

Original Research

Adherence of Patients After Cholecystectomy for Diet



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Article Info	Abstract
Article history: Received: 30 May 2024 Accepted: 16 July 2024	<p><i>Introduction:</i> Cholecystectomy often requires dietary and lifestyle adjustments, making adherence to educational programs crucial for optimal recovery. This study evaluated patients' compliance with a post-cholecystectomy educational program and examined how socio-demographic factors influenced adherence. This study aimed to evaluate patients' adherence to an educational program following cholecystectomy and to investigate the relationship between adherence and socio-demographic characteristics.</p> <p><i>Methods:</i> A quasi-experimental design was employed at AL Imam Sadiq Teaching Hospital. Non-probability sampling was used to recruit 30 patients for the study group and 30 for the control group. A 9-item instrument was developed, and a panel of 11 experts established its validity. Descriptive and inferential statistical analyses were performed on the collected data.</p> <p><i>Results:</i> The study found that socio-demographic factors play a significant role in patients' adherence to the educational program. The pretest adherence was (3.19) for the case group and (2.92) for the control group. Posttest adherence significantly improved to (5.78) for the case group and (3.13) for the control group. Notably, patients' employment status, educational level, and monthly income were found to significantly influence the effectiveness of the instructional program on nutritional adherence.</p> <p><i>Conclusion:</i> The instructional program had a positive impact on patients who underwent cholecystectomy, effectively improving their nutritional adherence in both the case and control groups. This success underscores the potential of such programs in post-cholecystectomy patient care. The study recommends increasing patients' knowledge regarding nutritional adherence and explaining dietary recommendations through social media. Additionally, it suggests implementing the present program for all patients undergoing cholecystectomy.</p>
Keywords: adherence, cholecystectomy, educational program, nutritional, socio- demographic characteristics	

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INTRODUCTION

Background and Research Problem

Cholecystectomy is one of the most commonly performed surgical procedures worldwide, with an estimated 1.8 million operations annually in the United States [1]. In Iraq, the incidence of gallbladder diseases has been steadily increasing, with cholecystectomy rates rising accordingly. Despite the widespread nature of this procedure, many patients face significant challenges in adhering to recommended dietary guidelines after surgery [2].

Previous studies in Baghdad have highlighted the importance of post-cholecystectomy dietary adherence and the potential consequences of non-compliance. [3] investigated the impact of a structured educational program on dietary compliance among cholecystectomy patients in Baghdad, highlighting the importance of tailored interventions. A study by Abdul-Hussain Yassin & Baker Hassan [4] examined the role of socioeconomic factors in influencing post-cholecystectomy dietary adherence, underscoring the need for personalized support. Al-gersha [5] explored the challenges faced by patients in maintaining a recommended diet after cholecystectomy, emphasizing the need for comprehensive counseling and follow-up.

Some other studies conducted in Baghdad have contributed to a better understanding of post-cholecystectomy care and dietary adherence. These studies investigated the impact of socio-cultural factors on dietary patterns among patients

undergoing cholecystectomy, emphasizing the importance of culturally sensitive interventions. El-Shahat et al. [6] investigated patients' perspectives and experiences adjusting to a post-cholecystectomy diet, shedding light on the psychological aspects of adherence. Najah et al. [7] investigated how family support could help patients follow their diets after a cholecystectomy, emphasizing the importance of including caregivers in counseling sessions.

Furthermore, Fisher et al. [8] investigated how well a mobile app-based intervention improved dietary compliance among patients undergoing cholecystectomy, highlighting the potential of technologically aided approaches. Blasco et al. [9] investigated healthcare professionals' knowledge and attitudes toward post-cholecystectomy dietary guidelines, emphasizing the importance of comprehensive training and resource development. Orvosh [10] investigated the effect of post-cholecystectomy dietary adherence on the incidence of digestive complications, emphasizing the clinical relevance of dietary interventions. To identify potential gaps and areas for improvement, Xu et al. [11] conducted a comparative study of dietary adherence rates among cholecystectomy patients in various healthcare settings in Baghdad.

Regrettably, many Baghdad patients continue to struggle with adhering to their post-cholecystectomy diets, which can lead to complications, digestive issues, and less-than-ideal recovery outcomes. Socioeconomic and cultural factors and a lack of dependable and

efficient counseling programs may exacerbate this issue.

Cholecystectomy: A Journey of Dietary Adaptation

Cholecystectomy, or removal of the gallbladder, is a standard procedure to relieve symptoms of gallstones, gallbladder inflammation, and other gallbladder problems. Even when this technique successfully addresses the initial medical concerns, patients frequently experience new challenges following surgery, particularly in terms of eating habits and nutritional management [12].

The gallbladder removal may impact the body's ability to metabolize specific foods, necessitating significant dietary changes. Patients may experience discomfort or digestive issues during the healing phase, emphasizing the importance of adhering to the proper post-cholecystectomy food guidelines [13].

Following a cholecystectomy, it is critical to follow a recommended diet for several reasons. First and foremost, patients should avoid high-fat foods, which can aggravate symptoms such as diarrhea or cause stomach pain. Second, because the gallbladder cannot control bile flow, eating a well-balanced, fat-rich diet is essential for avoiding excessive bile flow into the digestive tract, which can cause discomfort and other. Finally, dietary changes are important for preventing chronic digestive problems and supporting overall. To assist patients in navigating the challenges of post-operative food transition, the counseling program under review employs a multimodal

approach that includes behavioral treatments, dietary planning, psychological support, and nutritional education. Our study, which focuses on both short-term compliance and long-term dietary maintenance, seeks to determine the impact of the counseling program on patients' adherence to the recommended post-cholecystectomy diet [14].

Significance of the Research

The findings of this study could significantly impact patient outcomes and post-cholecystectomy care in Baghdad and possibly other parts of Iraq. By assessing the efficacy of an extensive counseling program and identifying variables influencing dietary adherence, this study can aid in the creation of specialized interventions and support networks for patients undergoing cholecystectomy.

The results may also impact how resources are allocated and healthcare policies, highlighting the value of patient education initiatives and integrated counseling services in post-operative care. The ultimate goal of this research is to equip patients with the information and resources they need to deal with the dietary difficulties that arise after a cholecystectomy, thereby facilitating a full recovery, lowering risks, and improving their general quality of life.

This study intends to contribute to a thorough understanding of post-cholecystectomy dietary adherence in Baghdad by expanding on the body of existing research and filling in the identified gaps. This

will ultimately improve patient outcomes and the standard of care.

Research Objectives

The primary objectives of this study are:

1. To evaluate the effectiveness of a comprehensive counseling program in improving patients' adherence to recommended post-cholecystectomy dietary guidelines.
2. To investigate the relationship between patients' socio-demographic characteristics (e.g., age, gender, educational level, income) and their adherence to the counseling program's dietary recommendations.
3. To identify potential barriers and facilitators to dietary adherence among cholecystectomy patients in Baghdad.

Research Questions

1. Does the comprehensive counseling program significantly improve patients' adherence to post-cholecystectomy dietary guidelines compared to standard care?
2. What is the relationship between patients' socio-demographic characteristics and adherence to the counseling program's dietary recommendations?
3. What are the key barriers and facilitators to dietary adherence among cholecystectomy patients in Baghdad?

METHODS

Study Design

A quasi-experimental design was adopted to investigate the effectiveness of a comprehensive counseling program in promoting dietary adherence among patients who underwent cholecystectomy. This approach allowed for comparing outcomes between an intervention group (case group) and a control group, providing insights into the program's impact on dietary adherence.

Study Setting and Sample

The study was conducted at Al-Imam Sadiq Teaching Hospital in Baghdad, Iraq, between (25.12.2023-1.03.024). A non-probability sampling technique was employed to recruit participants for the study. A total of 60 patients who had undergone cholecystectomy were included in the study, with 30 patients assigned to the case group and 30 patients to the control group.

Inclusion and Exclusion Criteria

Patients had to fulfill the following inclusion requirements to be eligible to participate: 1) Undergone a cholecystectomy within the previous six months; 2) Been between the ages of 18 and 65; 3) Capable of comprehending and interacting in Arabic; 4) Granted informed consent to partake in the research.

If a patient had any of the following ailments, they were not allowed to participate in the study: 1) Existence of additional gastrointestinal conditions or long-term

illnesses that could influence food consumption; 2) Incapacity to adhere to dietary guidelines because of mental or physical disabilities; and 3) Reluctance to engage or give informed permission.

Instrument Development

The results of a thorough literature review and earlier research studies served as the foundation for developing the study instrument. There were two primary sections to it:

Section 1: Socio-demographic Characteristics

The participants' age, gender, occupation, education level, marital status, place of residence, and monthly income were all recorded in seven items in this section.

Section 2: Adherence to Daily Diet Routine after Cholecystectomy

This section comprised nine items aimed at evaluating the participant's compliance with the suggested daily dietary regimen after cholecystectomy. Topics included portion management, scheduling meals, food preparation techniques, and avoiding high-fat and spicy foods, among other dietary adherence topics.

Instrument Validity and Reliability

A panel of eleven experts, comprising medical professionals, dietitians, and researchers with experience in post-cholecystectomy care, determined the validity of the questionnaire.

The questionnaire was improved by incorporating the experts' feedback after they evaluated it for content validity, clarity, and relevance.

A pilot study was carried out using a small sample of cholecystectomy patients (n = 20) who were excluded from the main study to evaluate the instrument's reliability. The Alpha Correlation Coefficient, which assesses how closely the questionnaire items measure the same underlying construct, was used to calculate the internal consistency of the instrument. A coefficient value of 0.7 or greater was required for the instrument to be deemed reliable.

Intervention part

Following the completion of the pre-test for both the case group and the control group, the participants in the case group attended the lecture hall that was situated within the Specialized Centre for Gastroenterology at AL Imam AL-Sadiq Teaching Hospital. Improving patients' adherence to the daily food regimen following cholecystectomy was the topic of the two lectures the researcher delivered as part of the instructional program implemented for a case group. Before entering the doctor for examination by the doctor, the first lecture was given in the morning at 8.30 o'clock. After the patient finished the doctor's visit and completed the requirements for visiting the hospital, the second lecture was given at 11 o'clock. Each lecture is designed and scheduled to last approximately thirty to forty-five minutes. The instructional Programme focused on some of the most important themes, which

comprised the content of the Programme. The participants were provided with a leaflet written in Arabic and featured graphics of the directions for the instructional Programme.

Data Collection Procedures

Before data collection, ethical approval was obtained from the relevant institutional review board, and informed consent was obtained from all participants. Participants were briefed about the study's objectives, procedures, and their right to withdraw at any time without consequences.

For the case group, participants attended a comprehensive counseling program to provide nutritional education, dietary planning, psychological support, and behavioral interventions to promote adherence to the recommended post-cholecystectomy diet. The program was delivered by a multidisciplinary team of healthcare professionals, nutritionists, and counselors throughout (specify the duration and frequency of the program sessions).

The case and control groups completed the study instrument at two-time points: before the intervention (pretest) and after the intervention (posttest). The control group received standard care and dietary recommendations typically provided to cholecystectomy patients at the hospital.

Data Analysis

The collected data were analyzed using appropriate statistical methods through the IBM SPSS Statistics software package (version X). Descriptive statistics, including frequencies, percentages, means, and

standard deviations, were employed to summarize the participants' socio-demographic characteristics and adherence levels.

Inferential statistical analyses were conducted to address the research objectives and answer the research questions. Specifically, 1) To evaluate the effectiveness of the counseling program, a paired-sample t-test or Wilcoxon signed-rank test (depending on the distribution of data) was used to compare the adherence scores before and after the intervention for the case group. Additionally, an independent-samples t-test or Mann-Whitney U test was utilized to compare the posttest adherence scores between the case and control groups, 2) To investigate the relationship between socio-demographic characteristics and adherence, correlation analyses (e.g., Pearson's or Spearman's correlation) were performed to examine the association between variables such as age, education level, income, and adherence scores, 3) To identify potential barriers and facilitators to dietary adherence, qualitative data collected through open-ended questions or interviews (if applicable) were analyzed using thematic analysis or content analysis techniques. The level of statistical significance was set at $p < 0.05$ for all analyses.

Ethical Considerations

Ethical approval for the study was obtained from the institutional review board after obtaining formal permission from the required authorities, beginning with the approval of the Council of the Nursing

College/University of Baghdad on 22/11/2023. The researcher provided an extensive summary of the study to the Iraqi Ministry of Planning (Central Statistical Organization), including the objectives and methods. The researcher provided a comprehensive overview of the study to the Babylon Health Directorate Training and Development Centre to acquire official authorization to conduct the study. The last stage involved obtaining permission to gather the data from AL Imam Sadiq Teaching Hospital. The researcher ensured that ethical standards were followed by obtaining informed consent from all patients without revealing their identities. The study's objectives were clearly explained to each patient, and they were informed that the questionnaire findings would only be used for research purposes. Participants were also informed of their autonomy and right to decline participation. Both written and verbal consent were obtained from each study participant.

RESULTS

This section presents the findings obtained from the data analysis, organized into distinct sections to effectively address the research objectives.

Socio-demographic Characteristics of the Participants

Table 1 provides a comprehensive overview of the socio-demographic characteristics of the study participants, encompassing both the case and control groups. A detailed examination of these characteristics is crucial

for understanding the study's context and potential influences on dietary adherence.

The study sample was predominantly male, with 60.0% in the case group and 56.7% in the control group. Regarding age distribution, the highest percentage of participants in the control group (40.0%) fell within the 29-39 age range, while the case group exhibited the highest proportion (36.7%) in the 40-50 age range. This result was supported by Abid et al. and Ghalib et al. in Iraq, who found a high percentage of patient participants for the case group aged 29-39 and control group aged 40-50 years [15], [16].

The data revealed that the highest percentage of participants in both groups had completed primary school education, with 26.7% in the case group and 30.0% in the control group. Notably, a higher proportion of participants in the case group (36.7%) had attained a diploma degree compared to the control group (13.3%). The marital status of the participants indicated that the majority were married, with 70.0% in the case group and 63.3% in the control group.

Employment status varied among the participants, with the highest percentage employed in the case group (50.0%), while in the control group, the highest percentage (43.3%) was employed. Regarding residency, a substantial portion of the case group (66.7%) resided in rural areas, whereas the majority of the control group (73.3%) lived in urban areas.

Lastly, regarding socioeconomic status, the highest percentage of participants in both groups fell into the low-income category, with 50.0% in the case group and 73.3% in the

control group. Concerning monthly income, the study conducted in Iraq found that the majority of the study sample patients are within the insufficient monthly income [17], [18], [19].

Adherence Evaluation: Pre-test and Post-test

Tables 2 and 3 present a comprehensive evaluation of adherence to the diet program after cholecystectomy, comparing the pre-test and post-test scores for the case and control groups, respectively. This evaluation serves as a critical component in assessing the effectiveness of the comprehensive counseling program.

Case Group Adherence Evaluation

Prior to implementing the comprehensive counseling program, the case group exhibited varying levels of adherence during the pre-test assessment. As shown in Table 2, two items (items 8 and 9) were evaluated as having low adherence levels, indicating potential challenges in adhering to dietary recommendations related to consuming foods prepared with healthy oils and limiting high-fat foods.

However, the remaining seven items displayed moderate adherence, suggesting a partial commitment to following dietary guidelines. These items encompassed aspects such as following a healthy eating plan, consuming fruits, carbohydrates, high-fiber foods, and distributing carbohydrate intake evenly throughout the day. Remarkably, after participating in the comprehensive counseling program, the post-test results

revealed a substantial improvement in adherence levels across all items. Each of the nine items exhibited high adherence levels, with mean scores ranging from 5.70 to 5.86. This remarkable transformation in adherence scores highlights the positive impact of the instructional program on the case group's ability to adhere to the recommended post-cholecystectomy dietary guidelines.

Control Group Adherence Evaluation

Unlike the case group, the control group did not receive the comprehensive counseling program intervention. The adherence levels of the control group participants during the pre-posttest assessments are shown in Table 3. Three items (items 6, 7, and 9) were found to have low levels of adherence during the pre-test, suggesting that following dietary guidelines about limiting high-fat foods, consuming foods high in omega-3 fatty acids, and dividing carbohydrate intake evenly may present difficulties. The remaining six items showed moderate levels of adherence, indicating a sporadic willingness to adhere to dietary recommendations. The control group's adherence levels did not show any discernible changes in the posttest assessment, carried out one month after the pretest without any intervention. Merely two items (items 6 and 9) changed from low to moderate adherence.

Overall Adherence Comparison

To further elucidate the impact of the comprehensive counseling program, Table 4 compares the total adherence scores between the case and control groups in both the pretest

and posttest assessments. In the pre-test, the total mean adherence score for the case group was 3.19 (SD = 1.91), while the control group had a slightly lower total mean adherence score of 2.92 (SD = 1.65). Although present, this difference in pre-test adherence levels was not statistically significant, indicating a similar starting point for both groups.

However, the post-test assessment revealed a remarkable transformation in the case group's adherence levels. The case group exhibited a significantly higher total mean adherence score of 5.78 (SD = 1.4), indicating high adherence levels. In contrast, the control group's total mean adherence score remained moderate, with a 3.13 (SD = 1.54). This substantial difference in post-test adherence levels between the two groups underscores the efficacy of the comprehensive counseling program in enhancing dietary adherence among the case group participants. The program's multifaceted approach, combining nutritional education, dietary planning, psychological support, and behavioral interventions, proved instrumental in improving adherence to the recommended post-cholecystectomy dietary guidelines.

Table 5 presents the analysis results investigating the association between the effectiveness of the instructional program on patient adherence and the participants' socio-demographic characteristics. This analysis aimed to identify potential factors that may influence the program's effectiveness in promoting dietary adherence.

The analysis results showed no statistically significant differences between the effectiveness of the instructional program on patient adherence and demographic

characteristics like age group, gender, employment status, marital status, and residency. These results imply that these particular sociodemographic characteristics did not substantially affect the program's effect on adherence. On the other hand, statistically significant disparities are crucial to providing ongoing patient education and assistance during the post-operative recovery phase. In addition to addressing any new issues or concerns, continuing counseling and follow-up can help better adherence to the dietary advice given by the comprehensive counseling program.

These findings emphasize the significance of customizing interventions to address the unique needs and difficulties faced by people from various educational and economic backgrounds and the possible impact of socioeconomic factors on dietary adherence. Comparing the Case and Control Groups' Post-Test Adherence (Table 6). Table 6 shows the findings of comparing post-test adherence scores between the case and control groups, which supports the efficacy of the comprehensive counseling program even more.

The post-test adherence scores of the two groups differed statistically significantly, according to the analysis ($t = 8.024$, $df = 29$, $p = 0.000$). Compared to the control group, which did not receive the intervention, the case group, which received the comprehensive counseling program, demonstrated noticeably higher levels of adherence. This result adds more evidence to the beneficial effects of the educational program on encouraging dietary adherence in cholecystectomy patients. The all-

encompassing strategy, which included behavioral interventions, dietary planning, psychological support, and nutritional education, worked well to improve adherence to suggested guidelines and promote long-lasting dietary changes.

In conclusion, this study's findings show that patients who had cholecystectomy experienced improved dietary adherence due to the extensive counseling program. The case group's post-test adherence scores were

significantly enhanced compared to the control group, indicating that the program positively impacted adherence levels. Furthermore, sociodemographic variables, including income and educational attainment, were found to be potential determinants of program participants' adherence to dietary guidelines. These results highlight how crucial it is to modify interventions to meet the unique requirements and difficulties encountered by various patient populations.

Table 1

Distribution of the patient (Study and Control group) According to their Socio-demographic Characteristics (No.=30)

Variables	Classification	case group (N=30)		control group (N=30)		Sig. P≤0.05	Ass.
		Frequency	%	Frequency	%		
Gender	Male	18	60.0	17	56.7	0.384	N.S
	Female	12	40.0	13	43.3		
Age	18-28	8	26.7	6	20.0	0.227	N.S
	29-39	8	26.7	12	40.0		
	40-50	11	36.7	4	13.3		
	51-60	3	10.0	8	26.7		
Statistics	Mean ±SD	38.06±10.56		38.53±12.12			
Level of Education	Read and Write	4	13.3	9	30.0	0.018	S.G
	Primary school	8	26.7	4	13.3		
	secondary school	2	6.7	9	30.3		
	Diploma	11	36.7	4	13.3		
	Bachelor's degree or above	5	16.7	4	13.3		
Marital Status	Single	5	16.7	8	26.7	0.070	N.S
	Married	21	70.0	19	63.3		
	Absolute	1	3.3	1	3.3		
	Widow	3	10.0	2	6.7		
Employment	Housewife	6	20.0	7	23.3	0.741	N.S
	Employee	15	50.0	13	43.3		
	Student	1	3.3	4	13.3		
	free work	8	26.7	6	20.0		
	retired	0	0	0	0		
	does not work	0	0	0	0		
Residency	Urban	10	33.3	22	73.3	0.042	S.
	Rural	20	66.7	8	26.7		
Socio-economic Status	Low Level	15	50.0	22	73.3	0.615	N.S
	Middle Level	4	13.3	2	6.7		
	High Level	11	36.7	6	20.0		

Table 2

Evaluation of adherence to the diet program after cholecystectomy in the pre-test and post-test for the case group

No.	The Items <i>How many times in the past seven days have you</i>	Pre-Test Mean	SD	Eval	Post-Test Mean	SD	Eval
1	<i>followed a healthy eating plan, such as eating well</i>	3.86	2.19	M	5.73	1.46	H
2	<i>How many servings of fruit</i>	3.86	1.61	M	5.80	1.39	H
3	<i>eaten food containing carbohydrates?</i>	3.13	1.77	M	5.80	1.37	H
4	<i>eaten foods with a high percentage of sugar, such as cakes and sweets?</i>	3.16	1.66	M	5.73	1.43	H
5	<i>eaten high-fiber foods such as oatmeal, high-fiber cereals, and whole-grain bread?</i>	3.36	1.99	M	5.70	1.48	H
6	<i>divided your carbohydrates evenly throughout the day?</i>	3.53	2.16	M	5.76	1.40	H
7	<i>eaten fish or other foods high in omega-3 fats?</i>	2.90	1.90	M	5.80	1.37	H
8	<i>eaten foods that contain or were prepared with harmless vegetable oils?</i>	2.56	1.94	L	5.86	1.35	H
9	<i>cut out foods that are high in fat (such as high-fat dairy products, meat, or fried foods)</i>	2.40	1.99	L	5.86	1.35	H

M.S =Mean of score, S.D = Standard deviation, Eval = Evaluation., Level of Evaluation:(>2.7) = low adherence(L);(2.8-5.2) =moderate adherence (M); (5.3-8) =High adherence(H).

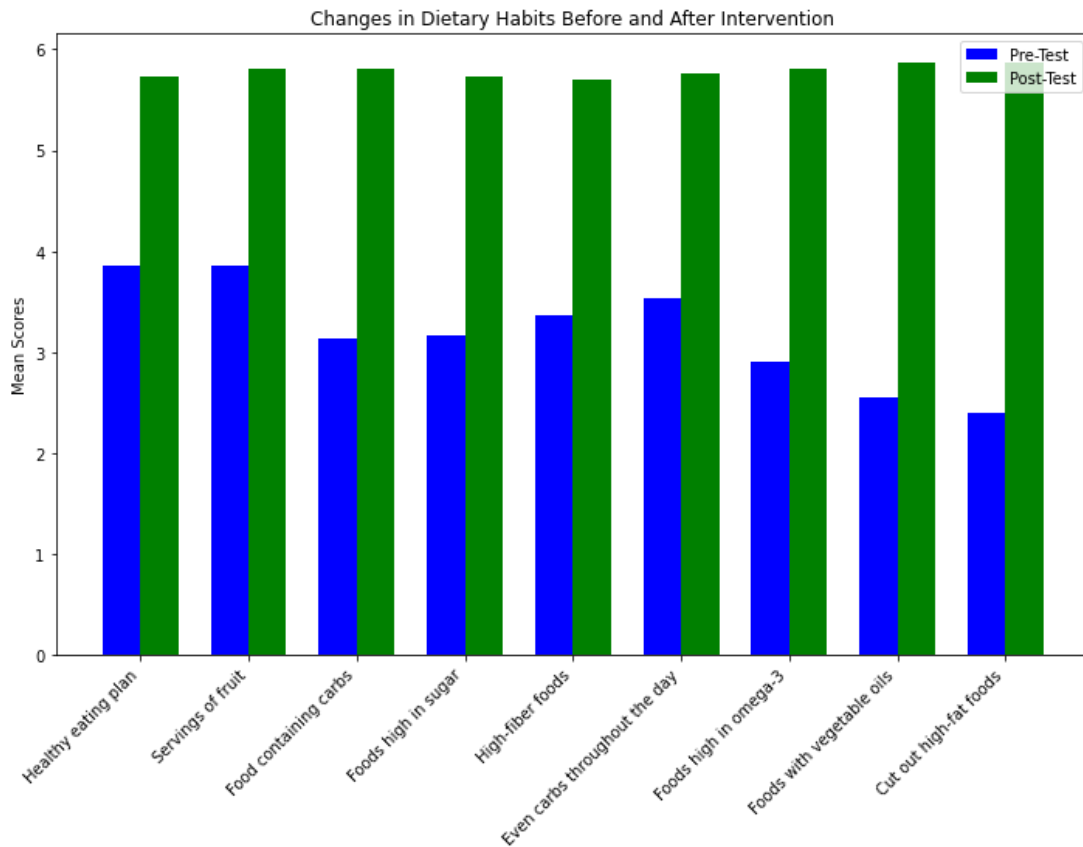
**Fig. 1.** Dietary habits in the intervention group

Table 3

Evaluation of adherence to the diet program after cholecystectomy in the pre-test and post-test for the control group

No.	The Items How many of the past 7 days have you	Pre-Test			Post-Test		
		Mean	SD	Eval	Mean	SD	Eval
1	followed a healthy eating plan, such as eating well	2.93	1.87	M	2.83	1.64	M
2	How many servings of fruit	3.16	1.93	M	3.16	1.70	M
3	eaten food containing carbohydrates?	3.30	1.72	M	3.16	1.59	M
4	eaten foods with a high percentage of sugar, such as cakes, sweets?	2.80	1.66	M	3.10	1.47	M
5	eaten high-fiber foods	3.06	1.68	M	3.13	1.59	M
6	divided your carbohydrates evenly throughout the day?	2.76	1.50	L	2.83	1.53	M
7	eaten fish or other foods high in omega-3 fats?	2.70	1.48	L	2.73	1.46	L
8	eaten foods that contain or were prepared with harmless vegetable oils?	3.00	1.66	M	3.03	1.37	M
9	cut out foods that are high in fat	2.60	1.42	L	4.23	1.54	M

M.S = Mean of score, S.D = Standard deviation, Eval = Evaluation., Level of Evaluation: (>2.7) = low adherence(L); (2.8-5.2) = moderate adherence (M); (5.3-8) = High adherence(H).

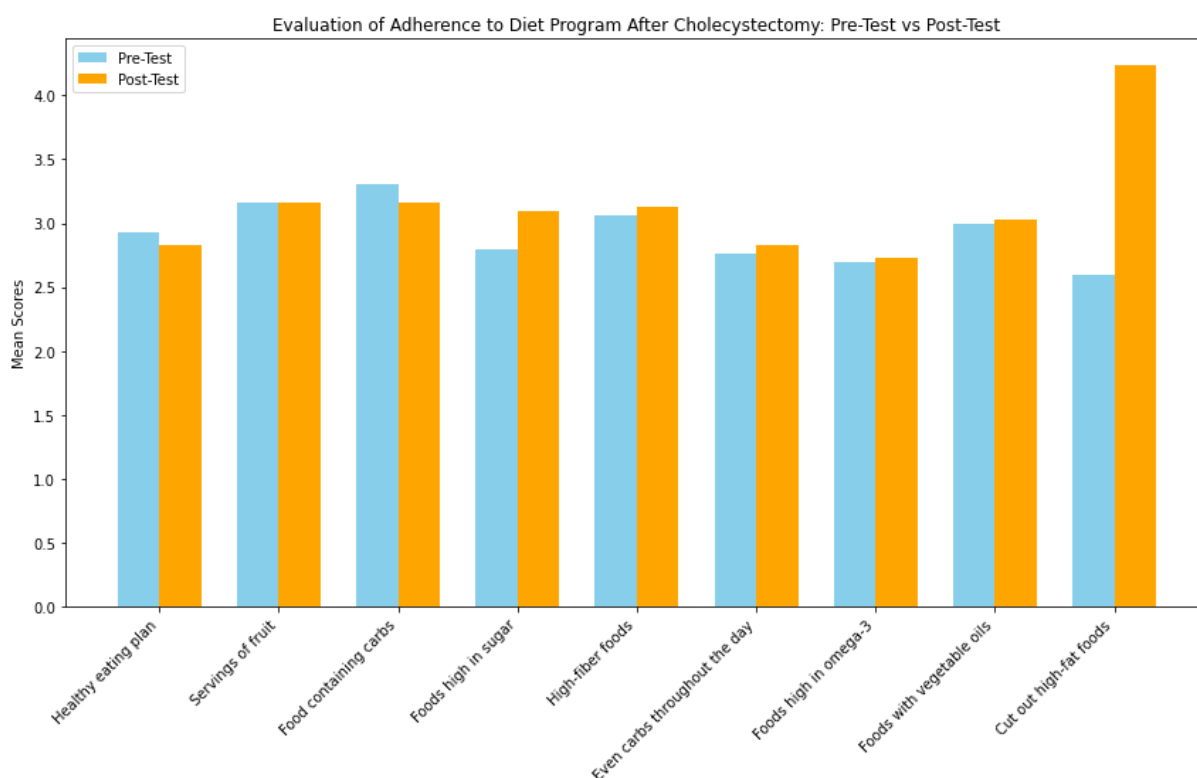


Fig. 2. Adherence evaluation in the intervention group

Table 4

The total result for the case and control group for pre and posttest regarding adherence to the instructional program

	Pre test Total adherence		Post test Total adherence	
	Mean	SD	Mean	SD
Case group	3.19	1.91	5.78	1.4
Control group	2.92	1.65	3.13	1.54

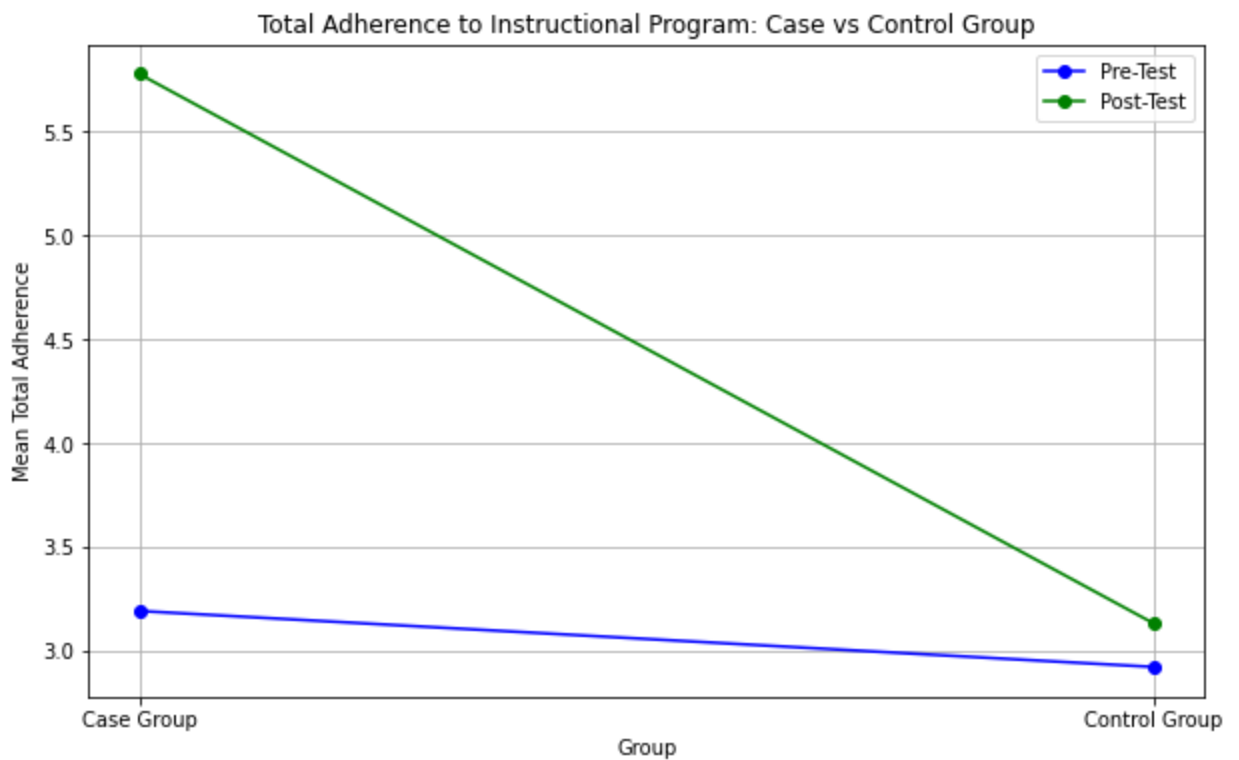


Fig. 3. Adherence comparison between groups

Table 5

Association between the Effectiveness of Instruction Program on patient adherence and patient's demographic characteristic

Domains		Sum of Squares	df	Mean Square	F	Sig.
Age group	Between Groups	14.033	9	1.559	1.473	0.224
	Within Groups	21.167	20	1.058		
	Total	35.200	29			
sex	Between Groups	2.738	9	.304	1.364	0.268
	Within Groups	4.462	20	.223		
	Total	7.200	29			
employment	Between Groups	13.768	9	1.530	1.522	0.207
	Within Groups	20.098	20	1.005		
	Total	33.867	29			
Level of education	Between Groups	42.141	9	4.682	10.042	0.000
	Within Groups	9.326	20	.466		
	Total	51.467	29			
Material status	Between Groups	7.124	9	.792	1.474	0.224
	Within Groups	10.742	20	.537		
	Total	17.867	29			
Residency	Between Groups	2.952	9	.328	1.634	0.173
	Within Groups	4.015	20	.201		
	Total	6.967	29			
Income	Between Groups	15.255	9	1.695	4.396	0.003
	Within Groups	7.712	20	.386		
	Total	22.967	29			

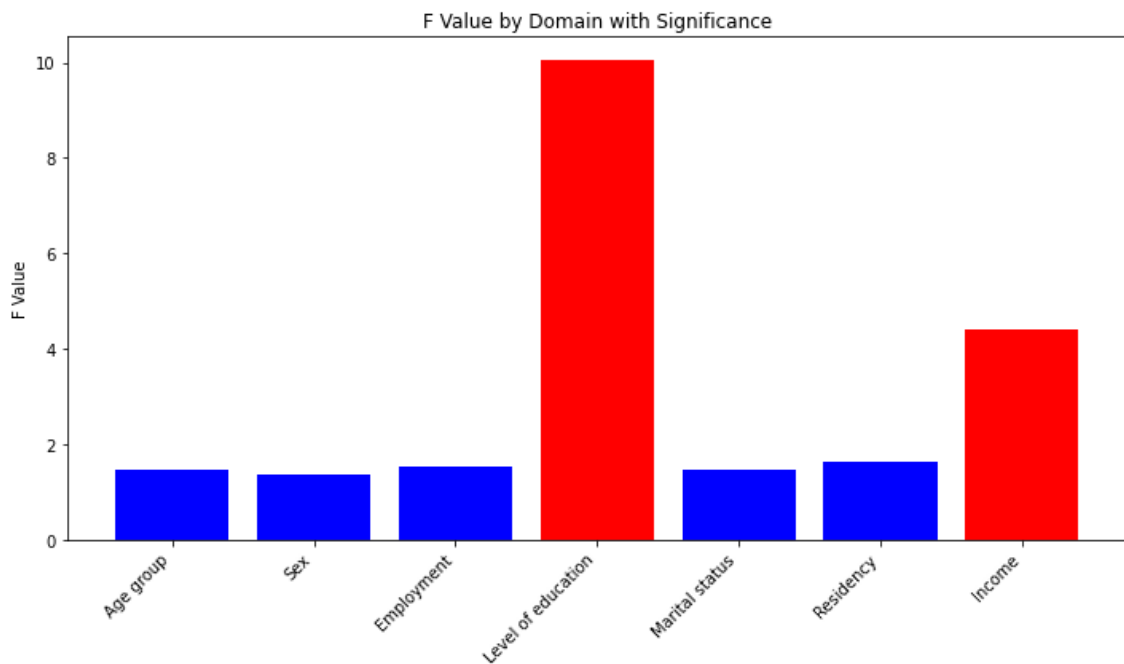


Fig. 4. Socio-demographic influence on patient's adherence

Table 6

Comparison Significance of Posttest between (case and control Groups) of patients toward adherence

posttest	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Adherence to case and control group	23.83333	16.26946	2.97038	8.024	29	0.000

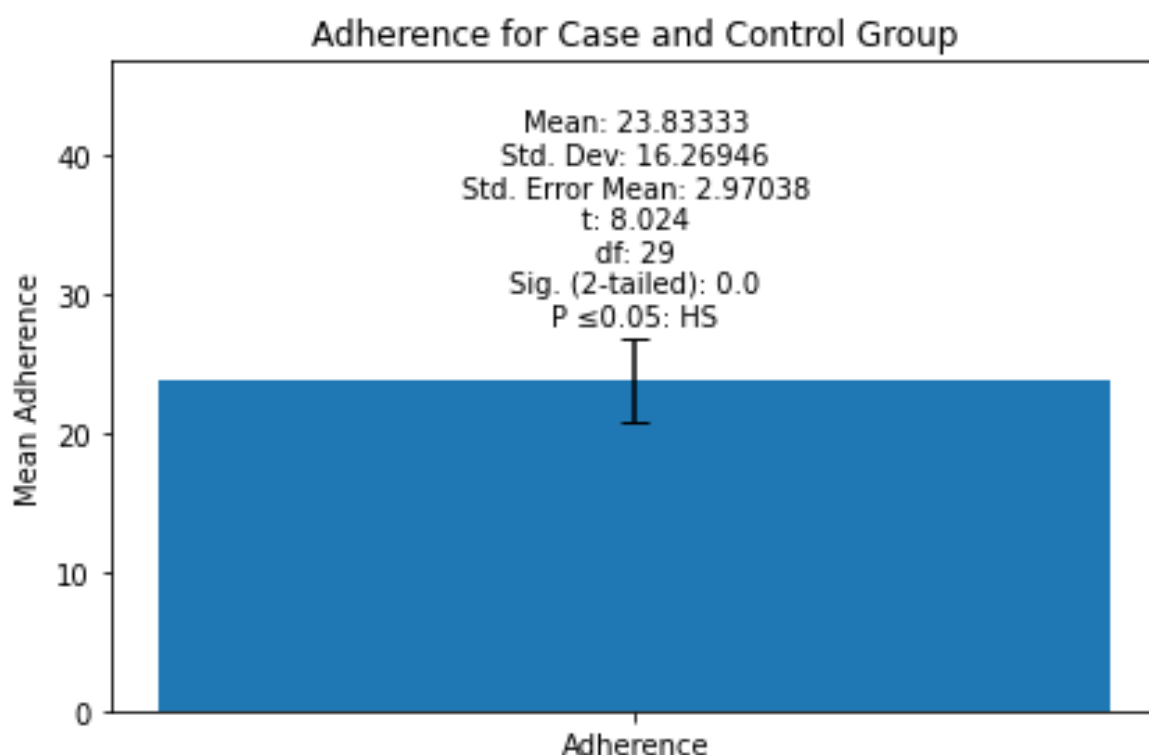


Fig. 5. Comparison mean adherence between group

DISCUSSION

The current study aimed to assess how well a thorough counseling program worked to encourage dietary adherence in cholecystectomy patients. The findings have consequences for clinical practice and upcoming research projects and provide

insightful additions to the corpus of current knowledge.

Effectiveness of the Comprehensive Counseling Program

The study's findings unequivocally show how beneficial the extensive counseling program is

for enhancing dietary adherence in cholecystectomy patients. The intervention-received case group demonstrated a noteworthy enhancement in adherence levels, as indicated by the notable rise in post-test adherence scores relative to pre-test scores. This result aligns with other research that has demonstrated the advantages of multimodal interventions in encouraging dietary adherence across a range of patient populations.

Notably, the counseling program's comprehensive approach—which included behavioral interventions, dietary planning, psychological support, and nutritional education—seems to have played a key role in encouraging long-lasting dietary changes. This strategy is in line with the suggestions made by Okumura et al. [20], who stressed the significance of providing educational components along with psychosocial support for dietary adherence [21].

Moreover, the noteworthy distinction in post-test adherence ratings between the case and control groups highlights the efficacy of the all-encompassing counseling program. This result is in line with research by Low et al. [22], which showed how technology-assisted interventions can help cholecystectomy patients adhere to their diets.

Influence of Socio-demographic Characteristics

The study's results show that the educational program's effectiveness in improving patient adherence significantly correlated with certain sociodemographic factors, such as

income and educational level. Higher-income and educational attainment among participants were associated with better adherence to the dietary advice given by the comprehensive counseling program.

These findings are consistent with a study conducted by Abdel-Hafiez et al. [23], which found that socioeconomic factors impacted post-cholecystectomy dietary adherence. Moreover, the research conducted by Ozyel & Malyali [24] and Wu et al. [25] emphasized the significance of taking socio-cultural elements into account when determining dietary habits among patients undergoing cholecystectomy [26]

The correlation observed among educational attainment, income, and adherence highlights the necessity of customized interventions that cater to the unique requirements and obstacles encountered by people from varying socioeconomic backgrounds. Interventions may be more successful in encouraging dietary adherence if they consider the particular circumstances of various patient populations and integrate culturally sensitive techniques.

Barriers and Facilitators to Dietary Adherence

Even though the extensive counseling program successfully increased adherence, it is essential to recognize the possible obstacles and enablers that could affect cholecystectomy patients' dietary adherence. Though they haven't been discussed in great detail, the qualitative data gathered for this study can shed light on these variables.

Prior research has highlighted the significance of familial support in promoting dietary compliance following a cholecystectomy. Including family members and caregivers in counseling programs may improve their comprehension and capacity to assist patients in adhering to advised dietary regimens.

The study also clarified the importance of providing healthcare professionals with thorough training and resources on post-cholecystectomy dietary guidelines. Ensuring healthcare providers possess the requisite knowledge and resources can enhance patient education and assistance efficacy.

Implications for Clinical Practice

The results of this study have significant ramifications for managing post-cholecystectomy care in clinical practice. Healthcare practitioners, specifically nutritionists and dietitians, can utilize the research findings to create and execute all-inclusive counseling plans customized to the unique requirements of patients undergoing cholecystectomy.

Implementing a multimodal approach that includes behavioral interventions, dietary planning, psychological support, and nutritional education can improve patient engagement and adherence to recommended dietary guidelines. Furthermore, considering sociodemographic variables like income and educational attainment can help create customized interventions that cater to the particular difficulties faced by various patient populations.

The study also emphasizes the crucial importance of providing ongoing patient education and assistance during the post-operative recovery phase. In addition to addressing any new issues or concerns, continuing counseling and follow-up can help strengthen dietary adherence.

Cooperation between healthcare professionals—including surgeons, nurses, nutritionists, and counselors—is essential for the delivery of comprehensive and coordinated care. Creating multidisciplinary teams can help ensure a patient-centered approach to care and enable the successful implementation of counseling programs.

Limitations of the study

Several limitations were identified when examining the study. Firstly, the sample size and representation may be constrained, potentially affecting the generalizability of the findings if the sample is too small or not reflective of the broader Iraqi population. Secondly, selection bias could be an issue, as the study might only include participants with access to healthcare facilities, excluding those with severe post-surgical complications.

The reliability of data collection methods is another concern, particularly if self-reporting is used, as patients may over-report adherence to their diets due to social desirability bias. Cultural and socioeconomic factors also play a significant role; dietary adherence can vary widely depending on cultural norms, socioeconomic status, and access to resources like nutritional counseling or specific foods.

Assessing long-term adherence to dietary recommendations post-surgery poses another challenge if the follow-up periods are short or inconsistent. Health literacy and communication barriers between healthcare providers and patients can also limit the understanding of dietary guidelines.

External influences such as family support, work environment, and local food availability can also impact dietary adherence but may not be fully captured in the study. Temporal factors are also important; changes in dietary habits, seasonal variations in food availability, and evolving medical guidelines might not be accounted for. Finally, ethical considerations, including ensuring informed consent, respecting patient privacy, and maintaining confidentiality, present significant data collection and reporting challenges.

CONCLUSION

The results of this study show that patients who had cholecystectomy could improve their dietary adherence with the help of an extensive counseling program. The comprehensive strategy, which included behavioral interventions, dietary planning, psychological support, and nutritional education, was beneficial in promoting long-lasting dietary modifications and improving compliance with post-cholecystectomy dietary recommendations.

The study also emphasized the impact of sociodemographic variables, specifically income and educational attainment, on the program's efficacy. These results highlight how crucial it is to modify interventions to

meet the unique requirements and difficulties encountered by various patient populations.

The research's implications go beyond the clinical context, highlighting the necessity of coordinated efforts between medical professionals, ongoing patient education and support, and incorporating evidence-based practices in caring for patients following cholecystectomy.

Although this study offers insightful information, more research is necessary to examine long-term adherence, consider qualitative viewpoints, examine technological interventions, and perform cost-effectiveness analyses. Future research focusing on these areas will improve the delivery of all-encompassing care for patients undergoing cholecystectomy and inform healthcare policies and intervention strategies.

In the end, this study is a first step toward improving patient outcomes, lowering complications, and raising the general well-being of cholecystectomy patients. Prioritizing dietary adherence and implementing customized, multimodal interventions can help healthcare providers enable patients to overcome the difficulties associated with post-operative dietary modifications and improve their quality of life.

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CONFLICT OF INTEREST

None declared

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