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RESEARCH ARTICLE

KNOWLEDGE AND ATTITUDE OF CAREGIVERS REGARDING PULMONARY TUBERCULOSIS

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ABSTRACT

Tuberculosis is an infectious disease which is spread through the infected droplets nuclei through air. People with prolonged, frequent, or close contact with TB patients are at particularly high risk of becoming infected. A descriptive survey design, non-probability purposive sampling technique and data was collected by using the self report interview technique among 100 caregivers of tuberculosis patient. The collected data was analyzed and reveal that half (50%) of caregivers had average knowledge and another (50%) of caregivers had below average level of knowledge and (78%) of caregivers had moderately favorable attitude score and (22%) of caregivers are favorable attitude score. There was a significant positive relationship between level of knowledge and attitude scores of caregivers of tuberculosis patient indicating that as the level of attitude increases, knowledge level also increases ($r=0.04$, $p < 0.001$). There was no significant association found between level of knowledge and attitude scores of caregivers with the selected demographic variables (age, gender, religion, marital status, monthly income, educational status, formal information and place of residence).

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INTRODUCTION

Tuberculosis is an infectious disease and it typically affects the lungs, caused by Mycobacterium Tuberculi. It is spread through the air when people who have an active TB infection through cough, sneeze, or otherwise transmit respiratory fluids through the air. Most infections are asymptomatic and latent, but about one in ten latent infections eventually progresses to active disease , if left untreated, kills more than 50% of those so infected (WHO, 2006). Pulmonary tuberculosis (TB) is a contagious bacterial infection and may spread to other organs like intestine, meninges, bones, joints, lymph glands, skin and other tissues of the body. One of the worst diseases of the 19th century. As the general standard of living and medical care got better and, the incidence of TB decreased has been shown. (Tuberculosis Coalition for Technical Assistance [TBCTA], 2006). Kiefer EM, Shano T. (2009) found tuberculosis spreads from person to person by droplet nuclei through air. However, in most people it is latent and only 10% of these infections turn into an active disease.

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The infection may incubate for year be asymptomatic or produced symptoms within weeks. Suganthi P, Chadha VK, (2008) reported Immuno-compromised people may suffer severe symptom. Every year approximately 18- lakhs people develop Tuberculosis and about 4 lakh die from it. India accounts for one fifth of global incidence of Tuberculosis and tops the list of 22 high Tuberculosis burden countries. Unless sustained and approximately 20 lakh people in India are estimated to die of Tuberculosis in next five years. According to the World Health Organization, (2004) one-third of people worldwide are infected with tuberculosis; a new person is infected every second. Of those infected, only 5 to 10 percent develop an active infection. In others, the immune system overcomes the bacteria and coats them with a thick waxy substance, rendering them dormant. The bacteria can remain dormant for years, but may become active if the person's immune system is weakened .The association between poverty and tuberculosis is well established. Even within the developed world the highest rates of disease are seen in the poorest sections of the community. More than three-quarters of these are women. The proportion of the world's wealth owned by the richest 20% has increased from 65% to over 85% in the same time period.

Vikas G. Rao, Jyothi Bhat, Rajiv Yadav *et al*. (2012) A survey report in Central India found prevalence was higher amongst males compared with females and also higher in rural areas as compared to the urban. (TBCTA, 2006) People who have inhaled the Tuberculosis bacteria, but in whom the disease is controlled, are referred to as infected. Their immune system has walled off the organism in an inflammatory focus known as a granuloma. They have no symptoms, frequently have a positive skin test for Tuberculosis, yet cannot transmit the disease to others. This is referred to as latent tuberculosis infection. Common risk factors are Elderly, Infants, HIV infection, low socioeconomic status, alcoholism, homelessness, crowded living condition, disease that weaken the immune system, migration from a country with a high number of cases, and health care workers.

(WHO, 2004) People with prolonged, frequent, or close contact with people with TB are at particularly high risk of becoming infected, with an estimated 22% infection rate. A person with active but untreated tuberculosis may infect 10–15 (or more) other people per year. Eva Nathanson, Paul Nunn, Mukund Uplekar *et al*. (2010) found Multidrug-resistant (MDR) tuberculosis and extensively drug-resistant (XDR) tuberculosis are serious threats to the progress that has been made in the control of tuberculosis worldwide over the past decade. Tupasi TE, Gupta R, Quelapio MI, *et al*. (2006) found National programs are failing to diagnose and treat MDR tuberculosis. Globally, just under 30,000 cases of MDR tuberculosis were reported to the World Health Organization (WHO) in 2008 (7% of the estimated total), of which less than one fifth were managed according to international guidelines. The vast majority of the remaining cases probably are not diagnosed or, if diagnosed, are mismanaged.

This problem remains despite the evidence that management of MDR tuberculosis is cost-effective[12] and that treatment of MDR tuberculosis, and even treatment of XDR tuberculosis, is feasible in persons who are not infected with HIV has been shown. (Orenstein EW, Basu S, Shah NS, *et al*. 2009). Eva Nathanson *et al*. (2010) reported the WHO (2010) recommended Stop TB Strategy provides the framework for treating and caring for those who are sick and controlling the epidemic of drug-susceptible and drug-resistant disease.

Lonnroth, Castro, Chakaya, *et al*., 92010) found the DOTS approach, which underpins the Stop TB Strategy, calls for political commitment to national programs designed to control disease by means of early diagnosis with the use of bacteriologic testing, standardized treatment with supervision and patient support, and provision and management of the drugs used in treatment; the approach also includes the monitoring of treatment and evaluation of its effectiveness. Between 1995 and 2008, a total of 36 million people were treated successfully with the use of the DOTS approach, and 6 million lives were saved has been shown (Raviglione, Uplekar, WHO's new Stop Strategy, 2006).

Problem Statement

A descriptive study to assess the knowledge and attitude among the caregivers of tuberculosis patients regarding pulmonary tuberculosis and its preventive measures in a selected Hospital of Mullana, Ambala Haryana.

Objectives of the study

- To assess the level of knowledge and attitude scores regarding pulmonary tuberculosis and its preventive measure among the caregivers of tuberculosis patient.
- To determine the relationship between the level of knowledge and attitude scores regarding pulmonary tuberculosis and its preventive measure among the care givers of tuberculosis patients.
- To seek the association between the level of knowledge and attitude score regarding pulmonary tuberculosis and its preventive measure among the caregivers of tuberculosis patients with the selected demographic variables.

Hypothesis

All hypotheses will be tested at 0.05 level of significance:

H1: There will be significant relationship between the level of knowledge and attitude scores regarding pulmonary tuberculosis and its preventive measures among the caregivers of Tuberculosis patients.

H2: There will be significant association between the level of knowledge and attitude scores regarding pulmonary tuberculosis and its preventive measures among the caregivers of Tuberculosis patients with selected demographic variables like age, gender, educational status, income, religion.

MATERIALS AND METHODS

A Non Experimental research approach was used for the study.The research design used in this study is Descriptive survey design which is represented in figure: 1 given below. The setting of the present study is on one hundred caregivers of tuberculosis patient in MMIMS & R Hospital at Mullana Ambala Haryana. Non-probability purposive sampling technique was used to select the sample from accessible population. The tool used in this study is a Structured knowledge questionnaire on pulmonary tuberculosis and its preventive measures and Attitude scale to assess the attitude was prepared on the basis of the objective of the study. The systemic representation of the Research Methodology adopted for the Descriptive survey design is shown in Fig: 1

Data collection tool

The present study aimed at assessing the knowledge and attitude of caregivers of tuberculosis patient regarding the preventive measure of pulmonary tuberculosis. The following data collection tools were constructed to obtain data.

- Sample characteristics to assess the personal data.
- Structured knowledge interview schedule to assess the knowledge of caregivers of tuberculosis patient regarding pulmonary tuberculosis and its preventive measure.
- Attitude scale to assess the attitude of caregivers of tuberculosis patients regarding pulmonary tuberculosis and its preventive measure.

Sample	Sampling technique	Research approach& design	Data collection tools	Data collection methods	Plan for data analysis
One Hundred caregivers of tuberculosis patient in in MMIMS & R Hospital, Mullana, Ambala.	Non probability - Purposive sampling technique	Research approach: Non Experimental research Research Design: Descriptive survey design	Section I - Sample characteristics. Section II -Structured knowledge questionnaire on pulmonary tuberculosis and its preventive measures Section III -Attitude scale	Self report (structured interview technique)	Descriptive statistics: -Frequency, percentage, mean, SD, mean% Inferential statistics: -"t" test , Karl Pearson, Chi square

Fig. 1. Systemic representation of the Research Methodology

Table 1. Reliability of the tools

Tool	Formula	Reliability	Normal Range
Structured knowledge	Split half method and		
Interview schedule	Spearman Brown Prophecy	0.74	(0.7-1)
Attitude scale	Cronbach's alpha	0.45	(0.1-0.5)

Table 2. Distribution of caregivers according to the level of knowledge

Grade	Knowledge Score	Percentage	Frequency	Percentage
Excellent	30-35	>80%	-	-
Good	24-29	66-80%	-	-
Average	18-23	51-65%	50	50%
Below average	1-17	<50%	50	50%

Minimum score: 0 Maximum score: 35

Development of the Tool

A structured knowledge interview schedule was constructed to assess the knowledge of caregivers of tuberculosis patients regarding pulmonary tuberculosis and its preventive measures. The tools were prepared based on:

- The extensive review of literature and non-research literature, seeking the opinion of experts and guide, formal and non-formal discussion with peer group.
- Item writing was done after preparing a blueprint specifying the domains of objectives (knowledge, comprehension, and application).
- Content validity.
- Pre test and reliability.
- Pilot study

A five point attitude scale was developed to assess the attitude of caregivers of tuberculosis patients towards pulmonary tuberculosis. The respondents were asked to indicate their degree of agreement by checking one of five response categories: Strongly Agree, Agree, Undecided, Disagree and strongly disagree.

Description of the Tools

The structured knowledge interview schedule comprised of two sections:

Section I: It comprised of 8 items seeking information pertaining to background data such as: age, gender, religion, marital status, economic status, education, sources of information and living place.

Section II: It comprised of 35 knowledge items regarding preventive measures of pulmonary tuberculosis covering the following content areas:

- Anatomy & Epidemiology I
- Sign & symptoms and diagnosis.
- Treatment, Side effect and Complication
- Prevention

All the items were multiple choices with four options. Each items had a single correct answer. Every correct answer was awarded a score of one and every wrong answer awarded zero score. The maximum possible score was 35 and the minimum possible score was zero.

The score obtained by the tuberculosis patients were arbitrarily categorized into 4 levels so given below:-

Excellent >80%
Good 61-70%
Average 51-60%
Below average <51%

Section III: Attitude scale to assess the attitude of caregivers of tuberculosis patients regarding pulmonary tuberculosis and its preventive measure.

The attitude scale comprise of 30 statements regarding preventive measures of pulmonary tuberculosis. Each statement in the attitude represented a specific aspect to seek the degree of agreement of response with the statement. Each participant was required to give their opinion for each of the statement.

The responses were quantified by giving scores. Positive statement were assigned a score of five for strongly agree and one for strongly disagree. Negative statement were assigned a score of five for strongly agree. The maximum possible score was 150 and the minimum possible score was 1. The attitude scale consisted of 20 positive and 10 negative statements scattered randomly.

The score obtained by the caregivers were arbitrarily categorized into 3 levels given below:-

>100% Favorable
50-100 Moderately Favorable
<50% Unfavorable

Validity and reliability of the tools

Content validity of the develop tools was obtained by submitting tools to nine experts in the field of:

- Medical and Surgical Nursing (2)
- Community Health Nursing (3)
- Obstetrical and Gynaecological Nursing (1)
- Child Health Nursing(3)

Experts were requested to judge the items for clarity, relevance, appropriateness, an meaningfulness for the purpose of the study to give their opinion and suggestions on the content, its coverage, organization presentation and language. Modification of the tool was done after careful review and discussion with guide and experts.

Reliability of the tools was obtained by administering the tools to 10 caregivers of tuberculosis patients, from one of the selected private hospitals after obtaining permission from the hospital authorities; reliability was computed by the following methods. The results obtained are shown in Table:1 The tools were found to be valid, reliable and feasible for the purpose of the study.

Data collection technique

Self reporting (Structured Interview technique) was considered to be most appropriate for collecting data related to knowledge and attitude of caregivers of tuberculosis patients. The structured tools with close ended items are efficient, easy to administer and analyses. The investigator obtained written permission from the concerned authority before conducting the study. Prior to the data collection, the researcher explained the purpose of the study and requested the participants for their full cooperation and assured about the confidentiality of the data. Verbal concerned was taken from the participants. The average time taken for each participant was 45 minutes.

Procedure for data collection

Data was collected from 50 caregivers of tuberculosis patients who fulfilled the inclusion criteria. Formal administrative permission was obtained from the concerned authority before conducting the study. Self-introduction and overview to the nature of the study were given to the participants.

Rapport was established and purpose of the study was explained. The structured knowledge interview schedule and attitude scale were administered and the response of caregivers of tuberculosis patients were recorded in the tools at the same time. The average time taken to complete the questionnaire was 45 minutes. All participants cooperated well with the investigator duringdata collection.

Plan for data analysis

The data would be analyzed by using descriptive statistics and inferential statistics.

The plan for data analysis would be as follows:

- Demographic variables would be analyses in terms of Frequency and percentage distribution.
- The Knowledge and attitude of caregivers of tuberculosis patients would be analyses in terms of frequency, percentage, mean, median, mean % and Standard Deviation.
- The relationship between level of knowledge and attitude scores would be found out by Karl Pearson correlation.
- The association between level of knowledge and attitude scores would be found out by Chi square test.

RESULTS

The findings of the present study shows that most of the respondents (28%) were in the age group of 31-40years, (44%) were males and (56%) were females, (34%) belonged to Hindu religion, (52%) were married, (42%) were illiterate, (34%) had a family income of 6001- 9000 Rs and (76%) belonged to rural area. Half of the respondents 50% had average level of knowledge and another half 50% had below average knowledge, None of the respondents having good and excellent knowledge regarding pulmonary tuberculosis and its preventive measures (Table: 2). Majority of the respondents (78%) had moderately favorable attitude score and (22%) had favorable attitude score. None of the sample having unfavorable attitude scoring (Fig.2). Area-wise knowledge of the respondents had I rank in the area of Anatomy and Epidemiology with Mean% scores (37.4%),mean (2.62) and SD (18.4) , II rank in the area of Treatment , side effect and complications mean% scores(26.22%), mean(2.36) and SD (16.6), III rank in the area of Sign & symptoms and diagnosis mean % scores (22.66%), mean (0.68) and SD (3.29) and IV rank in the area of Prevention Mean% scores (20.94%), mean (3.99) and SD(28) (Table: 3).

The relationship between the level of Knowledge of caregivers of tuberculosis patients mean score (9.6) and SD score(0.33), attitude mean score (96.36) and SD(0.83) and correlation value (0.04) (Table:). There was a positive relationship between knowledge and attitude of the respondents, indicating that as the level of attitude increases, knowledge level also increases ($r = 0.04$, $p < 0.001$). The results further showed that there was a significant low degree positive correlation between knowledge and attitude of the respondents. Hence the research hypothesis is accepted and null hypothesis is rejected.

Table 3. Area wise Mean, standard deviation and mean percentage of level of knowledge of caregivers of tuberculosis patients in various areas

S.No.	Area	Max score	Mean	SD	Mean% score	Rank
1	Anatomy & Epidemiology	7	2.62	18.4	37.4%	I
2.	Sign& symptoms and diagnosis	3	0.68	3.29	22.66%	III
3.	Treatment , Side effect and Complication	9	2.36	16.6	26.22%	II
4.	Prevention	16	3.98	28	20.94%	IV
	Total	35	9.64	66.29	107.22%	

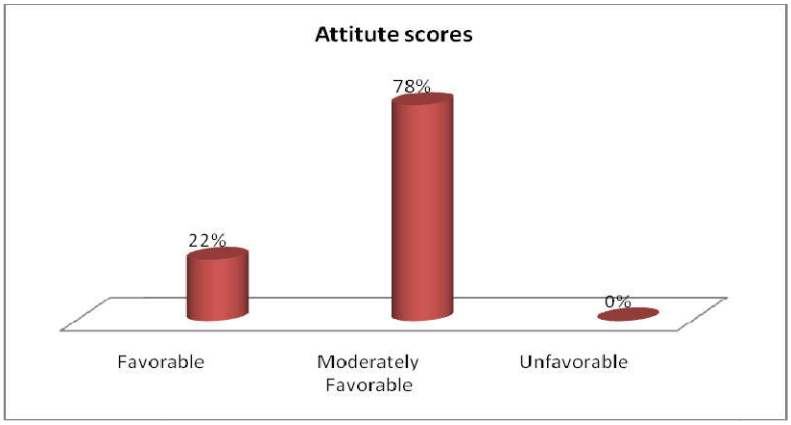

Fig. 2. Distribution of the caregivers according to attitude scores regarding pulmonary tuberculosis and its preventive measures

Table 4. Co relation between level of knowledge and attitude scores of Caregivers of tuberculosis patients regarding Pulmonary Tuberculosis and its preventive measures

Group	Test	Mean	SD	r
Knowledge Caregivers of tuberculosis patient	9.6	9.5		0.04
Attitude	96.34	97		

There was no significant association between level of knowledge and attitude scores of caregiver of tuberculosis patients regarding pulmonary tuberculosis and its preventive measures with selected demographic variables like age, gender, educational status, income, religion. Hence the null hypothesis is accepted and research hypothesis is rejected.

DISCUSSION

The findings of the study have been discussed with reference to the objectives and hypothesis stated and with the finding of the other studies. Most of the respondents (28%) were in the age group of 31-40years, (44%) were males and (56%) were females, (34%) belonged to Hindu religion, (52%) were married, (42%) were illiterate, (34%) had a family income of 6001- 9000 Rs and (76%) belonged to rural area. Half of the respondents 50% had average level of knowledge and another half 50% had below average knowledge, None of the respondents having good and excellent knowledge regarding pulmonary tuberculosis and its preventive measures. Majority of the respondents (78%) had moderately favorable attitude score and (22%) had favorableattitude score. None of the sample having unfavorable attitude scoring. Area-wise knowledge of the respondents had I rank in the area of Anatomy and Epidemiology with Mean% scores (37.4%), mean (2.62) and SD (18.4) , II rank in the area of Treatment, side effect and complications mean% scores (26.22%), mean (2.36) and SD (16.6), III rank in the area of Sign & symptoms and diagnosis mean % scores (22.66%), mean (0.68) and SD (3.29) and IV rank in the area of Prevention Mean% scores (20.94%), mean (3.99) and SD (28).

The relationship between the level of Knowledge of caregivers of tuberculosis patients mean score (9.6) and SD score (0.33), attitude mean score (96.36) and SD (0.83) and correlation value (0.04). There was a positive relationship between knowledge and attitude of the respondents, indicating that as the level of attitude increases, knowledge level also increases ($r = 0.04$, $p < 0.001$). The results further showed that there was a significant low degree positive relationship between knowledge and attitude of the respondents. There was no significant association between level of knowledge and attitude scores of caregiver of tuberculosis patients regarding pulmonary tuberculosis and its preventive measures with selected demographic variables like age, gender, educational status, income, religion. Hence the null hypothesis is accepted and research hypothesis is rejected. The above findings are supported by a descriptive studies, conducted to determine the knowledge and attitude on a convenience sample of 104 pulmonary PTB patients in a hospital of Lusaka, Zambia. An Interview Schedule comprising of two sections (knowledge,

attitude) was used to collect data A total of 104 respondents. And half of the respondent (49%) had average knowledge of TB preventive measures. Majority of the respondents (89.4%) had positive attitude towards preventive measures of tuberculosis has been shown. (Yadav *et al*., 2006)

Conclusion

Section I: Description of sample characteristics

- Most of the caregivers (36%) were in the age group of 31-40, (26%) were in the age of 20-30years, (22%) were in age of 41-50years, (16%) were in the age of above 50years.
- The majority of respondents (56%) was female, (44%) were male
- Most of the caregivers (34%) belonged to Hindu, (24%) belonged to Sikh religion,(22%) belonged to Muslim and (20%) Others
- Most of the caregivers (52%) was married,(26%) were Widow/ Widower,(14%)were Single and (8%) were Divorced.
- Most of the caregiver (34%) had 6001-9000, (26%) had 3001-6000, (24%) had above 9000 and (16%) had below 3000.
- Most of caregivers (40%) had illiterate,(30%) had primary, (16%) had high school, (8%) had senior secondary and (6%) had graduate and above, caregiver.
- Majority of the caregivers (42%) mass media, (24%) health personal, (20%) others and (14%) family members/ friends
- Majority of the respondents (76%) belonged to rural area, and (24%) belonged to urban area.

Section II: Assessment of Knowledge and attitude of caregivers of tuberculosis patients regarding Pulmonary Tuberculosis and its preventive measures

Half of the respondents 50% had average level of knowledge and another half 50% had below average knowledge, None of the respondents having good and excellent knowledge regarding pulmonary tuberculosis and its preventive measures. Majority of the respondents (78%) had moderately favourable attitude score and (22%) had favourable attitude score. None of the sample having unfavourable attitude scoring.

Area-wise knowledge of the respondents had I rank in the area of Anatomy and Epidemiology with Mean% scores (37.4%), mean (2.62) and SD (18.4), II rank in the area of Treatment, side effect and complications mean% scores (26.22%), mean (2.36) and SD (16.6), III rank in the area of Sign & symptoms and diagnosis mean % scores(22.66%), mean(0.68) and SD (3.29) and IV rank in the area of Prevention Mean% scores (20.94%), mean(3.99) and SD(28).

Section III: Relationship between the level of knowledge and attitude scores of caregivers of pulmonary tuberculosis patients towards Pulmonary Tuberculosis and its preventive measures

The relationship between the level of Knowledge of caregivers of tuberculosis patients mean score (9.6) and SD score (0.33), attitude mean score (96.36) and SD(0.83) and correlation value (0.04). There was a positive relationship between knowledge and attitude of the respondents, indicating that as the level of attitude increases, knowledge level also increases ($r = 0.04$, $p < 0.001$). The results further showed that there was a significant low degree positive relationship between knowledge and attitude of the respondents. Hence the research hypothesis is accepted and null hypothesis is rejected.

Section IV: Association between level of knowledge and attitude scores of caregivers of tuberculosis patients towards Pulmonary Tuberculosis with the selected demographic variables

1. The computed Chi square values of level of knowledge with age(3.58), gender(0.63), religion(0.67), marital status(1.93), monthly income(0.44), educational status(1.39), formal information(6.15) and place of residence(1.97) respectively. The computed Chi square value revealed that there was no significant association between level of knowledge of caregiver of tuberculosis patients with demographic variables.
2. The computed Chi square values of attitude scores with age(3.19), gender(1.22), religion(3.73), marital status(9.72), monthly income(2.26), educational status(6.91), formal information(3.56) and place of residence(3.56) respectively. The computed Chi square value of revealed that there was no significant association between attitude scores of Caregivers of tuberculosis patients with demographic variables. This indicated that level of knowledge of tuberculosis patients were independent of their age, gender, religion, marital status, monthly income, educational status, formal information and place of residence. Hence the null hypothesis is accepted and research hypothesis is rejected.

Implication

Nursing education

Nursing teacher can inculcate in the students values of human life, magnitude of pulmonary tuberculosis and their roll in creating awareness regarding preventive measure. Aggressive educational programs can be developed and implemented to sensitize the knowledge towards pulmonary tuberculosis in the society and thus facilitate the development of unfavorable attitude of pulmonary tuberculosis and its preventive measures among the caregiver.

Nursing personnel working in the community should be equipped with adequate knowledge and skills to educate caregivers of tuberculosis to prevent and control the infections regarding pulmonary tuberculosis. Nurses in educative role among caregivers are in a better position to bring a favorable attitude towards the tuberculosis.

Nursing research

Nurses can take initiate to conduct research regarding the knowledge and attitude of caregiver regarding pulmonary tuberculosis and its preventive measure. Adequate research has been carried out to estimate the preventive measure of pulmonary tuberculosis among the caregivers and the new preventive strategies to be introduced so as to increase the preventive measure of pulmonary tuberculosis.

Nursing researchers should be aware about the existing health care system and the status of the nursing profession, by conducting research and by formulating new theories, researcher could improve the knowledge, skill. This study showed that the caregivers have poor knowledge on prevention of pulmonary tuberculosis. Review of literature shows that there are not such studies on knowledge and attitude on preventive measure of pulmonary tuberculosis among the caregiver. Therefore, it is necessary to explore the knowledge and attitude of caregiver, which will help in planning better education programme.

Nursing practice

Students who have knowledge regarding pulmonary tuberculosis will be helpful in the future. Health education is an important aspect of nursing practice. Nurses working in the clinical setting can play an important role by educating patients and caregivers regarding pulmonary tuberculosis and its preventive measures.

Implication for research include replicating the study in other geographic area using a larger sample from a wide range of age, cultures, education, occupational background and income categories to see if the study result are consistent with what has been derived in the study.

Nursing administration

Nurse administrators can provide facilities and promote education to care givers regarding pulmonary tuberculosis and its preventive measures. The administrators should enable the nursing personnel to develop new skill through journals clubs, discussion, in – service education and continuing education regarding pulmonary tuberculosis and its preventive measures and its possible consequences. They should plan and organize programmes that are cost-effective. There should be necessary health education materials and administrative support provided to conduct the programmes. Adequate funds should be provided to develop health-teaching materials and make them accessible to all the staff in the hospital as well as in the community.

Recommendations

- The study may be conducted on large scale in selected area for generalization of the findings.
- A study to assess the knowledge and attitude of rural population regarding pulmonary tuberculosis and its preventive measures.
- An non-experimental study may be conducted to identify barriers to attitude towards patient and caregiver, develop strategies to enhance knowledge and change attitude towards the pulmonary tuberculosis and its preventive measures.
- A study may be undertaken to assess the impact of reinforced teaching regarding pulmonary tuberculosis and its preventive measures.
- A study may be undertaken to standardize tools for assessment of knowledge and attitude of general population regarding pulmonary tuberculosis and its preventive measures.

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