

## Educational Program for Elderly Patients Undergoing Flexible Bronchoscopy

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### Abstract

**Background:** The incidence of respiratory diseases and lung cancer is higher in elderly individuals, who constitute a large proportion of patients who require flexible bronchoscopy. **Aim of the study:** Was to evaluate the effect of the educational program on elderly patients undergoing flexible bronchoscopy. **Research design:** A quasi-experimental research design was utilized to conduct this study. **Setting:** The study was conducted at the Chest Outpatient Clinic in Benha University Hospital. **Subject:** A convenient sample of 100 elderly patients undergoing flexible bronchoscopy who are divided into two groups namely the study group and the control group. **Tools:** Two tools were used; **Tool I:** It consisted of three parts: **Part I:** Socio-demographic data of elderly patients, **Part II;** Complications after bronchoscopy. **Part III:** Elderly patients' knowledge toward flexible bronchoscopy includes questions about preparation, instructions before, during and after procedure, precautions and complications. **Tool II:** Used the Hospital Anxiety Scale (HAS) assessed hospital anxiety level. **Results:** 60% of the control group, and 56% in the study group aged 60-74 years old. 60% in the control group had complication of recent bronchoscopy, but 36% in the study group had complications of the recent bronchoscopy, 70% of the control group had a poor level of knowledge pre- program, and 66% of them had a poor level in the post-program. While, 70% of the study group had a poor level of knowledge pre- program, 57% of them had fair level followed by 40% who had good level in the post program. 70% of the control group had abnormal level of anxiety both in the pre-program and post-program implementation. Also, 66% of the study group had abnormal level in the pre-program, but 34% of them had abnormal level in the post-program. **Conclusion:** Implementing the designed educational program for elderly patients undergoing flexible bronchoscopy had a positive effect on increasing patients' knowledge, decreasing anxiety level and complications of bronchoscopy procedure in elderly patients. **Recommendation:** Providing appropriate information related to the disease and self-care for elderly patients, each according to his condition and his special educational needs, and correcting misinformation about flexible bronchoscopy procedure.

**Keywords:** Educational Program, Elderly Patients, Flexible Bronchoscopy

### Introduction

Aging can play a crucial role in the pathogenesis of several acute and chronic lung diseases. Respiratory disorders can be more prevalent, severe, and frequently associated with

disability and comorbidities in older adults (Chen et al., 2021). Elderly people are more susceptible to respiratory disorders, which are frequently coexisting with other non-respiratory

medical conditions. Interventional pulmonology includes advanced diagnostic and therapeutic techniques, successfully employed for benign and malignant pulmonary diseases with a good safety profile (**Mondoni et al., 2019**).

The introduction of Flexible Bronchoscopy (FB) has revolutionized the care and management of patients with pulmonary diseases. Since its invented, FB had undergone different revolutions and modifications to ensure that appropriate and adequate respiratory specimens are obtained for analysis (**Antony & Deshmukh, 2018; Gil et al., 2022**). Complications of FB are generally due to sedation and topical anesthesia, but can also be due to the following: introduction of the bronchoscope into the airway; sample collection procedures and patient clinical status (**Jacomelli et al., 2020; Hassan et al., 2022**).

Patients undergoing bronchoscopy commonly suffer from anxiety, fear, stress, lack of preparation, and low knowledge level. Anxiety may lead to increased duration and difficulty of the procedure. Prolongation in the duration may lead to an increase in complications (**Alam & Elashri, 2020; Hasan et al., 2018**).

The Community Health Nurse (CHN) is responsible for providing professional, holistic patient care in order to ensure the patient's physical safety and psychological well-being before, during, and after bronchoscopy procedures to prevent any hazards or avoidable complications (**Jones et al., 2018**).

### **Significance of the study**

In Egypt; the expected percentage of older people may reach 10.9% in 2026. A recent survey on Flexible Bronchoscopy (FB) practice in Cairo reported a mortality rate of 0.01%. In contrast, the overall complication rates (3%) were extremely higher in Egypt compared with other countries

(0.08-0.3%). These higher adverse event rates in our country may be reflected on the patient experience with FB procedure (**Madkour et al., 2015**).

### **Aim of the Study:**

The aim of the current study was to evaluate the effect of educational program for elderly patients undergoing flexible bronchoscopy.

### **Research hypotheses:**

The educational program would have positive effect on increasing patient's knowledge, decreasing anxiety level and complications of bronchoscopy procedure in elderly patients.

### **Subjects and Method**

#### **Study design:**

Quasi-experimental research design was utilized to conduct this study.

#### **Setting:**

This study was conducted at the Chest Outpatient Clinic in Benha University Hospital.

#### **Subjects:**

A convenience sample of elderly patients undergoing flexible bronchoscopy that were accepted to participate was included in this study. The study included 100 elderly patients. Elderly patients are divided into two groups namely the study group and the control group.

#### **Tools of data collection:**

#### **Two tools were used in this study:**

**First tool:** a tool developed by the researcher. It consisted of three parts:

**The first part:** Concerned with the demographic characteristics of the studied elderly patients which included (7) questions such as age, sex, education, occupation before retirement, residence, marital status, smoking habits.

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**The second part:** Concerned with complications after bronchoscopy which included (4) questions as if there was a complication of recent bronchoscopy, and signs of post bronchoscopy fever.

**The third part:** Was designed to assess the knowledge of elderly patients about flexible bronchoscopy including (40) questions about preparation, instructions before, during, and after the procedure, precautions and complications.

### **Scoring system:**

The scoring system for elderly patients was calculated as follows (1) score for the correct answer, while (0) for incorrect answer. For each area of knowledge, the score of the items was summed up and the total was divided by the number of the items, giving a mean score for the part. These scores were converted into levels. Total scores of knowledge = 40, Good knowledge was  $\geq 60\%$ , fair total score was  $50\% < 60\%$ , and poor total score was  $< 50\%$ .

**Tool (2): Hospital Anxiety Scale (HAS):** It was originally developed by (Zigmond & Snaith, 1983). It contained (7) items such as feeling tense, getting a sort of frightened feeling, worrying thoughts going through the mind, the patient can sit at ease and feel relaxed, patient get a sort of frightened feeling like ‘butterflies’ in the stomach, feeling restless as I have to be on the move, and get sudden feelings of panic.

### **Scoring system:**

The scale has a score ranging from 0 to 21. Items were rated on a four-point Likert-type scale ranging from 0 to 3. Scores of 0–7 indicated normal levels of anxiety. Scores from 8 to 10 indicated borderline anxiety. Scores from 11 to 21 indicated abnormal levels of anxiety (Woolrich et al., 2006).

### **Content validity:**

The tool validity was done by three of the Faculty's Staff Nursing Experts from Community Health Nursing Specialties who reviewed the tools for clarity, relevance, comprehensiveness, applicability, and reliability. The panel ascertained the face and content validity of the tools.

### **Tool Reliability:**

The reliability of the two tools was done by Cronbach's Alpha coefficient test which revealed which of the first tool consisted of relatively homogenous items as indicated by the moderate to the high reliability of each tool. The internal consistency of knowledge was 0.88 and 0.73 for the second tool (Al Aseri et al., 2015).

### **Ethical considerations:**

All ethical issues were assured; oral consent has been obtained from each patient before conducting the interview and giving them a brief orientation to the purpose of the study. They were also reassured that all information gathered would be kept confidential and used only for the purpose of the study. Patients had the right to withdraw from the study at any time without giving any reasons.

### **Pilot Study:**

The pilot study was conducted on (10) elderly patients who represented 10% of the studied sample. The pilot study aimed to test the content, clarity, applicability, and simplicity of the tool using the interviewing questionnaire as a pretest sheet. The estimation of the time needed to fill out the questionnaire was 30:45 minutes. No modifications were done, so the pilot study sample was included in the total sample.

**Fieldwork:**

**Data collection procedure:**

Once permission was granted to proceed with the study, the researcher started to prepare a schedule for collecting the data. The fieldwork was carried out within 8 months from the beginning of March 2021 until the end of October 2021.

**Program construction:**

The current study was carried out through four phases; preparatory phase, developmental phase, implementation phase, and evaluation phase.

**Preparatory phase:**

The preparation of the study design and data collection tools was based on an extensive review of the current and past available national and international references related to the research title was done, using a journal, textbooks, and internet search was done. This was necessary for the researcher to be acquainted with and oriented about aspects of the research problem as well as to assist in the development of data collection tools. Also prepared a handout for studied patients that included all items about flexible bronchoscopy procedure, this took time for preparing the tools about three months.

**Program development phase:**

Program was developed after the results. General objective of the program was to increase elderly patients' knowledge about flexible bronchoscopy, decreasing anxiety levels and complications of bronchoscopy procedure in elderly patients.

**Program implementation phase:**

In this phase, the researcher implemented the health educational program sessions for the study group with the clearance of general objectives. The educational program included the most important information related to flexible

bronchoscopy, anatomy of the respiratory system, equipment used for flexible bronchoscopy, indications of flexible bronchoscopy, preparations before, during, and after flexible bronchoscopy, and complications that might happen after the procedure. It is divided into four sessions:

**First session: (30 min)**

At the beginning of the first session, the researcher welcomes and introduce self to elderly patients, an orientation to the educational program was given, take oral informed consent of students after explaining the aim, and the nature of the study, and set an agreement on the number, time and duration of sessions. The researcher provides a trust, warm and secure atmosphere to relieve anxiety, tension, and increase the motivation to participate in all sessions of the educational program. Provide introduction about functions and content of the respiratory system, definition, and indications of the flexible bronchoscopy taking into consideration the use of clear and simple language. Discussion, motivation, and reinforcement during the session were used to enhance learning. Inform the patient that each session started with a summary about the previous session and the objectives of new topics.

**Second session: (30min)** covered instructions and preparations before undergoing a flexible bronchoscopy procedure.

**Third session: (30 min)** covered instructions and preparations during and after undergoing a flexible bronchoscopy.

**Fourth session :( 15 min)** covered complications that might happen after undergoing a flexible bronchoscopy procedure.

**Evaluation phase:** After implementing the educational program, the researcher applied the post-test immediately to both groups to evaluate

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the knowledge acquired. The evaluation was done by using the post-test questionnaire which was the same format as the pre-test in order to compare the change in the elderly patient's knowledge, anxiety level, and occurrence of complications after the implementation of the program.

### **Statistical analysis:**

All data collected were organized, tabulated, and analyzed by using the Statistical Package for Social Science (SPSS version 21), which used frequencies and percentages for qualitative descriptive data, and chi-square coefficient ( $\chi^2$ ) was used for relation tests, the mean and standard deviation was used for quantitative data, linear correlation coefficient (r) and matrix correlation to detect the relation between the variables (P value).

### **Results**

**Table (1):** Reveals that; 60% of studied elderly were in the control group, 56% in the study group aged 60-74 years old, 64% of them in the control group, and 68% of the study group were males. Also, 66% of the two groups couldn't read or write. 30% in the control group were housewives but 26% in the study group worked other jobs such as gas station workers, or peddlers, while 88% of the studied patients in the control group and 86% in the study group lived in rural. Finally, there were no statistically significant differences were found between the two groups regarding the patients' demographic characteristics.

**Table (2):** Demonstrates that; 60% in the control group had a complication of recent bronchoscopy, but 64% in the study group don't have complications of the recent bronchoscopy, whereas 96.7% in the control group had shortness of breath compared to 66.7% in the study group. Moreover, 60% in the control group had a fever  $>38^{\circ}\text{C}$  compared to 88.8% in the study group.

Finally, there is a statistically significant difference was found regarding complications of recent bronchoscopy, and shortness of breath. Moreover, there is highly statistically significant difference was found regarding feeling difficulty/discomfort with bronchoscopy.

**Figure (1):** Shows that; 70% of the control group had a poor level of knowledge pre- program, and 66% of them had a poor level in the post-program. While, 70% of the study group had a poor level of knowledge pre- program, 58% of them had fair level followed by 42% who had good level in the post program.

**Figure (2):** 70% of the control group had an abnormal level of anxiety both in the pre-program and post-program implementation. Also, 66% of the study group had an abnormal level in the pre-program, but 34% of them had an abnormal level in the post-program.

**Table (3):** Illustrates that; in the control group, a statistically mild positive correlation was found between the patient's level of knowledge pre- and post- the educational program ( $r = .403^{**}$ ;  $P = 0.004$ ). Also, a statistically strong positive correlation was found between the patient's level of anxiety pre- and post- the educational program ( $r = .838^{**}$ ;  $P = 0.000$ ).

**Table (4):** Clarifies that; in the study group, a statistically moderate positive correlation was found between the patient's level of knowledge pre- and post- the educational program ( $r = .522^{**}$ ;  $P = 0.000$ ). Also, a statistically mild negative correlation was found between the patient's level of anxiety pre- and post- the educational program ( $r = -.361^{**}$ ;  $P = 0.010$ ). Moreover, a statistically strong negative correlation was found between the patient's level of knowledge post- the educational program and complications after flexible bronchoscopy ( $r = -0.800$  -;  $P = 0.037^{*}$ ).



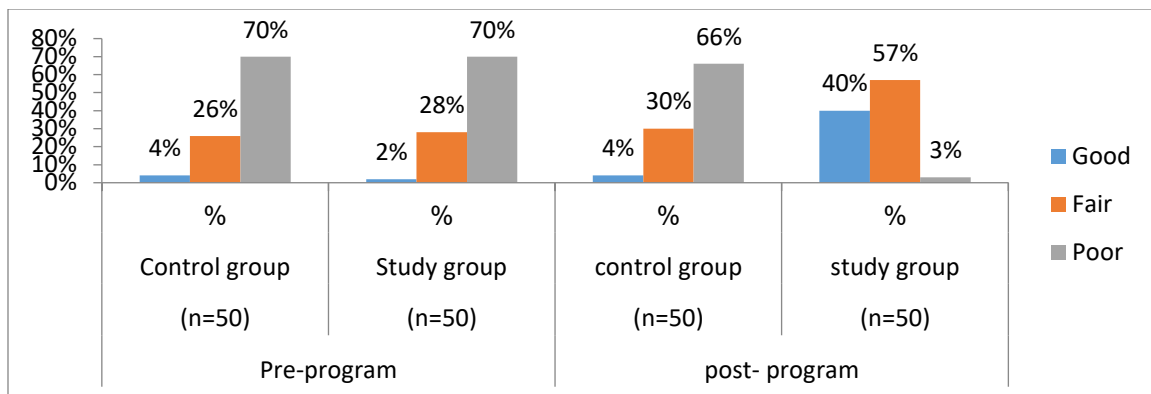
**Table (1): Frequency distribution of the studied elderly patients regarding their socio-demographic characteristics (n=100).**

Items	Control group n=50		Study group n=50		Significance
	No	%	No	%	
<b>Age group</b>					
• 60-74 years	30	60.0	28	56.0	X <sup>2</sup> = 4.169 p=0.124
• 75-84 years	18	36.0	14	28.0	
• 85 years	2	4.0	8	16.0	
<b>Gender</b>					
• Male	32	64.0	34	68.0	X <sup>2</sup> = 0.178 p=0.417
• Female	18	36.0	16	32.0	
<b>Marital status</b>					
• Single	1	2.0	0	0.0	X <sup>2</sup> = 3.340 p=0.342
• Married	31	62.0	29	58.0	
• Divorced	11	22.0	8	16.0	
• Widow	7	14.0	13	26.0	
<b>Educational level</b>					
• Can't read or write	33	66.0	33	66.0	X <sup>2</sup> = 0.667 p=0.881
• Basic education	11	22.0	13	26.0	
• Secondary education	5	10.0	3	6.0	
• University education	1	2.0	1	2.0	
<b>Occupation before retirement</b>					
• Skilled worker	9	18.0	8	16.0	X <sup>2</sup> = 2.555 p=0.635
• Housewife	15	30.0	11	22.0	
• Employee	14	28.0	12	24.0	
• Free business	3	6.0	6	12.0	
• Others (Gas station workers, or peddler)	9	18.0	13	26.0	
<b>Residence</b>					
• Urban	6	12.0	7	14.0	X <sup>2</sup> = 0.088 p=0.500
• Rural	44	88.0	43	86.0	

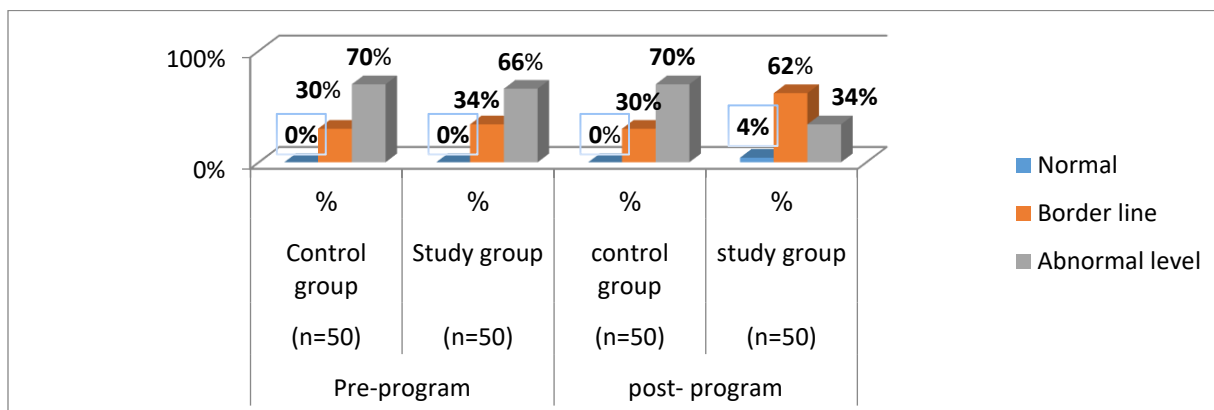
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**Table (2): Frequency distribution of the studied elderly patients regarding their complications from recent bronchoscopy (n= 100):**

Items	Control group (n=50)		Study group (n=50)		Significance
	No	%	No	%	
Difficult/ discomfort with bronchoscopy:					
• No	12	24.0	41	82.0	X <sup>2</sup> =33.762 p=0.000**
• Yes	38	76.0	9	18.0	
Complication of recent bronchoscopy					
• No	20	40.0	32	64.0	X <sup>2</sup> =5.769 p=0.014*
• Yes	30	60.0	18	36.0	
	(n=30)		(n=18)		
Fever >38°C	18	60.0	16	88.8	X <sup>2</sup> =5.348 p=0.148
Chest pain	22	73.3	16	88.9	X <sup>2</sup> =1.651 p=0.181
Shortness of breath	29	96.7	12	66.7	X <sup>2</sup> =8.128 p=0.008*
Rapid heart rate	24	80.0	11	61.1	X <sup>2</sup> =2.033 p=0.138
Rapid breathing	28	93.3	18	100.0	X <sup>2</sup> =1.252 p=0.386
Cough	27	90.0	16	88.9	X <sup>2</sup> =0.015 p=0.629
Fatigue	22	73.3	15	83.3	X <sup>2</sup> =0.637 p=0.335
Bleeding after bronchoscopy	26	86.7	16	88.8	X <sup>2</sup> =0.051 p=0.975
➤ Minimal	2	6.7	1	5.6	
➤ Minor	2	6.7	1	5.6	
➤ Moderate					



**Figure (1): Total knowledge score of elderly patients about flexible bronchoscopy (n=100)**



**Figure (2): Frequency distribution of the studied patients' undergoing flexible bronchoscopy regarding their hospital anxiety level (n=100)**

**Table (3): Correlation matrix between knowledge, anxiety level pre- and post- the educational program implementation, and complications in the control group (n=50)**

Items	Significance	Knowledge Pre-program	Anxiety		Complications
			Pre-program	Post-program	
Knowledge Post Program	R	.403**	.031	.081	0.030
	P	.004	.830	.575	0.836
Anxiety Post Program	R	.024	.838**		0.104
	P	.868	.000		0.472
Anxiety Pre Program	R	.165			
	P	.253			



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**Table (4): Correlation matrix between knowledge, anxiety level pre- and post- the educational program implementation, and complications in the study group (n=50)**

Items	Significance	Knowledge Pre-program	Anxiety		Complications
			Pre-program	Post-program	
<b>Knowledge post program</b>	r	.522**	.093	.024	0.800- -
	p	.000	.519	.869	0.037*
<b>Anxiety post Program</b>	r	.113	-.361**-		0.116
	p	.434	.010		0.423
<b>Anxiety pre Program</b>	r	.092- -			
	p	.525			

### Discussion

The aging population has been growing and is projected to continue growing in number, doubling in size by 2060. More diagnostic Flexible Bronchoscopy (FB) is performed for older people who have comorbidities and are taking several medications. Elderly patients have higher complication rates from FB when compared with a younger population. However, to this day, there is a lack of studies regarding flexible bronchoscope complication rates in older patients (Mclaughlin et al., 2018; Pocienė et al., 2022). Proper preparation of elderly patients before bronchoscopy is important because effective preparation will facilitate safe and successful procedure experiences and will help to gain patients' cooperation and confidence, and decrease anxiety (Hasan et al., 2018).

According to the socio-demographic characteristics of the studied elderly patients, the current study revealed that; more than half of both control and study group were aged 60-74

years old. This might be due to the Egyptian Governmental tendency to improve health care provided to the elderly which leads to an increase in the average age of the elderly in Egypt ranging from 60-73. This is supported by Labieb et al., (2017); who studied "Effect of nursing guidelines on knowledge and anxiety level of elderly patients' undergoing bronchoscopy at Assiut university hospital", Egypt, (n=150), and found that (60%) of the control group, and (56%) of the study group aged between 60> 75.

The present study clarified that; nearly two-thirds of both groups were male. This might be attributed to the higher incidence of chest diseases in men than in women due to the increase in the number of male smokers, and the higher work-related risk in men than in women. This is consistent with Yildizeli et al., (2018); who studied "Risk factors for bronchoscopic complications in patients over 75 years of age", Turkey, (n=243), and reported that (58%) of the study sample who less than 75 years were males.

The present study revealed that; three-quarters of the control group and one-fifth of the study group felt difficulty/ discomfort with bronchoscopy. This might be attributed to anxiety level in the study sample which leads to an increase in the sensation of discomfort. This is inconsistent with, **Andrychiewicz et al., (2017)**; who studied "Evaluation of factors that influence anxiety and satisfaction in patients undergoing bronchofiberoscopy", Poland, (n=552), and found that (69.33%) of patients did not experience any discomfort during BF; (23.54%) of patients experienced minor discomfort.

Regarding the total knowledge level of elderly patients about flexible bronchoscopy, the present study clarified that; nearly three-quarters of the control group had a poor level of knowledge pre-program, and two-thirds of them had a poor level of knowledge in the post-program phase. While nearly three-quarters of the study group had a poor level of knowledge pre-program, this changed to more than half of them having a fair level followed by two-fifths who had a good level after program implementation. This corresponds to the effect of educational program on improving the study group's knowledge and explained inadequate information given by health care members to the control study. It is supported by **Labieb et al., (2017)**; who studied "Effect of nursing guidelines on knowledge and anxiety level of elderly patients' undergoing bronchoscopy at Assiut university hospital", Egypt, (n=150), and reported that 94.7% of the control group had poor knowledge while 52.7% of the study group was fair after nursing guidelines and 21.3% had good knowledge. there were statistically significant differences between the study group and then the control group as regards their knowledge.

Regarding the hospital anxiety score for patients undergoing flexible bronchoscopy, the present study revealed that; a statistically significant difference was found between the control, and study groups in the post-program implementation phase. This may be attributed to inadequate knowledge given to the control group by health care workers about the procedure which made them experience a situation they were ignorant of, which increased anxiety, while the study group expected what would happen during the procedure. In the same line, **Malliarou et al., (2022)**; who studied "The effect of an information brochure on patients undergoing cardiac catheterization on their anxiety, knowledge, and fear", Greece, (n=44), found that the anxiety of the patients in the intervention group (those who received the information before the cardiac catheterization procedure) was significantly lower in all measurements compared to the anxiety of the patients in the control group.

The current study reported that; a statistically strong positive correlation was found between the patient's level of anxiety pre- and post-the educational program in the control group. On the other hand, **Lilly & Dakshayani, (2018)**; studied "Effect of preoperative teaching on the anxiety level of patients with neurosurgery", India, (n=54), and found Interventional group anxiety scores reduced after the educational program which is statistically significant ( $P > 0.05$ ) whereas no change of anxiety score in control groups, which is not statistically significant. Moreover, the current study illustrated that; a statistically moderate positive correlation was found between the patients' level of knowledge pre- and post-the educational program in the study group. It is supported by, **Zulianello et al., (2022)**; who studied "Preliminary effects of a

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structured educational program in cardiac patients”, Brazil, (n=99), and indicated that there was a significant improvement in the knowledge of those evaluated after the education intervention.

Finally, the present study revealed that; a statistically strong negative correlation was found between the patient’s level of knowledge after the educational program implementation and complications of flexible bronchoscopy in the study group. This might be due to the gained information from the educational program that made them follow instructions before, and during the procedure which led to a decreased probability of complications. It is consistent with, **Hasan et al., (2018)**; who studied "Impact of a designed educational program on patients undergoing flexible bronchoscopy", Egypt, (n=150), who found that there was a significant reduction in the number of patients who developed difficulties and complications during the bronchoscopy procedure in the study group.

### **Conclusion**

There was a statistically significance difference between the level of anxiety of the control and the study group after educational program implementation ( $p=0.001$ ). Additionally, a statistically mild negative correlation was found between the patients' level of anxiety pre- and post- the educational program in the study group ( $r=-.361^{**}$ ;  $p= 0.010$ ). Moreover, a statistically strong negative correlation was found between the patients' level of knowledge post- the educational program and complications after flexible bronchoscopy in the study group ( $r= -0.800$  -;  $P= 0.037^{*}$ ). Therefore, implementing the designed educational program for elderly patients undergoing flexible bronchoscopy had positive effect on increasing patient’ knowledge, decreasing anxiety level and complications of

bronchoscopy procedure in elderly patients ( $p<0.05$ ).

### **Recommendations**

- Providing appropriate information related to the disease and self-care for elderly patients, each according to his condition and his special educational needs, and correcting misinformation about flexible bronchoscopy procedure.
- Nursing instructions should be provided as an essential part of nursing care for the elderly before flexible bronchoscopy procedure.
- Applying the educational program that contains simple instructions about flexible bronchoscopy procedure for all patients undergoing this procedure.

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## برنامج تعليمي للمرضى المسنين الذين يخضعون لمنظار الصدر المرن

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تزداد نسبة الإصابة بأمراض الجهاز التنفسي وسرطان الرئة لدى كبار السن الذين يشكلون نسبة كبيرة من المرضى الذين يحتاجون إلى تنظير القصبات المرن. الهدف من هذه الدراسة هو تقييم تأثير البرنامج التعليمي على المرضى المسنين الذين يخضعون لتنظير القصبات المرن. هدفت هذه الدراسة هو لتقييم تأثير البرنامج التعليمي على المرضى المسنين الذين يخضعون لتنظير القصبات المرن. تم استخدام تصميم بحثي شبه تجريبي. وقد أجريت هذه الدراسة في عيادة الصدر الخارجية بمستشفى جامعة بنها. تم تطبيق هذه الدراسة على 100 مريض مسن خضعوا لتنظير القصبات المرن مقسمون إلى مجموعتين هما مجموعة الدراسة ومجموعة التحكم. حيث كشفت النتائج على 60% من المجموعة الضابطة و 56% في مجموعة الدراسة الذين تتراوح أعمارهم بين 60-74 سنة. 60% في المجموعة الضابطة لديهم مضاعفات تنظير القصبات الحديث ، لكن 36% في مجموعة الدراسة لديهم مضاعفات تنظير القصبات الأخير ، 70% من المجموعة الضابطة لديهم مستوى ضعيف من المعرفة السابقة للبرنامج ، و 66% منهم يعانون من ضعف المستوى في مرحلة ما بعد البرنامج. في حين أن 70% من مجموعة الدراسة كان لديهم مستوى ضعيف من المعرفة قبل البرنامج ، وكان 57% منهم يتمتعون بمستوى مقبول ، يليهم 40% ممن كان لديهم مستوى جيد في برنامج ما بعد البرنامج. كان لدى 70% من المجموعة الضابطة مستوى غير طبيعي من القلق في كل من تنفيذ ما قبل البرنامج وبعده. أيضًا ، كان لدى 66% من مجموعة الدراسة مستوى غير طبيعي في البرنامج التمهيدي ، لكن 34% منهم لديهم مستوى غير طبيعي في ما بعد البرنامج. وأوصت الدراسة بتقديم المعلومات المناسبة المتعلقة بالمرض والرعاية الذاتية للمرضى المسنين كل حسب حالته واحتياجاته التعليمية الخاصة ، وتصحيح المعلومات الخاطئة حول إجراء تنظير القصبات المرن.