Impact of Different Management Approaches on Clinical Symptoms among Patients with Gastroesophageal Reflux Disease

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Abstract

Background: Gastroesophageal reflux disease (GERD) is a common gastrointestinal illness with symptoms of heartburn, chest pain, and regurgitation. Management of GERD could involve proton pump inhibitor (PPI) medications, lifestyle modifications (healthy diet and diaphragmatic breathing exercises), and surgical intervention depending on the patients` condition. **Aim**: To evaluate the impact of different management approaches on clinical symptoms among patients with gastroesophageal reflux disease. **Research design**: Nonequivalent quasi experimental research design was utilized in this study. **Study Setting**: This study was conducted in gastrointestinal unit at kafrelsheikh University Hospital. **Study sample:** A convenient sample of 90 patients with gastroesophageal reflux disease were divided randomly into 3 groups receiving Proton pump inhibitor (maximum dose), Proton pump inhibitor (medium dose) with lifestyle modifications, and lifestyle modifications only. **Tools**: Two tools for data collection were used in this study as follow: tool (I) structured interview questionnaire and tool (II) GERD questionnaire which used to assess patients GERD levels in pre, post intervention and follow up stages. **Results**: the results showed significant decrease in GERD levels among patients receiving PPI, patients receiving PPI with lifestyle modifications, & patients receiving lifestyle modifications only as (X2=24.471&p= 0.001, X2=27.432&p= 0.001 & X2=5.085&p= 0.278) consequently. In addition, repeated measures one way ANOVA test showed a statistical difference between the total GERD mean scores in relation to time of intervention among patients receiving PPI combined with lifestyle modifications followed by PPI group as (F=17.131&p=<0.05) & (F=4.768 &p=<0.05) accordingly. **Conclusion**: Combination of pharmacological agent as Omeprazole (PPI) 20 mg/day with non-pharmacological nursing interventions as life style modifications in the form of dietary modifications and diaphragmatic breathing consider as the most effective method to reduce GERD clinical symptoms among patients with GERD. **Recommendations:** nurses' role as an educator should be continue to teach patients with GERD about lifestyle modifications and its positive effect on reducing the clinical symptoms of the disease. Provide continuous education about the latest modalities in this filed for nurses working with patients with gastrointestinal problems.

Keywords: Management approaches, clinical symptoms, gastroesophageal reflux disease

Introduction

Globally, gastroesophageal reflux disease (GERD) is a most common gastrointestinal major health problems, as prevalence of the disease had significantly increased over the last fifty years **(Boulton& Dettmar, 2022).**

Gastroesophageal reflux disease (GERD) estimated to affect up to 20% of the population worldwide, it considered the most prevalent in Western countries **(Newberry& Lynch, 2019)** and **(lei, et al., 2020)**. GERD occurs when stomach acid repeatedly flows back into the tube connecting mouth and stomach (esophagus). This backwash (acid reflux) could irritate the lining of the esophagus. Many people experience acid reflux from time to time.

Acid reflux might develop irritation and unpleasant taste at the back of the mouth. It might also cause the regurgitation of food or liquid from stomach into the mouth. (GERD) could be present = either as non-erosive reflux disease or erosive esophagitis **(Antunes, Aleem, & Curtis, 2022).** The most common cause of GERD is acidic food or high in fat like citrus fruits, tomatoes, onions, chocolate, coffee, cheese, and peppermint. Spicy foods or large meals could also be the root of distress **(FDA, 2020 & Sachdev, 2022)**

Gastroesophageal reflux disease is caused by interaction between environmental factors and genetic predisposition. The environmental factors could be including changes in diet, psychological upset and decrease physical activities, while the genetic factors including age, male sex, and obesity. The higher prevalence of GERD now increased worldwide **(Taraszewska, 2022)** Reflux of stomach contents causes troublesome symptoms and/or complications. Heartburn, regurgitation and chronic cough are the characteristic symptoms of GERD **(Antunes, Aleem, & Curtis, 2022)**. Esophageal complications of GERD are hemorrhage, stricture, Barrett's esophagus (BE), and adenocarcinoma. BE is an important, potentially pre-malignant complication of GERD and is clearly associated with esophageal adenocarcinoma **(American cancer society, 2020).**

The most common management for GERD is medications which could help to decrease the amount of acid in stomach in addition to lifestyle changes. Surgery also recommended for those patients. The initial treatment of mild GERD includes the use of nonprescribed antacids or histamine receptor antagonists. Antacids/alginates - Antacids (sample brand names: Tums, Maalox) neutralize stomach acid and are commonly used for short-term relief of heartburn symptoms **(Patti, 2021).**

Prescription-strength proton pump inhibitors is one of GERD Treatment which includes esomeprazole (Nexium), lansoprazole (Prevacid), omeprazole (Prilosec), pantoprazole (Protonix), rabeprazole (Aciphex) and dexlansoprazole (Dexilant). Another option of GERD treatment includes diaphragmatic breathing, as diaphragm is one of the main components of the esophagogastric junction and plays an important role in preventing gastroesophageal reflux. The diaphragm, as a skeletal muscle, is partially under voluntary control and its dysfunction could be improved via breathing exercises. Thus, diaphragmatic breathing training (DBT) could alleviate the symptoms in selected patients with GERD **(FDA, 2020 & Patti, 2021).**

Although a far firmer understanding is known today about GERD's pathology and symptoms, but still there is a need for more research that could be done to develop a non-invasive diagnostic tests and novel treatments. A clear understanding of the reflux across all countries would improve how accurate the prevalence of GERD really is. The more known about gastroesophageal disease and who it is at the greatest risk, will help to educate people about their lifestyle choices and how to manage their GERD symptoms, improving their quality of life and in turn preventing GERD and GERD related diseases **(Boulton& Dettmar, 2022 & Durazzo, et al. 2020).**

Some researchers reported that besides reducing body fat, exercise and position which could help in relieving stress, anxiety, and improving overall sense of well-being, also, in certain cases, it could decrease Gastroesophageal reflux disease (GERD) symptoms. As well multiple research studies found that being on left side is the best sleeping position for people with GERD as it reduces reflux episodes and reduce exposure of the esophagus to stomach acid. Sleeping in other positions, including on back, could make reflux more likely **(Zhang, 2021).**

Therefore, the healthcare professional team specially the nurses who should develop continuous non pharmacological management and interventions such as life style modifications which including healthy diet regimen, diaphragmatic breathing exercises, smoking cessation, proper sleeping position which could help in minimizing the symptoms of gastroesophageal reflux among patients with GERD, reduce burden of the disease, improve health related quality of life, and decrease acid suppression usage. This approach is the focus of the current research and its effect of relieving symptoms which will be compared with the treatment approaches of medications and medications combined with lifestyle modifications. Therefore the aim of the currents study is to evaluate the impact of different management approaches on clinical symptoms

among patients with gastroesophageal reflux diseases.

Significance of the Study

Gastroesophageal reflux disease is one of the most common gastrointestinal chronic diseases that had many complications and affect negatively all dimensions of patient heath. It is estimated that 60–70 million Americans are affected by gastrointestinal diseases annually. It is also estimated that 40% of the USA population experience GERD symptoms (**Antunes, Aleem, & Curtis, 2022**). Untreated GERD could result several serious complications, which including esophagitis and Barrett's esophagus. Esophagitis could be varied widely in severity with complicated cases resulting in extensive erosions, ulcerations and narrowing of the esophagus. Esophagitis may also lead to gastrointestinal (GI) bleeding (**Clarrett & Hachem, 2018).**

Gastroesophageal reflux disease is a significant linked with diminished quality of life and high morbidity. Effective handling of GERD symptoms had been associated with momentous enhancement in quality of life, including decreased physical pain, increased energy, improve physical and social functions, and emotional comfort (**Gorczyca, Pardak, Pękala,& Filip,2019).** Egypt had the high prevalence of the diseases evidenced by research conducted by (**Baklola, et al, 2023)** who reported that; GERD is a frequently occurring condition among Egyptian, as it affecting around one-fifth of them. In addition, the revision of the medical record and statistical data of Kafrelsheikh University Hospital revealed that the number of patients with GERD who are planned to be treated are 451 patients from (October 2022 to August 2023).

In addition, the finding of this study may identify the most effective approach that could help patients with GERD to control their symptoms. There were no nursing researches that studied the effect of 3 types of interventions to control GERD symptoms, but there were researches studied the effect of the pharmacological agents only such as PPI or life

style modifications only as dietary modifications or performing breathing exercises. In addition, the current study results may will have a positive effect on patients' health status, through minimizing the physical and psychological complications which may results from their disease. Furthermore, data derived from this study may provide a base for other qualitative and quantitative studies in such field.

Operational definition

Different management approaches

In the current study different management approaches include the following

1- Maximum dose of proton pump inhibitor

2- Medium dose of proton pump inhibitor with lifestyle modifications

3- Lifestyle modifications only

Maximum dose of proton pump inhibitor:

Daily dose of proton pump inhibitor (omeprazole 40mg/day) divided into three doses.

Medium dose of Proton pump inhibitor:

Daily dose of proton pump inhibitor (omeprazole 20mg/day) divided into three doses.

Lifestyle modifications

In the current study lifestyle modifications including diaphragmatic breathing exercises 6 -8 times/day and dietary modifications which include patients' instructions to avoid large and heavy meal, high calorie content, citrus, coffee, chocolate, fried food, spicy food and red sauces.

Clinical symptoms of GERD include:

Heartburn, regurgitation, epigastric pain, nausea, sleep disturbance. Symptoms measured by GERD questionnaire which was translated into points and percentage that indicate if patients with GERD level improved or not.

Aim of the Study:

The aim of this study was to evaluate the impact of different management approaches on clinical symptoms among patients with

gastroesophageal reflux disease, through comparing the effect of following three different treatment options on GERD level among the studied patients:

a- Proton pump inhibitor with maximum dose (omeprazole 40mg/day).

b- Proton pump inhibitor medium dose (omeprazole 20 mg/day) with lifestyle modifications (dietary modifications with diaphragmatic breathing exercise).

c- Lifestyle modifications only (dietary modifications with diaphragmatic breathing exercise).

Research Hypotheses:

To achieve the aim of this study, the following hypotheses were postulated to be tested:

H1: There will be a significant difference in clinical symptoms (GERD level) among patients with GERD after adhering to the maximum dose of Proton pump inhibitor approach.

H2: There will be a significant difference in clinical symptoms (GERD level) among patients with GERD after adhering to the medium dose of Proton pump inhibitor with lifestyle modifications approach.

H3: There will be a significant difference in clinical symptoms (GERD level) among patients with GERD after adhering to lifestyle modifications approach**.**

Research design

Nonequivalent quasi excremental research design was used to conduct this study.

Study Setting: This study was conducted in gastrointestinal unit at kafrelsheikh University Hospital.

Sample

A convenient sample of 90 patients with GERD were included in this study, the GERD was diagnosed by GERD score and /or endoscopy. Patients were classified randomly into three groups each group consisted of 30 patients

as follow; G1 received maximum dose of PPI, G2 received PPI with lifestyle modifications and G3 practice lifestyle modifications only.

Inclusions criteria: Adult patients, age ranged from 18-60 years old, fully conscious, male, and female with typically GERD symptoms based on GERD questionnaire and /or endoscopy diagnosis and agree to participate in the study.

Exclusion criteria: Patients with any other gastrointestinal diseases such as H pylori, gastroenteritis, dyspepsia with other causes, smokers, motility disorders peptic ulcer, gastric or esophageal cancer, patients receiving non steroid anti-inflammatory drugs (NSAID) for long period, congestive heart failure and heart attacks, and any physical or psychological disability that would impact study participation.

Tools of the Study

Tool (I): Structured Interview Questionnaire

It was developed by the researcher after reviewing the recent relevant literatures, it consisted of two parts:

Part (1): **Patients` demographic data** such as age, sex, occupation, level of education, income, marital status, BMI, residence data and smoking…etc.

Part (2): **Patients` Medical Data** which included: methods of disease diagnosis, time of complain of symptoms, patients eating habits, knowledge about the disease and if the patients follow special diet, and presence of other disease… etc.

Tool (II): GERD Questionnaire (GERD Q):

This tool was adopted from (**Jones, et al., 2009) and** translated into Arabic to assess the GERD level. It was composed of 6 questions including frequency of heartburn, regurgitation, epigastric pain, nausea, sleep disturbance, and using antiacid to relive symptoms.

Scoring system: the score is from 0-18 points based on how many times does the

symptoms occurred per week and the more the point= the high percent likelihood the patient had GERD

- From 0 to 2 points = patient had 0% percent likelihood of GERD or no GERD

- From 3 to 7 points = patient had 50 % likelihoods of GERD or mild level of GERD

- From 8 to 10 points = patient had 79 % likelihood of GERD or moderate GERD level

- From 11 to 18 points = 89 percent likelihood of GERD or sever GERD level

Validity and Reliability

Face and content validity of the study tools were tested by a panel of five experts' faculty members in Medical Surgical Nursing and medicine field from Faculty of Nursing and faculty of medicine at Kafrelsheikh University. The experts were asked to examine the tools for clarity, content coverage, length, wording, format, and overall appearance. Modifications were done accordingly. Reliability of the second tool was tested using Cronbach, alpha test = 0.8.

Ethical Considerations

Ethical approval was obtained from the Scientific Ethical Committee of kafrelsheikh University with the approval code MKSU50-10-13 as well as an official permission were obtained from hospital administrator to conduct the study. The purpose of the study was explained to the patients and informed consent was obtained from the subjects who agreed to participate in the study. They were given an opportunity to withdraw from the study without given a reason and at any time. Also they were assured that anonymity and confidentiality of the data collected were protected. Ethics, values, culture, and beliefs were respected.

Pilot study

A pilot study was conducted on 10 patients with the same inclusion criteria to ensure the feasibility of the study and the study tools for data collection, as well as to examine issues related to the research design, time required to fill in the sheet. Based on feedback taken from the pilot study there were no modifications needed for the study tool. Patients participated in the pilot study were included in the total study sample.

Procedures

After receiving the formal approval from Research Ethical Committee at Faculty of Medicine, Kafreelsheikh University to conduct this study, an official permission was taken from the gastrointestinal unit at kafreelsheikh University Hospital and hospital administrators to conduct this study. The study was conducted on four phases as the following: assessment, planning, implementation, and evaluation phase.

Assessment phase: involved collecting data through reviewing the literature regarding the disease, its treatment and by using the suitable tools, checking the feasibility of the study, also, accessibility of the sample was assessed.

Planning phase; based on the outcome of the assessment phase, final decision about time needed and frequency of patients' interview was develop, also, the researcher develop schedule to collect data including day, time and duration.

Implementation phase: this phase was started from October 2022 to April 2023. Each patient with the predetermined inclusion and exclusion criteria was approached individually for half an hour by the researcher to explain the purpose, nature of the study, benefits of adherence to intervention and all the previous mentioned ethical considerations. Each patient was asked to sign the consent form, then; the researcher was conducting structural interview with each patient to fill in the first research tool. Selected patients were divided into 3 equal groups using random assignment as follow; group (1) received Proton pump inhibitor (maximum dose), group (2) received Proton pump inhibitor medium dose with diaphragmatic breathing exercise and dietary modifications. Group (3) practiced diaphragmatic breathing exercise and dietary modifications. Clinical symptoms of GERD were assessed at baseline, one week then after tow month post intervention using the same tool (GERD questions).

The researcher teach patients of the second and third group how to do diaphragmatic breathing through demonstration and re-demonstration sessions as follow sit or lie in a comfortable place, close your eyes, place one hand on your chest and one hand on your abdomen, the bottom hand should do the moving, the top hand should remain still or only move as the bottom hand moves, inhale through your nose for about 4 seconds, feeling your abdomen expand, (you may feel slight tension the first few times you inhale), hold your breath for 2 seconds, exhale very slowly and steadily through your mouth for about 6 seconds. The mouth should be relaxed and repeat for 5-15 minutes. The researcher instructed the patients to perform diaphragmatic exercises 6 – 8 times/day.

The researcher also provided the patients in the second and third group written instructions about types, frequency of meals, indicated and contraindicated food and follow them in the hospital and at home by telephone

Evaluation phase: Clinical symptoms of GERD were assessed one week and after tow month post implementation of the interventions using the same tool (GERD questions).

Data analysis

Collected data was tabulated, computed, and analyzed using SPSS, version 22. Descriptive statistics including frequency distribution, percentage, means and standard deviations also correlational test such as t test were used.

Results

Table 1 presented the demographic characteristics among the three groups and showed that more than 50% of the study subjects were married, house wife females, resided in rural areas, their age ranged from (41-50 years old), and more than half of the subjects (56%) able to read and write. Regarding body mass index, the majority within each group was grade one obesity represents 47.7, 33.3 &36.7 % respectively, while the minority within each group were underweight. There was no statistically significant between the demographic data among the groups so they are homogenies groups.

Table 2 showed that 50% of the subjects were diagnosed by endoscopy and 40 % were diagnosed by GERD questionnaires. Regarding patient's habits, the majority 40 % of the subjects were lying down after eating while only 8% and 2% drink coffee and alcohol consequently. The majority of the subjects 42 % complained from pain after eating, while only 8% complained before eating. Regarding knowledge, 48% of the subjects had knowledge about the disease and 42 % had not. Regarding diet, the majority of the subjects within each group had no special diet. In relation to the medical history, there were no statistically significant differences among the study groups.

Table 3 denoted the comparison between the three group of study during the pre-intervention, post intervention and follow up period. Among the PPI group, 89% likelihood decreased from 63.3 in pre-intervention to 16.7% post intervention and showed further decrease to 13.3% in follow up phase with (p=0.001). While among PPI combined with lifestyle modifications; 89% likelihood decreased from 46.7% in pre-intervention to 13.3% post-intervention to 6.7% in follow up (p=0.001). Regarding the group who demonstrating lifestyle only, 89% likelihood decreased from pre-intervention to follow up with (p=0.278).

Figure 1 showed that there was a statistical difference between total GERD mean scores in relation to time of intervention among the studied groups as mean scores decreased from 10.2 in pre-intervention to 8.4 in post intervention to 7.3 in follow up for group receiving PPI & lifestyle modifications (F=17.131&p=<0.05). The mean score for patients received PPI was 9.4, then decreased to 8.6 then to 7.9 in follow up as (F=4.768 &p=<0.05). There was no significance among the last group in relation to time of intervention. Repeated measures one way ANOVA test was used to answer the three-research hypothesis through testing the change in means over the time of intervention between the three groups.

Figure (1): Differences between total GERD Q mean scores during three time points (pre intervention, post intervention and follow up).

Table (1): Distribution and percentages of demographic characteristics of the studied subjects (N=90).

	PPI Medication maximum dose (G1)		PPI medium dose& lifestyle modifications (G2)		Lifestyle modifications only (G3)		Chi – Square / Fisher's exact test	
	n	%	n	%	n	%	X^2	P
Age (Years)								
20 – <30	5	16.7	4	13.3	5	16.6		
30 – <40	8	26.7	9	30.0	9	30.0		
40 – <50	13	43.3	13	43.4	14	46.7		
50 – 60	4	13.3	4	13.3	2	6.7	1.070	0.983
Gender								
Male	9	30.0	11	36.7	12	40.0		
Female	21	70.0	19	63.3	18	60.0	0.679	0.712
Marital Status								
Married	27	90.0	26	86.7	28	93.3		
Single	3	10.0	4	13.3	2	6.7	0.741	0.690
Residence								
Rural	15	50.0	20	66.7	19	63.3		
Urban	15	50.0	10	33.3	11	36.7	1.944	0.378
Educational Level								
Cat read and write	18	60.0	15	50.0	18	60.0		
Can not read and write	12	40.0	15	50.0	12	40.0	0.814	0.665
Employment Status								
Governmental work	5	16.7	4	13.3	1	3.3		
Non – governmental work	10	33.3	9	30.0	11	36.7		
Unemployed	6	20.0	7	23.3	5	16.7		
Housewife	9	30.0	10	33.4	13	43.3	3.946	0.684
BMI								
Underweight	3	10.0	9	30.0	5	16.6		
Normal	7	23.3	4	13.3	6	20.0		
Overweight	6	20.0	7	23.3	8	26.7		
Grade I Obesity	14	46.7	10	33.4	11	36.7	5.146	0.525

Table (2): Distribution of the medical history among the studied groups. (N=90).

	PPI maximum dose Medication (G1)		PPI medium dose & lifestyle modifications (G2)		Lifestyle modifications only (G3)		Chi – Square / Fisher's exact test	
	n	%	n	%	n	%	X^2	P
Method of Gerd diagnosis								
Endoscopy	12	40.0	19	63.3	13	43.3		
GERD Q	18	60.0	11	36.7	17	56.7	3.824	0.148
Time patient complain form pain								
Eating large meal	8	26.7	15	50.0	7	23.3		
Lying down shortly after eating	12	40.0	10	33.4	18	60.0		
Eating spicy or acidic foods	5	16.7	3	10.0	2	6.7		
Drinking alcohol	1	3.3	1	3.3	0	0.0		
Drinking much coffee	4	13.3	1	3.3	3	10.0	10.55	0.229
Patients' usual habits								
In the morning	3	10.0	6	20.0	1	3.3		
After eating	10	33.4	14	46.6	13	43.3		
Before eating	4	13.3	5	16.7	6	20.0		
At bed time	13	43.3	5	16.7	10	33.4	8.403	0.210
Patients' knowledge about the disease and its causes & treatment								
I have knowledge	10	33.3	16	53.3	11	36.7		
I don't have knowledge	20	66.7	14	46.7	19	63.3	2.845	0.241
Following especial diet								
Yes	4	13.3	7	23.3	2	6.7		
No	26	86.7	23	76.7	28	93.3	3.417	0.181

*significant<0.05

Table (3): Distribution of the Gerd Q level among studied groups (N=90)

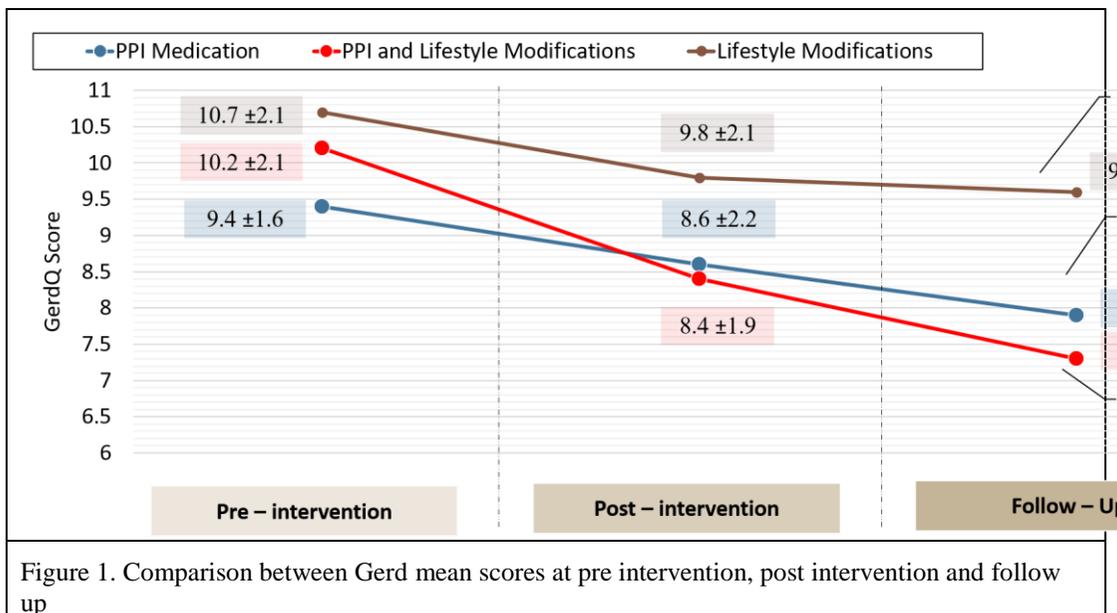|	Pre – intervention		Post – intervention		Follow – Up		Chi – Square	
	n	%	n	%	n	%	X^2	P
PPI maximum dose Medication								
50% Likelihood	5	16.7	17	56.6	20	66.7		
79% Likelihood	6	20.0	8	26.7	6	20.0		
89% Likelihood	19	63.3	5	16.7	4	13.3	24.471	<0.001**
PPI medium dose, lifestyle modification								
50% Likelihood	7	23.3	20	66.7	26	86.6		
79% Likelihood	9	30.0	6	20.0	2	6.7		
89% Likelihood	14	46.7	4	13.3	2	6.7	27.432	<0.001**
Lifestyle modification only								
50% Likelihood	8	26.7	11	36.7	16	53.3		
79% Likelihood	10	33.3	10	33.3	8	26.7		
89% Likelihood	12	40.0	9	30.0	6	20.0	5.085	0.278

*significant<0.05

Figure 1. Comparison between Gerd mean scores at pre intervention, post intervention and follow up

*significant <0.05

Discussion

A sample of 90 patients with GERD divided into three groups was utilized in the current study. Regarding the demographic characteristics, this study results indicated that; total number of the studied subjects were married female, and half of them resided in rural areas, and near than half of the studied subjects their age ranged between (41-50) years old. This result is in the same line with the results of study done by **(Yamasaki, et al., 2018)** who studied" the Changing Epidemiology of Gastroesophageal Reflux Disease and reported that the proportion of patients with GERD increased in all age groups and most of them were female. Concerning risk factors of GERD, the results of this study showed that forty percent of the subjects were lying down after eating, this result is not match with the results of study conducted by **(Esfahani, et al, 2021)** who studied "Dietary Intake in Relation to the Risk of Reflux Disease and conclude that; proper diet containing high-fat, carbonated beverages, citrus products, and spicy, salty, and fried foods were associated with risk of GERD.

Regarding symptoms of GERD among studied subjects, the results of the current study showed significant decrease in symptoms of GERD among the studied subjects after receiving medium dose of PPI combined with diaphragmatic breathing exercises and dietary modifications. There were no nursing researches that studied the effect of 3 types of interventions on GERD symptoms but there were researches studied the effect of pharmacological agents only such as PPI or life style modification only as dietary modifications or performing breathing exercises. The results of the current study agreed with the finding of study done by **(Yadlapati & DeLay, 2018)** who studied PPI refractory gastroesophageal reflux disease and reported that; Proton pump inhibitor (PPI) therapy is the mainstay pharmacologic management for GERD, although up to 40% of the patients who suspected GERD derive inadequate relief symptom with PPI. The results of this study also supported by the results of study done by **(Dagl & Kalkan, 2019)** who studied the role of lifestyle changes to the gastroesophageal reflux diseases treatment and suggested that; there might be a relation between reflux development and eating un healthy diet such as salty foods, chocolate, fatty foods, and carbonated drinks. The results of the current study is also supported by (Esfahani, et al, 2021) who studied the dietary intake in relation to the risk of reflux disease and mentioned that; his review results indicated that high-fat diets,

carbonated beverages, citrus products, and spicy, salty, and fried foods are associated with risk of GERD.

The current study is also congruent with study done by **(Eherer, 2020)** who studied Management of gastroesophageal reflux disease: lifestyle modifications and alternative approaches, and reported that; lifestyle modifications such as diet and diaphragmatic breathing exercise were effective in treating GERD. Also the results of this study is in the same direction with study done by **(Halland, 2021)** who studied "Effects of Diaphragmatic Breathing on the Pathophysiology and Treatment of Upright Gastroesophageal Reflux" and reported that; diaphragmatic breathing lower the number of postprandial reflux events among patients experiencing upright gastroesophageal reflux disease (GERD) by creating a greater difference between the lower esophageal sphincter (LES) and gastric pressure.

Conclusion

This study concluded that; Combination of pharmacological agent as Omeprazole (PPI) 20 mg/ day with non-pharmacological nursing intervention as lifestyle modifications in the form of dietary modifications and diaphragmatic breathing consider as the most effective method to reduce GERD clinical symptoms among patients with GERD.

Recommendations

Based on the current study findings, the following recommendations are formulated:

- Nursing role as an educator should be continuing to teach patients with GERD about lifestyle modifications and its positive effect on reducing clinical symptoms of the disease.

- Provide continuous education for nurses caring of patients with gastrointestinal problems about the latest modalities in this filed.

- Replication of the study on a larger probability sample selected from different geographical areas is recommended to obtain more generalizable data.

- Further studies should be applied to investigate the effect of other physical and psychological interventions on clinical symptoms among patients with GERD.

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