Original Article

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Comprehensive Nursing Intervention for Managing Pain, Anxiety, and Malnutrition among Elderly Patients with Liver Cirrhosis

Zeinab Shaker Abdullah[1*], Nermeen Mahmoud Abdel- Aziz[1], Ahmad Farooq Al Sayed[2], Saieda Abd Elhamed Abdelaziz[1]

[1]*Department Gerontological Nursing, Faculty of Nursing, Assiut University, Assiut 71515, Egypt*

[2]*Department of Tropical Medicine and gastroenterology, Faculty of Medicine, Assiut University, Assiut 71515, Egypt*

**Corresponding Author's Email: zeinab_shaker@aun.edu.eg*

ABSTRACT

Background: Liver Cirrhosis is a Chronic, progressive, and irreversible disease caused by vascular and hepatocellular injury. Comprehensive nursing intervention standardizes nursing responsibilities through an organized management system and may help improve pain, anxiety, and malnutrition in elderly patients. **Objectives:** To evaluate the effect of comprehensive nursing intervention on managing pain, anxiety and malnutrition in elderly patients with liver cirrhosis. **Methods:** Quasi-experimental research design was utilized. The study was conducted at the inpatient clinics of Al-Rajhy Liver Hospital, Assiut University, Egypt. A Purposive sample of 100 elderly patients diagnosed with liver cirrhosis was selected. divided equally into an intervention group 50 and a control group 50. Four tools were used: Tool I: Structured interview sheet. Tool II: visual analog scales. Tool III: **-** geriatric anxiety scale. Tool IV: mini nutritional assessment. **Results**: Findings revealed statistically significant improvements in the intervention group compared to the control group. Patients who received the comprehensive nursing intervention showed reduced levels of pain ($p = 0.001$), and anxiety scores were lower in the study group among participants who received visits ($p = 0.009$), as assessed by the visual analog scale and the geriatric anxiety scale, respectively. Additionally, nutritional status improved significantly ($p < 0.05$ for all variables). **Conclusion**: Comprehensive nursing interventions significantly enhance pain, anxiety, and improve nutritional status among elderly patients with liver cirrhosis. Incorporating these interventions into routine liver care is essential.

Keywords: Comprehensive Nursing Intervention; Elderly; Liver Cirrhosis

INTRODUCTION

Elderly people encounter numerous challenges in their daily lives due to the inescapable and unavoidable process of age-related decline (Dhafer *et al*., 2025). The global population of older adults is rising rapidly. Worldwide, individuals aged 60 years and above are projected to increase to 1.4 billion by 2030 (WHO, 2025). In Egypt, the number of older persons is expected to grow significantly, reaching around 22 million by 2050 (Central Agency for Public Mobilization and Statistics, 2024). Cirrhosis represents the advanced stage of chronic liver disease which developed from chronic liver disease with various etiologies, including hepatitis B virus (HBV) infection, hepatitis C virus (HCV) infection, alcohol consumption (AC), nonalcoholic fatty liver disease (NAFLD), and autoimmune liver disease (Lu *et al*., 2023).

Comprehensive nursing intervention provides an individualized, holistic framework that ensures consistency in nursing practice. It addresses mental health, organ function, medication effects, and dietary needs, supporting recovery and adaptive responses to declining health (Chen *et al*., 2021). In general, the most frequently reported symptoms in cirrhosis include pain (prevalence range: 30–79%), anxiety (14–45%), and malnutrition, which collectively impair quality of life. Pain may result from hepatic inflammation, ascites, and

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muscle wasting (Philips, 2024). while anxiety arises from the disease's chronic nature, recurrent hospitalizations, and uncertainty about prognosis. Malnutrition—affecting up to 80% of patients—results from reduced intake due to anorexia or early satiety. Together, these complications increase morbidity and complicate disease management (Ruben *et al*., 2022).

Gerontological nursing allows nurses regular time with older patients so can evaluate possible health issues, educate on treatment plans, and provide comprehensive health education. Nurses assist patients with maintaining safe physical activity, when to limit physical activity, and how to conserve energy. Educate patients on shifting lifestyles, medication compliance, and long-term health behaviors that are most effective for the person (Alfayomy *et al*., 2023).

Although the global population of older adults continues to increase, as highlighted by the World Health Organization, and Egypt is experiencing a similar demographic shift according to the Central Agency for Public Mobilization and Statistics, research specifically addressing elderly individuals with liver cirrhosis remains (WHO, 2025). Many existing studies focus on general adult populations and do not adequately consider age-related factors such as frailty, multiple medication use, and diminished hepatic reserve. Moreover, pain, anxiety, and malnutrition are commonly examined as separate conditions, despite their frequent coexistence and combined negative impact on patient outcomes. There is also insufficient evidence regarding the implementation of structured, theory-driven comprehensive nursing interventions within the Egyptian healthcare setting.

This study is innovative in that it concentrates on elderly patients with cirrhosis as a particularly vulnerable group and employs a multidimensional comprehensive nursing approach that concurrently targets pain, anxiety, and malnutrition. By doing so, it addresses existing gaps in gerontological and hepatology nursing research and contributes practical, evidence-based strategies to enhance quality of life among this high-risk population.

Significance of Study

Egypt has one of the highest global burdens of hepatitis C virus (HCV), a major cause of liver cirrhosis. Chronic HCV infection affects nearly 10% of individuals aged 15–59—over 8 million people—with prevalence rising sharply with age and exceeding 25% among those aged 50–60 years (AbdulRahman *et al*., 2024). At Al-Rajhy Liver Hospital, the prevalence of liver cirrhosis among elderly patients was reported at 44.7% (Abdullah *et al*., 2021).

Cirrhosis represents the final stage of chronic liver disease, marked by hepatocyte regeneration and fibrosis that lead to portal hypertension and progressive liver dysfunction. Its global incidence and mortality continue to rise, with 5–10 deaths per 100,000 annually (Devarbhavi *et al*., 2023), and liver diseases contribute to approximately two million deaths worldwide each year (Asrani *et al*., 2019).

This study addresses a significant gap in nursing practice related to managing chronic complications in elderly patients with liver cirrhosis. Pain, anxiety, and malnutrition are interrelated conditions that accelerate disease progression, and decrease quality of life. Egypt's high cirrhosis burden driven by widespread HCV infection, the need for multidisciplinary nursing interventions is critical. Therefore, this study aims to evaluate the effectiveness of comprehensive nursing intervention in managing pain, anxiety, and malnutrition among elderly patients with liver cirrhosis.

Study Aim

This study was carried out to evaluate the effect of comprehensive nursing intervention on managing pain, anxiety, and malnutrition in elderly patients with liver cirrhosis.

Research Hypothesis

H_o: Comprehensive nursing intervention will have no significant effect on pain, anxiety, or nutritional status among elderly patients with liver cirrhosis compared to those receiving routine nursing care.

H_1: Elderly patients with liver cirrhosis who receive comprehensive nursing intervention will have significantly lower pain levels compared to those receiving routine nursing care.

H_2: Elderly patients with liver cirrhosis who receive comprehensive nursing intervention will have significantly lower anxiety levels compared to those receiving routine nursing care.

H_3: Elderly patients with liver cirrhosis who receive comprehensive nursing intervention will have significantly better nutritional status compared to those receiving routine nursing care.

METHODOLOGY

Research design: Quasi-experimental research design was utilized in this study**.**

Setting: Al-Rajhy Liver Hospital, at Assiut University served as the research setting. Data for the study were collected from three inpatient wards.

Sample type: A purposive sample was utilized in this study.

Sample Size Calculation

During 2024, Al-Rajhy Liver Hospital admitted 400 elderly patients in total. Sample size determination employed a two-means comparison approach, focusing on anxiety duration measurements in elderly cirrhotic patients (Polit & Beck, 2008). Using statistical parameters of 80% power and 5% significance level, alongside an anticipated mean difference of 6.36 and standard deviations of 10.77 and 9.29 for control and study cohorts respectively, calculations yielded a minimum requirement of 40 subjects. Anticipating potential attrition or non-participation, researchers enlarged the cohort to 100 elderly patients were equally allocated with 50 participants for the study group and 50 for the control group.

Inclusion Criteria

Participants will include elderly patients aged 60 years and older who have a confirmed diagnosis of liver cirrhosis at mild to moderate stages. Patients will be excluded if they are diagnosed with hepatic encephalopathy grade III or IV, or if they have neurological impairments or physical disabilities that interfere with their ability to participate in the study.

Data Collection Tools

Four tools were utilized to collect data for this study:

Tool I: A structured interview questionnaire: It was designed and developed by the researcher based on a review of relevant literature and previous studies for data collection. 2 sections comprised the questionnaire structure:

Part I: Demographic variables included age, sex, residence, level of education, marital status, occupation, living condition and the patient's social status.

Part II: It included past medical and family history of the studied elderly patient's history of chronic disease (high blood pressure, diabetes, heart disease, joint osteoarthritis, and any other diseases).

A-*Present medical history of the studied elderly patients:* The assessment included evaluation of patients' medical history, frequency of hospital admissions, family history, duration of illness, underlying causes of liver cirrhosis, current medications, and associated complications (hepatomegaly, ascites, jaundice, esophageal varices, hepatic encephalopathy, and gastrointestinal bleeding (hematemesis and melena).

B-*Periodic examination and follow-up:* Duration of undergoing examination and follow-up at the doctor.

Tools II: Visual Analog Scales (VAS) which is widely used for pain assessment. It was developed by Sriwatanakul *et al*. (1983). It consisted of 0 to 10 score, in which 0 = no pain, 1-3 = mild pain, 4-6 = moderate pain, and 7-10 = severe pain. VAS had excellent test–retest reliability. VAS score was 0.97 [95% CI = 0.96 to 0.98].

Tools III: Geriatric Anxiety Scale (GAS-10) is a widely applied tool for assessing anxiety in elderly. It was specifically developed to capture the distinct manifestations of anxiety in the elderly. The GAS-10 was developed by selecting the most discriminative items from the somatic (3 items), affective (3 items), and cognitive (4 items) subscales. Each item is rated from 0 (not at all) to 3 (all of the time), with higher scores indicating greater anxiety severity (Mueller, 2015).

Scoring Methodology: Summation of items 1-10 generates the Total Score, with individual item values spanning 0 to 3. Score Distribution for GAS-10 (N = 556).

Tool IV: Mini Nutritional Assessment (MNA) is validated screening and evaluation instrument is designed to identify elderly individuals who are malnourished or at risk of malnutrition. It consists of 18 items grouped into four domains: (1) Anthropometric measurements—four items assessing weight, height, and body circumferences (maximum score: 8); (2) Dietary assessment—six items addressing meal frequency, food types, fluid intake, and feeding independence (maximum score: 9); (3) Global assessment—six items evaluating lifestyle, medication use, and mobility (maximum score: 9); and (4) Subjective assessment—two items reflecting self-perceived health and nutritional status (maximum score: 4) (Stephen, 2012).

Scoring System: The total score of MNA Total Assessment (max. 30 points):

24 to 30 points Normal nutritional status

17 to 23.5 points at risk of malnutrition

Less than 17 points Malnourished

Reliability of the Tools: Reliability was assessed using Cronbach's alpha coefficient, yielding values of 0.97 for the VAS scale, 0.88 for the Geriatric Anxiety Scale, and 0.79 for the Mini Nutritional Assessment, and indicating good internal consistency.

Validity of the Tools: Five specialists from Assiut University's Faculty of Nursing gerontological nursing department evaluated the instruments for face validity. Recommended adjustments from the expert panel were subsequently implemented.

Pilot Study: Prior to primary data collection, a preliminary investigation involved 10% of geriatric subjects (10 elderly patients), who were subsequently excluded from the main study. Based on the results of pilot the study, the necessary modifications were done.

Data Collection Phase (Field Work): Elderly patients who met the inclusion criteria were selected by the interviewer. Each participant was informed about the study's objectives and procedures, provided oral consent, and was assured that all information would remain confidential. Data collection occurred over eight months, from August 1, 2024, to March 31, 2025. The study group of 50 elderly patients received an educational program, while the control group of 50 patients continued with routine examinations.

Following institutional approval, biweekly ward visits were conducted, each lasting four hours (9:30 a.m.–1:30 p.m.). Each session took approximately 25–30 minutes. The study's purpose was explained before participation; informed consent was reiterated.

The comprehensive nursing intervention program consists of 5 phases:

Administrative Phase: Official approval to conduct the study was obtained from the Dean of the Faculty of Nursing, Assiut University and forwarded to the director of Al-Rajhy Liver Hospital.

Assessment Phase: It included assessing elderly patients' demographic characteristics and their past and present medical history related to liver cirrhosis. Pre-assessment was conducted using Tool I to collect demographic information, followed by the administration of Tools II, III, and IV as pretests.

Planning Phase: Patient Contact: Each participant's contact number was recorded to coordinate follow-up sessions, monitor adherence to the program, and address any questions or concerns.

Teaching Methods and Materials: Educational strategies were planned before program implementation, including lectures, interactive discussions, demonstrations, and repeated practice sessions. Supplementary materials included visual aids, informational booklets, and PowerPoint presentations to enhance learning and engagement.

Intervention Phase: arrangement and implementation of the program. The study group received an educational program, and the control group got a routine follow-up. It was implemented in small groups of 2-3 elderly patients.

The study group had three sessions. Every session took 50-60 minutes.

Session 1: Introduced the program, its purpose, structure, and expectations, along with an overview of liver cirrhosis, including definition, pathophysiology, risk factors, and the role of exercise for elderly patients. A pretest was administered.

Session 2: Reviewed the previous session and discussed causes, symptoms, treatment, and complications of cirrhosis, emphasizing health-promoting behaviors such as nutrition, pain management, exercise, and medication adherence.

Session 3: Reinforced previous content and healthy lifestyle practices, followed by a demonstration of deep breathing exercises for relaxation and symptom relief.

The comprehensive nursing intervention followed a structured protocol developed by the researchers based on evidence-based hepatology and geriatric care guidelines. The protocol consisted of three integrated domains:

Pain Management Component:

Included systematic pain assessment using the Visual Analog Scale, education on safe analgesic use considering altered hepatic metabolism, positioning techniques, energy conservation strategies, relaxation breathing exercises, and non-pharmacological pain relief methods.

Anxiety Reduction Component:

Included therapeutic communication, emotional support, guided deep-breathing exercises, education about disease progression to reduce uncertainty, encouragement of family involvement, and reinforcement of coping strategies tailored to elderly patients.

Nutritional Support Component:

Based on Mini Nutritional Assessment findings and aligned with ESPEN (European Society for Clinical Nutrition and Metabolism) and EASL (European Association for the Study of the Liver) recommendations, patients received individualized dietary counseling, guidance on small frequent meals, adequate protein intake (adjusted for cirrhosis stage), fluid management education, and strategies to manage anorexia and early satiety.

Evaluation Phase: Conducted one month after the program for both study and control groups using the same pretest tools (I–V) to assess outcomes.

Statistical Design: Statistical analysis was performed using SPSS version 26. Descriptive statistics were used to summarize demographic and clinical characteristics. Continuous variables were tested for normality using the Shapiro–Wilk test. As VAS (Visual Analog Scale) and GAS scores were not normally distributed, they were expressed as median and range. Between-group comparisons were conducted using the Mann–Whitney U test, while within-group comparisons were performed using the Wilcoxon signed-rank test. Categorical variables were analyzed using the chi-square test. Correlation analysis was performed using Spearman's rank correlation coefficient. A p-value < 0.05 was considered statistically significant.

Ethical Consideration

The research proposal was approved by the Ethical Research Committee of the Faculty of Nursing, Assiut University, Egypt with approval number 11202330652 on 27th August 2023.

RESULTS

Table 1: Demographic Distribution of Elderly Patients with Liver Cirrhosis in the Study and Control Groups

Demographic Variables	Study (n= 50)		Control (n= 50)		*p*-value
	No.	Percentage (%)	No.	Percentage (%)	
Age (years)					
Mean ± SD	65.56 ± 5.32		67.24 ± 5.13		0.111
Sex					
Male	28	56.0%	34	68.0%	0.216
Female	22	44.0%	16	32.0%	
Residence					
Urban	14	28.0%	8	16.0%	0.148
Rural	36	72.0%	42	84.0%	
Marital status					
Married	33	66.0%	31	62.0%	
Divorced	2	4.0%	1	2.0%	0.716
Widow	15	30.0%	18	36.0%	
Level of education					
No read & write	25	50.0%	30	60.0%	
Read & write	9	18.0%	10	20.0%	
Basic education	6	12.0%	5	10.0%	0.384
Secondary	4	8.0%	4	8.0%	
University	6	12.0%	1	2.0%	
Occupation					
Retirement	26	52.0%	33	66.0%	
Freelance	5	10.0%	4	8.0%	0.356
Housewife	19	38.0%	13	26.0%	
Living condition					
With husband/ wife	3	6.0%	1	2.0%	
With son/ daughter	21	42.0%	27	54.0%	0.516
Family members	2	4.0%	1	2.0%	
Husband/ wife and sons	24	48.0%	21	42.0%	

p value more than 0.05 means no significant difference

Table 1 shows the difference between age groups was not statistically significant (p = 0.111). Other demographic characteristics also showed no statistically significant differences.

Table 2: VAS Score Distribution (Pre and Post-Test) among Elderly Liver-Cirrhosis Patients in Study and Control Groups

VAS	Study (n= 50)	Control (n= 50)	*p*-value[1]
	Median (Range)	Median (Range)	
Pre-test	8.0 (2.0-10.0)	8.0 (2.0-10.0)	0.713
Post-test	4.0 (0.0-10.0)	8.0 (0.0-10.0)	0.001*
***P*-value[2]**	0.000*	0.012*	

There is a significant difference; Significant at p < 0.05

Table 2 shows pretest VAS scores were comparable between groups (p = 0.713), but post-test showed a significant pain reduction in the study group compared to the control group (p = 0.001)

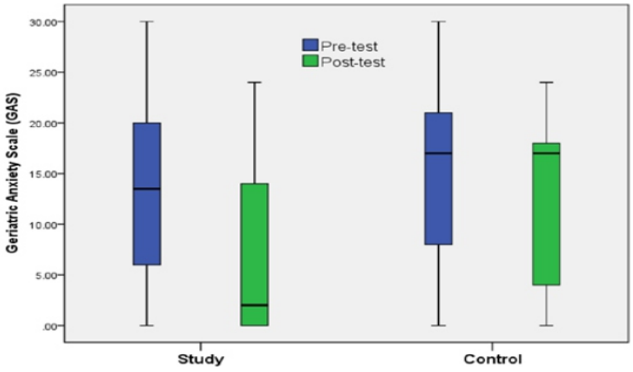

Figure 1: GAS score Distribution (Pre- and Post-Test) among Elderly Liver-Cirrhosis Patients in the Study and Control Groups

Figure 1 highlights a significant decrease in Geriatric Anxiety Scale (GAS) scores in the study group post-intervention

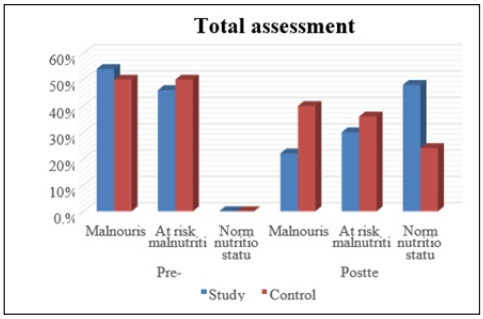

Figure 2: MNA Total Score Distribution (Pre- and Post-Test) among Elderly Liver-Cirrhosis Patients in the Study and Control Groups

Figure 2 demonstrates improved Mini Nutritional Assessment scores after the program.

Table 3: Post-test VAS Scores in Relation to Demographic Characteristics among Elderly Liver-Cirrhosis Patients

Demographic Characteristics	**VAS**	
	Study	**Control**
	Median (Range)	**Median (Range)**
Age (years)		
< 70	8.0 (2.0-10.0)	8.0 (2.0-10.0)
≥ 70	8.0 (2.0-10.0)	10.0 (6.0-10.0)
p-value	0.801	0.042*
Sex		
Male	8.0 (2.0-10.0)	8.0 (6.0-10.0)
Female	10.0 (2.0-10.0)	10.0 (2.0-10.0)
p-value	0.219	0.143
Residence		
Urban	9.0 (8.0-10.0)	10.0 (8.0-10.0)
Rural	8.0 (2.0-10.0)	8.0 (2.0-10.0)
p-value	0.190	0.170
Marital status		
Married	8.0 (2.0-10.0)	8.0 (6.0-10.0)
Not married	10.0 (2.0-10.0)	10.0 (2.0-10.0)
p-value	0.681	0.275
Level of education		
Illiterate	8.0 (2.0-10.0)	8.0 (2.0-10.0)
Literate	8.0 (2.0-10.0)	8.0 (6.0-10.0)
p-value	0.283	0.948
Patient's visit to family and friends		
Yes	8.0 (2.0-10.0)	8.0 (2.0-10.0)
No	8.0 (2.0-10.0)	10.0 (6.0-10.0)
p-value	0.050*	0.003*
Visiting the patient's family and friends		
Yes	8.0 (2.0-10.0)	8.0 (2.0-10.0)
No	8.0 (2.0-10.0)	6.0 (6.0-10.0)
p-value	0.331	0.053
Participation in social event		
Yes	8.0 (2.0-10.0)	9.0 (2.0-10.0)
No	8.0 (2.0-10.0)	8.0 (6.0-10.0)
p-value	0.234	0.935
Is there support from family and friends?		
Yes	6.0 (2.0-10.0)	6.0 (2.0-10.0)
No	9.0 (6.0-10.0)	10.0 (6.0-10.0)
p-value	0.001*	0.001*

**There is a significant difference; Significant at $p < 0.05$*

Table 3 reveals that post-test VAS scores were significantly lower among participants with family or friend support ($p = 0.001$)

Table 4: Post-Test GAS Scores in Relation to Demographic Characteristics among Elderly Liver-Cirrhosis Patients

Demographic Characteristics	GAS	
	Study	Control
	Median (Range)	Median (Range)
Age (years)		
< 70	16.0 (0.0-30.0)	13.0 (0.0-30.0)
≥ 70	12.0 (3.0-21.0)	18.0 (3.0-24.0)
p-value	0.357	0.152
Sex		
Male	13.0 (0.0-24.0)	17.0 (0.0-24.0)
Female	15.0 (3.0-30.0)	18.0 (3.0-30.0)
p-value	0.603	0.967
Residence:		
Urban	17.0 (4.0-24.0)	8.5 (4.0-24.0)
Rural	12.0 (0.0-30.0)	17.0 (0.0-30.0)
p-value	0.062	0.253
Marital status		
Married	13.0 (0.0-24.0)	13.0 (0.0-24.0)
Not married	14.0 (3.0-30.0)	18.0 (3.0-30.0)
p-value	0.544	0.540
Level of education		
Illiterate	16.0 (3.0-30.0)	17.5 (3.0-30.0)
Literate	12.0 (0.0-24.0)	12.5 (0.0-24.0)
p-value	0.683	0.577
Patient's visit to family and friends		
Yes	3.0 (0.0-21.0)	8.0 (0.0-21.0)
No	16.0 (4.0-30.0)	18.0 (4.0-30.0)
p-value	0.009*	0.003*
Visiting the patient's family and friends		
Yes	16.0 (0.0-30.0)	17.0 (0.0-30.0)
No	11.0 (3.0-21.0)	8.0 (3.0-21.0)
p-value	0.131	0.068
Participation in social event		
Yes	3.0 (0.0-7.0)	4.0 (0.0-7.0)
No	17.0 (3.0-30.0)	17.5 (3.0-30.0)
p-value	0.000*	0.000*
Is there support from family and friends?		
Yes	4.0 (3.0-18.0)	8.0 (3.0-18.0)
No	16.5 (0.0-30.0)	18.0 (0.0-30.0)
p-value	0.002*	0.010*

**There is a significant difference; Significant at P < 0.05*

Table 4 shows anxiety scores were significantly lower in the study group among participants who received visits ($p = 0.009$), took part in social events ($p < 0.001$)

Table 5: Post-Test MNA Scores in Relation to Demographic Characteristics among Elderly Liver-Cirrhosis Patients

Demographic Characteristics	Total Mini Nutritional Assessment Score							
	Study				Control			
	Malnourished		At risk of malnutrition		Malnourished		At risk of malnutrition	
	No.	%	No.	%	No.	%	No.	%
Age (years)								
< 70	19	70.4	18	78.3	15	60.0	14	56.0
≥ 70	8	29.6	5	21.7	10	40.0	11	44.0
p-value	0.526				0.774			
Sex								
Male	10	37.0	18	78.3	11	44.0	23	92.0
Female	17	63.0	5	21.7	14	56.0	2	8.0
p-value	0.003*				0.000*			

Residence								
Urban	11	40.7	3	13.0	5	20.0	3	12.0
Rural	16	59.3	20	87.0	20	80.0	22	88.0
p-value	0.030*				0.702			
Marital status								
Married	18	66.7	15	65.2	16	64.0	15	60.0
Not married	9	33.3	8	34.8	9	36.0	10	40.0
p-value	0.914				0.771			
Level of education								
Illiterate	14	51.9	11	47.8	16	64.0	14	56.0
Literate	13	48.1	12	52.2	9	36.0	11	44.0
p-value	0.777				0.564			

**There is a significant difference; Significant at p < 0.05*

Table 5 states that malnutrition was more common in the study group among females (63.0%), rural residents (59.3%), ($p = 0.003, 0.030$).

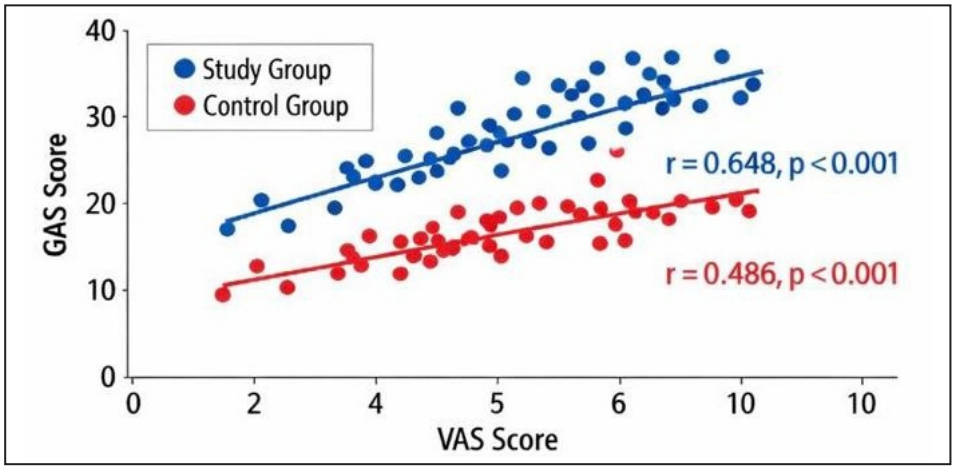

Figure 3: Correlation between VAS and GAS Scores among Elderly Liver-Cirrhosis Patients

Figure 3 shows positive correlation was observed between VAS and GAS scores in both groups (study: $r = 0.648, p < 0.001$; control: $r = 0.486, p < 0.001$).

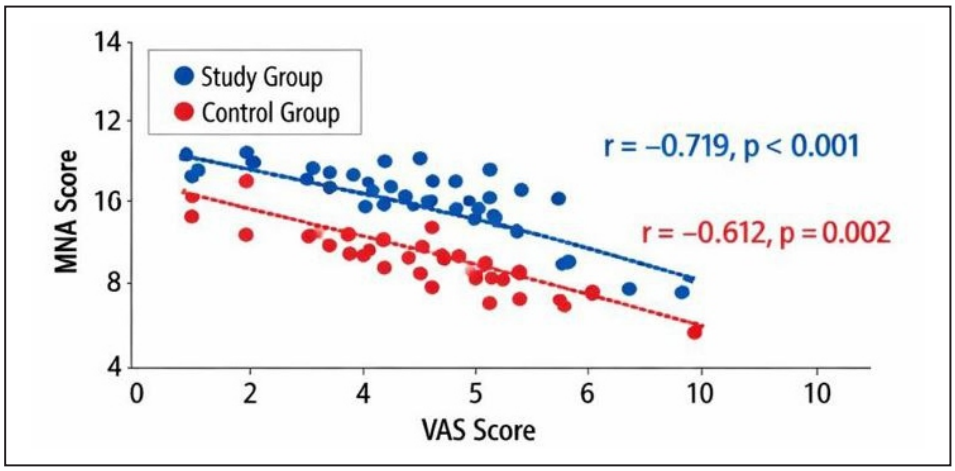

Figure 4: Correlation between VAS and MNA Scores among Elderly Liver-Cirrhosis Patients

Figure 4 shows pain intensity showed a significant negative correlation with nutritional status in both groups (study: $r = –0.719, p < 0.001$; control: $r = –0.612, p = 0.002$).

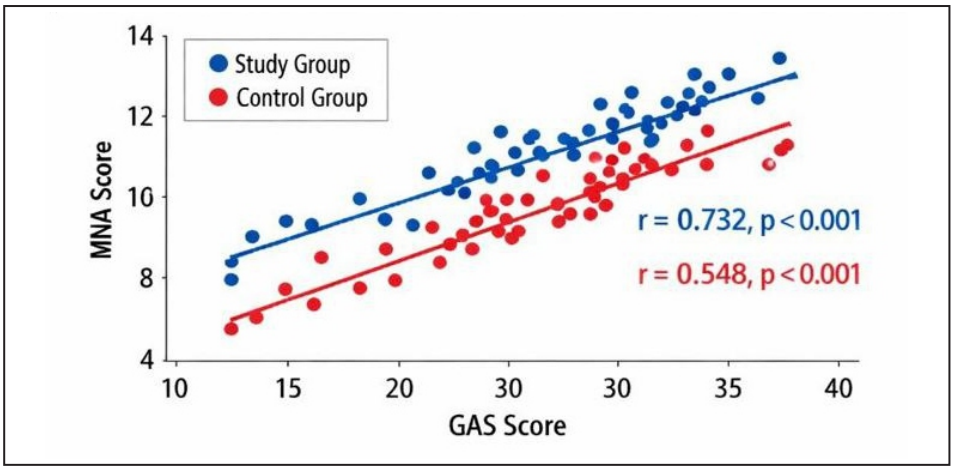

Figure 5: Correlation between GAS and MNA Scores among Elderly Liver-Cirrhosis Patients

Figure 5 shows a significant negative correlation observed between GAS and MNA scores (study: $r = -0.732$, $p < 0.001$; control: $r = -0.548$, $p < 0.001$).

DISCUSSION

Liver cirrhosis is an important cause of morbidity and mortality in people with chronic liver disease worldwide, often leading to severe complications and the need for liver transplantation (Daniel *et al*., 2023). So, the aim of this study was to evaluate the effect of comprehensive nursing intervention on managing pain, anxiety, and malnutrition in elderly patients with liver cirrhosis. Demographic analysis showed that the study group's mean age was 65.56 ± 5.32 years, while the control group's mean age was 68.44 ± 7.09 years. This reflects the chronic and progressive nature of hepatic injury, which often manifests clinically in later adulthood. These findings are consistent with who found a mean age of 66.5 ± 11.8 years among patients with liver cirrhosis, emphasizing the strong link between aging and disease occurrence with Oikonomou *et al*. (2025).

Regarding level of education, it was apparent that LC (liver cirrhosis) was more prevalent among illiterate individuals and those with only basic literacy skills. This may be attributed to past social circumstances when access to education was limited compared to the present. This result is in the same line with who clarified that LC is more common in patients can read and write (Magdy *et al*., 2023).

Post-intervention, the study group demonstrated a significant reduction in VAS pain scores (median = 4.0) compared to the control group, which showed minimal change (median = 8.0; $p < 0.001$). These findings indicate the effectiveness of the intervention in reducing pain among elderly cirrhotic patients. The results are consistent with those reported by Jing *et al*. (2024), who observed improved pain scores following comprehensive nursing care, and Xu and Shi (2024), who reported a significant reduction in pain and anxiety levels among patients receiving nursing care interventions.

Anxiety is common among elderly cirrhotic patients. The study group showed a significant reduction in GAS scores (13.5 → 2.0; $p < 0.001$), while the control group showed no change ($p = 0.253$). These results contrast with Soliman *et al*. (2023) who reported significant post-intervention anxiety improvements in their study cohort ($p = 0.000$). underscore the need to tailor nursing interventions to the psychosocial and cultural context of elderly patients.

Nutritional status, as measured by the Mini Nutritional Assessment (MNA), improved significantly in both groups, with a greater increase observed in the intervention group (15.15% to 22.2%), highlighting the positive impact of comprehensive nursing care. These findings are consistent with Volkert *et al*. (2019), who emphasized the effectiveness of holistic nutritional interventions among older adults with chronic illnesses.

Posttest VAS scores indicated that participants aged ≥70 years in the control group reported significantly higher pain levels compared to those in the intervention group ($p = 0.042$), which aligns with the findings of Du *et al*. (2022) regarding age-related vulnerability to pain. Furthermore, family visits and social support were significantly associated with lower pain scores ($p = 0.001–0.050$), supporting the findings of Moisoglou *et al*. (2024), who highlighted the role of social support in enhancing pain tolerance and resilience. Collectively, these findings underscore the importance of incorporating psychosocial support into comprehensive nursing care.

Posttest Geriatric Anxiety Scale (GAS) scores were lower among patients who received social visits and support, consistent with Novotney (2019), who highlighted the mental health benefits of strong social ties among older adults. These findings emphasize that emotional connectedness and social relationships serve as key protective factors against anxiety in the management of chronic illness.

Nutritional assessment scores were significantly higher among patients receiving visits from family or friends ($p = 0.011$ in the study group). This finding aligns with Tsang *et al*. (2025), who reported that social interactions enhance dietary intake and overall nutritional well-being in the elderly. These results suggest that social connectedness promotes healthier eating habits, improved appetite, and better nutritional status among older adults.

Correlation analysis revealed a significant positive relationship between pain (VAS) and anxiety (GAS). A strong correlation observed in the study group ($r = 0.648$, $p < 0.001$). Higher pain levels were associated with increased anxiety. These findings are consistent with Moisoglou *et al*. (2024), underscoring the importance of integrated nursing interventions that address both pain and anxiety to improve overall patient well-being. Additionally, results demonstrated a significant negative correlation between pain (VAS) and nutritional status, with a strong inverse relationship in the study group ($r = –0.719$, $p < 0.001$). Increased pain was associated with poorer nutritional status, likely due to appetite loss and reduced food intake. This finding is consistent with Soliman *et al*. (2023).

Furthermore, a significant negative correlation was observed between anxiety and nutritional status, with a strong relationship identified in the study group ($r = –0.730$, $p < 0.001$). Higher anxiety levels were associated with poorer nutrition, potentially due to appetite suppression, metabolic changes, and reduced dietary compliance. This result aligns with Ruben *et al*. (2022), who reported that anxiety negatively affects eating behaviors and nutrient intake in older adults.

The findings of the present study provide strong support for the proposed research hypotheses. The null hypothesis (H_0) was rejected, while the alternative hypotheses (H_1, H_2, and H_3) were accepted. Specifically, elderly patients with liver cirrhosis who received comprehensive nursing intervention demonstrated significantly lower pain levels, reduced anxiety scores, and improved nutritional status compared with those receiving routine nursing care. These results confirm that structured, holistic nursing care has a measurable and positive impact on managing key physical and psychological complications associated with liver cirrhosis in the elderly.

The significant reduction in pain scores observed in the intervention group supports H_1 and highlights the effectiveness of systematic pain assessment, patient education, and non-pharmacological pain management strategies implemented by nurses. This finding is consistent with evidence emphasizing the critical role of nursing-led pain management in cirrhotic patients, where altered drug metabolism often limits pharmacological options (Holman *et al*., 2022).

The marked decrease in anxiety levels among patients who received comprehensive nursing care supports H_2 and underscores the importance of psychosocial support, therapeutic communication, relaxation techniques, and family involvement. These results align with previous studies, demonstrating that nursing interventions and social support significantly alleviate anxiety in elderly patients with chronic liver disease (Novotney, 2019). Improvement in nutritional status among the intervention group supports H_3 and reflects the effectiveness of ongoing nutritional assessment, individualized dietary counseling, and nurse-led education. Given the high prevalence of malnutrition in liver cirrhosis, this finding reinforces the nurse's pivotal role in

early detection and prevention of nutritional deterioration, as recommended by ESPEN and EASL guidelines (Merli *et al*., 2019; Volkert *et al*., 2019).

From a practical perspective, these findings emphasize the necessity of integrating comprehensive nursing interventions into routine liver care for elderly patients. Nurses should adopt standardized assessment tools for pain, anxiety, and nutrition, ensure continuous patient and family education, and promote social support as part of holistic care plans. Implementing such evidence-based nursing practices may reduce complications, enhance quality of life, and improve overall clinical outcomes for elderly patients with liver cirrhosis.

The results emphasize how important nurses are in helping older patients with liver cirrhosis manage their complicated demands. In order to provide daily care, nurses must use a thorough, patient-centered approach that incorporates ongoing assessments of pain, anxiety, and nutritional status. Early detection of psychological and physical issues enables prompt therapies that can improve quality of life and stop decline. Improving adherence to treatment programs, lowering hospitalization rates, and promoting emotional well-being all depend on improved nurse-patient communication. The findings also highlight the necessity of continuing training programs in hepatology and gerontology to improve nurses' abilities to manage chronic liver disease. For this vulnerable group, putting organized, evidence-based nursing interventions into practice can greatly enhance clinical outcomes and support comprehensive care.

The study highlights practical implications for nurses caring for elderly patients with liver cirrhosis. Structured pain management is essential due to under-recognized pain and altered drug metabolism (Holman *et al*., 2022). Nurses should use validated pain scales and collaborate with physicians for safe analgesia. Anxiety reduction is also crucial, as psychological distress impacts outcomes and self-care strategies include family involvement, and non-pharmacological relaxation. Additionally, nutritional support is vital to prevent malnutrition and sarcopenia, with nurses assessing intake, educating on diet, and coordinating with dietitians (Merli, 2019).

Based on the study findings, the null hypothesis (H_0), which stated that comprehensive nursing intervention would have no significant effect on pain, anxiety, or nutritional status among elderly patients with liver cirrhosis, was rejected. The alternative hypotheses (H_1, H_2, and H_3) were supported, as the comprehensive nursing intervention significantly reduced pain and anxiety levels and improved nutritional status compared to routine nursing care.

Limitation

The current study had some limitations as the small sample size could prevent the researcher generalizing the study finding. In addition, no long-term follow up and also the age group of patients limits the study.

CONCLUSION

The present study demonstrated that comprehensive nursing interventions play a vital role in improving clinical and psychosocial outcomes among elderly patients with liver cirrhosis. The findings revealed a significant reduction in pain and anxiety levels, alongside a marked improvement in nutritional status following the implementation of structured nursing care. These outcomes highlight the effectiveness of holistic, patient-centered nursing approaches that address not only physical symptoms but also psychological well-being and functional needs of elderly individuals living with chronic liver disease. Future research is warranted to evaluate the cost-effectiveness and scalability of comprehensive nursing intervention programs across different healthcare settings. Further studies should also explore the long-term impact of such interventions on hospital readmission rates, disease progression, functional independence, and health-related quality of life.

Conflict of Interest

The authors declare that they have no competing interests.

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