by using 2 tools (III), tool (IV) for both study and control groups as follows:

Tool III: to assess the patients' knowledge regarding hepatic encephalopathy prevention and management, it took about 20 minutes.

Tool IV: to assess the patients' self-care regarding hepatic encephalopathy prevention and management, it took about 20 minutes.

II- Plan and Design:

This phase included analysis of the pre-test findings; the researcher designed the educational section's content according to the patient's needs, detected needs, requirements and deficiencies were translated into the aim and objectives of the educational program sections in the form of guidelines booklet. A review of current and past, local and international related literature in the various aspects using books, articles, periodicals and magazines were done. The nursing guidelines were prepared in simple Arabic language with simple photo illustrations. The objectives of the guidelines were guided by the previously determined patients' educational needs in order to improve patient's knowledge and self-care regarding hepatic encephalopathy

III- Implementation phase:

Based on the results obtained from the interviewing and observational sheets, as well as literature review, the self-care program was developed by the researcher. It was implemented immediately after the pre-test. No intervention was performed for the control group during the study. The researcher explained the nursing teaching guidelines to the study group which were developed by the researcher after passing through an extensive and relevant literature review. Its aim was to enable patients who had hepatic encephalopathy to be knowledgeable about guidelines which help them in minimizing risk of hepatic encephalopathy. It was prepared in simple Arabic language with simple photo illustrations.

Each patient was met for three sessions in the morning shift. The sessions took about 35 minutes. Patients were allowed to ask questions in case of misunderstanding while listening and expressing interest. After the session there were about 5-10 minutes for discussion and feedback. Reinforcement was performed according to patient's needs to ensure their understanding. One family member was present in the

Results:

Table (1): Frequency distribution of demographic data for the control and study groups (N = 60).

	Control (N = 30)	Study (N = 30)	Total (N = 60)	Chi-square
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sessions for patient support. Each patient obtained a copy of the booklet in a clear Arabic language also the researcher used pictures to enhance patient's knowledge and helped them to retain the learned material.

At the end of the sessions the researcher emphasized to the patients the importance of follow up visits or calls and arranged with them the time and place for follow up which was after 2 and 4 weeks post discharge. The researcher took the patients' telephone number to determine the time of appointments in order to complete data collection process (after 2 and 4 weeks post discharge).

IV-Evaluation phase:

Evaluation of the program was done by using the post-test questionnaire which was the same format of pre-test in order to compare the change in patients' knowledge and self-care. As well both groups were observed for patient condition, the incidence of hepatic encephalopathy and its grade during hospitalization, after 2 and 4 weeks post discharge.

Ethical consideration:

An approval was obtained from a scientific research ethics committee of the faculty of nursing at Helwan University and an oral consent was obtained from the study subjects individually before starting the study. The aim and objectives of the study was clarified to the patients included in the study by the researcher. Participants were assured that anonymity and confidentiality would guarantee. Patients were informed that they are allowed to choose to participate or withdraw from the study at any time. Ethics, culture, values were respected.

Statistical Analysis:

The collected data was organized, categorized, tabulated, entered and analyzed by using SPSS (statistical package for social science), software program version 26. Statistical significance and association were assessed using the arithmetic mean, standard deviation (SD), chi-square (X^2) and p-value to detect the relation between variables of the standard. Statistical significance was considered at (P-value <0.05).

	N	%	N	%	N	%	X ²	P-value
Gender								
Male	13	43.3	14	46.7	27	45.0	0.067	0.795
Female	17	56.7	16	53.3	33	55.0		
Age								
20 - <30	3	10.0	2	6.7	5	8.3	0.392	0.942
30 - <40	5	16.7	6	20.0	11	18.3		
40 - <50	7	23.3	8	26.7	15	25.0		
50 - ≤65	15	50.0	14	46.7	29	48.3		
Mean ± SD	49.73±12.27		49.40±10.85		49.57±11.48			
Marital status								
Single	5	16.7	4	13.3	9	15.0	0.141	0.986
Married	16	53.3	17	56.7	33	55.0		
Divorced	5	16.7	5	16.7	10	16.7		
Widow	4	13.3	4	13.3	8	13.3		
Level of education								
Illiterate	7	23.3	9	30.0	16	26.7	0.401	0.940
Basic education	13	43.3	12	40.0	25	41.7		
Secondary	5	16.7	5	16.7	10	16.7		
University	5	16.7	4	13.3	9	15.0		
Occupation								
Not working	14	46.7	17	56.7	31	51.7	0.601	0.438
Working	16	53.3	13	43.3	29	48.3		

*statistical significant p -value ≤ 0.05

Table (1) shows that there was no statistically significant difference between control and study groups with p -value > 0.05 , as regarding demographic characteristics like; age, gender, marital status, educational level and occupation which indicated proper matching between study and control groups in these variables.

As well table shows that about half of the studied patients in both groups control and study group were in age group 50:≤65 with mean age (49.73±12.27 - 49.40±10.85) respectively. More than half of the studied patients in both control and study groups were females 56.7% - 53.3% respectively, added married 53.3% - 56.7%, educational level of patients in both groups 43.3% - 40% respectively completed basic education, occupation 53.3% of the control group working and 56.7% of the study group not working.

Table (2) Frequency distribution of medical data for the control and study groups (N= 60).

	Control (N = 30)		Study (N = 30)		Total (N = 60)		Chi-square	
	N	%	N	%	N	%	X ²	P-value
Past medical history								
Hypertension	19	63.3	20	66.7	39	65.0	0.073	0.787

Diabetes Mellitus	17	56.7	16	53.3	33	45.0	0.067	0.795
Non	6	20.0	7	23.3	13	21.7	0.098	0.754
Others	3	10.0	3	10.0	6	10.0	0.000	1.000
Hepatic Viral Infections								
Hepatitis C Virus	19	63.3	16	53.3	35	58.3	0.617	0.432
Hepatitis B Virus	6	20.0	3	10.0	9	15.0	1.176	0.278
Times of previous hospitalization due to hepatic encephalopathy								
Non	12	40.0	13	43.3	25	41.7		
One time	8	26.7	12	40.0	20	33.3	2.507	0.474
Two times	6	20.0	3	10.0	9	15.0		
Three times	4	13.3	2	6.7	6	10.0		
Ascites	18	60.0	16	53.3	34	56.7	0.271	0.602
precipitating factors of hepatic encephalopathy								
GI bleeding	14	46.7	17	56.7	31	51.7	0.601	0.438
Electrolyte imbalance	16	53.3	13	43.3	29	48.3	0.601	0.438
Sepsis	11	36.7	9	30.0	20	33.3	0.300	0.584
Constipation	15	50.0	21	70.0	36	60.0	2.500	0.114
Dehydration	10	33.3	6	20.0	16	26.7	1.364	0.243
Others	4	13.3	1	3.3	5	8.3	1.964	0.161

*: Significant at $P \leq 0.05$

Table (2) shows that there was no statistical significant difference with p-value >0.05 between control and study groups as regarding medical data like past medical history, Times of previous hospitalization due to hepatic encephalopathy, precipitating factors of hepatic encephalopathy, with high percentage of hypertension among both control and study groups 63.3% - 66.7% respectively, added majority of them diabetes mellitus 56.7% -73.3% respectively, added having hepatitis c virus 63.3%-53.3%.

The table also shows that 40 – 43.3% respectively of control and study group hadn't previous hospitalization due to hepatic encephalopathy, added more than half of them had ascites 60.0% – 53.3% respectively. regarding precipitating factors of hepatic encephalopathy 46.7 – 56.7% had a gastrointestinal bleeding, 53.3% – 43.3% had electrolyte disturbance and 50% – 70% had constipation.

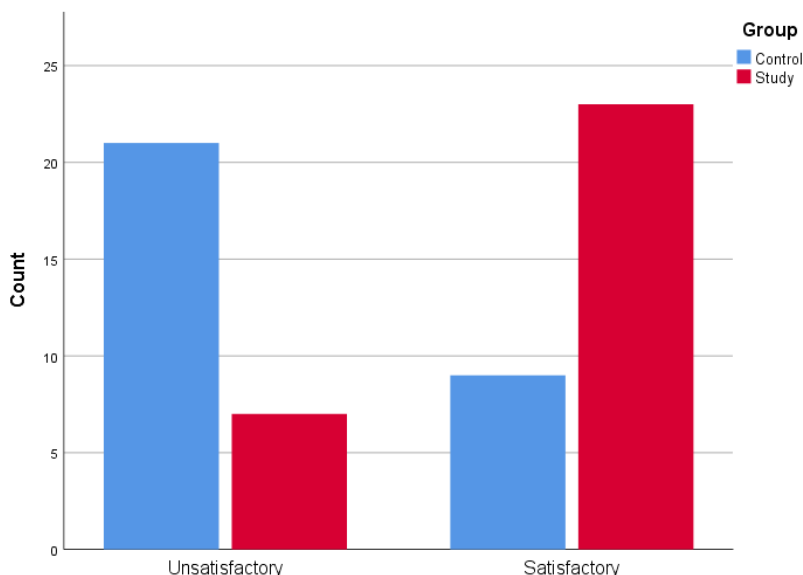


Figure (1): Comparison of patient's level of knowledge after the implementation of designated nursing guidelines in both study and control groups

Figure (1) illustrates that; there was a statistical significant higher percentage of satisfactory level of knowledge 76.7% in study group after implementation of designated nursing guidelines with ($X^2 = 13.125$ & $p\text{-value} = <0.001$) compared with control group 30.0%.

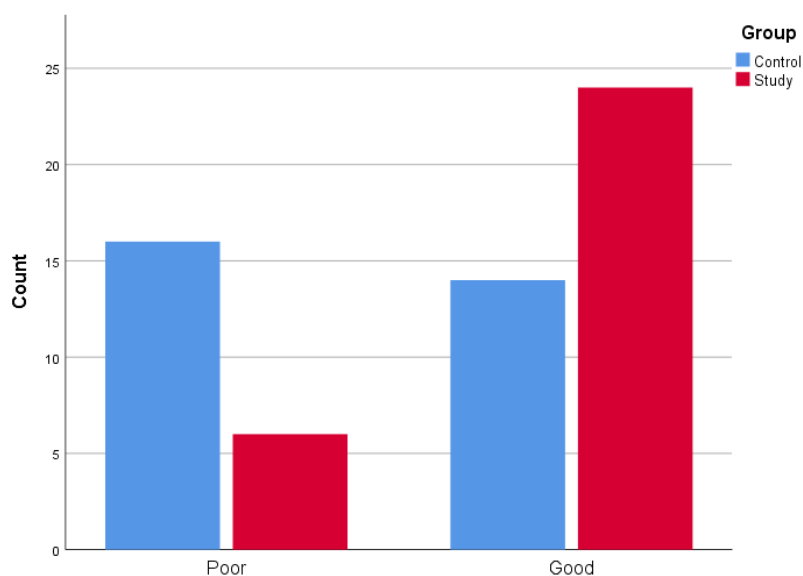


Figure (2): Comparison of patient's self-care after the implementation of designated nursing guidelines in both control and study groups

Figure (2) illustrated that there was a statistical significant difference in self-care level after implementation of nursing guidelines between control and study groups with ($X^2 = 7.177$ & $p\text{-value} = <0.007$), as 80.0% of the study group showed good level of self-care compared with control group 46.7%.

Table (3): Comparison between control and study group in relation to hepatic encephalopathy grade After two and four weeks post discharge (N = 60).

Grades	Control (N = 30)		Study (N = 30)		Total (N = 60)		Chi-square	
	N	%	N	%	N	%	X ²	P-value
After two weeks post discharge								
Minimal	18	60.0	25	83.3	43	71.7	4.473	0.346
Grade I	6	20.0	3	10.0	9	15.0		
Grade II	3	10.0	1	3.3	4	6.7		
Grade III	2	6.7	1	3.3	3	5.0		
Grade IV	1	3.3	0	0.0	1	1.7		
After four weeks post discharge								
Minimal	16	53.3	24	80.0	40	66.7	5.386	0.250
Grade I	5	16.7	3	10.0	8	13.3		
Grade II	5	16.7	2	6.7	7	11.7		
Grade III	3	10.0	1	3.3	4	6.7		
Grade IV	1	3.3	0	0.0	1	1.7		

Table (3) showed that there was no statistical significant difference with p-value >0.05 between control and study groups as regards hepatic encephalopathy grades after two weeks and 4 weeks post discharge.

Table (4): Comparison between control and study group in relation to recurrence admission to hospital during two weeks and one-month post discharge (N = 60).

	Control (N = 30)		Study (N = 30)		Total (N = 60)		Chi-square	
	N	%	N	%	N	%	X ²	P-value
During 2 weeks	6	20.0	2	6.7	8	13.3	2.308	0.129
During 4 weeks	10	33.3	3	10.0	13	21.7	4.812	0.028*

Table (4) showed that there was no statistical significant difference between control and study groups as regards recurrence admission to hospital during two weeks with (X² = 2.308 & p-value = <0.129).

On the other hand, there was a statistical significant difference between control and study groups as regards recurrence admission to hospital during four weeks post discharge with (X² = 4.812 & p-value = <0.028). as one third of the control group 33.3% readmitted to hospital compared with study group 10%.

Table (5): Comparison between control and study group in relation to patient condition after four weeks post discharge (N = 60).

Four weeks post discharge	Control (N = 30)		Study (N = 30)		Total (N = 60)		Chi-square	
	N	%	N	%	N	%	X ²	P-value
GIT condition								
Hematemesis	4	13.3	2	6.7	6	10.0	0.741	0.389
Vomiting	10	33.3	4	13.3	14	23.3	3.354	0.067
Constipation	14	46.7	4	13.3	18	30.0	7.937	0.005*
Diarrhea	8	26.7	4	13.3	12	20.0	1.667	0.197
Melena	6	20.0	2	6.7	8	13.3	2.308	0.129
Skin condition								
Ecchymosis	17	56.7	9	30.0	26	43.3	4.344	0.037*
Edema	18	60.0	9	30.0	27	45.0	5.455	0.020*
Ulceration	14	46.7	8	26.7	22	36.7	2.584	0.108
Nutritional status								
Weight changes in last 3 weeks:								
- Decrease	6	20.0	8	26.7	14	23.3	0.411	0.814
- No changes	7	23.3	7	23.3	14	23.3		
- Increase	17	56.7	15	50.0	32	53.3		
Dietary intake changes:								
- Decrease	9	30.0	8	26.7	17	28.3	0.102	0.950
- No changes	10	33.3	10	33.3	20	33.3		
- Increase	11	36.7	12	40.0	23	38.3		

Table (5) showed that there was no statistical significant difference between control and study groups as regards patient condition after four weeks post discharge with p-value <0.05, except in constipation (X² = 7.937 & p-value = <0.005), ecchymosis (X² = 4.344 & p-value = <0.037). and edema (X² = 0.037 & p-value = <0.020).

The table showed that nearly half of the control group had constipation 46.7% compared with study group 13.3%, added more than half of the control group had ecchymosis and edema 56.7% and 60.0% compared with study group 30.0%.

Table (6): Correlation between knowledge score and self-care score after implementation of designated nursing guidelines with study variables among both groups group (No:60).

Variables	Knowledge score before		Knowledge score After		self-care score After	
	R	P-value	R	P-value	r	P-value
Knowledge after	0.565	<0.001*	----	----	0.422	<0.001*
self-care before	0.285	0.027*	0.162	0.217	0.384	0.002*
self-care after	0.170	0.193	0.422	<0.001*	----	----

Table (6) illustrated that there was a statistical significant positive correlation between knowledge before nursing guidelines implementation and knowledge after implementation and self-care before implementation with p-value (<0.001 & 0.027) respectively, added that, there was a statistical significant positive correlation between knowledge after nursing guidelines

implementation and self-care after implementation with p-value (<0.001), which indicated that an increase in knowledge level will be associated with an increase in practice level.

Discussion:

The demographic and medical data of subjects in both control and study groups, were not significantly different; this means that the participants were selected from identical population of hepatic encephalopathy patients and good randomization obtained. These findings supported with **Thuy, (2019)** who conducted a study about "Patient knowledge about disease self-management of cirrhosis" and reported that most patients randomly assigned, there was little potential for bias.

These findings also agree with **Saad et al., (2021)**. Who conducted study about "Impact of Educational Program for Hepatic Encephalopathy on Nurses Performance and Patients Outcomes" stated that There was no significant difference among age, sex, educational level and occupation among studied patients

As regarding medical data, study findings revealed that more than half of studied patients among both study and control groups had past medical history of diabetes mellitus. This could be as a result of diabetic patients suffered from excess gastric transient and orocecal period along with overgrowth of the intestinal bacteria and glutamase activity. Moreover, insulin resistance promotes the breakdown of the muscles and production of ammonia. Additionally, these patients usually are associated with diabetic gastropathy, which lead to chronic constipation. The sequent impact of such mechanisms is the massive increase in the amount of ammonia, and systemic inflammation, which reverberated dramatically in the development of HE. This explanation supported by **El-Alfy et al., (2019)** who conducted study "Diabetes as a Risk Factor Hepatic Encephalopathy among Egyptian Cirrhotic Patients" and reported that Egyptian diabetic patients have a potential risk of 2811

developing HE among cirrhotic liver patients relative to non-diabetic patients

The study findings also noted that, more than half of studied patients among both study and control groups had hypertension. This could be as a result of liver diseases increase the risk for developing hypertension by Initiating Systemic Inflammation, increasing oxidative Stress and increasing vasoconstriction and decreasing vasodilation this explanation supported by **Zhao et al., (2020)** who conducted study "Nonalcoholic fatty liver disease: an emerging driver of hypertension" and reported that fatty liver considered as risk factor for developing hypertension.

In relation to hepatic viral infections, our study findings reported that, more than half of studied patients among both study and control groups had hepatitis C virus and less than one quarter had hepatitis B virus This could be as a result of viral hepatitis causes liver cells damage which alter liver function and lead to hepatic encephalopathy. This finding in line with **Peng et al., (2021)**. Who conducted study "Prediction and Risk Factors for Prognosis of Cirrhotic Patients with Hepatic Encephalopathy" and reported that more than half of hepatic encephalopathy patients had hepatitis C virus and little number of patients had hepatitis B virus.

Concerning Times of previous hospitalization due to hepatic encephalopathy, this study revealed that more than one third of the studied patients in both groups hadn't previous hospitalization due to hepatic encephalopathy and more than one quarter had one time of previous hospitalization due to hepatic encephalopathy. This could be as a result of exclusion of old age patients (>60 years) and patients with multiple system failure. This finding isn't in the same line with **Hafez, Abdallah & Hamad, (2020)** conducted a study

“Assessment of Precipitating Factors and Outcomes of Hepatic Encephalopathy in Cirrhotic Patients” and found that about three quarters of studied patients had thrice or more of Previous attack of hepatic encephalopathy.

In relation to precipitating factors of hepatic encephalopathy, the present study revealed that about half of the studied patients in both groups had gastrointestinal bleeding. This could be as a result of gastrointestinal bleeding causes increased urea concentrations in patients with normal liver function and high ammonia concentrations in patients with impaired liver function. This ammoniogenesis may precipitate encephalopathy. This finding in line with **Sethuraman & Balasubramanian, (2019)** who studied “Clinical spectrum of precipitating factors of hepatic encephalopathy in cirrhosis of liver and its relation to prognosis in a tertiary care hospital-a retrospective study” and noted that about third of studied patients had developed hepatic encephalopathy due to GIT bleeding.

the present study findings also showed that about half of the studied patients in both groups had electrolyte imbalance as a risk factor for hepatic encephalopathy. This could be as a result of fluid imbalance either fluid loss due to diarrhea, vomiting and diuretics therapy, or excessive body fluid due to increased fluid intake or fluid retention. There is very little information regarding the clinical consequences of hyponatremia in patients with cirrhosis. However, **Hafez et al., (2020)** reported that hyponatremia may theoretically affect the osmotic balance in many cells, including brain cells, owing to a reduction in the osmolality of the extracellular fluid that would cause cell swelling because of a shift of water from the extracellular to the intracellular compartment. The study finding also in line with **Kabir et al., (2018)** who also noted that electrolyte imbalance (hyponatremia and hypokalemia) were found to be a leading cause

for hepatic encephalopathy which were very high.

The present study findings also revealed that about half of the studied patients in both groups had sepsis and infection as a risk factor for hepatic encephalopathy. This could be as a result of cerebral dysfunction induced by the systemic response to the infection this finding supported by **Merli & Riggio, (2015)** who studied “Interaction between infection and hepatic encephalopathy” and noted that the probability to find neurocognitive alterations increased from patients without infection to patients with infection and no systemic inflammatory response syndrome (SIRS) to those with sepsis. Efficaciously treated patients, in whom the infection subsided, improved their neurological symptoms. Both overt and covert hepatic encephalopathy were influenced by the presence of infection and by its resolution.

The present study also revealed that, constipation is a common risk factor for hepatic encephalopathy, as more than half of the studied patients in both groups had constipation. This could be as a result of lack of mobility, lack of fiber intake and poor follow-up for bowel condition. Constipation considered as a risk factor for hepatic encephalopathy because it increases intestinal production and absorption of ammonia. This finding in line with **Abro et al., (2019)** who studied “Precipitating Factors of Hepatic Encephalopathy Experience at Shaheed Muhtarma Benazir Bhutto Medical University Larkana” and reported that, about half of the studied patients had constipation patients had as a risk factor for hepatic encephalopathy.

In this study, Dehydration also found as a risk factor for hepatic encephalopathy in more than one quarter of the studied patients, this could be as a result of electrolyte disturbance and hyperammonia. This result in line with **Sethuraman & Balasubramanian, (2019)** who studied “Clinical spectrum of precipitating

factors of hepatic encephalopathy in cirrhosis of liver and its relation to prognosis in a tertiary care hospital-a retrospective study” and reported that Dehydration and infections were the most common precipitating factors for hepatic encephalopathy. This finding is contrary with **Kowo et al., (2019)** who studied “Clinical Aspects and Precipitating Factors of Hepatic Encephalopathy Associated with Cirrhosis in a Cameroonian Population” and didn’t mention dehydration as a precipitating factor for hepatic encephalopathy

Regarding ascites, our study revealed that more than half of the studied patients had ascites. This could be as a result of the circulatory dysfunction in cirrhosis it considered the proposed pathophysiological mechanism leading to sodium and water retention in patients with liver cirrhosis. Hyperdynamic circulation is triggered by increased intrahepatic resistance due to cirrhosis, leading to a progressive increase in portal venous pressure. As portal hypertension worsens, local production of vasodilators increases due to endothelial activation, leading to splanchnic and systemic arterial vasodilation. This explanation is supported with **Bendahmash, Elsiey & Al-hamoudi, (2017)** who studied “Cirrhotic Ascites: Pathophysiological Changes and Clinical Implications”.

Pertaining to patients' knowledge regarding hepatic encephalopathy, its prevention and care, the findings of the present study illustrated that, there was no statistical significant difference between control and study groups as regarding knowledge level before the implementation of designated nursing guidelines as the studied patients selected randomly from the same population, and also revealed that the majority of studied patients among control and study groups had unsatisfactory knowledge

This finding could be as a result of patient’s level of education that may be a factor as more than two thirds of patients had a basic

education. Also this may be due to the lack of educational/teaching programs about hepatic encephalopathy and its prevention. This explanation is supported by **Atya et al., (2019)** who studied “Effect of Nursing Teaching Guidelines Among Patients with Cirrhosis on Their Knowledge Regarding Minimizing Hepatic Encephalopathy” and stated that the most of studied patients revealed a great lack of patient's knowledge as regard hepatic encephalopathy pre implementation of the nursing teaching guidelines, and noted that could be attributed to their formal education background that may be a factor as nearly two thirds of patients were illiterate. Also this lack of knowledge would be attributed to the lack of opportunity to be educated about hepatic encephalopathy prevention.

This finding is also in the same line with **Saad et al., (2021)**. Who revealed that more than three quarters of the studied nurses have unsatisfactory level of total knowledge on pre-implementation of the designed program. This result coincides with **Vlaisavljevic, Rankovic, (2015)** who studied “Specific Nursing Care Rendered in Hepatic Encephalopathy: Contemporary Review and New Clinical Insights” and stated that the majority of nurses in her study had unsatisfactory level of knowledge regarding hepatic encephalopathy.

The result also revealed that, there was a statistically significant higher percentage of satisfactory level of knowledge in study group after implementation of designated nursing guidelines compared with control group, as more than three quarters of the study group had satisfactory level of knowledge and more than two thirds of the control group had unsatisfactory level of knowledge. The increased level of knowledge among the study group after implementation of designated nursing guidelines may be due to study group receive teaching and instructions about the disease and self-care compared with control

group receive routine instructions and also due to the positive effect of designated nursing guidelines and the educational session.

This finding and explanation in line with **Atya et al., (2019)** who found that there was an obvious improvement in total mean knowledge scores of the studied patients immediately post and after three months from application of nursing teaching guidelines, added that may be attributed to theoretical sessions that were provided to patients which cover all aspects of hepatic encephalopathy and the provision and explanation of the nursing teaching guidelines.

This finding also agrees with **Mohammed et al., (2021)** who studied “Effect of Intervention Program on Critical Nursing Management Regarding Hepatic Encephalopathy” and stated that there was a statistical significant improvement in total nurses' knowledge after application of intervention program. This results also in line with **Saad et al., (2021)** who found that there was an improvement in studied nurses' knowledge post implementation of the program, added that this could be explained that the educational program was effective as there is an improvement of studied nurses' knowledge immediately after receiving knowledge of hepatic encephalopathy sessions.

concerning patient self-care regarding hepatic encephalopathy, findings of the present study revealed that, there was no statistical significant difference in self-care level before implementation of nursing guidelines between control and study groups, instead, there was a statistical significant higher percentage of good level of self-care among study group after implementation of nursing guidelines compared with control group. As about two thirds of the study group showed good level of self-care compared with control group who showed less than half of them have a good level of self-care. This could be as result of the increased knowledge of the study group patients after implementation of nursing guidelines.

This findings agree with **Rakhshani et al. (2022)** who stated in a study about "The effect of Orem- based self- care education on improving self- care ability of patients undergoing chemotherapy: a randomized clinical trial" that the findings showed that after intervention a statistically significant difference was seen between the two groups and significant difference in experimental group between before and after self-care performance, whereas, the same test showed no statistically significant difference in control groups.

The finding also noted that, more than half the control group showed a poor level of self-care, this also due to the lack of knowledge regarding hepatic encephalopathy. This finding in the same line with **Dong et al., (2020)** who conducted a study about “Self-Management Behaviors Among Patients with Liver Cirrhosis in Shanghai, China: A Cross-Sectional Study” and stated that the self-management behaviors regarding liver cirrhosis mean score was 2.51 out of 4.

In relation to recurrence admission to hospital after discharge, our findings revealed that, there was no statistical significant difference between control and study groups as regards recurrence admission to hospital during two weeks, while there was a statistical significant difference between control and study groups as regards recurrence admission to hospital during 4 weeks post discharge as on third of the control group readmitted to hospital. This could be as result of the lack of knowledge of the control group as regard hepatic encephalopathy prevention and self-care. This finding agree with **Neff et al., (2013)** who studied “Hospital readmissions metrics (HRM) related to hepatic encephalopathy (HE)” and noted that of the 31% of patients readmitted due to liver diseases within 1 month, 47% were readmitted for HE.

This finding also agrees with **Saab, (2015)** who conducted study “Evaluation of the impact

of rehospitalization in the management of hepatic encephalopathy” and noted that hospital readmissions after discharge for decompensated cirrhosis, and for HE in particular, are common in patients with cirrhosis. In addition, a considerable number of patients are readmitted within 1 month of hospital discharge. In addition to **Patel et al., (2019)** who conducted a study “Predictors of 1-month and 3-months Hospital readmissions in decompensated cirrhosis: a prospective study in a large Asian cohort’ and found that Seventy-eight patients (27.8%) were readmitted within 1-month of index hospitalization. Median time to re-admission was 18 days and incidence was highest in patients with HE during index stay (46.2%).

Conclusion

Based upon the study findings, we can conclude that; the designed nursing guidelines improve the hepatic encephalopathy patients’ outcomes. It was found that significant improvement in the patient’s level of knowledge, level of self care and occurrence of hepatic encephalopathy post discharge from hospital in the study group than in control group after implementing of the designed nursing guidelines.

Recommendations

Based on the previous findings, the following recommendations are suggested:

- Continuous Implementation of the designed nursing guidelines for hepatic encephalopathy patients to improve patient's knowledge about hepatic encephalopathy, its prevention and early detection.
- A written teaching hand book should be available for each patient in simplified term and containing simple pictures and distributed among cirrhotic patients about preventive measures of hepatic encephalopathy to provide them with the needed information.

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