

# Effect of Dietary Modification Program on Pain Level among Cholecystitis' Patients

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**Abstract:** Cholecystitis is the inflammation or swelling of the gallbladder. It can be acute in onset or chronic and persistent. In acute cases of cholecystitis, the patient complains of extreme pain that usually worsens when he/she moves, Following certain dietary changes can provide relief from cholecystitis to some extent. Aim of the study: To determine the effect of dietary modification program on pain level among cholecystitis' patients. Setting: The study was conducted at Medical department of Menoufia University & teaching Hospital Design: A quasi experimental research design was utilized to achieve the aim of study.. Sample: A purposive sample consisted of 50 adult patients had cholecystitis were undertaken Data were collected using *Tool one:* structured interviewing questionnaire schedule, it consisted of four parts: Part one: socio demographic data as age, sex, marital status, and education & occupation.. Part two Medical data .Part three: Knowledge about factor that affecting cholecystitis pain .Part four: A- Dietary habit. B- 24hours dietary recall *Tool two: Physiological measurement Tool three: Visual Analogue Pain Scale.*

**Result:** there was a statistical significant difference related to factor that affect cholecystitis pain pre and post dietary modification program among studied group. Also there was a statistical significant difference related to pain pre and post dietary modification program among studied group **Conclusion:** It is concluded that:

The program about dietary modification had a positive effect on Pain level among Cholecystitis' Patients **Recommendation:** - based on this study it was recommended that: special attention should be given regarding teaching family members and nurses to help change their patients behavior and helping them to comply with the prescribed therapeutic diet

**Keywords:** cholecystitis, pain, dietary modification.

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## 1. INTRODUCTION

Cholecystitis is the inflammation of the gallbladder. It can be acute in onset or chronic and persistent. In acute cholecystitis, the patient complains of extreme pain that usually worsens when patient moves and caused by gallstones that irritating the wall of gallbladder. It is caused by multiple factors, including obstruction of a bile duct, which are the major cause of cholecystitis, but other causes include injury and infection or tumor <sup>(1)</sup>. The ultimate risk factor for cholecystitis is gallstones. Female sex, obesity, or quick rapid weight loss, increase aging, people with diabetes mellitus are risk factor of gallstone <sup>(2)</sup>.

Cholecystitic pain usually presents in the right upper quadrant or epigastric area. It differs from biliary colic by the occurrence of manifestation of an inflammatory constitute (fever, increased white cell count). This pain is start as intermittent, but later usually presents as constant and severe, also patient feel pain as sharp, cramping or dull pain <sup>(3) (4)</sup>. The pain is referred in the right scapula region (Boas' sign) which is hyperaesthesia (increased or altered sensitivity) below the right scapula can be a symptom in acute cholecystitis during abdominal examination <sup>(5)</sup>. Nausea, diarrhea,

vomiting, and tenderness on the right abdomen usually associated with pain. Other symptoms that may occur include: Clay-colored stools, yellowing of skin and whites of the eyes (jaundice) <sup>(6) (7)</sup>

Proper nutrition is extremely important after cholecystitis disease treatment or gallbladder removal in order to recover from the damaged physical condition. It is significant that people with this condition put a special diet into practice related with the disease if the person has had a removal of the gallbladder recently or experiencing the symptoms of the disease <sup>(8)</sup>.

Dietary changes beyond treatments necessary for patients have cholecystitis. Patients should eliminate saturated fats, which are found primarily in animal products and trans fats, found in many processed, junk foods. Also avoid fried and greasy foods, soft drinks, margarine, spicy foods, commercial oils, chocolate, salt, caffeine, tobacco, alcohol, white flour, refined carbohydrates and sugar because these foods are regarded as digestive system stressors that increase inflammation in the body <sup>(9)</sup>.

Patient must follow cholecystitis diet plan to eliminate symptom as pain from disease. Patients must avoid foods as red meat, nuts, eggs, dairy products, fried foods, ice cream and chocolates, carbonated drinks, black tea, coffee, and vegetables such as cauliflower and cabbage. Eating Lean meat, such as chicken with skinless is preferred and fish not be packed in oil). Increase fruits and vegetables in diet are an important. Whole grains (such as oats, brown rice, bran cereal, and whole wheat bread,). Therefore, it is important to identify effective nutrition options and adjuvant therapeutic methods for cholecystitis <sup>(10) (11)</sup>.

It is very important for cholelithiasis patient to maintain weight within normal, or ideal through eating a well-balanced diet that contain small amount of calories and low in fat. Also increase risk associated with rapid weight loss lead to an increase of cholesterol stones in the gallbladder, evoking symptomatic gallstones <sup>(12)</sup>.

#### **Significance of the study:**

The most common presenting symptom of acute cholecystitis is upper abdominal pain. The pain of acute cholecystitis is similar to biliary colic (pain caused by gallstones but is more severe and lasts longer, more than 6 hours and often more than 12 hours. The pain peaks after 15 to 60 minutes and remains constant. The following characteristics may be reported: in uncomplicated cholecystitis, a liquid or low-fat diet may be appropriate until the time of surgery. Incidence Acute cholecystitis cases account for 3%–10% of all patients with abdominal pain. 38–40 the percentage of acute cholecystitis cases in patients under 50 years old with abdominal pain <sup>(7)</sup>. So the aim of the study to determine the effect of dietary modification program on pain level among cholecystitis' patients.

#### **Aim:**

-To determine the effect of dietary modification program on pain level among cholecystitis' patients

#### **Research hypotheses:**

- There will be change of knowledge post dietary modification program among studied group.
- There will be decrease in pain score post dietary modification program among studied group

## **2. SUBJECTS AND METHOD**

#### **Design:**

A quasi experimental research design was utilized to achieve the aim of study,

#### **Setting:**

The study was conducted at Medical department of Menofia University & teaching Hospital .

#### **Subjects:**

A purposive sample consisted of 50 adult patients had cholecystitis were undertaken .They were eligible to participate if they had the following criteria

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Inclusion criteria: the study subjects were selected according to the following criteria:

- Adult patient
- Both sexes
- Conscious and able to give response for pain
- Has no Diabetes mellitus, peptic ulcer.

### Sample technique:

The subjects of our study were chosen from Medical department of Menoufia University & teaching Hospital. Within six months the cases admitted medical department who met the inclusion criteria were included in this study

-From November 2015 to April 2016.

### Tools:

Tools: in order to achieve the aim of study, three tools were utilized to collect the data.

These tools are as follow:

#### *Tool one: An interviewing questionnaire*

It was developed by researcher to assess pt's knowledge .

#### **Part one:** Socio demographic Data

It included information about Pt's age, sex, material status, level of education& occupation.

#### **Part two:** Medical data

-It comprised of items about clinical manifestation of disease as pain, nausea, vomiting, fever.

#### **Part Three:**

Knowledge about factor that affecting cholecystitis pain as proper nutrition; it comprised of items about food allowed & not allowed, anxiety ,spicy food and water intake

#### **Part four:**

A- Dietary habit. Including type of food eaten at a particular time methods of preparing food.

B- 24hours dietary recall: to compare between actual dietary intake of food before and after the dietary modification and the patient asked to report all foods, beverages and supplement she was taken with portions size in house hold measurements.

**Tool two: Physiological measurement:** this included measuring weight, height. (Body mass index) Mid arm circumference, triceps skin fold.

**Tool three: Visual Analogue Pain Scale:** This scale was developed by <sup>(13)</sup> to assess pain level . It consisted of a horizontal 10 mm line on a piece of paper with 'no pain' at one end and severe at the other end. The scores were coded as none (0), mild (1-3), moderate (4-6) and severe (7-10). The scale used pre and posts the program. It used to assess the effectiveness of dietary modification program on pain relief.

### Methods:

The study was conducted over a period of six months from -From November 2015 to April 2016.

-An official permission was obtained from the head of Medical department of Menoufia University Hospital & Shebin ELkom teaching Hospital, after explanation of the study and its purpose.

-Ethical consideration: a verbal and written consent was obtained from each patient to gain his / her cooperation. Each patient has a right to withdrawal from the study without any effect on their hospital routine care.

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- Tool development: Tool 1 was developed by the investigator after extensive review of the relevant literature & was tested for content validity by 6 experts in the field of medical surgical nursing & necessary modification was done. While tool three: Visual Analogue Pain Scale by <sup>(13)</sup>

-Reliability of the tools: all tools were tested using attest retest method and a pearson correlation coefficient formula were used. It was 0.89 for tool I(part three) and reliability of Visual analogue pain scale: ranged from 0.97 to 0.99).

### --Pilot study :

A Pilot study was initially carried out prior to data collection on 5 patients 10% of the subjects to evaluate the tentative developed tools for clarity, feasibility and applicability of the tools as well as estimate the time needed for data collection. Data obtained from pilot study were not included in the current study.

### - Data collection:

-Patient who agreed to participate in the study & fulfilling the inclusion criteria were included in the study.

-A structured interview was utilized in order to fill out the study tools.

-Every patient was interviewed individually.

-The data obtained were used as pretest, also measurements of weight, height and triceps skin fold thickness were taken and recorded as base line data and assessed pain level Using tool I, II, & III . And also formulating the dietary modification educational according to patient's need.

-The education was delivered by researcher in one session about 45-60 minutes

-The researcher gave verbal & written instruction for each patient.

-In addition, the researcher used to telephone the patient before the time of follow up to remind them .

-An immediate posttest was carried out after providing the needed intervention.

-Each subject was evaluated using tool I Part two, part three, part four , tool II,& tool III to estimate the improvement of patient' knowledge about proper nutrition regarding to cholecystitis& to assess the effectiveness of dietary modification program.

-After three months, all subjects were evaluated using tool I Part two, part three, part four , tool II,& tool III and, then comparison between pretest, posttest was carried out

### Statistical analysis:

Results were statistically analyzed by SPSS version 20(SPSS Inc., Chicago, IL, USA). Paired t test was used for parametric data. Wilcoxon signed rank test was used for non-parametric data. Chi-square and McNemar tests were used for qualitative data. P value  $\leq 0.05$  is set to be significant

## 3. RESULTS

**Table (I)** This table showed that, the majority of the sample were female at the age blew 60 years old, lived in rural area (70%). More than half of sample were unmarried(56%). Half of sample was house wife (50%).

**Table (II)** Showed that; there was a statistical significant difference related to clinical manifestation pre and post dietary modification program ( $<0.001$ ).

**Table (III)** Showed that; there was a statistical significant difference related to factor that affect cholecystitis pain pre and post dietary modification program among studied group.

**Table (IV)** It revealed that there was a statistical significant difference between time of conducting the dietary modification program in relation to calories, vitamin and mineral (  $P <0.001$ ). It was found the mean and Standard deviation regarding to the daily intake of protein, fat, & Carbohydrate increased before program ( $77.68 \pm 28.33$ ,  $87.10 \pm 28.17$ ,  $215.88 \pm 89.39$ ) respectively, then started to decrease post program ( $57.0 \pm 24.66$ ,  $38.49 \pm 15.45$ ,  $140.51 \pm 50.94$ ) respectively. While fiber & vitamin were increase post program

**Table (V)** Showed that; there was a statistical significant difference related to dietary habit pre and post dietary modification program among studied group  $P(<0.001^*)$  except eating fruit there was no significant difference

**Fig (1):** Showed that more than half of studied sample had mild pain pre dietary modification program while all of them had no pain post dietary modification Program

**Table (VI)** Showed that; there was a statistical significant difference related to anthropometric measurement pre and post dietary modification program among studied group

**Table 1: Number and Percentage distribution of Socio demographic data among studied group**

	(n=50)	%
<b>Sex</b>		
Male	15	30.0
Female	35	70.0
<b>Age in years</b>		
<60	35	70.0
≥60	15	30.0
<b>Marital status</b>		
Married	22	44.0
Single	4	8.0
Divorced/ Widowed	24	48.0
<b>Residence</b>		
Urban	15	30.0
Rural	35	70.0
<b>Education</b>		
Illiterate	18	36.0
Read and write	1	2.0
Basic	3	6.0
University	28	56.0
<b>Occupation</b>		
Worker	6	12.0
Employee	14	28.0
Retired	5	10.0
Housewife	25	50.0

**Table (2): Clinical manifestation pre and post dietary modification program among studied sample**

Clinical Manifestation	Intervention				Test of sig	P value
	Pre		Post			
	(N=50)		(N=50)			
<b>C/P</b>						
<b>Nausea and Vomiting</b>	27	54.0	17	34.0	$\chi^2$	<0.001*
<b>Fever</b>	3	6.0	2	4.0		
<b>Mixed symptoms</b>	20	40.0	0	0.0		
<b>Free</b>	0	0.0	31	62.0		

\*<0.05 is set to be significant

Table (3): Knowledge about factor that affect cholecystitis pain pre and post dietary modification program among studied group

	Intervention				Test of sig	P value
	Pre (N=50)		Post (N=50)			
<b>Knowing what food increases Pain</b>						
Yes	28	56.0	48	96.0	McNemar	<0.001*
No	22	44.0	2	4.0		
<b>Type of food</b>					$\chi^2$ 3.90	0.689
Milk products	3	10.7	2	4.2		
Red meat	2	7.0	1	2.1		
Fried food	10	35.7	22	45.8		
Fat	5	17.9	13	27.1		
Cakes	4	14.3	5	10.4		
Oil bread	2	7.1	3	6.2		
Eggs	2	7.2	2	4.2		
<b>Spicy food increases pain</b>					McNemar	<0.001*
Yes	20	60.0	48	96.0		
No	30	40.0	2	4.0		
<b>Anxiety increases pain</b>					McNemar	<0.001*
Yes	8	16.0	41	82.0		
No	42	84.0	9	18.0		
<b>Water is useful for gall bladder</b>					McNemar	<0.001*
Yes	7	14.0	36	72.0		
No	43	86.0	14	28.0		
<b>Knowing suitable food for health</b>					$\chi^2$ 79.12	<0.001*
Complete answer	1	2.0	45	90.0		
Incomplete	18	36.0	4	8.0		
Don't know	31	62.0	1	2.0		
<b>Allowed and not allowed food</b>					$\chi^2$ 89.80	<0.001*
Complete answer	0	0.0	47	94.0		
Incomplete	17	34.0	3	6.0		
Don't know	33	66.0	0	0.0		
<b>Canned food increase pain</b>					McNemar	<0.001*
Yes	3	6.0	24	48.0		
No	47	94.0	26	52.0		
<b>Excessive intake of sweet increase pain</b>					McNemar	<0.001*
Yes	8	16.0	41	82		
No	42	84.0	9	18.0		

\*<0.05 is set to be significant

Table (4): Mean and Standard deviation regarding to dietary recall pre and post dietary modification program among studied group

	Intervention		Wilcoxon Test	P value
	Pre (N=20)	Post (N=20)		
	Mean ±SD	Mean ±SD		
<b>Calories</b>	1669.45± 630.70	1233.28± 400.71	<b>6.02</b>	<b>&lt;0.001*</b>
<b>Protein A</b>	50.06± 20.18	29.08± 14.91	<b>5.81</b>	<b>&lt;0.001*</b>
<b>Protein P</b>	27.61± 14.41	27.92± 18.39	<b>0.28</b>	<b>0.776</b>
<b>Total Protein</b>	77.68± 28.33	57.0± 24.66	<b>5.28</b>	<b>&lt;0.001*</b>
<b>Fat A</b>	51.59± 21.42	23.59± 11.62	<b>6.15</b>	<b>&lt;0.001*</b>
<b>Fat P</b>	35.50± 15.87	14.89± 7.80	<b>5.91</b>	<b>&lt;0.001*</b>
<b>Total fat</b>	87.10± 28.17	38.49± 15.45	<b>6.14</b>	<b>&lt;0.001*</b>
<b>CHO</b>	215.88± 89.39	140.51± 50.94	<b>6.10</b>	<b>&lt;0.001*</b>

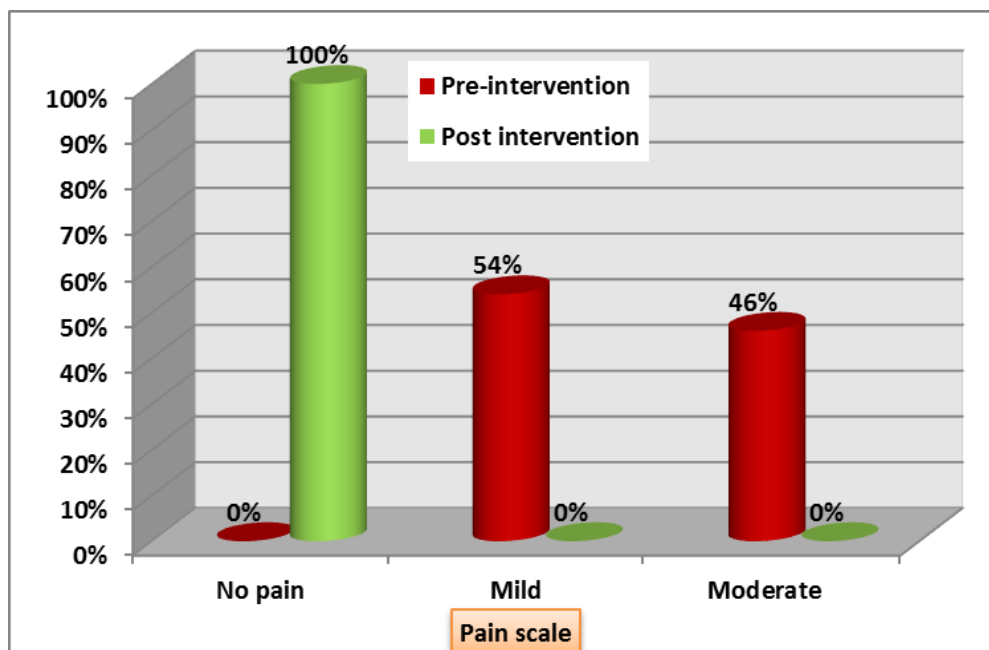
<b>Fibers</b>	8.81± 5.57	23.02± 13.61	<b>6.13</b>	<b>&lt;0.001*</b>
<b>Ca +</b>	580.44± 305.56	437.73± 296.88	<b>4.35</b>	<b>&lt;0.001*</b>
<b>Phosphor</b>	973.21± 464.55	721.27± 358.90	<b>5.08</b>	<b>&lt;0.001*</b>
<b>Iron A</b>	8.29± 5.79	8.73± 4.69	<b>0.53</b>	<b>0.592</b>
<b>Iron P</b>	8.02± 5.96	11.73± 4.81	<b>4.27</b>	<b>&lt;0.001*</b>
<b>Total iron</b>	16.31± 9.22	20.47± 7.51	<b>2.91</b>	<b>0.004*</b>
<b>Na+</b>	2537.80± 1291.71	1329.59± 543.69	<b>5.95</b>	<b>&lt;0.001*</b>
<b>K+</b>	1835.03± 837.90	1293.50± 525.67	<b>5.76</b>	<b>&lt;0.001*</b>
<b>Mn+</b>	333.40± 123.69	215.13± 108.37	<b>5.89</b>	<b>&lt;0.001*</b>
<b>Vit A</b>	223.20± 200.04	326.52± 274.71	<b>4.49</b>	<b>&lt;0.001*</b>
<b>Vit C</b>	23.30± 24.53	72.95± 57.72	<b>6.15</b>	<b>&lt;0.001*</b>
<b>TC</b>	471.74± 282.45	172.29± 151.43	<b>6.14</b>	<b>&lt;0.001*</b>

Table (5): Number and percentage distribution regarding to dietary habit pre /post dietary modification among studied group

	Intervention				Test of sig	P value
	Pre (N=50)		Post (N=50)			
<b>Number of meals/ day</b>					$\chi^2$ 39.80	<0.001*
One	18	36.0	2	4.0		
Two	18	36.0	3	6.0		
Three	13	26.0	42	84.0		
More	1	2.0	3	6.0		
<b>Having regular meals</b>					McNemar	<0.001*
Yes	11	22.0	49	98.0		
No	39	78.0	1	2.0		
<b>Way of cooking</b>					$\chi^2$ 72.56	<0.001*
Boiling	3	6.0	44	88.0		
Frying	20	40.0	1	2.0		
Stewing	5	10.0	4	8.0		
Grilling	15	30.0	0	0.0		
Don't know	7	14.0	1	2.0		
<b>Drinking milk</b>					McNemar	0.125
Yes	30	60.0	35	70.0		
No	20	40.0	15	30.0		
<b>Type of milk</b>					$\chi^2$ <b>43.94</b>	<0.001*
Full cream	27	54.0	3	6.0		
Skimmed	3	6.0	32	64.0		
Don't drink	20	40.0	15	30.0		
<b>Eating too much fatty meals</b>					McNemar	<0.001*
Yes	35	70.0	8	16.0		
No	15	30.0	42	84.0		
<b>Eating read meat</b>					McNemar	0.013*
Too much	17	34.0	6	12.0		
less	33	66.0	44	88.0		
<b>Type of red meat</b>					$\chi^2$ <b>77.63</b>	<0.001*
No fat	4	8.0	48	96.0		
Full fat	33	66.0	1	2.0		
Less fat	13	26.0	1	2.0		
<b>Eating poultry</b>					McNemar	1.0
Frequently	41	82.0	41	82.0		
Rare	9	18.0	9	18.0		
<b>Eating Skin on poultry</b>					$\chi^2$ <b>60.45</b>	<0.001*
No	4	8.0	27	54.0		
Small piece	36	72.0	1	2.0		
Complete piece	1	2.0	13	26.0		
Do not eat poultry	9	18.0	9	18.0		

<b>Eating between meals</b>						
Sometimes	20	40.0	30	60.0	McNemar	0.041*
Rare	30	60.0	20	40.0		
<b>Type of food between meals</b>						
Cake	8	16.0	1	2.0	$\chi^2$ <b>39.32</b>	<0.001*
Fat bread	13	26.0	3	6.0		
Fruits	3	6.0	32	64.0		
Any available food	26	52.0	14	28.0		
<b>Eating too much sweets</b>						
Yes	25	50.0	2	4.0	McNemar	<0.001*
No	25	50.0	48	96.0		
<b>Eating too much canned food</b>						
Yes	24	48.0	3	6.0	McNemar	<0.001*
No	26	52.0	47	94.0		
<b>Eating take- away</b>						
No	22	44.0	46	92.0	$\chi^2$ <b>29.97</b>	<0.001*
Rarely	4	8.0	3	6.0		
Sometimes	10	20.0	1	2.0		
Often	1	2.0	0	0.0		
Always	13	26.0	0	0.0		
<b>Eating fruits</b>						
Yes	44	88.0	46	92.0	McNemar	0.687
No	6	12.0	4	8.0		
<b>Vegetables</b>						
Fresh	18	36.0	28	56.0	$\chi^2$ 5.14	0.076
Cooked	22	44.0	18	36.0		
Don't eat	10	20.0	4	8.0		

\*<0.05 is set to be significant



\*<0.05 is set to be significant

Fig (1): Pain scale pre/post dietary modification among studied group



**Table (6) Mean and Standard deviation regarding to anthropometric measurements pre/post dietary modification among studied group**

	Intervention		Test of significance	P value
	Pre No(50)	Post No(50)		
<b>BMI: Mean ±SD</b>	22.88±4.96	18.92 ±4.59	Paired t=6.05	<0.001*
<b>TSF: Mean ±SD</b>	28.90±5.74	26.0 ±6.04	Paired t=3.79	<0.001*
<b>MAC: Mean ±SD</b>	25.08±4.66	21.90 ±4.16	Paired t=8.78	<0.001*
<b>MAMC: Mean ±SD</b>	31.0±7.0	25.08 ±7.27	Paired t=3.90	<0.001*

#### 4. DISCUSSION

Gallbladder disease (cholecystitis) is influenced by diet, exercise, and patients should be encouraged to incorporate these healthy habits into their life style in order to reduce their risk of gallbladder disease<sup>(14)</sup>

##### *Bio sociodemographic characteristics of the sample:*

The finding of the present study illustrated that the majority of the sample were females, less than 60 years old. This finding is consistent with the<sup>(14)</sup> who stated that female sex more likely to develop cholecystitis than men. In the same line with<sup>(14) (16) (17)</sup> who stated that women over 40 years old more likely to develop cholecystitis than men. This is due to an excess amount of estrogen and contraceptive pills acts to increase cholesterol levels in bile. This then decreases the motility in the gallbladder, which lead to gallstones.

##### *Knowledge related to diet that increase cholecystitis pain pre/post dietary modification program :*

Regarding to pre/post dietary modification program, the knowledge of the present sample revealed that there was statistically significant differences existed among patients at pre/post dietary modification program related to diet that increase cholecystitis pain. These results are consistent with<sup>(18)</sup> who showed a statistical significant difference between before and after conduction the nursing management protocol that indicates an improvement of patients total mean score of knowledge after intervention. This result is also in line with<sup>(19)</sup> who found that a significant differences between control and study groups as regard to total knowledge scores after protocol of care .The improvement of knowledge clarify the role of nurses as nurses who understand the disease process and nursing diagnoses associated with cholecystitis and who implement nursing interventions and patient teaching positively influence patient outcomes. In addition to result by<sup>(20)</sup> who stated that the main objective of nutrition education programs is to offer accurate knowledge and information about nutrition which lead to improvement of knowledge, attitude, behavior of nutrition post educational program.

##### *Regarding to dietary habit before and after dietary modification program :*

The current study mentioned that improvement of dietary intake post dietary modification program, this result was the same line with<sup>(21)</sup> who stated that nutritional education program had a positive effect in improving dietary behavior, habit and nutritional status.

The present study showed the daily intake of fat, carbohydrates& cholesterol, were decrease after intervention. This result is consistent with<sup>(22)</sup> who repotted that knowledge about dietary modification of decreased fat intake that decrease occurrence of biliary colic& cholecystitis pain ,So advise patients to take diet free from fatty or spicy foods. In addition to<sup>(23)</sup> who presented that Cholesterol stones account for 70% to 95% of adult gallstones. Also<sup>(24)</sup> stated that diets that are high in carbohydrates (such as pasta and bread) can also increase risk of pain. It may be due to are high in fat and cholesterol and low in fiber increases the risk of gallstones due to increased cholesterol in the bile and reduced gallbladder emptying.

The present study showed the daily intake of fiber was increase post intervention .This result at the same line with<sup>(25)</sup> who stated that fiber helps rapidity the digestion process. Fruit& vegetables can also contribute to low fat, high fiber diet reduce risk of cholecystitis.

The present study showed the daily intake of vitamin C was increase post dietary modification. This result consistent with <sup>(9)</sup> stated that increasing vitmin C intake decrease the risk developing gallstone by conversion of cholesterol to bile salts therapy decreasing the lithogenicity of bile and also indicated that more than two third ate much fatty diet pre intervention and most of studied sample had knowledge about suitable food for health, this result is supported by <sup>(32)</sup> who mentioned that more than three quarters of studied sample preferred fatty food pre nutritional regimen, while post intervention fatty diet decreased and. about three quarters of intervention group had satisfactory knowledge post nutritional regimen.

The current study stated that the daily intake of calcium was decrease post dietary modification .This result was a same line with <sup>(26)</sup> <sup>(27)</sup> who stated that brown or black pigment gall bladder stone The changes in color may be due to the amount of calcium salts, like calcium bilirubinate, and cholesterol which also affects the consistency.

This explained as excessive calcium in diet lead to formation of pigment gallstone, these stone cause irritation, inflammation of gall bladder, so it is important for cholecystitic patients to reduce calcium in diet.

***Regarding to clinical manifestation pre and post dietary modification:***

The current study presented that clinical manifestation about cholecystitis as nausea, vomiting enhanced post dietary modification, this result as the same line with <sup>(30)</sup> who noted that life style modification through dietary change improved symptoms of cholecystis.

***Regarding to anthropometric measurements before and after intervention:***

The present study showed that to anthropometric measurements were decrease post interventions. This result at the same line with <sup>(28)</sup> who stated that Obese individuals are more likely to develop gallstones than those who are at a healthier weight (as BMI increases, the risk for developing gallstones also rises) . Also <sup>(29)</sup> stated Obesity is considered one of the most important risk factor associated with gallstone disease.

***Regarding to pain pre/post dietary modification:***

The present study showed that there was statistically significant difference between levels of pain pre/post dietary modification. This result at the same line with Shehata & Atalla (2013) who stated that pain was decreased after educational intervention for study group more than control group with statistical significant difference. In addition to <sup>(30)</sup> <sup>(31)</sup> who illustrated that the patient's dietary history may lead to cholecystis and biliary colic. and can be prevented by lifestyle modification through decreasing fatty food , high-fire in diet ; so improve of dietary intake is associated with a reduced risk of gallstone formation and it is possible to improve the patient's symptoms as pain.

## 5. CONCLUSIONS

The overall findings in the present study revealed that dietary modification Program was effective and have a significant improvement of knowledge, physiological parameters and a reduction of pain among cholecystitis' patients.

**Recommendation:**

- 1- Replication of the study using a large probability sample of patient from different geographical areas to allow greater generalizability of the result.
- 2- Special attention should be given regarding teaching family members and nurses who have an active role in patients' nutrition to help them minimize pain.

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