Video assisted Education and its Effect on Bowel Clearance and Satisfaction among Patients Undergoing Colonoscopy

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Abstract

Background: The bowel preparation remains a significant barrier for patients who need to undergo colonoscopy. Inadequate bowel preparations still occur in about 10–25% of colonoscopies. So the inadequate nursing intervention leads to inadequate bowel preparation, serious complications and dissatisfaction for the patient undergoing colonoscopy. **Aim:** to examine the effect of video assisted education on bowel clearance and satifaction among patients undergoing colonoscopy. **Design:** a quasi-experimental research design was utilized. **Setting:** Gastrointestinal Endoscopy Unit of Menoufia University Hospital. **Sample:** Consecutive sample of 60 patients undergoing colonoscopy were assigned randomly into two equal groups, 30 patients for each group: Study group (I): received video assisted education along with routine hospital care. Control group (II): received routine hospital care only. **Instruments** (1): Structured interviewing questionnaire (2): Boston Bowel Preparation Scale (BBPS) (3): Modified Group Health Association of America 9(mGHAA-9 Questionnaire). **Results:** The findings revealed that there were highly significant differences were existed between study and control groups regarding their degree of bowel clearance ($P< 0.001$) in addition to improvement of patients' satisfaction among the study group subjects than control group subjects. **Conclusions:** Video assisted education had a positive effect on enhancing quality of bowel clearance and improvements in patients' satisfaction for patients undergoing colonoscopy. **Recommendations:** Developing illustrative educational videos to encourage the patients for bowel preparation and improve patient satisfaction and training program for nurses to improve their skills in teaching patients about colonoscopy preparation and the importance for seeking rapid medical advice.

Key Words: Video assisted Education, Bowel clearance, Satisfaction and Colonoscopy.

Introduction

Colonoscopy is the gold standard tool of screening with a high sensitivity and specificity. It affords the opportunity to detect and resect neoplasia and precancerous lesions across the entire large bowel and is the definitive examination when other screening tests are positive. It is a procedure that uses a long, flexible, narrow tube with a light and tiny camera at one end, called a colonoscope. Colonoscopy is largely performed in daily clinical practice for both diagnostic and therapeutic purposes (Jung, Park, et al., 2017)

Proper bowel preparation is essential to assure complete mucosal visualization and reduce risk of complications. In contrast, inadequate bowel preparation has been shown to reduce colonoscopy quality, cause

difficult viewing and longer procedure time, and to increase need for repeated colonoscopy (Liu, Song, etal, 2018).

Patient satisfaction is a vital concern in achieving quality in health care service. It is based on the degree to which nursing care meets patients' expectation in terms of art of care. Maintenance of patient comfort, dignity, and privacy are importance during colonoscopy. Discomfort during bowel preparation and during colonoscopy, factors which may be related to dissatisfaction towards the procedure. Waiting times for colonoscopy appointment and on the colonoscopy day which have also been recognized as major factors for patient dissatisfaction towards their experience with the procedure (Brotons, Guilabert, et al., 2019)

Inadequate bowel preparation is considered to be the leading cause of patient dissatisfaction of the outpatient colonoscopy service followed by waiting times for colonoscopy appointment and on colonoscopy day (Baker, Mari, et al., 2019; Chan and Goh, 2012).

Despite the importance of bowel preparation, a low bowel preparation rate was reported 20 to 25% for all colonoscopies. It is well known that adequate colon preparation is essential for successful and safe colonoscopy, whereas inadequate cleansing usually leads to procedural difficulties, operation related complications, a lower cecal intubation rate, higher procedural time and number of missed lesions, in addition to patient dissatisfaction, the reduced interval to follow up, which may require early repeat colonoscopy, ultimately increasing overall healthcare expenditures (Bernstein, Kong, et al., 2019).

Moreover, preparing for a colonoscopy can be frustrating for the patients; so, it is the role of the care providers to take time for explaining how exactly they should approach in order to avoid any failures and repeat exams which can be agonizing for the patient (Wexner and Beck, 2016).

It is important that patients are educated and engaged in the colonoscopy preparations process. Therefore, a number of interventions to improve patient education and understanding of the procedure have been reported in the literature. It have been significantly improved compliance with the instructions for bowel preparation and ultimately promoted the visualization of the colon in patients undergoing colonoscopy. These include the use of instructional visual aids, oral and written instructions (Hayat, Lee, etal,2016 and Bernstein, Kong et al., 2019).

Videos are an option for distributing information, this method is especially helpful for demonstrating skills because videos can be replayed and stopped. Videos are effective than written instruction so, it takes advantages of more than one route for imparting information. It is also independent of reading level; cheapest to lend to the patient for home viewing, with subsequent return to the practice when finished (Ahmed, 2016 and Liu, Zhang et al., 2017).

A randomized controlled trial of an educational video to improve quality of bowel preparation for colonoscopy study carried by Park, Kim, et al (2016) mentioned that, the video group exhibited better bowel preparation (mean Ottawa total score: 3.03 ± 1.9) than the non-video group (4.21 ± 1.9; $P < 0.001$) and had good bowel preparation for colonoscopy (total Ottawa score < 0.001).

According to Pillai, Menon, et al., (2018), concluded that patients who watched an instructional video prior to colonoscopy

had better bowel preparations as compared with their counterparts.

For achieving the aim of the current study video was designed to explore the steps of bowel preparation, which included instructions to supplement the standard written preparation instructions. Therefore, the current study aimed to examine the effect of video assisted education on bowel clearance and satisfaction among patients undergoing colonoscopy

Significance of the Study

The number of colonoscopies is increasing worldwide, and concerns about associated adverse events are growing. An estimated 11-13 million colonoscopies are performed in the United States annually (Smith, Andrews, et al., 2019). Inadequate bowel preparation affects on patient satisfaction toward colonoscopy. Unsatisfactory colonoscopy screening experience may discourage repeat screening (Brotons, Guilabert, et al., 2019). Bowel preparation is inadequate in about 10% to 25% of colonoscopies (Millien and Mansour 2020), and have impacts on colonoscopy quality, lengthens procedure times and results in shorter surveillance intervals, incomplete screening colonoscopy and increased costs. Colonoscopic examinations of these patients were associated with increased technical difficulty and patient discomfort (Shah, Zhou, and Parikh, 2019).

Purpose of the Study

The purpose of the current study was to examine the effect of video assisted education on bowel clearance and satisfaction among Patients undergoing colonoscopy.

Research Hypothesis:

- Patients received video assisted education exhibit more improvement in bowel clearance (study group) than patients who follow routine medical care alone (control group).
- Patients received video assisted education exhibit improvement in their satisfaction (study group) than patients who follow routine medical care only (control group).

Subjects & Methods:

Research design:

A quasi-experimental research design (study and control) was utilized to achieve the purpose of this study.

Research Setting:

The study was carried out at Gastrointestinal Endoscopy Unit of Menoufia University Hospital.

Sampling:

Consecutive sample of 60 adult patients of both gender scheduled for colonoscopy divided randomly and alternatively into two equal groups 30 patients in each (study and control group).

- Study group (1): Patients received a detailed education about proper technique of colon preparation for colonoscopy by using designed video illustrates all instructions and activities along with routine medical care.

- Control group (2): received routine hospital care only such as oral and written instruction.

Sampling Technique:

The sample of the study estimated by using the following power analysis equation: n = [(Zα/2 + Zβ)2 × {(p1 (1-p1) + (p2 (1-p2))}]/(p1 - p2)2 based on this assumption, the sample size was estimated to be 60 at confidence interval 80%.

Inclusion criteria

- Conscious patients aged 18-65 years
- Patients who scheduled for colonoscopy for the first time.

Exclusion criteria

- Emergency cases such as patients who presented with intestinal obstruction, patients with chronic constipation, severe toxic megacolon and fulminant colitis to avoid perforation.

Instruments:

Three instruments were used by the researchers for collecting the necessary data, these instruments were:

Instrument I: Structured Interviewing questionnaire.: It was developed by the researchers based on pertinent literature and guidance of expertise to collect sociodemographic data. It consisted of three parts as the following:-

- Part one: Sociodemographic data: It was comprised of six questions includes data related to patient's age, gender, marital status, occupation, level of education and residence.
- Part two: Medical data: It include questions about medical history, family history, and reason for colonoscopy.

Instrument II: Boston Bowel Preparation Scale (BBPS):

This scale was developed by the section of gastroenterology at Boston Medical Center (BMC). Adopted by Lai, Calderwood and Jacobson, (2011) to distinguish various degrees of bowel cleanliness. In this scale, the colon is divided in three segments as following:

- The right side (including cecum and ascending colon),
- The transverse colon (including the hepatic and splenic flexures)
- The left sided colon, which includes the descending colon, sigmoid and rectum.

❖ **Scoring system:**

Four-point scoring system applied to each of the three broad regions of the colon. The points are assigned as follows:

- 0 = Un prepared colon segment with mucosa not seen due to solid stool that cannot be cleared.
- 1 = Portion of mucosa of the colon segment seen, but other areas of the colon segments not well seen due to staining, residual stool or opaque liquid.
- 2 = Minor amount of residual staining, small fragments of stool or opaque liquid, but mucosa of colon segment seen well.
- 3 = Entire mucosa of colon segment seen well with no residual staining, small fragments of stool or opaque liquid

The maximum BBPS score for a perfectly clean colon without any residual liquid is 9 and the minimum BBPS score for an unprepared colon is 0.

Total scoring system for BBPS as the following:

BBPS	Score
The maximum BBPS score for a perfectly clean colon without any residual liquid	9
The minimum BBPS score for an unprepared colon	0
Excellent BBPS score	(≥ 7 degrees)
Fair	(4-6 degrees)
Poor	(≤ 3 degrees)

Instrument III: Self-Administered Questionnaire 9(Modified Group Health Association of America 9(mGHAA-9 Questionnaire): It was adopted by (Johanson, Schmitt, etal., (2000). It was based on the modified Group Health Association of America9 (mGHAA-9) questionnaire. used by researchers to assess level of patients satisfaction. It consists of ten questions, that reflect degree of satisfaction.

❖ **Scoring system**:

A five point Likert scale used to grade satisfaction (1=poor, 2=fair, 3=good, 4=very good, 5=excellent). Patient response for each question 1 to 8 was dichotomized to favorable (excellent, very good, good) and unfavorable (fair, poor). Scores 1 and 2 were considered unfavorable, while a score of 3 or more denoted that favorable response. The percentages of favorable and unfavorable responses for each of the questions were calculated.

Methods:

Written approval:

A written approval from ethical committee was obtained to carry out the study; then an official letter from Faculty of Nursing Menoufia University was delivered to the responsible authorities of hospital chief executive and the director of Gastrointestinal Endoscopy Unit (hospital administrators and the head nurses of unit) to obtain written approval to conduct this study from them after explaining the aim of the study.

Validity:

All instruments were tested for its content validity by jury of five experts in the field of medical surgical nursing, Faculty of Nursing, Menoufia University and modifications were done to ascertain relevance and completeness.

Reliability:

All instruments were tested using a test-retest method and a pearson correlation coefficient formula was used. The period between each test was two weeks. It was 0.97, 0.89 and 0.80 for first, second and third instrument respectively

Ethical Consideration:

A written and verbal consent was obtained from all patients' to participate in this study after explanation of the purpose of the study. Each patient was reassured that any information obtained would be confidential and would only be used for the study purpose. The researchers emphasized that participation in the study was entirely voluntary and anonymity of the patients were assured through coding of data. Patients were also informed that refusal to participate in the study wouldn't affect their care.

Pilot study:

It was conducted prior to the actual study on 10% of the study sample (6 patients) to test the clarity and applicability of the tools and estimate the time needed to collect data. Data obtained from the pilot study was excluded from the current study.

Data collection procedure:

1. Data collection extended over a period of five months from beginning of October 2019 to end of February 2020.

2. Each patient who fulfills the inclusion criteria and agree to participate in the study was interviewed individually by the researchers in the waiting area of endoscopy unit immediately on admission day. Session took about 20: 30 minutes.

3. The researchers introduced themselves to each patient, explain the aim of the study, and describe the instruments for patients prior to data collection.

4. The subjects were divided randomly into two equal groups, study group (I) and control group (II).

5. The researchers collect the data from the control group (Π) firstly then the study group (I) to avoid the contamination of data collection.

6. Pre study data (Sociodemographic data) assessed by the researchers using part one of instrument (I) for both study and control groups at the time of admission.

7. Medical data was taken before the beginning of the preparation by using part two of instrument (I) for both groups I and II on admission day.

8. Each patient of study group (I) scheduled individually for one teaching session using **the designed video**. It took about 20:25 minutes for instructions and about 5:10 minutes for discussion and feedback.

9. During the session, study group (I) received instructions through **video** illustrates the instructions for more clarifications, which include structure and function of the colon, definition of colonoscopy, colon preparation before colonoscopy, etc. The instructions were given such as the followings:

   - Instruct patient to stop vitamins, supplements and anti-inflammatory medications temporarily (ibuprofen/Aspirin).

   - The contents of a proper diet before colonoscopy, adequate hydration (water or recommended fluids) after taking the laxatives.

   - Before a few days (three to four day) of the colonoscopy procedure, start eating a low-fiber diet that are easy to digested and eliminated from the colon quickly before the procedure.

   - Patients instructed to avoid eating solid food for 24 hours before the test and inform patient to have clear liquids such as sports drinks, clear juice like apple and clear broth. Soda, coffee and tea, but without cream, gelatin and ice pops, but stay away from anything colored red, blue, or purple.

   - Patients were encouraged to drink a lot of fluids and to continue clear liquids up until two hours before their scheduled time for procedure.

   - Instruct patient that the colon is fully empty and ready for screening if bowel movement become watery and clear.

   - An enema prescribed in cases where the large intestine is not fully empty following colonoscopy preparation, for example due to constipation.

10. The researchers took a feedback from discussion to make sure that they successfully mastered and give a direct

insight into what is working well and what needs further improvement.

11. Reinforcement of teaching performed according to patient's needs to ensure their understanding.

12. Finally, each patient in the study group (I) were get a copy of the video.

13. Control group (II) exposed to routine hospital care only such as oral and written instructions.

14. Quality of Bowel clearance for colonoscopy assessed by the researchers during procedure using instrument II (Boston Bowel Preparation Scale (BBPS)) for both study and control groups

15. Patient's satisfaction was assessed after procedure (after patients have recovered from sedation and before they leave the endoscopy suite. By using the instrument III (Modified Group Health Association of America 9 (mGHAA-9 Questionnaire) for both study and control groups.

Statistical Analysis

Data were collected, tabulated, statistically analyzed using an IBM personal computer with Statistical Package of Social Science (SPSS) version 22 (SPSS, Inc, Chicago, Illinois, USA).where the following statistics were applied:. Two types of statistics were done:

1) Descriptive statistics: in which quantitative data were presented in the form of mean, standard deviation (SD), range, and qualitative data were presented in the form numbers and percentages.

2) Analytic statistics: used to find out the possible association between studied factors and the targeted disease. The used tests of significance included:

- Chi-square test ($\chi 2$): was used to study association between two qualitative variables.
- Fischer exact test for 2 x 2 tables when expected cell count of more than 25% of cases was less than 5.
- Student t-test: is a test of significance used for comparison between two groups having quantitative variables.
- Mann-Whitney test (nonparametric test): is a test of significance used for comparison between two groups not normally distributed having quantitative variables.
- Kruskal-Wallis test (nonparametric test): is a test of significance used for comparison between three or more groups not normally distributed having quantitative variables.

P-value at 0.05 was used to determine significance regarding:

- P-value > 0.05 to be statistically insignificant.
- P-value ≤ 0.05 to be statistically significant.
- P-value ≤ 0.001 to be highly statistically significant.

Results

Table (1): illustrated that, the mean age of study and control groups were 48.7± 10.4 and 45.9 ± 8.78 years respectively. About two thirds of both studied groups were male and lives in rural areas, around two third (63.3%) of study group were single compared to 46.7% of control group. In relation to educational level, more than one third of both groups were illiterate. In addition to more than half of both studied

groups were worked. 46.7% and 50.0% of both studied groups respectively were smokers. The mean body mass index of study group was 27.2±3.36 while in control group was 26.8±3.44. There were no statistically significant differences between both study and control group regarding to all socio-demographic characteristics.

Table (2): The findings showed that, there were statistically significant differences were existed between study and control groups regarding degree of bowel clearance. 83.3%, 63.3% and 46.7% of colon preparation for study group subjects had seen well for ascending, transverse and descending colon respectively compared to control group subjects.

Figure (1): showed that there were highly statistically significant differences between study and control groups regarding their total bowel clearance scores at P value < 0.001, 80.0 % of study group subjects had excellent scores while 6.70 % had bad scores for bowel preparation compared to 16.7% of control group subjects had excellent scores and 50% had poor scores for bowel clearance.

Table (3): showed that There was statistically significant difference between study and control group regarding satisfaction after colonoscopy. 80.0% of control group and 36.7% of study group were not satisfied.

Table (4): showed that, there were relationships between degree of bowel clearance and satisfaction post colonoscopy among the studied groups. So, 100% of poor preparation of study group subjects un satisfied and 75.0 % of subjects with excellent preparation were satisfied.

Table (1): Distribution of the studied sample according to their Socio-demographicc characteristics.

Socio demographic characteristics	Study group n=30		Control group n=30		Test of sig.	P value
	No.	%	No.	%		
Age / years	Mean ±SD 48.7±10.4		Mean ±SD 45.9±8.78		t-test 1.08	0.283
Gender						
Male	21	70.0	20	66.7	χ^2	0.781
Female	9	30.0	10	33.3	0.077	
Marital status						
Single	19	63.336.7	14	46.7	χ^2	0.194
Married	11		16	53.3	1.68	
Residence						
Rural	20	66.7	18	60.0	χ^2	0.592
Urban	10	33.3	12	40.0	0.287	
Educational level						
Illiterate	13	43.3	14	46.7		
Basic	8	26.7	10	33.3	χ^2	0.825
Secondary	5	16.7	3	10.0	0.902	
University	4	13.3	3	10.0		
Occupation						
Work	16	53.3	18	60.0	χ^2	0.602
Not work	14	46.7	12	40.0	0.271	
Smoking						
Yes	14	46.7	15	50.0	χ^2	0.796
No	16	53.3	15	50.0	0.067	
BMI	Mean ±SD 27.2±3.36		Mean ±SD 26.8±3.44		t-test 0.448	0.656

Table (2): Distribution of studied groups according to bowel clearance degree (N=60).

Studied variables	Study group N=30		Control group N=30		χ^2	P value
	No.	%	No.	%		
Ascending colon preparation						
Un prepared	2	6.70	5	16.7		
Partial portion was seen	1	3.30	6	20.0	19.8	**<0.001***
Minor of residual staining	2	6.70	11	36.6		
Seen well	25	83.30	8	26.7		
Transverse colon preparation						
Un prepared	1	3.30	10	33.3		
Partial portion was seen	1	3.40	10	33.3	28.5	**<0.001***
Minor of residual staining	9	30.0	8	26.7		
Seen well	19	63.3	2	6.70		
Descending colon preparation						
Un prepared	3	10.0	12	40.0		
Partial portion was seen	1	3.30	11	36.6	25.6	**<0.001***
Minor of residual staining	12	40.0	5	16.7		
Seen well	14	46.7	2	6.70		

* Significant :at P value ≤ 0.05

Figure (1): Distribution of the studied groups according to total bowel clearance scores.

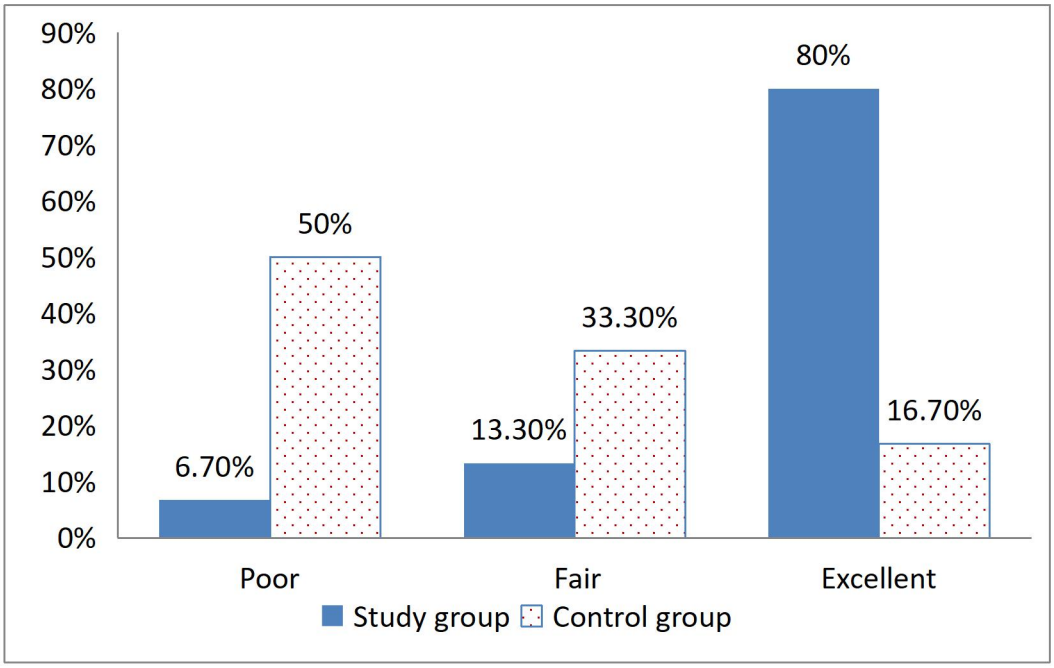

Table (3): Distribution of the studied groups according to total post colonoscopy satisfaction scores (n=60).

Studied variables	Study group N=30		Control group N=30		χ^2	P value
	No.	%	No.	%		
Satisfaction						
Satisfied	19	63.3	6	20.0	11.5	**0.001***
Unsatisfied	11	36.7	24	80.0		

* Significant: at P value ≤ 0.05

Table (4): Relation between bowel clearance score and satisfactions after colonoscopy among the study group (N.=30).

Satisfactions	Study group BBPS						χ^2	P value
	Poor N=2		Fair N=4		Excellent N=24			
	No.	%	No.	%	No.	%		
Satisfaction								
▪ Satisfied	0	0.00	1	25.0	18	75.0	7.39	**0.024***
▪ Not satisfied	2	100	3	75.0	6	25.0		

* Significant: at P value ≤ 0.05

Discussion:

Regarding to Socio-demographic characteristics of the studied sample: The result of the present study revealed that, there was no statistical significant difference between studied groups regarding their socio-demographic characteristics and this was consistent with Janahiraman, Tay, et al. (2020); Ahmed (2016) and Liu, Song, et al (2018) who reported that the studied groups didn't differ significantly at baseline regarding biosociodemographic characteristics.

The results of the current study illustrated a highly statistical significant difference between study and control groups regarding the degree of bowel clearance, as the majority of the study group subjects had higher degree of colon clearance than control group subjects.

Regarding to total bowel clearance scores among studied groups, the findings revealed that there were highly statistically significant differences between study and control groups regarding their total bowel clearance scores at P value < 0.001. From the researchers point of view, these results may be related to using video assisted education about preparation before colonoscopy was more effective on improving quality of bowel preparation.

This result was agree the results of Ergen, Pasricha, et al (2016) and Park, Kim, et al (2016) who reported that the use of a visual aids such as a booklet and educational videos, as a means of education, was associated with improved quality of bowel preparation.

Conversely, a randomized controlled trial of 969 patients that aimed to investigate the effect of visual aid on bowel preparation found no statistically significant impact of visual aid on quality of bowel preparation; a 91% rate of adequate bowel preparation was noted in the experimental group and 89% adequate bowel preparation rate in the control group (P = .43) (Calderwood, Lai, etal 2011).

Liu, Song, et al (2018) mentioned that an educational video followed by asking the patient to retell the process of bowel preparation immediately after regular instructions at the colonoscopy appointment is a convenient and feasible intervention, which could enhance patient compliance with bowel preparation instructions and improve bowel preparation quality.

Moreover, Hayat, Lee, etal, (2016) and Cho and Kim (2015) reported that patients who completed the viewing of the video had significantly higher rates of satisfactory bowel preparation rates as compared with the patients who did not see the video

Additionally, This result was in the same line with Ahmed (2016) who revealed that, The video group exhibited better bowel preparation (mean Ottawa total score: 3.03 ± 1.9) than the non-video group (4.21 ± 1.9; P < 0.001) and had good bowel preparation for colonoscopy (total Ottawa score < 0.001) . Therefore, The addition of an educational video

recommended to improve the quality of bowel preparation in comparison with standard preparation methods.

So, The first hypothesis which revealed that patients received video assisted education exhibit more improvement in bowel clearance (study group) than patients who follow routine medical care alone (control group). was accepted through the current study research findings.

Regarding to the patients satisfaction, The findings of the present study revealed that, the mean score of the patients satisfaction was significantly higher in the study group than control group subjects. This result indicate that, ineffective bowel preparation and discomfort during procedure were main factors for patient dissatisfaction. So, using video assisted education before colonoscopy was associated with increased patient satisfaction.

This result parallel with Cho, Lee, et al (2017) who reported that, The mean score of the patients satisfaction were significantly higher in the study group than control group 7.62±2.2 vs 5.97±2.2, respectively at P value <0.001). Also, These results were in line with, Chartier, Arthurs, et al. (2010) who cleared that, a precolonoscopy consultation was associated with increased patient satisfaction and willing to return under the same conditions.

So, The second hypothesis which revealed that patients received video assisted education exhibit improvement in their satisfaction (study group) than patients who follow routine medical care only (control group) was accepted through the current study research findings.

Regarding to relation between degree of bowel clearance and satisfactions after colonoscopy among the study group subjects, the findings revealed that, there was relationship between degree of bowel clearance and satisfactions after colonoscopy among the studied groups. These results were in line with Chan and Goh (2012) who mentioned that, high quality of bowel preparation is essential for a successful colonoscopy and patient satisfaction, as improper bowel preparation leads to patients dissatisfactions, repeating procedure and increases cost.

It can be concluded that video assisted education significantly improve the quality of bowel clearance and satisfaction among study group subjects compared to control group subjects.

Conclusions:

Based on the findings of current study, it can be concluded that:

1. Video assisted education significantly improve the quality of bowel clearance among study group subjects compared to control group subjects.
2. Video assisted education had a positive effect on patient's satisfaction among study group subjects compared to control group subjects.

Recommendations:

A) Recommendations for patients:

Developing illustrative educational video for patients about colonoscopy and preparation for enhancing quality of bowel clearance and improvements in patients' satisfaction.

B) Recommendations for nurses:

Training program for nurses to improve their skills to teach patients about colonoscopy preparation and the importance for seeking rapid medical advice.

C) Recommendations for future studies:

Replication of the study using a larger probability sample from different geographical areas to attain more generalizable results.

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