

## Effectiveness of Structured Teaching Program on Knowledge, Anxiety State and Tolerance for Patients with Gastrointestinal Endoscopy: Randomized Controlled Trial

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**Abstract: Background:** Gastrointestinal endoscopies are painful procedures that cause discomfort and anxiety. Education of the patient prior to the procedure lead to decrease provokes anxiety. Aim of the study to determine the effectiveness of structured teaching program on knowledge, anxiety state and tolerance for patients with gastrointestinal endoscopy. **Subjects and methods:** The study was conducted in the endoscopy unit in Mansoura University; in Egypt using a quasi-experimental study design with pre and post assessments on 60 patients was assigned for endoscopy. Data collection tools included: (a) demographic and medical information sheet, (b) Endoscopy knowledge assessment sheet, (c) State-Trait Anxiety scale, and (d) Patient's tolerance assessment sheet. The researcher designed structured teaching program to decrease anxiety and improve tolerance. Each patient was evaluated at two phase pre and post implementation of program months after program implementation, and six months after the second evaluation. **Results:** The study results revealed that statistically significant improvement in all aspects of patient knowledge score at pre and post implementation of structured teaching program ( $p<0.001$ ). There were significant improvements of level of anxiety from pre and post implementation of program to endoscopy ( $p<0.05$ ). Also there was a statistical significant difference in the pre and posttest mean score of tolerance ( $p<0.05$ ). **Conclusion and recommendations:** The results concluded that structured teaching program regarding endoscopy have positive effects on the patient's knowledge, tolerance and anxiety level associated with the endoscopic procedure. Replication of this study is highly recommended on a large representative probability sample to achieve generalizable results.

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**Key words:** Endoscopy, structured teaching program, knowledge, anxiety, patient tolerance

### 1. Introduction:

Upper gastrointestinal endoscopy (UGE) is an effective procedure for diagnosis and treatment of gastrointestinal disorders [1]. Possible factors that could lead to a patient's anxiety before upper gastrointestinal (GI) endoscopy procedure are fear of injury and choking, discomfort and unexpected diagnoses such as cancer [2,3]. Indeed, anxiety, discomfort, and pain are interrelated as being common in patients undergoing invasive medical procedures [4]. Therefore, endoscopic nurse should be offer a holistic package of care to patients undergoing GI endoscopy through provides appropriate care before, during and after the procedure, gives advice on admission and discharge, ensures safe delivery of endoscopic procedure and minimal anxiety[5].

Gastrointestinal endoscopy is a fairly safe and well-tolerated procedure. However, high levels of pain or discomfort have been associated with less satisfaction [6]. Patients often experience anxiety prior to gastroscopy due to fear. Inadequate information about gastroscopy may lead to hampers compliance and decrease the patients' tolerance. Adequate

information improves the cooperation of the patient to procedure and reducing the need to repeat the gastroscopy and hospital stay of patients with gastro-intestinal disorders undergoing these procedures.[7,8] Increasing endoscopy tolerance may contribute to increased compliance and improved outcomes.[9] Gebbensleben, & Rohde (2012) stated that patient's tolerance of gastroscopy is mainly influenced by anxiety. Anxiety may result due to lack of knowledge regarding the procedure, which may lead to more difficult and painful procedure. So, relieving the anxiety before gastroscopy is done by using information or explanation regarding the procedure in written or oral form and teaching relaxation and coping techniques to the patients are essential.[10].

Patient education is a vital nursing intervention to prepare patients for an optimal and uncomplicated course of therapy. Patient education programs also assist the patients, nurses, and physicians in working to reach common goals [11]. For instance, Brown [12], found that patient teaching brought positive outcomes in adults, because it increased patients' knowledge,

self-care behaviors and to improve the quality of patient care. Therefore, Patient education programs are used in many Gastroenterology units to prepare patients for endoscopy procedures. They have been found successful to relieve fear and anxiety in large percentage of patients. Patient education has numerous psychological benefits such as patient satisfaction, cooperation and decreased anxiety [13]. A pre endoscopy patient education programme apparently increases patient compliance decreasing both the need for repeated examination and therefore attendant costs [11]. Therefore, the specific knowledge and awareness for patient's aims to establish a close collaboration with endoscopic to minimize the complication and reduce patients potential anxiety and improve patient satisfaction.

**Operational definition:**

**Structured Teaching Program:** It is a designated program provided to endoscopic patients with health information to improve their knowledge, copying with procedure and improve their overall health status.

**Tolerance:** it is the ability of the patients to adjust and satisfaction, these are more likely to participate in their own treatment regime, and follow their schedules.

**Significance of the study:**

Gastrosocopy is a widely used procedure in medicine today. It is the diagnosis and treatment of choice among patients with upper gastrointestinal disorders. Thus anxiety, worry, fear of adverse outcome or side effect and discomfort regarding endoscopy reduces the patient's acceptance ability [14]. Therefore, effective procedure explanation and safety measures has positively impact on decrease anxiety lead to patient more relaxed , well tolerance procedure and improve patients general health condition. So, providing guidelines in the form of a brochure and video can minimize anxiety and other discomfort that endoscopy is indicated and improving tolerance during the procedure.

**Aim of the study**

This study aimed to evaluate effectiveness of structured teaching program on knowledge, anxiety state and tolerance for patients with gastrointestinal endoscopy.

**Research hypotheses:**

H1: Patients total knowledge of upper gastrointestinal tract endoscopy means score will be significantly higher post implementation of the structured teaching program.

H2: Patients level of anxiety improves after implementation of structured teaching program and as well as improve the tolerance with procedure.

**Research variables:**

*Independent variables:*

The Independent variables in the study is structured teaching program.

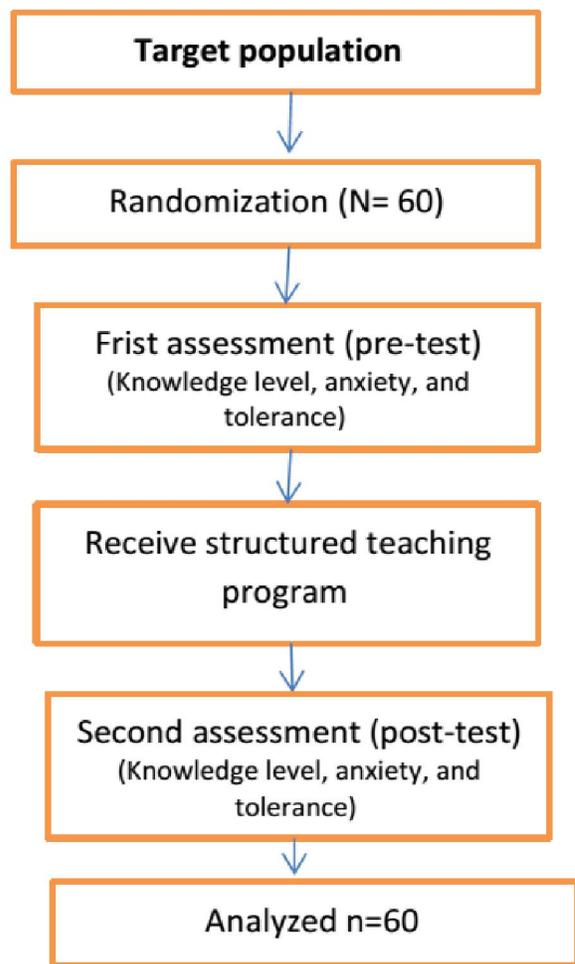
*Dependent variables:*

Dependent variables are knowledge, anxiety level, and tolerance of patients.

**2. Subjects and methods:**

**Study design and setting**

This study was carried out at the digestive tract endoscopy unit at Mansoura University Hospital in Egypt. A quasi experimental study design with pre and post assessments was used in this study to fulfill the aims of this study (Figure 1).



**Figure 1. Recruitment and allocation to study group**

**Subjects:**

The study involved a convenience sample of 60 adult patients, drawn from all the patients waiting for endoscopic examination during this period. The criteria for selection were: patients' age ranged between 18-60 years old; undergoing endoscopy, and agreeing to participate in the research. Patients with gastrointestinal complications, speech disorder, who

are sedated/confused and end stage of liver, were excluded.

**Tool:**

The following tools were utilized to collect data pertinent to this study:

**Part 1: Socio-demographic and Medical data:**

Demographic data and medical information sheet was designed by the researcher to elicit subjects, gender, age, educational level, residence, employment status, household income and marital status. Clinical data: It includes patients' diagnosis, previous medical history and endoscopy, duration of endoscopy, blood pressure, and complication etc.

**Part 2: Endoscopy Knowledge Assessment:**

This tool was developed by the researcher based on literature review [15-17]. The scale assessed 5 areas of knowledge with 20 items, including general knowledge gastrointestinal tract & endoscopy (8 items), knowledge about instrument (2 items), knowledge related to discomfort (4 items), information related to diet and fluid restrictions (3 items) and finally knowledge related follow up (3 items). The answers were in yes/no format, MCQ, and easy. The total score for this knowledge test was (40) divided as following: Scores less than 18 (< 50%) are considered unsatisfactory level of knowledge. Scores from 18-31(50-74%) are considered satisfactory level of knowledge, and Scores from 31- 40 (>75%) are considered good level of knowledge. After construction of the tools, they were evaluated by 7 experts from nursing faculty and gastrointestinal physician for content of validity, relevance, and tested for reliability (by test- retest) on 10 patients.

**Part 3: Anxiety Assessment Scale:**

State Trait Anxiety Inventory (STAI) was adopted from **Spielberg, (1983)**, It consists of 40 items, designed to measure anxiety according to its subscales: a) Trait anxiety (20 items) and b) State anxiety (20 items). Anxiety subscale are using a 4-point rating scale, ranging from 1 (hardly ever) to 4 (almost always), which is attached to each statement. Possible scores range from range from 4 to 160, higher scores indicate anxiety. STAI requires approximately 10 -15 minutes to complete [18].

**Part 4: Tolerance Assessment Sheet (TAS):**

The measurement of tolerance is primary patient's outcome for endoscopy, It was developed and written in Arabic language by the researcher after reviewing relevant literature [19, 20].It included drawback during endoscopy, pain, discomfort (nausea, vomiting), attempting to grasp the endoscope, and attempts to remove the tube, total procedure time spent, shout during the procedure, etc., The questionnaire consisted of ten items. Each correct option was given a score of one and zero for incorrect option. The alternative of "do not know" was

included. The maximum score on tolerance level was 10. The tolerance score was interpreted as poor, moderate or good.

**Human right and ethical considerations:**

The researcher approached patients individually at endoscopy unit and explaining the purpose of the study. Patients who were willing to participate were included in the study after obtaining their written consent. Confidentiality of all information was secured.

**Validity and reliability of the tools:**

Validity of tools was done by 7 experts from medical and nursing field to check the relevancy, clarity, comprehensiveness, and applicability of the questions. According to their opinions, minor modifications were done and the final form was developed. The reliability of the tool was tested using the internal consistency method. It was found that Cronbach's alpha reliability coefficient was 0.85[21].

**Pilot Study:**

The Arabic versions of the tools were piloted on ten patients to test feasibility of conduction and clarity of tools. Patients included in the pilot study were excluded in the study sample.

**Field Work:**

Data were collected in the following sequence:

**Assessment phase:** the study protocol was approved and an official permission from hospital director to carry out the study after identification of the purpose of the study. The data were collected throughout two phase of assessment by using two tools. The first phase of assessment was collected prior to conducting the teaching guidelines to have base line about patient condition and observe and measure patient outcome through anxiety level and tolerance for procedure.

**Planning Phase:** development of the teaching guideline was based on analysis of the collected data. It was developed guided by reviewing the most recent related literature; the researchers developed a training program for patients using teaching aids and media, video and also Arabic handouts.

**Implementation phase:** data were collected at endoscopy unit at Mansoura university hospital. Data collection covered a period of 8 months started from the first of May 2014 to the end of Dec. 2015, this program covered by 4 sessions (2 sessions for information, one session pretest and one session posttest). Each session take 30-45 hours, number of patients in each session included two patients or individualized patients. Structured teaching regarding the procedure of upper GI endoscopy was administered to all the selected patients. Initially they were proved a video depicting procedure of endoscopy, instruments used and associated discomfort. In addition to, explain the various the preparation, steps of procedure during endoscopy and

post endoscopic care.

**Evaluation phase:** the last phase of teaching guideline. Each patient was evaluated two times First, before start the endoscopic procedure, and secondly upon discharge. Pre-examination phase, were elicited demographic data, and anxiety level. The second step was accomplished after endoscopy and on discharge and involved patients' knowledge, anxiety level and tolerance level as primary outcome was estimated by the researcher using tool. Evaluation of patients' tolerance was observed by the researcher using tools part III. While the patient recuperated from the procedure, around 1-2 hour after takeoff the endoscopy.

#### Statistical analysis:

Upon completion of data collection variables included in each data assessment sheet were coded and scored manually prior to computerized data entry. Descriptive statistics (frequency, percentage, mean and standard deviation) were performed for quantitative and qualitative variables. Person's correlation coefficient ( $r$ ) and test of significant (paired and unpaired  $t$ -test and chi-square).  $p$  value was considered significant if less than 0.05. The above mentioned statistical technique were obtained by using the statistical package of social sciences SPSS.

### 3. Results:

The study sample of patients consisted of (66.66) males, (38.33) being females with mean age ( $42.75 \pm 13.65$ ) as seen in Table (1). Nearly two third are married (56.66). Their education was mostly none and elementary (63.33.3), with only 13.33% having university education, the most of studied subjects (70%) were lived in rural area. The nearly two third of patients were no previous endoscopy experience (57.1%).

**Figure (2).** This table revealed that the most patients (36.6% and 31.6%) were more than 41 years olds in study group.

**Table (2).** Shows marked deficiency in patients' knowledge related to all aspects, with none of overall satisfactory knowledge during the pre-program. While, there statistically significant improvements in all aspects of patients' knowledge regarding endoscopy after the implementation of the program at the posttest ( $p < 0.001$ ).

**Table (3).** This table illustrated that the three were highly statistical difference between the mean scores of pre and posttest respectively ( $p < 0.001$ ).

**Figure (3).** This figure stated that statistically significant improvement in level of anxiety from base line to post program implementation.

**Table (4).** Shows that there was a statistically significant difference in the mean tolerance scores of

the study group at ( $p < 0.0001$ ) level. The significant mentioned above are illustrated graphically in **figure 4**.

**Table (5).** This table revealed statistically significant positive correlations between patient's knowledge scores and anxiety level and tolerance with procedure. The table also illustrates statistically significant negative correlations between patients' age and of knowledge and anxiety level. There are statistical significantly between education level and knowledge ( $p < 0.05$ , respectively). Also tolerance levels had statistical significantly with knowledge level ( $p < 0.001$ , respectively). No statistically significant relations were found between knowledge and gender in study group.

**Table 1. Socio demographic and medical characteristics of patients with upper gastrointestinal endoscopy (N=60)**

Items	Frequency	Percent (%)
<b>Gender:</b>		
- Male	37	66.66
- Female	23	38.33
<b>Age:</b>		
- M $\pm$ S.D	42.75 $\pm$ 13.65	
<b>Marital status:</b>		
- Single	10	16.66
- Married	34	56.66
- Widow	16	26.66
<b>Level of education:</b>		
- None & elementary	38	63.33
- Middle & high school	14	23.33
- University	8	13.33
<b>Occupation:</b>		
- Employer	10	16.66
- Skilled worker	17	28.33
- Farmer	14	23.33
- House wife	13	21.66
- Not working	6	10
<b>Residence:</b>		
- Rural	42	70
- Urban	18	30
<b>Previous endoscopic experience:</b>		
- Yes	21	35
- No	39	65
<b>Procedure duration (min)</b>		
- M $\pm$ S.D	5.34 $\pm$ 2.13	
- Range	4-20	
<b>Diagnosis:</b>		
- Esophagitis	18	30
- Gastritis	23	38.33
- Gastro duodenal ulcer	12	20
- Others	7	11.66

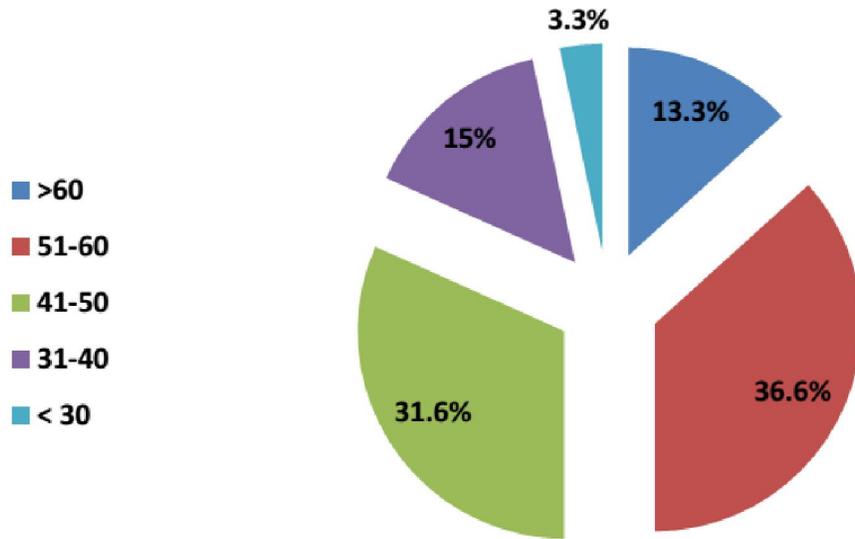


Fig. 2. Age distribution of study group

Table 3. Difference between pre and post test scores of knowledge for study group

Knowledge level	Pre- test (M±S.D)	Post -test (M±S.D)	P- value
- Unsatisfactory	52(86.66)	42(70)	P<0.001
- Satisfactory	8(13.33)	18(30)	
- (M±S.D)	8.62 ± 1.95	25.2 ± 1.21	P<0.001

Table 2. Knowledge level among the study group pre and post teaching program

Items	Pre		Post		Chi-square	
	N	%	N	%	X2	P- value
<b>Gastrointestinal endoscopy natural &amp; function:</b>						
- Satisfactory	10	16.66	50	83.33	132.4	<0.001
- Unsatisfactory	40	66.66	10	16.66		
<b>Endoscopy Instrument:</b>						
- Satisfactory	8	13.33	51	85	112.45	<0.001
- Unsatisfactory	42	70	9	15		
<b>Endoscopy Procedure:</b>						
- Satisfactory	7	11.66	48	80	110.83	<0.001
- Unsatisfactory	43	71.66	12	20		
<b>Discomfort:</b>						
- Satisfactory	4	6.66	57	95	87.37	<0.001
- Unsatisfactory	56	93.33	3	5		
<b>Follow up:</b>						
- Satisfactory	5	9.43	53	88.33	125.18	<0.001
- Unsatisfactory	55	91.66	7	11.66		
<b>Total knowledge:</b>						
- Satisfactory	8	13.33	42	70	142.34	<0.001
- Unsatisfactory	52	86.66	18	30		

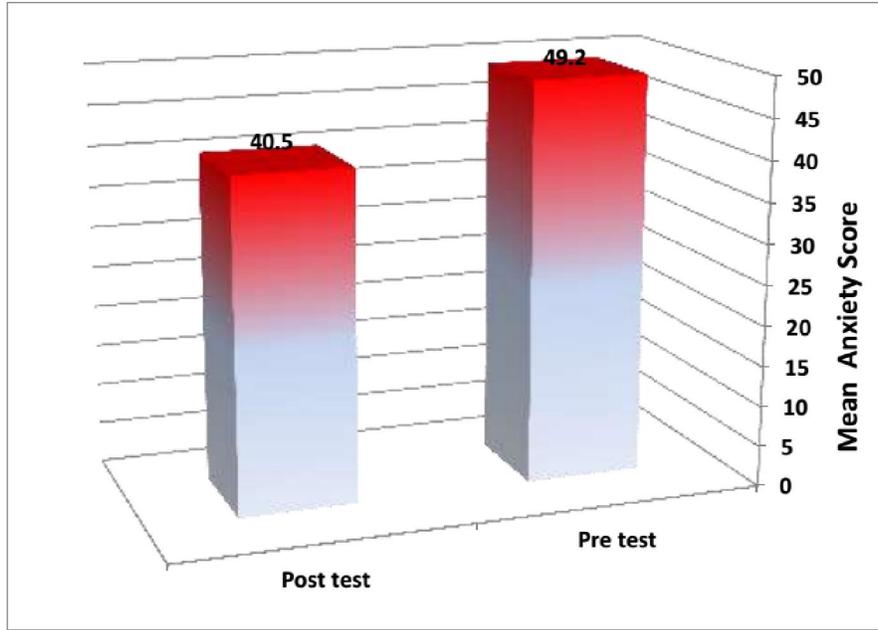


Fig. 3. Mean anxiety score of patients undergoing endoscopy during the Pretest and Posttest

Table 4: Table 4: Difference between pre and post test score of tolerance for the study

Items	Pre- test Mean ± SD	Post – test Mean ± SD	Independent ‘t’ test & P value
Good tolerance	1.86 ±2.48	5.21±2.034	-3.6800 P<0.001
Moderate tolerance	14±1.000	9.93±1.830	
Mild/ intolerance	18.7±1.12	16.5±1.56	

61\*\*\* $p < 0.0001$

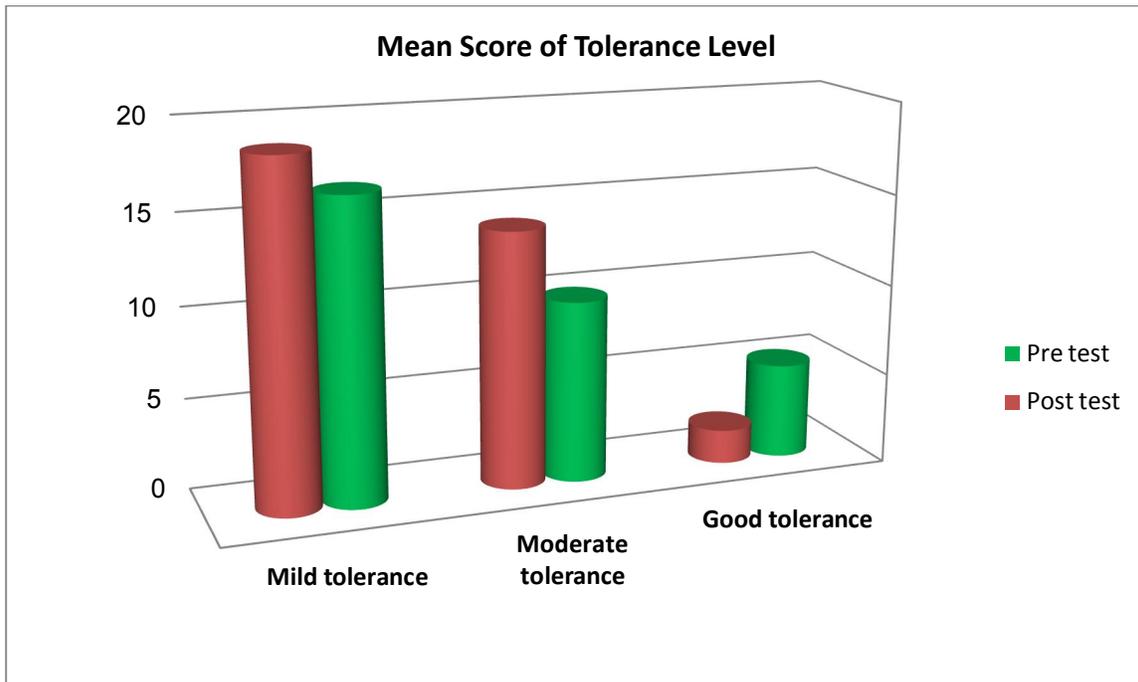


Fig. 4 Mean score of tolerance level among study participants

**Table 5. Correlation between knowledge levels and some variables related to endoscopic process among studied patients.**

Items		N	Knowledge (Mean±S.D)	Independent 't' test	P value
<b>Sex:</b>	Male	37	11.17±7.037	1.234	0.512
	Female	23	9.93±8.540		
<b>Educational level:</b>	Educated	22	13.12 ±8.32	3.247	0.045*
	Not educated	38	10.778±6.635		
<b>Age:</b>	<30	2	5.456±0.678	-1.153	0.046*
	31-40	9	12.543±5.125		
	41-50	19	14.100±6.51		
	51-60	22	9.92±7.05		
	>60	8	10.65±7.67		
<b>Anxiety level:</b>	No	45	2.41±2.43	2.131	0.038*
	Yes	15	3.45±2.214		
<b>Tolerance:</b>	Well	39	13.68± 8.21	4.590	0.001*

\*p<0.05(significant)

#### 4. Discussion:

Previously endoscopic procedure anxiety, it often associated with the fear of experiencing pain and discomfort during endoscopy was positively associated with decreases patient cooperation and tolerance with procedure [22]. Therefore, control of discomfort and pain during the endoscopy was considered to be a high priority by patients [23]. For these reasons, the current study recommended patient education to overcome this problem during all phases of the procedures.

The present study included 60 patients; their mean age was (42.75±13.65) years. The more third of the patients their age ranged from 41-50 years, and was predominantly males 37 (66.66%). These have attributed to stressful life style and consume junk foods and increased consumption of caffeine, heavy smoking, and long-term aspirin therapy and spacy food. These findings are in agreement with study done by Lee and colleagues [24], revealed that most of the patients undergoing upper GI endoscopy were (57.2%) and belonged to the age group 41-49 years. This was in line with Ruhl & Everhart, who stated that majority of the patients undergoing upper GI endoscopy belonged to the age group 50-59 years [25].

According to the current study finding, the total mean knowledge score of the patients increased significantly after the structured teaching programmed. On the same line, study conducted by Maguire and colleagues [26], stated that providing written information in the way of a brochure would be a best intervention done by nurses to deal with and reduce patients' anxiety during the procedure. Statistical analysis showed that there was a statistical significant increase in the information and attitude of patients after the structured teaching program

( $p < 0.05$ ). As a result, get better clinical outcome and prohibit clinical complication.

The finding of the present study revealed anxiety level is increase before for gastrointestinal endoscopic procedure due to feeling of pain and discomfort associated with the procedure. These findings in similarity with Jones *et al.* [27], found that the anxiety level is increased before the endoscopy procedure. Brandt [2], who found that patients scheduled for endoscopy are usually anxious about the technical aspects of the procedure, the pain and discomfort during and after the procedure of gastroscopy and decrease procedure tolerance [11]. In a study performed by Aabakken [28], emphasized that structured information, which transmitted more detailed information may decrease patients' anxiety and improve general health.

The current study revealed that the mean anxiety score in the post test less than the mean anxiety score in pretest after implementation of teaching guidelines. This is congruent with Maguire, *et al.* [26], they stated that combination of information and training prior to procedure is an effective means for reducing anxiety. This may be attributed that adequate information and increase awareness among patients pre procedure associated with reduce the anxiety level and as well as tolerance with procedure. In equivalence with this, Mahajan [29] in which better tolerance of upper GI endoscopy with lower anxiety levels among elderly patients.

Anxiety, discomfort, and pain are interrelated, and each may increase the others [30], making positively affect endoscopic procedure and occurs more difficult. Thus, several methods can be used to reduce patient pre-procedural worries, such as relaxation and coping techniques [31, 32], and ziker

mediation [33], educational materials including videotapes [34], during the procedure had beneficial effects on the patients. This led to the anxiety level was significantly low in the informed patients and families. Kutluturkan, et al., [35], who suggested use of written material including detailed information to inform the patient before endoscopy was useful in lessening their anxiety level.

The findings show significant improvements in tolerance throughout procedure, with almost all patients post implementation of teaching guidelines. This result is consistent with those obtained by Rosa, et al., [36], found that nursing intervention consisting of both cognitive and behavioral preparation was more effective in reducing patient anxiety than a purely cognitive intervention. Shapira & Tamir [37], who reported that increase patient knowledge, allay the anxiety of OGD patients. So, reduction in anxiety favors and improved patient satisfaction and tolerance with the procedure. In the same line study by Abuksis *et al.*[11], stated that a pre-endoscopy patient education program apparently increased patient compliance and improve over general health.

In current study, gender, and age, influenced significantly the tolerance were identified as indicators of an overall unsatisfied procedure. This is consistent with study by Mulcahy *et al.*[38] found that besides anxiety, the age and gender also influenced significantly the tolerance to endoscopy. In consistent study by Lee *et al.*[24], revealed that the no significant difference in sex, or age with education program.

### 5. Conclusion and recommendations:

The findings of the study concluded that the anxiety state is found to be more common among the patients subjected to endoscopy procedure. Preparatory guideline intervention was an effective method to decrease the anxiety and increase the tolerance of the patients subjected to gastroscopy. This study is recommended that replication of the current study on a larger probability sample from which geographical areas, to achieve generalizable results. Also an Arabic guide should be distributed to endoscopy patients prior the procedure.

### Conflicting Interest:

The author declared that there was no conflict of interest.

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### Author contributions:

SAM developed this study's idea and planned the design, collected and analyzed the data, and wrote the paper.

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