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Effect of patient's compliance with nursing instructions on minimizing hepatic encephalopathy

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Abstract
Background: Hepatic encephalopathy is a common complication occurs in 30-70% of cirrhotic patients.
Aim: To evaluate effect of patient's compliance with nursing instructions on minimizing hepatic encephalopathy.
Research design: Quasi- experimental design.
Setting: Tropical Medicine and Gastroenterology department at El - Rajhi liver Hospital in Assuit University Hospital.
Patients and Methods: Sixty adult patients child B or C liver cirrhosis.
Tools: I: Structured interview patient questionnaire.
II: Compliance assessment questionnaire.
III: West-Haven criteria.
Results: There was a statistically significant difference between study and control group patients regarding severity of hepatic encephalopathy through three months ($p<0.005$) and a highly significant relation was documented between compliance of patients with nursing instructions and severity of hepatic encephalopathy ($p<0.001$).
Conclusion and recommendations: Hepatic encephalopathy was minimized among patients who complied with nursing instructions. Simplified illustrated and comprehensive Arabic language instructions hand book should be available for patients about preventive measures of hepatic encephalopathy.

Keywords: Compliance, nursing instructions, hepatic encephalopathy

1. Introduction

Hepatic encephalopathy is a neuropsychiatric complication commonly associated with liver disease, namely cirrhosis. The inability of the liver to metabolize ammonia results in a buildup of ammonia, which can cross the blood–brain barrier and cause significant neurocognitive impairment. It is estimated to occur in 30-70% of patients and a large proportion of these patients are at high risk of recurrent HE (Flamm, 2018) [14].

According to the WHO; increasing effectiveness of adherence interventions may have greater impact on the health of populations than improvements in specific medical treatments. This is because however efficacious novel treatments are, when patients do not take them correctly, then the expected benefits such as averted morbidity, disability and mortality may not be realized (WHO, 2003) [45]. Compliance is the extent to which patients are obedient and follow the instructions, proscriptions and prescriptions of health professionals. Also it is the extent to which the patients' behavior (in the term of taking medication, following a diet, and/or executing lifestyle changes) corresponds with the agreed recommendations from a healthcare provider. Adherence to the therapeutic regimen

requires that the patients make one or more changes in the life style. The patient may need to take medications accurately, adhere to a diet, restrict their activities, promoting rest, and seeks periodic evaluation of their health status. The role of the nurse in teaching and directing patient towards adherence is a significant one (Krot and Sousa, 2017) [27].

Patient's compliance consists a complex and multidimensional health issue. It has beneficial effect on disease management. Indeed, benefits of therapy will be achieved only if patients comply with the prescribed treatment regimens. Nurses may be able to influence patients to be adherent to the therapeutic regimen and effectively use this authority for changing health behaviors and promote treatment (Alikari and Zyga., 2014) [6].

Patient education is an essential aspect in enhancing compliance and can be seen as the base for the majority of patient–core intervention, education authorize patients to create decision about their treatment, and can develop their motivation and intent to comply with the therapeutic regimen as prescribed (Marcus, 2014) [31].

In the field of nursing, some researchers stated that compliance is realized as more than following behavior or

just compliance with healthcare professionals' recommendations. They emphasized on patients' activity and responsibility in the process of treatment, in which the patients act in close cooperation with the healthcare professionals for maintaining their health. The care plan is dictated by healthcare professionals and the patients as obedience should follow them (Rafii *et al.*, 2014) [36].

There are several factors to consider when developing a cost-effective approach to managing HE, such as patient compliance as effective HE management is reliant on patient adherence to treatment. Once patient demonstrate clinical improvement, management then transit to the prevention of recurrent hepatic encephalopathy, including reinforcement of compliance with treatment. Poor adherence rates may contribute to the cost burden associated with HE (Shawcross, 2018) [38].

Prevention of hepatic encephalopathy is done through maintaining a proper nutrition, avoidance of precipitating factors (prevention of constipation, management of gastrointestinal bleeding and prevention of infection), good monitoring of intake and output, as a precaution administration of lactulose so that the bowel remain open and poor chance for ammonia to be absorbed, compliance with treatment and follow up (Shah *et al.*, 2016) [37].

1.1 Significance of the study
According to hospital registry at Tropical Medicine and Gastroenterology department at El Rajhi liver Hospital there were about 940 patients diagnosed with liver cirrhosis and about 200 patient diagnosed as hepatic encephalopathy were admitted in 2016 (El Rajhi liver Hospital registry, 2016) [10]. The researcher had observed from clinical experience that liver cirrhosis patients have lack of knowledge about complications of liver cirrhosis especially hepatic encephalopathy and importance of compliance with therapeutic regimen so there is a definite need for health education in patients with cirrhosis regarding the risk of hepatic encephalopathy and its prevention.

1.2 Aim of the study
To evaluate the effect of patient's compliance with nursing instructions on minimizing hepatic encephalopathy.

1.3 Research hypothesis
The current study hypothesized that hepatic encephalopathy will be minimized among liver cirrhosis patients who will comply with the nursing instructions.

2. Patients and methods
2.1 Research design
Quasi-experimental research design was utilized in this study.

2.2 Study variables
The independent variable was the compliance with the nursing instructions while the dependent variable was minimization of hepatic encephalopathy among patients with liver cirrhosis.

2.3 Setting of the study
The study was conducted in the Tropical Medicine and Gastroenterology department at El - Rajhi liver Hospital in Assiut University hospital.

2.4 Patients
A total of sixty (35 male and 25 female) adult patients diagnosed with liver cirrhosis child B or C were included in the study, their mean age was 59.16± 6.046 years for study group and 59.23 ± 6.27 years for the control group. Patients were divided equally into two groups. Study group who received the nursing instructions booklet while the control group received the routine hospital instructions. The sample size was determined statistically by power analysis. The calculation was done considering the following: Type I error with significant level (α) = 0.5, Type II error by power test (1-B) = 80% and found the minimum sample size was 25 patients for each group. Although the minimum number of 50 patients was required by power analysis, the researcher had obtained 60 patients in this study because non-response rate was expected to be lost from the subjects.

2.5 Tools for data collection
Tool I: Structured interview patient questionnaire: This tool was developed by the researcher to assess demographic and medical data of patients. It included two parts:

Part I: Socio-demographic data of the patients (name, age, gender, marital status, residence, level of education and occupation).

Part II: Medical data (etiology of liver cirrhosis, history of other chronic diseases, presence of bleeding, esophageal varices, ascites and jaundice).

Tool II: Compliance assessment questionnaire
It included two parts
Part I: Compliance of patients with nursing instructions
The content of this part was developed by the researcher after passing through an extensive and relevant literature review to assess patient's compliance with nursing instructions as (dietary instructions and early detection and avoidance of precipitating factors).
It included (20) questions with a yes or no response. Every question was given one score, a score of zero was given for a negative response while a score of one was given for a positive response (Yes= 1; No= 0).The total scores was (20) score. Scores less than (<50%) were considered low compliance, scores from (50% to <70% were considered medium compliance and scores equal or more than (≥70%) were considered high compliance. This classification based on statistical analysis**.**

Part II: Compliance of patients with medications:
This part was assessed by Morisky Medication Adherence Scale (MMAS – 8). The MMAS-8 is a self- reported scale developed by Morisky *et al.*, (2008) [32]. It is used for assessing patients' adherence level to their drugs. Eight questions were used for evaluating the patients' forgetfulness, patients understanding of the need for continued medications and if the patient felt it was inconvenient adhering to daily treatment plan.
Scoring system: A score of zero was given for a positive response while a score of one was given for a negative response for questions 1, 2,3,4,6 and 7 (Yes= 0; No= 1). Contrariwise, for item 5, a score of zero was given for a negative response while a score of one was given for a

positive response (Yes= 1; No= 0). For item 8 a score of one was given for "Never/Rarely" while a sore of zero was given for "Once in a while/Sometimes/Usually/All the time" The total score was eight. Patients who had a score below 6 were considered having low adherence. Patients who had a score between 6 < 8 were considered as having medium adherence. While patients who had a score equal 8 were considered as having high adherence.

Tool III: West-Haven criteria: It was developed by (Ferenci *et al*., 2002) [12] to assess the severity of hepatic encephalopathy; this is based on the level of impairment of autonomy, changes in consciousness, intellectual function and behavior. It ranged from (0-4)

Grade 0: indicate (no abnormality detected).

Grade 1: indicate (trivial lack of awareness, euphoria or anxiety, shortened attention span, impaired performance of addition).

Grade 2: Indicate (lethargy or apathy, minimal disorientation of time or place, subtle personality changes, inappropriate behavior, impaired performance of subtraction).

Grade 3: indicate (somnolence to semi stupor but responsive to verbal stimuli, confusion, gross disorientation).

Grade 4: indicate (coma (unresponsive to verbal or painful stimuli).

2.6 Ethical considerations
Permission to carry out the study was obtained from the ethical committee of the Faculty of Nursing. An official letter was issued from the Dean of the Faculty of Nursing to the Head of Tropical Medicine and Gastroenterology department at El- Rajhi liver hospital explaining the purpose of the study. The researcher emphasized that the participation was voluntary and the patients had the right to refuse to participate in the study and can withdraw at any time. Verbal consent was obtained from each patient prior to his/ her contribution in the present study. Confidentiality and anonymity of any obtained information was assured through coding of all data.

2.7 Procedure
This study was carried out in three phases:

2.7.1 Preparatory phase
Tools development
A review of current and past, local and international related literature in the various aspects using books, articles, periodicals and magazines were done.

Content validity and reliability
Content validity was done by expertise (2 medical staff from Tropical Medicine and Gastroenterology department) & (3 nursing staff from the Medical-Surgical Nursing department) who reviewed the tools for clarity, relevance, comprehensiveness, understanding and applicability. Minor

modifications were required and correction was carried out accordingly. As for the reliability tool II (part one) were confirmed for consistency by cronbach's alpha coefficient (alpha=0.88), for Morisky medication adherence scale the total standardized Cronbach's alpha as a measure of reliability was (0.80), which showed that the internal consistency of the tool was good.

Pilot study
A Pilot study was conducted on 10% of sample (6 patients) admitted to the Tropical Medicine and Gastroenterology department at El - Rajhi liver Hospital in Assuit University Hospital to test the applicability and clarity of the tools. According to this pilot study, no modifications were made to the tools, so those patients were included. It had also provided an estimate of time needed to fill out the tools

2.7.2 Implementation phase
- During this phase the researcher conducted the assessment process for the number of cases admitted in the Tropical medicine and Gastroenterology department at El- Rajhi liver hospital.
- Once permission was granted to proceed with the proposed study, the researcher initiated data collection, name of potential patients who have admitted to the unit and who met the criteria were obtained from computerized system.
- First, 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. The researcher took the patients' telephone number at the first contact (during hospitalization) to determine the time of appointments in order to complete data collection process (every month for three months).
- After taking the patient oral agreement for voluntary participation in the study, each patient involved in the study (study and control group) was interviewed individually for filling (Tool I). For the control group they were given the standard hospital instructions.
- For the study group the researcher explained the nursing instructions which were developed by the researcher after passing through an extensive and relevant literature review. Its aim was to enable patients who had liver cirrhosis to be knowledgeable about instructions which help them in minimizing risk of hepatic encephalopathy. It was prepared in simple Arabic language with simple photo illustrations. It was covered the following:
- Brief overview about anatomy of liver.
- Functions of liver.
- Brief overview about liver cirrhosis.
- Information about hepatic encephalopathy disease as (definition, risk factors, signs & symptoms and diagnostic studies).
- Nursing instructions to minimize hepatic encephalopathy as (maintaining proper nutrition, prevention of precipitating factors and importance of compliance to therapeutic regimen).
- Each patient was met for one session in the morning shift. The session took about 20-30 minutes. One family

member was present in the session for patient support and increasing their sense of responsibility. 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. At the end of the session the researcher emphasized to the patients the importance of follow up visits and arranged with them the time and place for follow up which were every month for three months in the outpatient clinic of El- Rajhi liver hospital.
- Each patient obtained a copy of the book*let al*so the researcher used pictures to enhance patient's knowledge and helped them to retain the learned material.
- The collection of data lasted through the period from July 2017 to June 2018.

2.7.3 Evaluation phase
- In this phase study group patients were assessed three times (one month, second month and three month) from the application of nursing instructions for their compliance with the instructions using (Tool II) and evaluated for severity of hepatic encephalopathy using (Tool III). The session took about 20 minutes.
- For the control group patients they were evaluated three times (one month, second month and three month) for severity of hepatic encephalopathy using (Tool III).

2.8 Statistical design
Data entry was done using compatible personal computer by the researcher. All data was entered into statistical packages for the social sciences (SPSS) version 20.0 software for analysis and Excel for figures. The content of each tool was analysed, categorized and then coded by the researcher. Categorical variables were described by number and percent, where continuous variables described by mean and standard deviation (Mean, SD). Chi-square test and fisher exact test used to compare between categorical variables where compare between continuous variables by unpaired t-test. A two-tailed $p<0.05$ was considered statistically significant.

3. Results
In relation to basic personal data: of the 60 patients, slightly more than half of study group (53.3%) and nearly two thirds of control group (63.3%) were male. More than half (56.7%) in both groups their age was ranged from sixty to less than sixty five. The mean of age of the study group was 59.16±6.046 years and 59.23 ±6.27 years for the control group. Regarding marital status it was found that the highest percentage of study and control were married (80.0%, 80.3%) respectively. Regarding residence it was found that the majority of study and control were residents in rural areas (96.7%, 93.3%). Regarding to educational level it was found that highest percentage (63.3%, 66.7%) in study and control group respectively were illiterate. Regarding to occupation it was found that nearly half of study group (46.7%) were housewives while half of control group were non-workers. Also, there were no statistically significant differences between two groups regarding their demographic characteristics.

Regarding medical data hepatitis C virus was the main cause of cirrhosis in the highest percentage of study and control group (80.0%, 63.3%). As regarding medical co-morbidities diabetes mellitus, hypertension and cancer were documented in (40.0%, 26.7%, 23. 3%) for study group and (16.7%. 20.0%, 10.0%) for control group.While all the study and control group of patients hadn't renal disease. More than half (53.3%) of study group and more than one third (37.9%) of control group had gastrointestinal bleeding half of them had both hematemesis and melena. More than half (51.7%) of study group and nearly one fourth (23.3%) of control group had oesophageal varices and the highest percentage of study group and all of control group had performed endoscopic band ligation. The majority (80.0%) of both study and control group had ascites more than one third (37.5%) of them in the study group had marked ascites while half of control group had moderate ascites. The highest percentage in both study and control group (63.3%, 70.0%) respectively had jaundice.
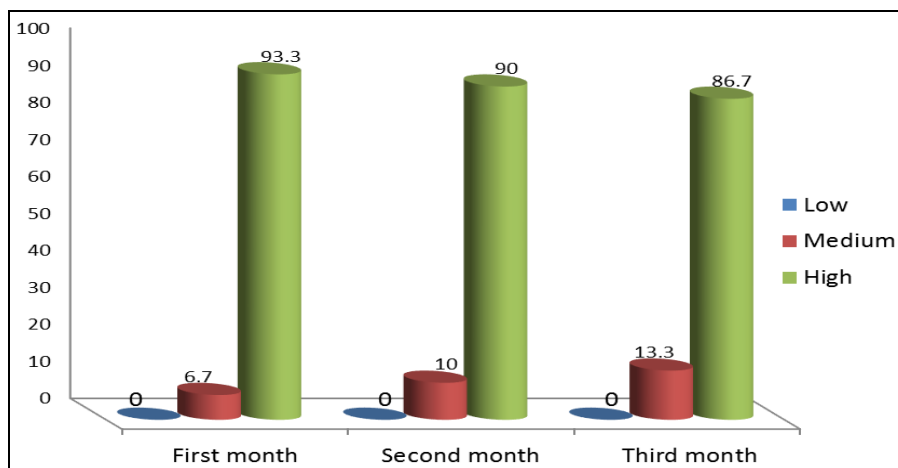

Fig 1: Percentage distribution of study group of patient's responses regarding compliance with nursing instructions through three months.

Table 1: Total score of study group of patient's responses regarding compliance with medication by Morisky Medication Adherence Scale through three months (n= 30).

patients responses	First month		Second month		Third month	
	N.	%	N.	%	N.	%
Low compliance < 6	0	0.0	1	3.3	6	20.0
Medium compliance(6-8)	24	80.0	24	80.0	19	63.3
High compliance (=8)	6	20.0	5	16.7	5	16.7
Mean±SD	7.10±	.54	7.03±	.61	6.56±	1.35

Table 2: Distribution of study group of patients responses regarding total compliance with nursing instructions and medication through three months (n= 30).

Patients response	First month		Second month		Third month	
	N.	%	N.	%	N.	%
Low compliance	0	0.0	0	0.0	0	0.0
Medium compliance	2	6.7	3	10.0	3	10.0
High compliance	28	93.3	27	90.0	27	90.0
Mean± SD	25.16±2.65		24.60±3.16		24.96±2.96	

Table 3: Distribution of studied patients (both study and control group) as regarding severity of hepatic encephalopathy through three months (n= 60).

Severity of hepatic encephalopathy by (West Haven Criteria)	1st month				P. value	2nd month				P. value	3rd month				P.value
	Study group (n=30)		Control group (n=30)			Study group (n=30)		Control group (n=30)			Study group (n=30)		Control group (n=30)		
	N.	%	N.	%		N.	%	N.	%		N.	%	N.	%	
Grade 0	28	93.3	20	66.7	0.01*	27	90.0	21	70.0	0.052*	25	83.3	24	80.0	0.500 [NS]
Grade 1	0	0.0	1	3.3	0.500 [NS]	0	0.0	1	3.3	0.500 [NS]	0	0.0	0	0.0	-----
Grade 2	2	6.7	4	13.3	0.335 [NS]	2	6.7	5	16.7	0.212 [NS]	0	0.0	1	3.3	0.500 [NS]
Grade 3	0	0.0	2	6.7	0.246 [NS]	0	0.0	1	3.3	0.500 [NS]	3	10.0	2	6.7	0.500 [NS]
Grade 4	0	0.0	3	10.0	0.119 [NS]	1	3.3	2	6.7	0.500 [NS]	2	6.7	3	10.0	0.500 [NS]

Ns= Non-significant difference ($p > 0.05$) * =Significant difference ($p \leq 0.05$)

Table 4: Difference between total number of patients in the study and control group regarding severity of hepatic encephalopathy through three months.

	First month		Second month		Third month		Total number through three months		P. value
	N	%	N	%	N	%	N	%	
Study (30)	2	6.7	3	10.0	5	16.7	10	11.1	
Control (30)	10	33.3	9	30.0	6	20.0	25	27.8	0.004**
Total (60)	12	20.0	12	20.0	11	18.3	35	19.4	

* = highly statistical significant ($p<0.005$)

Table 5: Relation between mean compliance score of the study group of patients and their sociodemographic characteristics.

Sociodemographic characteristics	Total compliance with nursing instructions (p. value)		
	First month	Second month	Third month
Age	0.619 [Ns]	0.502 [Ns]	0.669 [Ns]
Gender	0.257 [Ns]	0.542 [Ns]	0.667 [Ns]
Marital Status	0.310 [Ns]	0.310 [Ns]	0.430 [Ns]
Residence	0.756 [Ns]	0.661 [Ns]	0.513 [Ns]
Level of education	0.375 [Ns]	0.415 [Ns]	0.*773* [Ns]
Occupation	0.618 [Ns]	0.933 [Ns]	0.194 [Ns]

Ns= Non-significant difference ($p > 0.05$)

Table 6: Relation between mean compliance score of the study group of patients and their medical data.

Medical data	Total compliance with nursing instructions (p.value)		
	First month	Second month	Third month
Diabetes	0.124 [NS]	0.476 [NS]	0.239 [NS]
Hypertension	0.920 [NS]	0.429 [NS]	0.197 [NS]
Cancer (HCC or others)	0.441 [NS]	0.613 [NS]	0.639 [NS]
Gastrointestinal bleeding	0.754 [NS]	0.456 [NS]	0.156 NS
Esophageal varices	0.737 [NS]	0.911 [NS]	0.241 [NS]
Ascites	0.614 [NS]	0.633 [NS]	0.563 [NS]

Ns= Non-significant difference ($p > 0.05$)

Table 7: Relation between total compliance with nursing instructions and severity of hepatic encephalopathy among study group of patients through three months (n=30).

Severity of hepatic Encephalopathy by West Haven Criteria	Compliance with nursing instructions					
	First month		Second month		Third month	
	N.	Mean ±SD	N.	Mean ±SD	N.	Mean ±SD
Grade 0						
Yes	28	25.78±1.25	27	25.48± 1.71	25	24.88±2.35
No	2	16.50±.70	3	16.66± 1.52	5	22.80±4.91
P. value		0.001**		0.001**		0.149Ns
Grade 1						
Yes	0	-----	0	------	0	-------
No	30	25.16±2.65	30	24.60±3.16	30	24.46±2.93
P. value		-------		------		-----
Grade 2						
Yes	2	16.50± .70	2	17.50± .707	0	-------
No	28	25.78±1.25	28	25.10± 2.60	30	24.46±2.93
P. value		0.001**		0.001**		-------
Grade 3						
Yes	0	-----	0	------	3	24.00±5.19
No	30	25.16±2.65	30	24.60±3.16	27	24.59±2.72
P. value		-------		-------		0.745Ns
Grade 4						
Yes	0	-----	1	15.00±-----	2	24.78±2.64
No	30	25.16±2.65	29	24.93± 2.64	28	21.00±5.65
P. value		-----		0.001**		0.076Ns

Ns= Non-significant difference ($p>0.05$) ** = highly significant difference ($p\leq0.001$)

Figure (1): shows that the highest percentage of patients had high compliance with nursing instructions in the first, second and third month (93.3%, 90.0%, 86.7%) respectively.

Table (1): Shows that highest percentage of patients had medium compliance with medication in the first, second and third month (80.0%, 80.0%, 63.3%) respectively.

Table (2): Shows that the highest percentage of patients had high compliance with total nursing instructions in the first, second and third month (93.3%, 90.0%, 90.0%) respectively.

Table (3): Illustrates that in the first and second month there was a statistically significant difference was documented between study and control group as regarding severity of hepatic encephalopathy while in the third month there was no statistically significant difference was documented between study and control group.

Table (4): Shows that nearly one fourth of patients exposed to hepatic encephalopathy in the three months with a highly statistical difference between study and control group with (P value < 0.005).

Table (5): Demonstrates that there was no statistically significant difference was documented between patients mean compliance and their Sociodemographic characteristics.

Table (6): Clarifies that there was no statistically significant difference was documented between patients mean compliance and their medical data.

Table (7): Reflects that that in the first and second month there was a highly statistical significant relation was documented between patient's compliance with nursing instructions and severity of hepatic encephalopathy while in the third month there was no statistically relation.

4. Discussion
Regarding socio-demographic characteristics of the patients; the current study revealed that; more than half of the patients in both study and control group their age ranged from sixty to less than sixty five and the mean age of the patients in study group was 59.16±6.04 years and in control group was 59.23 ±6.27 years. These findings supported by Hayward et al., (2017) [18] who reported that the mean age of patients was 58.4 ± 10.2 years.

The results from data collected in this study showed that more than half in the study group and nearly two thirds in the control group were male. This result was congruent with Al Ghamdi and Shah, (2018) [4] who reported in their study that more than half of patients were male. Likewise similar to our results a study conducted by EL-Shafei et al., (2017) [11] and revealed that more than two thirds of patients were male.

In relation to marital status the present study revealed that the majority of patients were married. According to occupation the present study revealed in both groups all of female patients were housewives and the highest percentages of male patients were non-workers. As regarding to educational level around two thirds of them were illiterate. This study finding was in line with a study conducted at Internal Medical Department in Minia University Hospital by Taha et al., (2015) [40] entitled as "Impact of a Designed Nursing Intervention Protocol on quality of life for liver cirrhosis patients in Minia University Hospital" which revealed that the majority of both study and control group patients were married, housewives, and illiterate.

As regards to residence, results from data collected in this study showed that the majority of both groups (study and control) were residents in rural areas these finding was supported by Khalil *et al*., (2015) [24] and Abdel Rehaim and Mohamed, (2017) [2] who reported that highest percentage of patients lived in rural area.

4.1 Regarding to medical data: The results of the present study revealed that, the majority of study group and also highest percentage in control group had diagnosed with hepatitis C as a cause for liver cirrhosis. This result agrees with Kamal *et al*., (2018) [23] and Jamil and Durrani. (2018) [22] who reported that the most common cause of hepatic cirrhosis in their study population was chronic infection with hepatitis C.

Likewise Ali *et al*., (2014) [5] who conducted a study entitled as "Efficacy of rifaximin in prevention of recurrence of hepatic encephalopathy in patients with cirrhosis of liver" support the previous finding as they stated that majority of patients had cirrhosis due to chronic hepatitis C.

Also Khan *et al*., (2012) [25] and Khalil *et al*., (2015) [24] were in the same line as they mentioned that hepatitis C was the predominant underlying cause of cirrhosis and was seen in majorities of the patients.

On the other hand this finding contradicted with Handady *et al*., (2015) [17] who reported that regarding etiology of liver cirrhosis nearly half of cases had viral hepatitis B. They clarified the discrepancy between their study and other studies by multiple factors, such as race discriminations, as well as a population difference and decreasing knowledge concerning vaccination against Hepatitis B virus.

As regarding presence of chronic diseases the present study documented that diabetes mellitus, hypertension and cancer were present in minority of patients and the entire study and control group hadn't renal disease. Chang *et al*., (2015) [9] agree with these findings as they reported that diabetes mellitus, hyperlipidemia and hypertension were present in more than one third while renal impairment was documented in minority of patients. In agreement with our results Kuo *et al*., (2017) [28] who conducted a study on liver cirrhosis patients who waiting liver transplantation and revealed that regarding to medical co-morbidities hypertension, diabetes, and coronary artery disease were reported in minority of patients.

The study results represented that, more than half of study group and more than one third of control group had gastrointestinal bleeding half of them had both hematemesis and melena. Also more than half of study group and nearly one fourth of control group had oesophageal varices and the highest percentage of study group and all of control group had performed endoscopic band ligation. These findings were supported by Abd Elkader *et al*., (2014) [1] who reported that nearly half of patients presented with hematemsis & melena but disagree with method of treatment as stated that more than half of patients were treated by variceal injection and band ligation. Also the previous finding was supported by Garcia-Tsao *et al*., (2017) [15] who stated that gastro esophageal varices are present in approximately 50% of patients with cirrhosis. In patients with compensated cirrhosis these are present in 30%-40%, whereas they can be present in up to 85% of patients with decompensated cirrhosis.

Study results represented that, the majority of both study and control group had ascites, similar to our results Nayak *et al*., (2016) [33] revealed that ascites were documented in the highest percentage of patients.

The current study revealed that one third of patients in the study group and half of control group had moderate ascites. This finding was in line with a study conducted by Abdel Rehaim and Mohamed, (2017) [2] entitled as "Knowledge of Patient with Liver Cirrhosis Regarding Ascites Self-Management: Instructions Nursing Guideline" which revealed that the majority of the study group had moderate degree of ascites while the minority from them had mild degree of ascites.

The same result was supported by James and Liou, (2015) [21] and Cesario *et al*., (2011) [43] who reported that ascites is the most common major complication of cirrhosis and it is an important landmark in the natural history of chronic liver disease.

The present study revealed that the highest percentage in both study and control group had jaundice.Wasim *et al*., (2014) [43] support this result as they mentioned that the most common signs and symptoms which was found in cirrhotic patients are weight loss and anorexia in all of the patients, jaundice, fatigue and weakness in majority of them. Also similar to our results Nayak *et al*., (2016) [33] who revealed that; jaundice were documented in more than two thirds of patients.

4.2 Regarding compliance of patients with nursing instructions: The result of the present study revealed that the highest percentage of patients had high compliance with nursing instructions given to them in the first, second and third month. These results were in line with Weheida *et al*., (2009) [44] and Taha *et al*., (2015) [44] who reported that the majority of study group patients were following the instructions given to them about therapeutic regimen, the food allowed and avoided food, and instructions about indicated and contraindicated medications after implementation of the nursing intervention protocol.

Also this finding agrees with Abou-El-Fadl *et al*., (2015) [3] who carried out a study entitled as "Effect of discharge planning for patients with esophageal varices on compliance to therapeutic regimen"; and revealed that patients had high level of compliance after implementation of the educational program and also following-up the program three months later.

The present study revealed the highest percentage of patients had a medium compliance and minority had low compliance with medication. These finding was in line with a study conducted by Polis *et al*., (2016) [35] and reported that the highest percentage of the patients reported a high adherence and the minority of them reported a low adherence.

Likewise Yassine *et al*., (2016) [46] supported the results as they stated that the mean 8-MMAS score was 6.59 ± 2.0. Following classification, 50.5% showed a high adherence, 27.1% medium adherence, and 22.4% low adherence. These results were modified to 77.6% have high adherence and 22.4% have low adherence following dichotomization.

In the same line with our results Hayward *et al*., (2017) [18] in their study which entitled as "Medication beliefs predict medication adherence in ambulatory patients with

decompensated cirrhosis" reported that (42%) were categorized as having "High" medication adherence, 37% with "Medium" adherence, and 21% with "Low" adherence. Waari *et al*., (2018) [42] are in the same line with our result as they found that (45.5%) of patients was fully adhering to the prescribed medications. Self-reported adherence to medication measured by MMAS-8 scale was high for 45.5%, medium for 26.2% and low for 28.3% of the study participants.

4.3 Regarding severity of hepatic encephalopathy using west haven criteria: The results of the current study revealed that in the three months there were nearly one fourth of patients in both groups who had hepatic encephalopathy.In agreement with these findings Patidar and Bajaj, (2015) [34] pointed out that hepatic encephalopathy is a common neurologic complication of cirrhosis estimated to occur in 30-70% of patients with cirrhosis.

This study finding was in agreement with Wasim *et al*., (2014) [43] who reported that among the most frequent complications presented in patients were ascites in (97.3%), followed by peripheral edema in (73%), recurrent infections in (43.2%), hepatic encephalopathy in (28%), Upper GIT bleeding in (4.1%) and hepatocellular carcinoma in (1.4%).

The present study confirmed that there was a highly statistically significant difference between study and control group of patients who exposed to hepatic encephalopathy through three months. This may be due to that the researcher provides sufficient information regarding preventive measures of hepatic encephalopathy and provide a handbook containing this information that supported with simple pictures and also reinforced patients regarding compliance with it. Garrido *et al*., (2017) [16] supported this finding as they stated that providing structured information for the understanding of hepatic encephalopathy (HE) might be relevant to the prevention and management of the syndrome.

Also Mahdy *et al*., (2018) [29] support these findings as they stated that more than one third of the control group and the minority of the study group readmitted after three month of educational guidelines implementation complaining hematemesis, melena, syncope due to re-bleeding that needed ligation for the most of cases. Moreover, there were statistically significant differences between the study and control group regarding readmission and recurrent bleeding follow up- guidelines intervention.

4.4 Regarding relation between patients mean compliance scores and their sociodemographic characteristics: The result of the present study revealed that there was no statistically significant difference was documented between patients mean compliance and their sociodemographic characteristics. Taha *et al*., (2017) [39] were in the same line with these findings as they demonstrated that there was no statistical significant relation between patients' total compliance and socio-demographic characteristics as age, gender, marital status, residence and occupation but disagree in the relation of education and compliance as they illustrated that adherence of patients to therapeutic regimen raises when they have better learning.

Also these findings were in the same line with

Manobharathi *et al*., (2017) [30] who reported that, there was no association between compliance and socio-demographic characteristics of patients. Also these findings supported by Yassine *et al*., (2016) [46] and Ibrahim *et al*., (2011) [19] who reported that sociodemographic factors were not associated with any variation in adherence levels.

Likewise Ismail *et al*., (2017) [20] were in the same line as they pointed that no significant correlation was seen between total score adherence and patients' gender, marital status, literacy level, employment, residence, severity of the disease.

4.5 Regarding relation between patient's compliance and medical data: The current study revealed that there was no statistical significant difference was documented between patient's compliance and their medical data. This may be due to that the researcher had reinforced on all patients about importance of compliance to avoid further complications. In the same line with our results Kuo *et al*., (2017) [28] reported that hypertension, coronary artery disease or ascites had no effect on adherence level among patients.

The same result was contradicted by Kim *et al*., (2018) [26] who stated that having hypertension or diabetes mellitus were protective factors against non-adherence. This may be due to the different nature of the study.

4.6 Regarding relation between patient's compliance and severity of hepatic encephalopathy: The current study revealed that in the first and second month there was a highly statistical significant relation was documented between patient's compliance with nursing instructions and severity of hepatic encephalopathy. From the researcher point of view this may due to the fact that the researcher had provided patients with instructions with all the needed information that helped them to minimize this complication and supported with simple pictures and diagram which helped them to retain learned material, also follow up of the studied patients by the researcher to ensure commitment of the patients to implement the nursing instructions and reinforced them to comply with it which had positive effect on improving patient's outcomes.

This finding supported with Flamm, (2018) [13] who clarified that effective HE management is reliant on patient adherence to treatment. Likewise this finding was in line with Volk *et al*., (2012) [41] who reported that 22% of hospital readmissions that occurred within the first month were considered preventable through patient education on the proper use and maintenance of treatment, highlighting the importance of adherence.

Similarly these findings was supported with Bajaj *et al*., (2010) [7] who conducted retrospective analysis for patients with cirrhosis who received secondary prophylaxis for hepatic encephalopathy, and evaluated the association of adherence and recurrence. They found that patients who developed recurrent HE were non-adherent to their treatment. Furthermore, all patients who did not have HE recurrence were adherent to their treatment.

Likewise Krot and Sousa, (2017) [27] support these results as they stated that the increase in the degree patient compliance with medical recommendations brings considerable clinical and economic benefits for both patients and entire healthcare systems.

Likewise Ibrahim *et al.*, (2011) [19] were in the same line with study results as they stated that there is a positive association between good compliance and achievement of better control of chronic diseases.

Results of the current study revealed that in the third month there was no significant relation was documented between compliance and severity of hepatic encephalopathy. This may be explained there are non-preventable factors that patient can't control them and expose them to complications.

5. Conclusion
The study findings supported the research hypothesis as it had been proven that hepatic encephalopathy was minimized among patients who complied with nursing instructions.

6. Recommendations
Based on the findings of present study, the following recommendations are suggested:
1. Continuous educational programs to improve patient's awareness about hepatic encephalopathy, its prevention and early detection especially high risk patients.
2. Strategies to improve and sustain adherence levels are required including counseling offered to patients who are deteriorating or experience periodic exacerbation of symptoms.
3. Simple educational pamphlet for liver cirrhosis patients and their family members about preventive measures of hepatic encephalopathy should be available at the Tropical Medicine and Gastroenterology department at El - Rajhi liver Hospital in Assuit University hospital.

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