

# The Effect of Implementing a Health Education Program on Knowledge and Practice Assessment for Patients with Pulmonary T.B and Their Care Givers

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**Abstract:** Tuberculosis (TB) major cause of illness and death worldwide, particularly in low and middle income countries. The aim of this study was to determine the effect of health education to improve knowledge and practices towards TB patients and their families (care givers). Design: A quasi experimental design was utilized in this study. Setting: The study was conducted at Chest Hospital (El-Mamore) and Kom El-Shoaafa hospital both in Alexandria. Sample: 100 patients, attending the settings during the period of the study, (from beginning of May to the end of October 2013) beside 100 from their family care givers. Tools: A structured interviewing questionnaire, it contains 3 parts: a) Sociodemographic data, b) Environmental assessment sheet, c) Knowledge of patients and their families about TB, d) Assessing practice toward TB as observed the patient and family caregivers. Results of this study elaborated that the patients and their family caregivers had lack of knowledge and practices about tuberculosis pre program implementation; The study showed also remarkable improvement in knowledge and practices of patients and their family caregiver. Post implementation of the health education program. The study concluded that the health education program had been succeeded in improving knowledge and practices of patients and their family caregivers about tuberculosis post program implementation. The study recommended that implementation of health education about preventive measures, infection control are importance of complying to treatment.

**Keywords:** Tuberculosis, patients, family caregivers, nursing intervention, health education program, preventive measures, methods of treatment.

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## 1. INTRODUCTION

Tuberculosis (TB) is an airborne infectious disease caused by various strains of Mycobacterium, usually mycobacterium Tuberculosis which estimated one third of the world population and remains the leading causes of death among TB – positive people {1}. It's usually associated with poverty, malnutrition, overcrowding, substandard housing , and inadequate health care , more than 1.5 million people die each year due to tuberculosis , the most common form (70%) of TB is found in the lungs and known as pulmonary tuberculosis, while (30%) found in other parts of the body, and referred to extra – pulmonary tuberculosis {2}.

TB disease becomes active, and about 75% have a symptoms which include: chest pain, and a productive bloody prolonged cough for more than three weeks, fever, chills, night sweats, appetite loss, weight loss, pallor and fatigue {3}. And also a prevalent life-threatening disease in USA According to data from the Tuberculosis Control Department of the

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Ministry of Health of Egypt, TB has intermediate level of incidence and mortality, the size of burden at 74% of TB cases occur among socially and economically productive age groups of 15 to 54 years {4}. Tuberculosis usually attacks the lungs but can also affect other parts of the body, including the lymph-nodes, the covering of the heart known as the pericardium, the bones and joints, the liver, brain and the intestines.

In Egypt the incidence rate of tuberculosis per 100 000 reported in 2010, 18.000 cases{5} and 17.000 cases in 2011 {6} while in 2006 it was 20.000, and in 2007 it was 20,000 more over in 2008 it was 19,000 and in 2009 it was 19,000{7}. Last reported of TB prevalence was 28,000 per 100,000{8}. The incidence and prevalence of TB has declined sharply over the years, the rates in Egypt are still higher than those in Europe and North America {6-9}.

The aims of TB treatment are, (to cure the patient and restore quality of life and productivity, to prevent relapse of TB to reduce the transmission of TB to others, to prevent the development and transmission of drug resistant TB ){10}.

Nurses have a primary role in administering medications at hospitals and health-care facilities. In addition to their active role in DOTS implementation, nurses have responsibilities in TB screening programmers, identifying risk groups for TB, referring individuals with signs and symptoms of active TB for diagnostic procedures, taking sputum samples, and providing care and education for patients and caregivers. As nurses are primarily responsible for administering anti-TB drugs to patients, they should have knowledge about the effects, side-effects and potential interactions of anti-TB drugs with other drugs. Nurses should comply with the principles of administering the correct drug and dosage through the correct administration route {11}.

### Significance of the study:

Tuberculosis is public health problem, morbidity and mortality rates continue to rise. Approximately 80% of TB cases are founded in Egypt. Every year 8 million people worldwide develop active TB, so it's necessary to develop strategy, providing knowledge and practice of parents and care givers to control this infection (TB). And increasing awareness. {12}

### Aim of the study:

This study aimed to determine The Effect of implementing a Health Education Program on Knowledge and Practice for Parents with Pulmonary T.B and Their Care Givers

### Research Hypothesis:

**Subject (patients) who receive health education program (study group) will – show improvement in TB knowledge and practices post program compared to subject before program.**

**Subject (caregivers) who receive health education program (study group) will – show improvement in TB knowledge and practices post program compared to subject before program**

## 2. SUBJECTS & METHOD

### Research Design:

A quasi experimental research design was utilized.

### Settings:

This study was conducted at outpatient clinics at El-Mamore and Kom El-Shoaafa dispensaries in Alexandria which is affiliated to ministry of health and population. the settings are representative for TB patients and their family care givers.

### Sample:

A convenient sample of one hundred (100) TB patients, their ages range from 20 years old and more who were accompanying the, lived at the same home and the responsible about direct patient care.

### Tools of the Study:

"patient knowledge assessment; structure interview schedule format", it was constructed by the researchers after reviewing relevant literatures. The questionnaire was divided into three parts:

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- **Part one:** socio-demographic characteristics of the patients caregivers as (age, gender, marital status, educational level, occupation, family income, .....etc.)
- **Part two:** It Include questions assessing patients and their (caregivers' knowledge about Tuberculosis such as: definition of disease, symptomatology, causative agents, high risk groups, mode of transmission, dangerous of disease, disease investigations, prevention treatment, and source of information, incubation period, vaccination against tuberculosis, duration of treatment and compliance, suitable diet for patient with tuberculosis, infection control among contacts. **Scoring System:** one score was given for a correct answer, while zero was given for the wrong, or no answer. Knowledge was categorized into satisfactory knowledge >50% and unsatisfactory knowledge <50%
- **Part three:** It Included questions assessing practices towards tuberculosis as isolation technique included, (general hygienic measures, hand washing, handling body secretions, using gloves, wearing mask), methods of prevention and infection control among contacts and type of food eaten. **Scoring System** was as follow: - A correct answer was scored one point while the wrong answer or no answer was given zero, accordingly practices was categorized into correct practices >50% and incorrect practices <50%

### Pilot Study:

A pilot study was made for 10% of newly diagnosed patients with tuberculosis and their caregivers to test the content clarity and time needed to fill the tools as a pre-test and to estimate the required time to fill the questionnaire. According to pilot study no modification done. So, the pilot study sample was not included in the study sample.

### Field work:

Actual field work was carried out from beginning of May 2013 until last of October 2012 in previous mentioned settings. Tool was tested for content validity by Jury of four experts in the field of medical surgical nursing ,and medical specialty to ascertain reliability pilot relevance and completeness.

### Administrative Consideration:

- Official letters of approval of the study was obtained from the dean of the faculty of nursing, managers of chest El – Mamore Hospital to facilitate the process and study aim. The first contact between the researchers and participants, done at the outpatient clinic, during this interview the personal characteristics of patient were obtained, including their address and telephone numbers. Other interviews were carried out with the participants at homes.
- Informed consent was taken from participant after explanation of the aim of the study.
- Privacy and confidentiality was assured to each participant.
- Right to withdraw of anytime was assured.

### Nursing intervention construction:

The nursing intervention was carried out in four phases:-

#### ▪ Assessment phase:

In this phase knowledge and practice assessment were carried out for each participant (parents and care givers using tool).

#### ▪ Planning phase:

Based on the results obtained from the assessment phase, and literature review, and health education program designed by the researcher.

#### ▪ General objective of nursing intervention:

- was to provide knowledge about TB, definition, mode of transmission, causative agent, vaccination management, infection control, methods of prevention.
- Illustrate the importance of follow preventive majors.
- Apply the majors of infection control toward TB.

- **Content:** had been provided through 5 sessions (3 sessions for theoretical content and 2 sessions for practical content). The content of theoretical sessions include scientific information about TB, definition, mode of transmission, causative agent, methods of prevention..... etc. The practical sessions contain majors of infection control application of isolation technique.

- **Implementation Phase:**

The nursing intervention was implemented over a period of 8 months; it carried out in 5 sessions (3 sessions for theory and 2 sessions for practice).The duration of each session was ranged from 60-90 minutes. The health education was implemented either individually or in groups from 2 to 4 patients and their caregivers. At the beginning of each session the researchers started by a summary about what was given through the previous session and objectives of the new one, taking into consideration using simple and clear language to suit the patients' educational level.

Different teaching methods were used including small group discussion, lectures, brain storming demonstration and re-demonstration. The teaching aids used were brochures, colored posters and laptop screen show. At the end of each session, the patients were informed about the content of the next session and its time. The health education program has been carried out in conference room in the hospital.

- **Evaluation phase:**

Health education was evaluated when pre and post test immediately post implementation of the program for patients and their care givers in knowledge and practice using tool.

**Statistical Analysis:**

Data entry and analysis were performed using statistical package for Social Science (SPSS) version 17.Data were presented using descriptive statistics in the form of frequency ,percentages ,means and standard deviations for quantitative variables. Qualitative cat goral variables were compared using chi-squared test. Statistical significance was considering at P-value < 0.05.

### 3. RESULTS

**Table (1): Distribution of the studied sample according to their socio-demographic characteristics (n=100)**

Demographic characteristics	Patients n= 100		Care givers n=100	
	No	%	No	%
<b>Age ( years)</b>				
20 –	16	16.0	56	56.0
30 –	52	52.0	24	24.0
> 40	32	32.0	20	20.0
<b>Mean ± SD</b>	37.68 ± 6.83		21.46 ± 6.05	
<b>Gender</b>				
Male	66	66.0	28	28.0
Female	34	34.0	72	72.0
<b>Marital status</b>				
Single	8	8.0	30	30.0
Married	88	88.0	68	68.0
Widowed	4	4.0	2	2.0
<b>Education levels</b>				
Read and write	8	8.0	18	18.0
Basic	32	32.0	22	22.0
Secondary	42	42.0	44	44.0
University	18	18.0	16	16.0
<b>Occupation</b>				
Does not work	0	0.0	48	48.0

House wife	22	22.0	20	20.0
Officer	64	64.0	32	32.0
Free business	14	14.0	0	0.0
<b>The number of family members</b>				
<5	74	74.0	-	-
≥5	26	26.0	-	-
<b>Family income</b>				
Enough	0	0.0	-	-
Not enough	100	100.0	-	-
<b>Kind relationship</b>				
Husband/wife	-	-	42	42.0
Daughter/son	-	-	46	46.0
Mother	-	-	12	12.0
<b>Place of residence</b>				
With patient	-	-	100	100

Table (1): Revealed the socio- demographic characteristics of patients 52.0%, 24.0 % were aged 30- years with the mean age  $37.68 \pm 6.83$  years, 66.0%, 28.0% were males and 88.0%, 68.0% of them were married. While for care giver members 74.0 % was ranged from < 5 members. Concerning the education 42.0%, 44.0% of them had secondary education and the most of the studied patient had officer or free business (64.0%, 24.0%) respectively. Will the majority of caregivers (48.0%, 20.0%. respectively) does not work/housewife. All caregivers residents with the patient in same place the majority of them reported their income were not enough 100.0 %.

Table (2): Percentage distribution of home environmental condition of the studied sample (N=100)

Home condition	Number	Percentage (%)
<b>House condition:</b>		
Separate	12	24.0
Shared	38	76.0
<b>Quality of the building:</b>		
Mud	10	20.0
Brick	40	80.0
<b>Numbers of rooms:</b>		
Two	21	42.0
Three and more	29	58.0
<b>Types of the home ground:</b>		
Mud	6.0	3
Court	58.0	29
Armed	36.0	18
<b>Source of drinking water:</b>		
Tap house	50	100.0
<b>Water storage:</b>		
Yes	45	90.0
No	5	10.0
<b>Storage system: (n=45)</b>		
Covered container	45	100.0
<b>Types of bath room:</b>		
Balady bath room	39	78.0
Ordinary bath room	11	22.0
<b>Sewage system:</b>		
Governmental sewage networks	50	100.0
<b>The degree of sun exposure:</b>		
Good	12	24.0
Poor	38	76.0
<b>Ventilation:</b>	29	58.0

Adequate		
Not adequate	21	42.0
<b>Garbage disposal:</b>		
Every day	43	86.0
Every two days	7	14.0

Table (2): Illustrated the home environmental condition of the studied patients, 76.0 % of the patients lived in common house, 80.0 % of them have brick buildings and 58.0 % of them have two rooms. Regarding type of the home ground, 58.0 % of the patients have court ground. All patients (100.0 %) been stored water in covered container and 78.0 % of them have balladry bath room. Concerning sewage system, the majority of them governmental sewage network. As regard the degree of sun exposure and ventilation were bad and inadequate in more than half of their house 86.0 %. All of the studied patients disposed their garbage every day.

Table (3): Distribution of TB patients according to their practices toward pre- post program

Practice items	n=100								X <sup>2</sup>	P-value
	Pre				Post					
	Done		Not done		Done		Not done			
	N0.	%	N0.	%	N0.	%	N0.	%		
Use a specialized equipment's for isolation	44	44.0	56	56.0	100	100.0	0	0.0	38.889	<0.001**
Take treatment regularly	88	88.0	12	12.0	100	100.0	0	0.0	6.383	<0.05*
absent from the days of his specific follow-up:	66	66.0	34	34.0	100	100.0	0	0.0	20.482	<0.001**
Apply breathing exercise	16	16.0	84	84.0	94	94.0	6	6.0	61.455	<0.001**
Eat meals at regular intervals	68	68.0	32	32.0	86	86.0	14	14.0	4.574	<0.05*
Eat integrated meal contains (protein + carbohydrates + fats)	20	20.0	80	80.0	90	90.0	10	10.0	49.495	<0.001**
Eat Boiled Food	40	40.0	60	60.0	100	100.0	0	0.0	42.857	<0.001**
Cover mouth and nose with tissue during coughing and sneezing	78	78.0	22	22.0	96	96.0	4	4.0	7.162	<0.05*
Get rid of the spit correctly in a Container or Plastic bag	30	30.0	70	70.0	98	98.0	1	2.0	50.174	<0.001**
Put of tissues, & disposed it immediately after use in plastic container and put it in the trash	36	36.0	64	64.0	100	100.0	0	0.0	47.059	<0.001**
Wash hands after coughing or sneezing	18	18.0	82	82.0	94	94.0	6	6.0	58.604	<0.001**
Wear clean clothes	68	68.0	32	32.0	92	92.0	8	8.0	9.00	<0.05*
Get rid of all discharges and waste in the toilet	44	44.0	56	56.0	90	90.0	10	10.0	23.929	<0.001**

(\*) A Statistical significant  $p \leq 0.05$

(\*\*) Highly Statistical significant  $p \leq 0.001$

Table (3) : Shows patient done practice of use a specialized equipment for isolation, take treatment regularly, regular follow-up, Apply breathing exercises, eat meals at regular intervals, Eat integrated meal contains (protein+ carbohydrates+ fats) , Eat boiled food , Cover mouth and nose with tissue during coughing and sneezing ,Get rid of the spit correctly in a container or plastic bag, Put of tissues & disposed it immediately after use in plastic container and put it in the trash , wash hands after coughing or sneezing , wear clean clothes and Get rid of all discharges and waste in the toilet . The highest level percentage of done practice was these observed after program implementation (100.0%, 100.0%, 100.0 % , 94.0%, 86.0%, 90.0%, 100.0%, 96.0%, 98.0%, 100.0, 94.0 % , 92.0% & 90.0% respectively) this difference was highly statistically significance (P <0.001).

Table (4): Distribution of Their (caregivers) according to their Observed practices toward TB pre and post program

Practice items	n=100								X <sup>2</sup>	P-value
	Pre				Post					
	Done		Not done		Done		Not done			
	N0.	%	N0.	%	N0.	%	N0.	%		
Wear mask when dealing with patient.	0	0.0	100	100.0	64	64.0	36	36.0	47.059	<0.001**
Adequate ventilation	12	12.0	88	88.0	94	94.0	6	6.0	67.483	<0.001**
Reduce crowdedness and contact with patient.	4	4.0	96	96.0	46	92.0	8	8.0	77.564	<0.001**
Help the patient in drug compliance.	28	28.0	72	72.0	100	100	0	0.0	56.250	<0.001**
Encourage the patient to go for follow up.	14	14.0	86	86.0	98	98.0	2	2.0	71.591	<0.001**
Provide the patient with proper diet	0	0.0	100	100.0	66	66.0	34	34.0	49.254	<0.001**
Prevent patient for bad habit (smoking).	22	22.0	78	78.0	90	90.0	10	10.0	46.916	<0.001**
Not use patient utensils	6	6.0	94	94.0	20	20.0	80	80.0	4.332	<0.05*
Wear gloves when dealing with patient discharge.	8	8.0	92	92.0	52	52.0	48	48.0	23.048	<0.001**
Wash hand before & after dealing with patient.	18	18.0	82	82.0	68	68.0	32	32.0	25.500	<0.001**
Specialized equipment for patient.	24	24.0	76	76.0	60	60.0	40	40.0	13.300	<0.001**
Wash patient utensils separate from family utensils	4	4.0	96	96.0	48	48.0	52	52.0	25.156	<0.001**
Clean hard surface with cover household detergent	0	0.0	100	100.0	38	38.0	62	62.0	23.457	<0.001**
Wash patient clothes & bed linen separate from family clothes .	10	10.0	90	90.0	74	74.0	26	26.0	42.036	<0.001**
Collect garbage & disposed every day.	60	60.0	40	40.0	96	96.0	4.0	4.0	18.881	<0.001**
Clean the toilet after using of patient	22	22.0	78	78.0	94	94.0	6	6.0	53.202	<0.001**
Clean the house with disinfection solution.	14	14.0	86	86.0	70	70.0	30	30.0	32.184	<0.001**

(\*) A Statistical significant  $p \leq 0.05$

(\*\*) Highly Statistical significant  $p \leq 0.001$

Table (4): Shows caregivers practice of Wear mask when dealing with patient, Adequate ventilation, reduce crowdedness and contact with patient, Help the patient in drug compliance, Encourage the patient to go for follow up, provide the patient with proper diet, prevent patient for bad habit (smoking), not use patient utensils, wear gloves when dealing with patient discharge, wash hand before & after dealing with patient, specialized equipment for patient, wash patient utensils separate from family utensils, clean hard surface with cover household detergent , wash patient clothes & bed linen separate from family clothes, collect garbage & disposed every day, clean the toilet after patient using and clean the house with disinfection solution.

The highest percentage of practice of caregivers post program implementation(64.0%, 94.0%,92.0%,100.0%, 98.0%, 66.0%, 90.0%,20.0%, 52.0%, 68.0%, 60.0%, 48.0%, 38.0%,74.0%, 96.0%, 94.0%&70.0% respectively) this difference was highly statistically significance ( $P < 0.001$ ).

Table (5): Percentage distribution of patients and their caregivers knowledge of pre-post program implementation.

Knowledge	Patient n=100				X <sup>2</sup> P-value	Caregiver n=100				X <sup>2</sup> P-value
	Pre		Post			Pre		Post		
	N0.	%	N0.	%		N0.	%	N0.	%	
<b>Definition of Tuberculosis</b>										
Correct answer	4	4.0	100	100.0	92.308	8	8.0	100	100.0	85.185
Wrong answer or no Answer	96	96.0	0	0.0	<0.001**	92	92.0	0	0.0	<0.001**
<b>Causative agent of TB</b>										
Correct answer	0	0.0	86	86.0	75.439	4	4.0	90	90.0	74.227
Wrong answer or no Answer	100	100.0	14	14.0	<0.001**	96	96.0	10	10.0	<0.001**
<b>Body system affected by TB</b>										
Correct answer	10	10.0	78	78.0	46.916	12	12.0	84	84.0	51.923
Wrong answer or no Answer	90	90.0	22	22.0	<0.001**	88	88.0	16	16.0	<0.001**
<b>Mode of transmission</b>										
Correct answer	0	0.0	92	92.0	85.185	14	14.0	96	96.0	67.919
Wrong answer or no Answer	100	100.0	8	8.0	<0.001**	86	86.0	4	4.0	<0.001**
<b>Predisposing factors</b>										
Correct answer	6	6.0	80	80.0	49.980	18	18.0	92	92.0	55.313
Wrong answer or no Answer	94	94.0	20	20.0	<0.001**	82	82.0	8	8.0	<0.001**
<b>Clinical manifestation</b>										
Correct answer	16	16.0	96	96.0	64.935	10	10.0	88	88.0	60.864
Wrong answer or no Answer	84	84.0	4	4.0	<0.001**	90	90.0	12	12.0	<0.001**
<b>Incubation period</b>										
Correct answer	6	6.0	66	66.0	39.063	0	0.0	74	74.0	58.730
Wrong answer or no Answer	94	94.0	34	34.0	<0.001**	100	100.0	26	26.0	<0.001**
<b>Vaccine against TB</b>										
Correct answer	20	20.0	98	98.0	62.877	20	20.0	96	96.0	59.278
Wrong answer or no Answer	80	80.0	2	2.0	<0.001**	80	80.0	4	4.0	<0.001**
<b>Drugs used in the treatment of TB</b>										
Correct answer	8	8.0	84	84.0	58.132	16	16.0	90	90.0	54.958
Wrong answer or no Answer	92	92.0	16	16.0	<0.001**	84	84.0	10	10.0	<0.001**
<b>Types of foods must be eating during the period of illness</b>										
Correct answer	12	12.0	98	98.0	74.707	12	12.0	96	96.0	71.014
Wrong answer or no Answer	88	88.0	2	2.0	<0.001**	88	88.0	4	4.0	<0.001**
<b>Methods of prevention</b>										
Correct answer	18	18.0	96	96.0	62.056	22	22.0	94	94.0	53.202
Wrong answer or no Answer	82	82.0	4	4.0	<0.001**	78	78.0	6	6.0	<0.001**
<b>Total</b>										
<b>Satisfactory</b>	10	10.0	92	92.0	67.267	4	4.0	84	84.0	64.935
<b>Unsatisfactory</b>	90	90.0	8	8.0	<0.001**	96	96.0	16	16.0	<0.001**

(\*) A Statistical significant  $p \leq 0.05$

(\*\*) Highly Statistical significant  $p \leq 0.001$

Table (5) : Shows that, at the pretest nearly all patients and caregivers had poor total knowledge about the disease, at posttest the patients knowledge increased in all items of knowledge related to definition of the disease 100.0% ,causative agent of tuberculosis 86.0% ,90.0% ,body system affected by TB 78.0%, 84.0% mode of transmission 92.0% , 96.0%, predisposing factors 80.0%, 92.0%, clinical manifestation 96.0%, 88.0%, incubation period 66.0% , 74.0% , vaccination against tuberculosis 98.1% , 96.0% , drugs used in the treatment of TB 84.0% ,90.0%, types of foods must be eating during the period of illness 98.0% ,96.0% ,methods of prevention 96.0%, 94.0% , .This improvement was highly statistically significant ( $P < 0.001$ ).



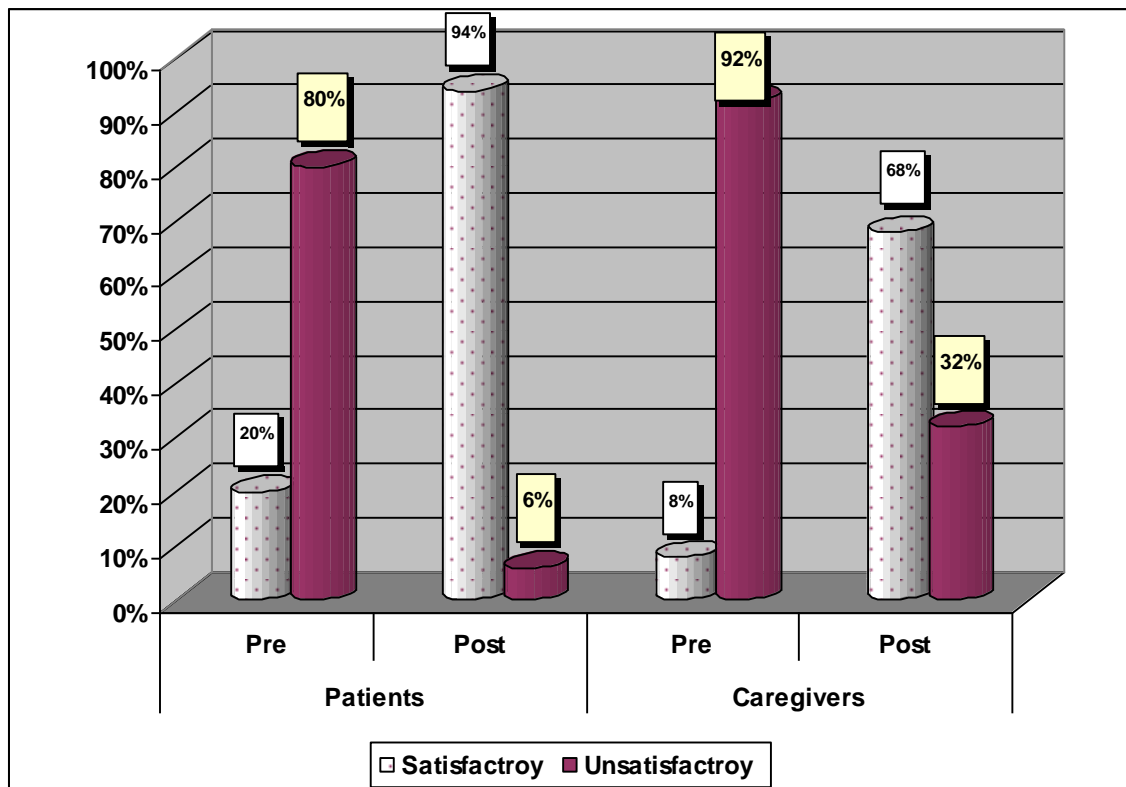


Figure (1): Percentage distribution of patients and caregivers according to level of practice of (Pre-Post Program) implementation

Figure (1): Illustrated the patients and caregivers practice about TB pre-post program. The figure revealed that none of the study patient and caregivers had satisfactory practice about TB preprogram. The study subject's total satisfactory practice increased to reach 94.0% for the patient and 68.0% for caregivers' post program. This improvement was statistically significant difference in total caregivers practice pre-post program  $P < 0.001$

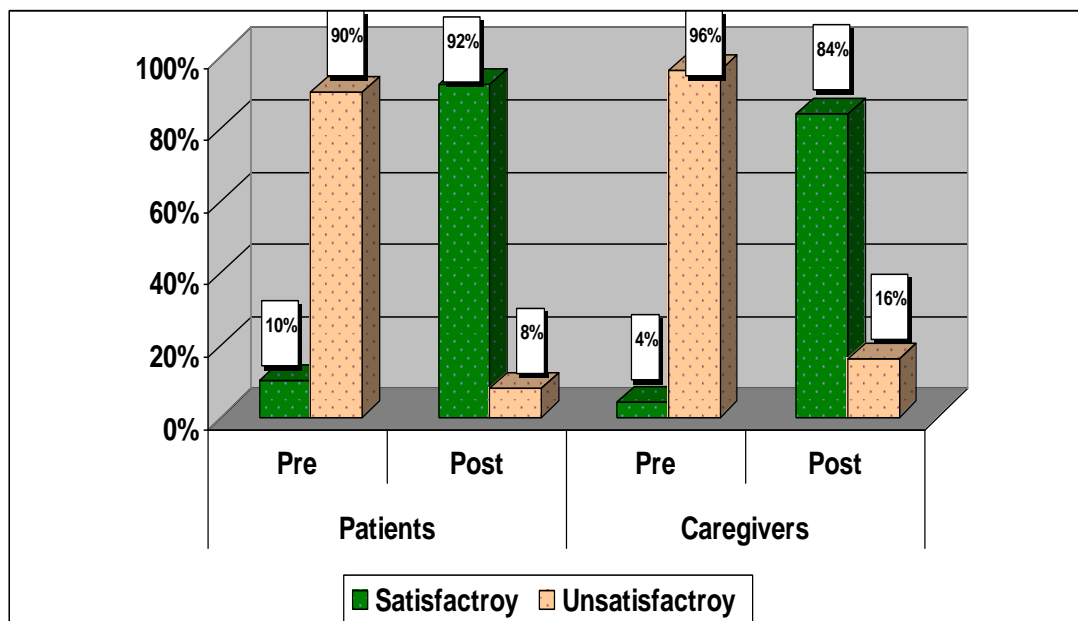


Figure (2): Percentage distribution of patients and caregivers according to level of knowledge of (pre & post Program) implementation

Figure (2): Illustrated patients and caregivers knowledge about TB pre-post program. The figure revealed that none of the study patient and caregivers had satisfactory total knowledge about TB pre-program. The study subjects total satisfactory practice increased to reach 92.0% for the patient and 84.0% for caregivers post program. This improvement was statistically significant for total caregivers practice score pre-post program  $P < 0.001$

**Table (6): Correlation coefficient between total knowledge and practice mean score for both patients and their caregivers of pre & post program implementation.**

		Total patients knowledge score				Total caregivers knowledge score			
		Pre		Post		Pre		Post	
		R	P	R	P	r	p	R	P
Total TB patients practice score	Pre	0.444	<0.01**						
	Post			0.464	<0.01**				
Total Their (caregivers) practice score	Pre					0.844	<0.01**		
	Post							0.399	<0.01**

**\*\*Correlation is significant at the 0.01 level.**

Table (6) : Shows the correlation between total knowledge and total practice mean score regarding patient and caregivers pre-post program. There was a highly statistically significant correlation between total knowledge and total practice mean score.

**Table (7): Correlation coefficient between total knowledge, practice mean score, according to age and level of education of patients and their caregivers of pre & post program implementation**

Variable	Patients with TB				Caregivers			
	Age		Level of Education		Age		Level of Education	
	R	P	r	P	r	P	R	P
Total knowledge score pre-Intervention Program	-0.317	<0.05*	0.306	<0.05*	-0.346	<0.05*	0.505	<0.01**
Total knowledge score post-Intervention Program	-0.392	<0.01**	0.541	<0.01**	-0.332	<0.05*	0.706	<0.01**
Total practice score pre-Intervention Program	-0.434	<0.01**	0.338	<0.05*	-0.395	<0.01**	0.486	<0.01**
Total practice score post-Intervention Program	-0.405	<0.01**	0.494	<0.01**	-0.629	<0.01**	0.419	<0.01**

**\*Correlation is significant at the 0.05 level (2-tailed).**

**\*\*Correlation is significant at the 0.01 level (2-tailed)**

Reliability knowledge Alpha = .9597

Reliability practice of patient Alpha = .9267

Reliability practice of caregiver Alpha = .9632

Table ( 7) Shows the correlation between total knowledge and practice mean score regarding patient and caregivers age and educational levels pre-post program .There was a highly statistically significant correlation between total knowledge total practice mean score regarding patients and caregivers age and educational levels pre-post program, where of when not clear:

Reliability knowledge Alpha = .9597

Reliability practice of patient Alpha = .9267

Reliability practice of caregiver Alpha = .9632

#### 4. DISCUSSION

Tuberculosis is a worldwide health problem with a continued increase in both morbidity and mortality. Worldwide various factors have been cited and these include; lack of family support, poverty, long distance from area of residence to health facility and cultural belief {13,14} . The study site was chest hospital of Alexandria affiliated to Ministry of Health and Population. The study comprised of two thirds males and one third females patients as gender/sex distribution. In terms of age characteristics, the patients age were ranged from 20 up to above 40 years old with a mean age of  $37.68 \pm 6.83$ . The study finding of {15,16} also showed that majority of the TB patients in Thailand belong to the economically active young age group of 21-50 years. This finding suggests that tuberculosis is widely known to affect the most economically active group. In countries which are highly populated it was reported that tuberculosis affects mainly young, economically and active adults. For marital status, the findings support that the majority of the patients were married. More than quarter of them has from 5 or more family members. For patients level of education, the current study revealed that less than half of them had secondary education while more than one tenth of them had university level which may be reflected in their level of knowledge and practice regarding tuberculosis. Unfortunately, contracting tuberculosis does not discriminate whether educated or not. High level of educational status facilitates better communication between client and health care providers. It also increased retention of information provided by health care providers, therefore better implementation of interventions that would have been recommended for example taking tablets same time daily and completion of course of treatment. This goes in line with the study of {17} who found that less than half of the patients had secondary education while more than one tenth of them had university level. The result also revealed that more than two thirds of the patients were officers, and all of them had low income, This finding was in same line with study conducted by {18} they reported that, 64.6% of the TB patients, their family income is insufficient. This was also supported by {19} in a report that tuberculosis affects mostly the poorest people in the world.

##### **Socio-Demographic of the caregivers:**

The sample consists of hundred caregivers. Their age ranged from 20 up to above 40 years old with a mean age of  $21.00 \pm 6.05$ . The majority of caregivers were females and more than two thirds married. As regard the educational levels and occupation of the caregivers it was illustrated that less than half of them had secondary education and doesn't work.

##### **Home environmental condition:**

The present study findings revealed that the majority of the patients had shared and brick building house. More than half of them had court home ground and live in three rooms or more. About two third of them had two rooms. All patients had tap water as a source of drinking water while the majority of them stored water in covered container. This results showed also that the majority of patients had balady bath room. Regarding sewage system, all of patients had governmental sewage network. The majority of patients had poor degree of sun exposure and less than half of them had inadequate ventilation. This was supported by all of the patients were from the low

socio-economic status hence could not afford better houses. Also they were low income earners therefore they were mostly malnutrition as good nutrition was unaffordable. This compromised the body immunity. The majority of patients disposed garbage daily. {20} noted that a situation favorable to acquisition of infection would be an overcrowded and poorly ventilated house. {21} also reported that every one's health depend on the health environmental factors including ventilation must be taken in consideration to make proper control of spread of TB.

##### **Knowledge of patients about tuberculosis:**

According to their knowledge related to meaning of TB., causative agent system affected by TB and mode of transmission, the finding of the study revealed that, there was improvement of patients' knowledge after program implementation .This agrees with the study conducted by {17} who reported in his study that the majority of the patients knew that TB is caused by bacteria and it's highly infectious. This finding is consistent with findings of {23} who reported in his study that the majority of patients know that common part of the body infected by TB is the lungs and TB can be affect any part of the body. Also study conduct by {24} (showed that the majority of patients know that tuberculosis is transmitted by droplet infection, use of materials contaminated by TB patients.

Regarding predisposing factors and clinical manifestation of TB, results of the current study revealed that, the patients' knowledge was improved post program among majority of the study subjects. This finding is consistent with the finding of {25} who found that majority of England patients were aware of common symptoms of Tuberculosis such as coughing fever in the evening, blood in sputum, loss of weight and loss of appetite.

Concerning to knowledge about incubation period vaccination against TB, and treatment of TB, the results of the present study revealed that, the patients' knowledge was improved after the program. This may be program covered this area in the lecture and the booklet given to them contain this information.

Regarding knowledge about nutrition and methods of prevention of TB, the results of the current study indicated that, the majority of patients had incorrect knowledge about them before the program while after the program their knowledge was improved among the majority of the subjects. This finding was consistent with the finding of {26} found that seventy five percent of the tuberculosis patients know that there was a link between nutrition, drug intake, and tuberculosis patients' health status. Patients who took their drugs after the recommended diet showed noticeable recovery. Also study conduct by {27} showed that majority of patients mentioned that transmission of tuberculosis could be prevented by covering their mouth while coughing and use of other forms of masks handkerchief can also be used. {28} noted that a proper sanitation and vaccination were modalities of prevention of TB mentioned by the majority of patients.

#### **Knowledge of caregivers about tuberculosis**

According to their knowledge related to meaning of TB, system affected by TB and mode of transmission, the finding of the present study demonstrated that, there was improvement of caregivers' knowledge after program among majority of caregivers compared to minority before the program. This finding was in agreement with {29}, who found change and improve in the knowledge of their study groups in all items of knowledge about TB as a result of the educational program. Also the study conduct by {28} showed that mother's knowledge was improved after the program.

Regarding predisposing factors and clinical manifestation of TB, the results of the current study revealed that, the caregivers' knowledge was improved after the program among the majority compared to minority before the program. Also the knowledge about incubation period and treatment of TB, the study revealed that, the caregivers' knowledge was improved after the program.

Regarding knowledge about nutrition and methods of prevention of TB, the present study demonstrated that, more than tenth of caregivers reported correct knowledge about nutrition before the program and more than two fifths had correct knowledge about methods of prevention of TB. While after the program their knowledge was improved among the majority. {29} noted that majority of the family had not enough income, they failed to secure balanced diets. So that it is important to educate the patients and their caregivers by teaching them about good meal planning techniques.

#### **Practices of patients about tuberculosis**

Self-Care practice is a practice of activities that the individual initiate and perform on their own behalf in maintaining life, health and wellbeing (Orem, 1990). Self-care practices focused on adherence to prescribed treatment, control of TB infection. According to isolation technique the finding of the current study revealed that, more than half of the patients had private room, with window in their room for ventilation. While the foundation of specialized equipment for the patients were improved after the program among all of the study subjects. Regarding to practice toward treatment system the finding demonstrated that, the majority of patients' taking treatment regularly. While two thirds of the patients was absent from follow-up days improved to none was absent from follow-up days after program implementation this may be due to clarification of the importance of follow-up in improving the prognosis of the disease. The minority of the patients follow breathing exercise to reduce the shortness of breath this ratio was increased after program to reach the majority. This means that education program increasing patient's level of practices.

According to patients' nutritional practice the findings of the current study revealed that, more than two thirds of patients were eating three meals per day. While less than one third were never eating meals at regular intervals. While regarding the types of food during the period of disease less than one fifth eating integrated meals and this ratio was improved after the program. Regarding to practice toward methods of prevention the finding of the current study demonstrated that, the majority of patients' using tissue to cover mouth and nose during coughing and sneezing, less than one third riding of the spit correctly in a container or plastic bag, and more than one third of the patients disposed tissue immediately after use in

plastic container and put it in the trash and more than two thirds wear washed and clean clothes continuously. While more than one tenth of the patient washing hands after coughing or sneezing and less than half riding-of all discharges and waste in the toilet this ratio was improved after the program by the majority. These means that the educational program was successful in up grading patient's practices related tuberculosis.

### Practices of caregivers about tuberculosis

Regarding isolation, treatment and nutrition practice the finding from this study demonstrated that, none of caregivers using mask when dealing with the patient, and only two of them working to reduce crowdedness and contact with the patient this ratio was increased after program more than two thirds and the majority of them retrospectively. One tenth of caregivers open the window or using fan to keep the flow of fresh air and ventilate the house. More than quarter of caregivers helping the patient in the implementation of the treatment system and encourage the patient and go with him for follow-up care this ratio was increased after program by all of them. None of caregivers get attention to nutrition, and the application of diet prescribed for the patient and less than quarter of them preventing the patient from bad habits (smoking) this ratio was increased after program by two thirds and the majority of them retrospectively. {29} reported good nutrition is pivotal in remedying the damage caused by any disease, including tuberculosis (TB). When people are not in good health, they require support, especially in the provision, preparation and serving of food. Eating enough and a balance of different foods helps repair and build body tissue, maintain body weight, build body cells, and improve the performance of the immune system. A balanced diet is critical for the quick recovery of a tuberculosis patient.

In relation to caregivers practice toward methods of prevention the finding showed that, only three of caregivers not to participate in the use of patient towels and four of them wearing gloves when dealing with respiratory secretions and waste, and when cleaning the home this ratio was increased after program by the majority and half of them respectively. Less than fifth of caregivers washing the hands before and after dealing with patient by soap and water and getting towel especially for the patient and each family member while after program the majority of them were using alcohol for cleaning the hand. Only two of caregivers cleaning and washing patient's utensils separate far from the family's towels and wash bed sheets, towels and the patient's clothing separate far from family's clothes while none of them cleaning hard surfaces with soap and water or use a common household detergent this ratio was improved after program by half and two thirds of them respectively. Less than two thirds s of caregivers collecting garbage or waste and disposed every day throw rubbish collected in front the house while after program More the majority of them used wastebasket and burned it. Less than quarter of caregivers cleaning the house and the bathroom used by the patient daily and one fifth used disinfectants as chlorine when cleaning the home this ratio was improved after program by the majority .The improvement of caregiver's practices in this study could be related to the clarity and consistency of the program contents and caregivers interest to acquire knowledge for the practice.

Regarding the total score of knowledge of the studied patients, the findings showed that, the score of total knowledge of patients' were improved and a statistically significance differences in patients' knowledge before and after implementing the program. The study revealed a significant difference between knowledge before and after implementation of the program. {1} assured the importance of formal process of education in carrying enormous advantages to the health and life of TB. patients and the consequent social and economic advantages to society. {30} suggested that the increasing of knowledge and decreasing the feeling of uncertainty are essential for new adaptation. The present study denoted that education is needed to ensure adherence to diet, drug regimen and measures to control and prevent spread of infection. Also regarding the total score of knowledge of the studied caregivers, the findings showed that, the score of total knowledge of caregivers' were improved and a statistically significance differences in caregivers' knowledge before and after implementing the program. This due to effects of face-to-face health education program.

Regarding the total score of practices of the studied patients, the findings showed that, the score of total practices of patients' were improved and a statistically significance differences in patients' practices before and after implementing the program. The study focused on the items of practice as prescribed food, medication, breathing exercise, prevention and controls the spread of infection and follow-up. The increased scores after the program in all aspects of practice implies that education and training of patients and their caregivers are the foundations of good control of TB infection. {7} stated that many TB patients don't seem to get insight until contact with the professional health resources. Hence, nurses can play a major role in educating their patients.

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Also regarding the total score of practices of the studied caregivers, the findings showed that, the score of total practices of caregivers' were improved and a statistically significance differences in caregivers' practices before and after implementing the program. This may be related to concise practical presentation of each session using a simple language and methods used in teaching the program contents helped the patients and their caregivers to understand and absorb information deeply.

According to the relation between total knowledge score and total practice score of patients and their caregivers' pre-post program, there was a highly statistically significant correlation between total knowledge and total practice.

According to the relation between total knowledge score and total practice score of patients and their caregivers' and the age and educational levels of them pre and post program .There was a highly statistically significant correlation pre and post program. This contradicted with the study by {17} found there was no significant relation between patient's knowledge about TB and their socio- demographics characteristics.

The study results proved the hypothesis of the present study which indicated significant improvement of the subjects' knowledge and practices post home health care implementation about TB.

### 5. CONCLUSION

The study concluded that, health education program had a significant improvement in the total knowledge and practices of mean score for patients and caregivers.

### 6. RECOMMENDATION

Based on the study finding, the following recommendations had been suggested:

1. Education program to patients with TB and caregivers about the disease and its prevention.
2. In-service education program should be carried out for newly recruited nurses and nurses working in chest hospital.

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