ORIGINAL RESEARCH PAPER
Volume-9 | Issue-2 | February-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY TO ASSESS KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING DIAGNOSIS AND MANAGEMENT OF TUBERCULOSIS AMONG POST GRADUATE STUDENTS OF GOVERNMENT MEDICAL COLLEGE, BHAVNAGAR.

Respiratory Medicine

Dr Dhruv R Patel Resident Doctor, Department of Respiratory Medicine Government Medical College, Bhavangar

Dr Jigna D. Dave* Head and Professor , Department of Respiratory Medicine Government Medical College, Bhavangar *Corresponding Author

ABSTRACT

BACKGROUND: A high level of awareness of tuberculosis is very important for prevention and control in the community.
OBJECTIVES: Study was conducted to assess the knowledge of post graduate students of Government medical college, Bhavnagar.
STUDY DESIGN: Observational study
METHOD: This study used a self-reported questionnaire based on the RNTCP technical and operational guidelines. 155 post graduate students were recruited. The survey was done from august 2018 to July 2019.
RESULTS: Out of 155 students, 85 (55%) students have good and 70 (45%) students, have poor knowledge regarding symptoms, diagnosis, and management of TB. Poor knowledge for TB with HIV, pregnancy and TB in new born baby. 10 (6%) knew about DR-TB. Good attitude for isolation in MDR TB patients, importance of breast feeding to infants of sputum positive mother, 89(57%) have attitude that isoniazid resistance would developed after IPT. 103(67%) no use streptomycin in pregnancy with tuberculosis, 93(60%)start ATT in pleural effusion if ADA normal, 85(55%)use fixed drug combination for DS-TB, 68 (44%) practice with shorter MDR regimen.
CONCLUSION: More than half of the students included in this study having good knowledge, attitude and practice regarding diagnosis and management of pulmonary Tuberculosis. Students have poor knowledge regarding pulmonary tuberculosis in PLHA patients and in pregnancy. They have poor practice on extra-pulmonary TB management, recent advances of RNTCP and PMDT guidelines.

KEYWORDS

Tuberculosis, KAP, post graduate students.

INTRODUCTION

Tuberculosis (TB) is an airborne disease caused by the bacteria Mycobacterium Tuberculosis. TB is a contagious bacterial infection that can be found nearly anywhere in the body, but is found most commonly in the lungs. Although TB has been discovered over 100 years ago, it is still one of disease that causes the most deaths annually. TB accounts for more deaths among adults worldwide than any other single infectious disease[1].

Introduction to KAP study:
A Knowledge, Attitudes and Practices (KAP) survey is a quantitative method (predefined questions formatted in standardized questionnaires) that provides access to quantitativ and qualitative information.

MATERIAL AND METHOD

- **Study Type :** observational
- **Study Design :** prospective study
- **Study Site :** Government Medical College,Bhavnagar
- **Sample Size:** 155 post graduate students of different departments and of them 33 students of 3rd year, 62 students of the 2nd year and 60 students from 1st year enrolled in study population.

- This study was carried out from November 2018 to July 2019.
- Permission for the study was taken from the Institutional Human Research Ethics Committee.
- Performa of students questionnaire is given in appendix
- Validation of questions done with chronbach alpha scoring on 16 students for standardizing the questionnaire.

INCLUSION CRITERIA

- Post graduate student of Government Medical College, Bhavnagar
- PG students who give consent to fill the questionnaire

EXCLUSION CRITERIA

- PG students who not give consent to fill the questionnaire

STASTICAL ANALYSIS

- Data was collected in the Case Record Form (Annexure 1) and then transferred to EXCEL format and then analyzed statistically by SPSS software Version 12.0.
- Qualitative data is expressed as frequencies and percentages. Quantitative data is expressed in Mean ± Standard deviation (SD). The Data Analysis was done with Statistical Package for the Social Sciences (SPSS).

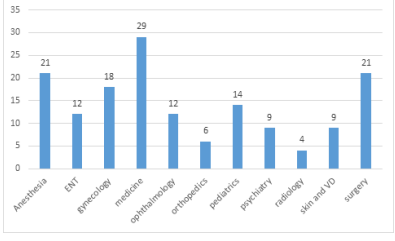
5. RESULT AND DATA ANALYSIS

The study included total 155 post graduate students of Government Medical College, Bhavnagar.

Table 5.1 Profile of students

Department	No. of students in department	Percentage (%)
Anesthesia	21	13.5
ENT	12	7.7
Gynecology	18	11.6
Medicine	29	18.7
Ophthalmology	12	7.7
Orthopedics	6	3.9
Pediatrics	14	9.03
Psychiatry	9	5.8
Radiology	4	2.58
Skin and VD	9	5.8
Surgery	21	13.5
Total	155	100.0

Figure 5.1 profile of students



From the above chart and table 5.1 students from different departments participate in this study and among them maximum students were from medicine and equally from surgery and anaesthesia department.

Table 5.2 Profile of students according to year of current study

Year of post graduate student	Number of students	Percentage of students
First year	60	38.7%
Second year	62	40%
Third year	31	21.3%
total	155	100 %

According to table 5.2, students from different years of current study either from 1st, 2nd, or from 3rd year. Maximum students were from 2nd

year participated in this study.

Knowledge Part:

Table 5.3 Distribution of correct answers to knowledge questions about tuberculosis among post graduate students

Questions.	Number (%)of students give correct answer
1. A) Cough with or without sputum , fever, decreased appetite, weight loss, blood in sputum all are symptoms of TB	35 (22.6%)
1. B) Cough, fever, decreased appetite, weight loss are symptoms of TB	48 (31%)
1. C) Cough, fever, weight loss are symptoms of TB	69 (44.5%)
1. D) Cough and fever symptoms of TB	76 (49%)
1. E) Cough with or without sputum only symptom of TB	141 (91%)
2. Most specific diagnostic modality for pulmonary TB is sputum smear - yes	132 (85%)
3. You advice sputum CBNAAT for sputum smear negative chest x-ray suggestive of TB - yes	105(67%)
4. Is necessary to send all sputum positive sample for CBNAAT - yes	77 (49%)
5. Is necessary to do HIV test and counselling, chest x-ray, and FNAC for lymph node TB – yes	30 (19%)
6. Suspected case of pulmonary TB in PLHA should go for sputum CBNAAT – yes	52 (33%)
7. Will you start AKT for TB meningitis on the basis of radiological findings, if CSF CBNAAT is negative? - yes	41 (26%)
8. Duration of AKT prolonged if radiological lesion not improved – yes	24 (15%)
9. No role of Mantoux test in diagnosis of active TB - yes there is no role	106 (68%)
10. No role of Serological test in diagnosis of TB - yes there is no role	91 (58%)
11. Chest x-ray, HIV counselling and testing, MRI spine for TB spine – yes	06 (4%)
12.A) Drug susceptibility test for TB patients with HIV positive during or before the course of AKT – yes	64 (41%)
12. B) Drug susceptibility test for sputum smear positive after IP(intensive phase) of AKT – yes	96 (62%)
12. C) Drug susceptibility test for patient who were sputum positive after a course of AKT completed – yes	71 (46%)
12.D) Drug susceptibility test for patients who are sputum smear positive	70 (45%)
13. MDR tuberculosis definition - correctly defined	137 (88%)
14. First line LPA for sputum positive after IP phase of AKT in sputum CBNAAT rifampicin sensitive result – yes	56 (36%)
15. Audio-gram, Mental health evaluation, Thyroid function tests, and UPT(Urine pregnancy test in child bearing female patient) for pre-treatment evaluation for shorter MDR regimen – yes	10 (6%)
16. Contraindication of shorter MDR regimen in pregnancy, TB meningitis, and in second line AKT drug resistance pulmonary TB - yes	37 (24%)
17. MTP (medical termination of pregnancy) for DR-TB with pregnancy of 12 weeks gestation period – yes	41 (26%)
18. Streptomycin injection use with caution in CKD (chronic kidney disease) patients - yes	110 (71%)
19. Isoniazid prophylaxis therapy for healthy asymptomatic newborn of sputum positive mother – yes	88 (57%)
20. Reassurance and continue AKT and ART in paradoxical reaction – yes	73 (47%)

From the above table 5.3 overall mean±SD knowledge score is 21±5.086. Good knowledge in 132 (85%) students use of sputum smear for AFB as a good diagnosis modality, 88(57%) students isoniazid prophylaxis therapy for baby of sputum positive mother, 137 (88%) could define MDR TB, 110 (71%) students use streptomycin with caution in CKD (Chronic Kidney Disease) patients, 106 (68%) students believed that currently there is no role of mantoux test and serological tests in diagnosis of TB , and 105 (67%) students advice sputum CBNAAT for sputum smear for AFB negative and x-ray positive patient. 82 (53%) students poor knowledge in the paradoxical reaction management, 114 (73%) students advice MTP (medical termination of pregnancy) in 12 weeks gestation pregnancy diagnosed DR-TB, 37 (24%) students knew that shorter MDR regimen is contraindicated in pregnancy, 52 (33%) students knew that sputum CBNAAT for PLHA patient suspected to have pulmonary TB,10 (6%) students knew about pre-treatment evaluation of shorter MDR regimen, 41 (26%) students would start AKT for TB meningitis on the bases of radiological findings if CSF CBNAAT is negative, few students evaluating the pulmonary TB and HIV test and counselling in case of extra-pulmonary TB[lymph-node 30 (19%) and spine 06 (4%)] management.

Table 5.4: Scoring of good and poor knowledge, attitude and practice.

	Maximum points scored	Good	Poor
Knowledge	35	>20	<20
Attitude	18	>10	<10
Practice	20	>10	<10

Maximum points scored = 35, Knowledge > 20 points is good and < 20 points is poor knowledge

Maximum points scored = 18, Attitude >10 points is good and <10 points is poor Attitude

Maximum points scored = 20, Practice >10 points is good and <10 points is poor Practice

Figure 5.3 Response of students to the knowledge part

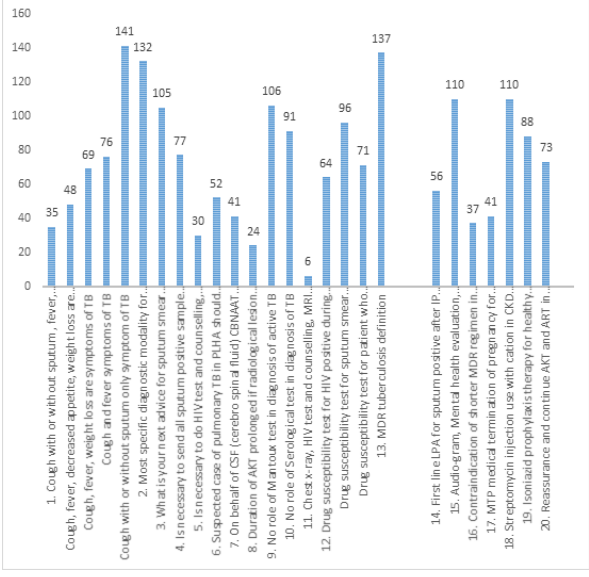
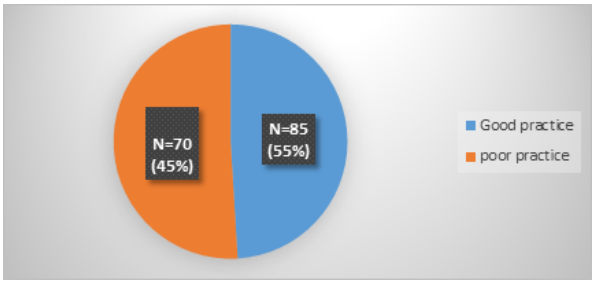


Figure 5.4 students response to knowledge part



Attitude part:

Table 5.5 Attitude of P.G. students about Tuberculosis.

Question	Very Important N (%)
1. Isolation of patient is always necessary for MDR pulmonary TB - yes	133 (85%)
2. Sputum CBNAAT always for all sputum smear positive samples - yes	72 (46%)
3. Need for spreading awareness in our institute - yes	143 (92%)
4. Sputum positive mother on treatment can feed baby - yes	115 (74%)
5. BCG vaccination is best way of prevention of TB - yes	87 (56%)
6. Pregnancy not interact with mantoux test -yes	74 (47%)
7. It is necessary to do follow-up MRI/CT scan for TB spine until radiological resolution of TB lesion -yes	100 (64%)
8. Not correct to stop AKT after 2 months of smear negative on routine follow-up on AKT - yes	114 (73%)
9. Urine sample is valid for CBNAAT test for kidney TB - yes	71 (45%)
10. IPT (Isoniazid prophylaxis Therapy) will give H-mono resistance - yes	89 (57%)

According to table 5.5, attitude of students regarding isolation (85%), importance of routine follow-up (64%), isoniazid prophylaxis (57%) etc was good with mean±SD score of 12.45±2.80.

Figure 5.5 Students response to attitude part

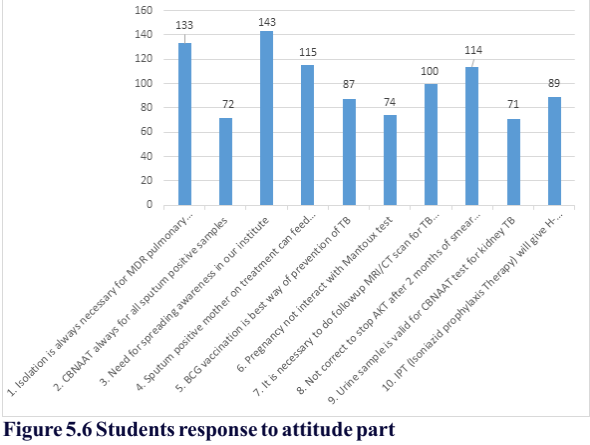


Figure 5.6 Students response to attitude part

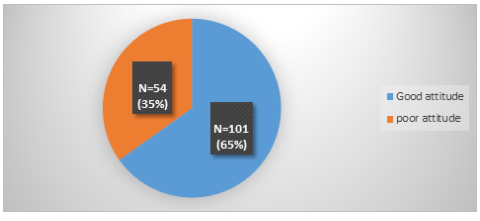
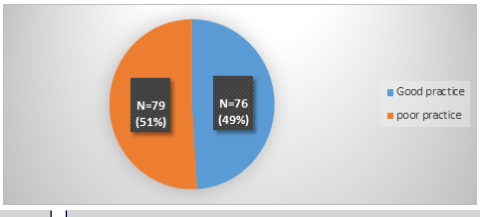


Table 5.4 and figure 5.5 and 5.6 shows the attitude of students; 55% of students reported that urine sample is not valid for CBNAAT test, 53% of students believe that Mantoux test is interact with pregnancy, 54% do not need to do CBNAAT in all sputum positive patients. About half of students believed that BCG vaccination is not plays best role in prevention of TB.

Practice part:

Figure 5.7 Students response to practice part



Practice mean±SD of students was (10.98 ± 3.58), only 33 (21%) students use CBNAAT test for diagnosing all extra-pulmonary (abdominal, lymph-node, TB meningitis, Pleural TB) sites in their routine practice

- 93 (60%) students do not recognize ADA as a standard remark to start AKT for pleural effusion in PLHA patient and 65 (42%) of students give steroids for TB Meningitis in PLHA patient where other life threatening opportunistic infections are absent.
- 90 (58%) students would better differentiate TB breast from carcinoma breast with local examination.
- 103(67%) students stop injection streptomycin during pregnancy to avoid teratogenic effect
- Only 68(44%) advice shorter MDR to decrease duration of AKT with high dose Moxifloxacin
- 86 (56%) students advice for chest x-ray with shield to pregnant lady with suspected pulmonary TB if sputum smear for AFB was negative, 85(55%) students practice with daily fixed drug combination AKT and only 17(11%)students stop ethambutol and streptomycin for chronic kidney disease patients.

Figure 5.8 KAP distributions among the PG students

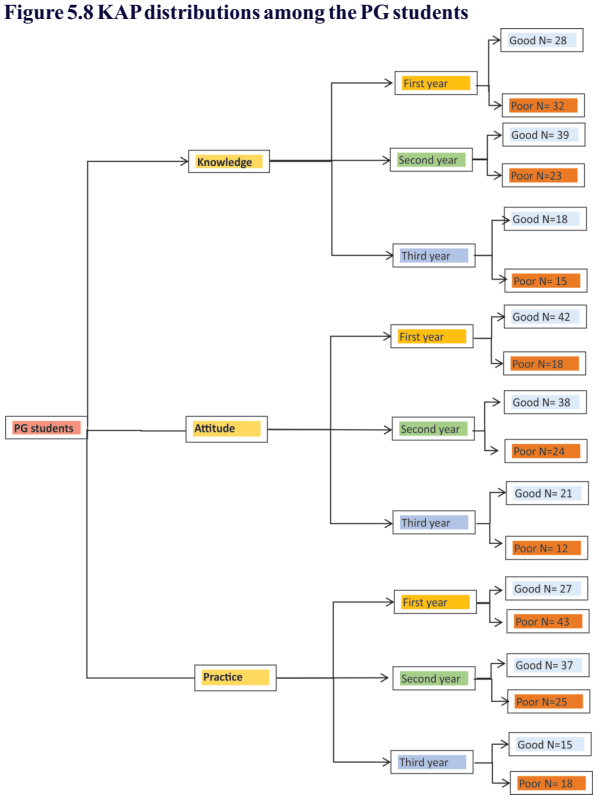
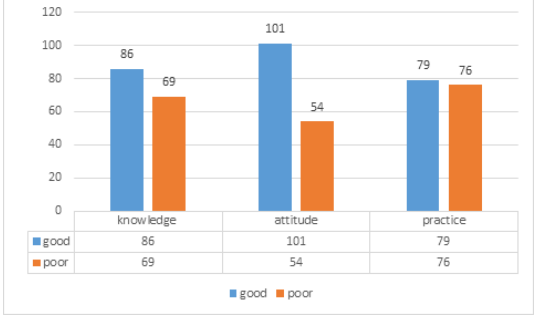


Figure 5.9 overall knowledge, practice and attitude



From the above table 5.4 and figure 5.9 more than half of post graduate 86 students have good knowledge and 101 having good attitude and 79 having good practice regarding diagnosis and management of tuberculosis. 69 students have poor knowledge, 54 students have poor attitude and 76 have poor practice for tuberculosis.

DISCUSSION

This study was carried out on 155 students, currently doing post graduation in Government Medical College, Bhavnagar. All of them

were from different departments and different year. Knowledge of the PG students was good in constitutional symptoms of TB, diagnostic modality, importance of sputum CBNAAT, isoniazid prophylaxis, definition of MDR TB and role of serological tests. PG students had poor knowledge for extra-pulmonary TB management, sputum CBNAAT for all PLHA patients, pregnancy and DR-TB treatment, paradoxical reaction and pretreatment evaluation for starting of DR-TB regimen.Their attitude was good for isolation of TB patients, breast feeding in sputum positive mother, interaction between pregnancy and Mantoux test, need of spreading awareness of TB in Sir Thakhtasighji hospital, Bhavnagar, necessary to do follow-up MRI/CT in TB spine Knowledge scores in the present study according to table 5.3 and figure 5.3 and 5.4 are good score with mean±SD value of 21±5.08 (55% correct). A study by Elizabeth Kiefer in the San Juan de Lurigancho district of Lima, Peru, found that Mean knowledge score was 10.0 ± 1.9 out of 14 (71 % correct) [82]. A survey of knowledge of TB in an urban slum in Nairobi, Kenya, found those with a diploma in medicine had score better than those with lesser degrees [83].

In this study, only 35 (22%) students knows that cough with or without sputum, fever, blood in sputum, weight loss and decreased appetite all are constitutional symptoms of TB, around 131(85%) students knows that sputum smear is the most reliable test for pulmonary TB diagnosis and 103(67%) knew about that sputum CBNAAT is the next advice for sputum negative and chest x-ray suggestive of pulmonary TB. Students have poor knowledge about chest x-ray and HIV counseling, to test HIV in extra-pulmonary TB management and sputum CBNAAT is always adviced in PLHA patient who is suspect for pulmonary TB. The study revealed that 136 (88%) students knew the definition of MDR TB. Very few, around 9 (6%) students knew about the pretreatment evaluation before starting shorter MDR regimen and 90 (58%) and 124 (80%) students were unaware of contraindication of shorter MDR regimen in pregnancy and in TB meningitis respectively. Only 55 (36%) students knew that first line LPA is necessary to rule out isoniazid resistance in 2 months follow-up sputum positive with rifampicin sensitive on initial of treatment. 19 (12%) students believed that it is not wise to give AKT with ART in paradoxical reaction. Students have good knowledge to avoid injection streptomycin in Chronic Kidney Disease patients.

Survey of KAP for tuberculosis among general practitioner in Delhi, India [84]. 78.5% of general practitioners recommended chest x-ray with or without other investigations for the diagnosis of TB, while only 12% recommended sputum examination [84]. In our study only 18 (11.6%) students recommended chest x-ray as best investigation for diagnosis of pulmonary TB rather than sputum smears for AFB. Hong et al. surveyed private general practitioners in Korea and found that considerable misunderstandings existed about basic TB concepts; sputum examinations were considerably neglected. Over 50 % did not consider sputum examination essential in case finding/diagnosis [85].

In the field of BCG vaccination more than half of the students (56%) familiar with effect of the BCG vaccination in the prevention of TB, and they agree with the role it plays in the prevention of TB. In other study over the final year students in Yazd, central Iran [86] more than half (51.7%) of students not familiar with the effect of BCG vaccine. Other study in Hunan, China, only 25.5% of final year medical students knew about the effect of the BCG vaccination [88]. Other similar study on non medical university students in Bangladesh they surveyed the knowledge among non medical university students about TB, particularly on common symptoms, disease agent, communicable or non communicable, latent TB, vaccination against TB, treatment system etc. That study revealed that more than half of students believed that TB is communicable disease, most of the students correctly answered about TB vaccination. More than two third students agreed that TB is major health problem in Bangladesh. Most of them believed that TB is curable disease, and about half of the students knew that bacteria are the agent for TB, few students have idea about latent TB and most of the respondents had heard about DOTS program, Poor knowledge about TB was noted in students came from urban and joint family, 93% of students aware of vaccination of TB [89]. From other survey in Korea among private general practitioner regarding tuberculosis 49% general practitioner considered that the tuberculosis is not serious situation, 47% answered that the BCG vaccination causes untoward reactions with no or limited effectiveness [85].

From the present study 133 students (85%) have good attitude regarding isolation of MDR patients. Similar study of knowledge and practice in final year medical students of Rio de Janeiro, Brazil, two-thirds of their students did not use masks when examining pulmonary TB patients [87].

In the present study, the most satisfactory finding was students have very good knowledge about TB transmission and importance of MDR patient isolation, study in Yazd, central Iran [86] the most worrisome finding was the poor knowledge about TB transmission, two third of students did not know the distance that should be kept from contagious patients in spite of their recognition that the usual route of TB transmission is aerosol.

A study by N. Vandan, M.Ali, R.Prasad, C Kuroiwa knowledge regading tuberculosis management in Lucknow, India [90] A public-private sector comparison. Study covered both public and private sector doctors, reviewing their knowledge about TB-DOTS and the RNTCP guidelines, only 51% of the doctors knew all the symptoms, which was certainly less than desirable. In our study only 22.6% of students was knew about all symptoms of tuberculosis.

The RNTCP guidelines recommend that sputum microscopy with/without chest radiography and culture should be the preferred diagnostic test for TB identification. However, in the present study 133 students (85%) recommended the use of sputum microscopy with/without other investigations. A similar study conducted in Delhi [91], India in 1998 highlighted that only 12% of doctors recommended sputum testing with/without other investigations and 78.5% of doctors recommended the use of chest radiography with/without other investigations. In our study 133 students (85%) recommended the sputum smear for AFB is the most specific test to diagnose pulmonary tuberculosis. This suggests over the years, sputum microscopy has become the preferred diagnostic test for identification of TB. In our study compare the post graduate students with their year of post graduation there is first year students have poor practice than second and third year students.

The questionnaire in this study encompassed all domains of TB symptoms, diagnosis, prevention, isolation, new drug regimen indication contraindication, prophylaxis, adverse drug reaction duration of treatment and management of tuberculosis in pregnancy and HIV positive patients, so it evaluated students better than previous studies with limited questions

The limitations of this study were the self reporting nature of assessment of practice among students. The only one medical college is included in this study. Number of students and year of study are different. No data available of basic training a knowledge regarding tuberculosis. This study is not blind study.

SUMMARY

This study entitled "A study to assess knowledge, attitudes and practices regarding diagnosis and management of tuberculosis among the post graduate students in Government Medical College, Bhavnagar" enrolled 155 post graduate students as per the inclusion criteria after approval from Institutional Review Board, Bhavnagar.

The purpose of study is to know that students in their routine practice with tuberculosis patient, how to suspect, modality which they use for diagnosis pulmonary and extra-pulmonary TB, start and duration of anti tuberculosis Treatment, current use fixed drug regimen, drug resistance tuberculosis, adverse drug reaction and plans to manage tuberculosis with PLHA, pregnancy and prophylaxis in newborn from sputum positive mother, breast feeding etc.

Questionnaire designed with guideline from PMDT (Programmatic Management Drug-Resistant Tuberculosis in India 2017) and RNTCP (Revised National Tuberculosis Control Programme). Three parts in the questionnaire are- knowledge part 20 questions and 10 questions each for attitude and practice.

Out of 155 students in knowledge part 35 (22%) students considered cough with or without sputum, fever, blood in sputum, decreased appetite, and weight loss all are symptoms of pulmonary TB. Only 52 (33%) aware of that PLHA patients should go for sputum CBNAAT, 30 (19%) students not rule out pulmonary TB in suspected case of lymph-node and spine TB, 41 (26%) students would not start anti tuberculosis treatment for TB meningitis if ADA level in CSF is normal limit, 24 (15%) students not extend anti tuberculosis treatment in spine TB until

radiologicaly not improved lesion, 56 (36%) students not aware of sputum first line LPA if sputum positive after 2 months of anti tuberculosis treatment in rifampicin sensitive pulmonary TB, more than half 82 (53%) students did not give anti tuberculosis treatment in paradoxical reaction and 19 (12%) students would not give anti tuberculosis treatment with ART in paradoxical reaction, only 10 (6%) students have knowledge about pre treatment evaluation before starting shorter MDR regimen and 117 (76%) students have no knowledge about contraindication of shorter MDR regimen . Students have good knowledge for sputum smear AFB most preferred investigation than chest x-ray, sputum CBNAAT for smear AFB negative, role of Mantoux test and serological test, define MDR-TB, streptomycin give with caution in chronic kidney disease patients.

Students have good attitude for isolation, pregnancy and mantoux interaction, breast feeding, BCG vaccination, need to do follow-up MRI/CT in TB spine patients, continue AKT if sputum negative after 2 months of anti tuberculosis treatment, 89 (57%) students attitude for isoniazid resistance more in patients taking isoniazid prophylaxis therapy, 45 % believed that urine sample is not valid for CBNAAT.

Students having good practice with pleural fluid ADA level, that ADA is not only diagnostic test for starting anti tuberculosis treatment for pleural TB and steroid given for PLHA patient if other life threatening opportunistic infections absent in TB meningitis, streptomycin not given during pregnancy to avoid teratogenic effects, chest x-ray with shield to rule out pulmonary TB in pregnant female, daily fixed drug regimen for primary rifampicin sensitive TB, poor practice part that students not doing CBNAAT for all extra-pulmonary TB (pleural, abdominal, lymph node, meningitis), currently duration of anti tuberculosis treatment is reduced with shorter MDR regimen and ethambutol and streptomycin use with caution in chronic kidney disease on anti tuberculosis treatment.

CONCLUSION

- In this study as observe that students having overall good knowledge and attitude and practice regarding diagnosis and management of pulmonary tuberculosis.
- Students have poor knowledge regarding pulmonary tuberculosis in PLHA patients and in pregnancy. They have poor practice on extra-pulmonary TB management, recent advances of RNTCP and PMDT guidelines.
- Recommendations to improve clinical knowledge regarding newer advances in RNTCP and new regimen, manage extra-pulmonary TB, attitude and practice plan for Continuing Medical Education (CME) and lectures to guide them in proper way to mange TB in routine practice.

ACKNOWLEDGEMENT

The completion of my study brings me to the time to express my sense of obligation. The entire work is an outcome of most kind, sympathetic and learned guidance of my esteemed teacher **Dr. Jigna Dave,** Professor and Head, Department of Respiratory Medicine, Government Medical College and Sir Takthasinghji Hospital, Bhavnagar, for her invaluable guidance and constant inspiration throughout my postgraduate study, and for the expression of love and care in preparing me for the future without whose initiative and enthusiasm this study would not have been completed. Words can never express my feelings and indebtment to her, for her invaluable constant guidance, everlasting encouragement, kind supervision and valuable suggestions during the course of my work.

REFERENCES

1. Tbcindia.gov.in
2. World Health Organization. Tuberculosis research office tuberculin reaction size on five consecutive days. Bull world health organ 1955;21:189-96.
3. The KAP survey model (Knowledge Attitude and Practices) spring nutrition.org
4. Grange JM, Zumla AI. 15 Human tuberculosis due to Mycobacterium bovis and related animal pathogens. Tuberculosis E-Book: A Comprehensive Clinical Reference. 2009 Mar 24:146.
5. Balasubramanian V, Wiegeshaus EH, Taylor BT, Smith DW. Pathogenesis of tuberculosis:pathway to apical localization. Tuber Lung Dis 1994; 75:168-78.
6. Beck JS, Skin changes in the tuberculin test. Tubercle 1991;72:81-7.
7. Chandha VK, Krishnamurthy MS, shashidhara AN, Jagganath PS, magesh V, presence of under-nutrition in a south indian community and is influence on estimates of annual risk of tuberculous infection 1997;44:67-71.
8. Klien RS, Flanigan T, Schuman P, Smith D, Vlahov D, the effect of immunodeficiency on cutaneous delayed type hypersensitivity testing in HIV-infected women without anergy:implication for tuberculin testing.Int J Tuberc lung Dis 1999;3:681-8.
9. MEDCHILL MT, GILLUM M. Diagnosis and management of tuberculosis during pregnancy. Obstetrical & gynecological survey. 1989 Feb 1; 44(2):81-4.
10. Steingart KR,Henry M, Laal S, Hopewell PC, Ramsay A, Menzies D, et al. Commercial serology antibody detection tests for diagnosis of pulmonary tuberculosis a systematic review. PLoS Med 2007; 4e202.
11. Shoemaker SA, Fisher JH, Scoggin CH. Techniques of DNA hybridization detect small numbers of mycobacteria with no cross-hybridization with nonmycobacterial respiratory organisms. American Review of Respiratory Disease. 1985 May;131(5):760-3.
12. Shankar P, Manjunath N, Mohan KK, Prasad K, Behari M, Ahuja GK. Rapid diagnosis of tuberculous meningitis by polymerase chain reaction. The lancet. 1991 Jan 5; 337(8732):5-7.
13. Clarridge J3, Shawar RM, Shinnick TM, Plikaytis BB. Large-scale use of polymerase chain reaction for detection of Mycobacterium tuberculosis in a routine mycobacteriology laboratory. Journal of Clinical Microbiology. 1993 Aug 1;31(8):2049-56.
14. Wilson SM, McNerney R, Nye PM, Godfrey-Faussett PD, Stoker NG, Voller A. Progress toward a simplified polymerase chain reaction and its application to diagnosis of tuberculosis. Journal of Clinical Microbiology. 1993 Apr 1;31(4):776-82.
15. PMDT guideline 2017.
16. Sheller JR, Dez prez RM, CNS tuberculosis nerol clin 1986; 4:143-58.
17. Moudgil H, Sridhar G, Leitch AG. Reactivation disease: the commonest form of tuberculous pleural effusion in Edinburgh, 1980–1991. Respiratory medicine. 1994 Apr 1;88(4):301-4.
18. AllenJC, Apicella MA, Experimental pleural effusion as a manifestation of delayed hypersensitivity to tuberculin PPD. J Immunol 1968;101:481-7.
19. Leckie WJ, Tothill P, Albumin turnover in pleural effusion. Clin Sci 1965;29:339-52.
20. Aktogu S, Yorgancioglu A, Cirak K, Kose T, Dereli SM. Clinical spectrum of pulmonary and pleural tuberculosis: a report of 5,480 cases. Eur Reespir J 1996;9:2031-5.
21. Valdes L, Alvarez D, San Jose E, Penela P, Valle JM, Garciapazos JM, et al. Tuberculosis pleurisy:a study of 254 patients. Arch Intern Med 1998;158:2017-21.
22. Sibley JC, A study of 200 cases of tuberculosis pleurisy with effusion .Am Rev Tuberc 1950;62:314-23.
23. Levine H, Szanto PB, Cugell DW, tuberculosis pleurisy : an acute illness. Arch Intern Med 1968;122:329-32.
24. Berger HW, Mejia E, Tuberculosis pleurisy Chest 1973;63:88-92.
25. Seibert AF, Haynes J Jr, Middleton R, Bass JB Jr. Tuberculous pleural effusion : twenty years experience. Chest 1991;99:883-92.
26. Shan SA. State of the art. The pleura . Am Rev Respi Dis 1998;138:184-234.
27. Goshal AG, Goshal S, Guhathakurta R, Sinha A, Banerjee AK, Chakrabarti AK,. Sputum AFB positivity in tuberculous pleural effusion with no radiologically apperant parenchymal lung lesion. India J Tuberc 1997;44:13-5.
28. Relkin F, Aranda CP, Garay SM, Smith R, Berkowitz KA, ROm WN,. Pleural tuberculosis and HIV infection, chest 1994;105:1338-41.
29. Light RW. Tuberculous pleural effusions. In: Light RW, editor. Pleural diseases. Fourth Edition. Philadolphia: Lippincott Williams and Wilkins;2001.p.182-95.
30. Chan CH, Arnold M, Chan CY, Mak TW, Hoheisel Gb. Clinical and pathological features of tuberculous pleural effusion and its long term consequences. Respiratoration 1991;58:171-5.
31. Epstein DM, Kline LR, Albelda SM, Miller WT. Tuberculous pleural effusion. Chest 1987;91:106-9.
32. Onandeko BO, Tuberculous pleural effusion : clinical patterns and management in Nigerians. Tubercle 1978;59:269-75.
33. Spieler P. The cytologic diagnosis of tuberculosis in pleural effusion Acta Cytol 1979;23:374-9.
34. Kumar S, Seshadri MS, Koshi G, John TJ, Diagnosing tuberculous pleural effusion: comparative sensitivity of mycobacterial culture and histopathology. Br Med J [Clin Res Ed] 1981; 283:20.
35. Enarson DA, Dorken E, Grzybowski S. Tuberculous pleurisy. Can Med Assoc J 1982;126:493-5.
36. Escudero Bueno C, Garcia Clemente M, Cuesta Castro B, Molinos Martin L, Rodriguez Ramos S, Gonzalez Panizo A, etal. Cytologic and bacteriologic analysis of fluid and pleural biopsy specimens with Cope's needle. Study of 414 patients. Arch intern Med 1990;150:1190-4.
37. Fontan Bueso J, Verea Hernando H, Garcia-Buela Jp, Dominguenz Juncal L, Martin Egana MT, Montero Martinez MT, Diagnostic value of simultaneous determination of pleural adenosisn deaminase and pleural lysozyme/serum lysozyme ratio in pleural effusion. Chest 1988;93:303-7.
38. Valdes L, San Jose E, Alvarez D, Sarandeses A, Pose A, Chomon B, et al. Diagnosis of tuberculous pleurisy using the biology parameters adenosine deaminase isoenzymes in the diagnosis of tuberculous pleuritis. Curr Opin Pulm Med2000;6:259-66.
39. Liang QL, Shi HZ, Wang K, Qin SM, QIn XJ, Diagnostic accuracy of adenosine deaminase in tuberculous pleural effusion: a meta-analysis. Respi Med 2008;102:744-54. Epub 2008 Jan 28.
40. Kataria YP, Khurshid I. Adenosine deaminase in the diagnosis of tuberculous pleural effusion. Chest 2001;120:334-6.
41. Tndon PN, Bhatia R, Bhargava S, Tuberculous meningitis. In: Harris AA, editor. Handbook of clinical neurology [revised series]. Amstredam: Elsevier science; 1998.p.195-226.
42. Bhargave S, Gupta AK, Tandon PN. Tuberculous meningitis a CT study. Br J Radiol 1982;55:189-96.
43. Thwaites GE, Tran TH,. tuberculous meningitis: many questions too, few answers. Lancet Neurol 2005;4:160-170.
44. National Institute for Health and Clinical Excellence, National Collaborating Centre for Chronic Conditions. Management of non-respiratory tuberculosis: clinical diagnosis and management of Tuberculosis, and measures for its prevention and control. London : Royal College of Physician;2006.p.63-76.
45. Blumberg HM, Burman WJ, Chaisson RE, Daley CL, Etkind SC< Friedman LN, et al; American Thoracic Society, centers for Disease control and prevention and the Infectious Disease Society of america Treatment of tuberculosis. Am J Respi Crit Care Med 2003; 167:603-62.
46. Grigis NI, Farid Z, Kilpatrick ME, Sultan Y, Mikhali IA, Dexamethasone adjunctive treatment for tuberculosis meningitis. Tubercle 1966; 47:75-91.
47. Grigis NI, Farid Z,Hana LS, Yassin MW, Wallance C. the use of dexamethasone in preventing ocular complications in tuberculous meningitis, Trans R soc Trop med HYG 1983;77:658-9.
48. Ashby M Grant H, Tuberculous meningitis treated with cortisone.Lancet 1955;1:65-6.
49. Volijarec BF, Corpe RF,. the influence of corticosteroid hormones in the treatment of tuberculous meningitis in Negroes, Am REv Respi Dis 1960;81:539-45.
50. Lepper MH, Spies HW, The present system of the treatment of tuberculosis of the central nervous system ,Ann NY Acad Sci 1963;106:106-23.
51. O'Toole RD, Thronton GF, Mukherjee MK, Nath RL, Dexamethasone in tuberculosis meningitis:Relationship of cerebrospinal fluid effects to therapeutic efficacy:Ann Intern Med 1969;70:39-48.
52. Escobar JR, Belsey MA, Duenas A, Medina P, Mortality from tuberculous meningitis reduced by steroid therapy. Paediatrics 1975;56:1050-5.
53. Tuberculosis and Human Immunodeficiency virus infection: recommendations of the Advisory Committee for the Elimination of Tuberculosis [ACET]. MMWR Morb

Mortal WKly Rep 1989;38:236-8.
54. Kent SJ, Crowe SM, Yung A, Lucas CR, Mijich AM. Tuberculous meningitis. Bull Jhon Hopkins Hosp !933;52:5-37.
55. Hodgson AR, Stock FE, Anterior spine fusion. A preliminary communication on the radical treatment of Pott's disease and pott's paraplagia. Br Surg 1956;44:266-75.
56. Hodgson AR, Stock FE, Anterior spine fusion for the treatment of tuberculosis spine.J Bone joint Surg 1960;42-A 295-310.
57. Proudfoot AT, Akhtar AJ, Douglas C, Home NW. Milliary tuberculosis in adults.BMJ 1969;2:273-6.
58. Ormerod LP. Respiratory tuberculosis. In: Davies PDO, edotor. Clinical tuberculosi. London : chpman an hall medical :1997.p.76.
59. Sharma SK, Mohan A, Pande JN, Prasad KL, Gupta AK, Khilnani GC< Clinical profile, laboratory charecteristics and outcomes in milliary tuberculosis Q J Med 1995;88:29-37.
60. Hass DW, Des Prez RM. Tuberculosis and acquired immunodeficiency syndrome: a historical perspective on recent developments. Am J Med 1994;96:439-50.
61. Lado Lado FL, Barrio Gomez E, Carballo Arceo E, Carbarcos Ortiz de Barron A. clinical presentation of tuberculosis and the degree of immunodeficiency in patients with HIV infection. Scand J Infect Dis 1999;31:387-91.
62. Gupta R, Gupta AS< Duggal N. Tubercular mastitis. Int Surg 1982;67:422-4.
63. Alagaratnam TT, Ong GB. Tuberculosis of the breast. Br J Surg 1980;67:125-6.
64. Banerjee SN, Ananthakrishnan N, mehta RB, Prakash S, Tuberculous mastitis: a continuing problem. World J surg 1987;11:105-9.
65. Shrma SK , Mohan A, Kadhiravan T.HIV -TB coinfection epidemiology, diagnosis and management. Indian J Med Res 2005;121:550-67.
66. McIlleron H, Meintjes G, Burman WJ, Maartens G, Complicatons of antiretroviral therapy in patients with tuberculosis: drug interactions, toxicity, and immune reconstruction inflammatory syndrome J infect Dis 2007;196:[Supp 1]: S63-75.
67. Meintjes G, lawn SD, Scano F, Maartens G, FrenchMA, Worodria W, et al; international Network for the study of HIV-associated IRIS. Tuberculosis- associated immune reconstruction inflammatory syndrome: case definition for use in resources-limited settings. Lancet infect Dis 2007; 8:516-23.
68. Technical and operational guideline of tuberculosis: 2016; 70-74.
69. Nation Technical guidelines on Anti retroviral Treatment: 2018: page 67-72.
70. Warkany J, Antituberculosis drugs. Teratology 1979; 20:133-7.
71. Snider DE Jr, Layde PM, Jhonson MW, Lyle MA. Treatment of tuberculosis during pregnancy. Am Rev Respir Dis 1980;145:494-8.
72. Bonebrake CR, Noller KL, Loehnen CP, Muhm JR, Fish CR. Routine chest radiography in pregnancy. JAMA 1978;240:2747-8.
73. Mattox JH. The value of a routine prenatal chestx-ray. Obstet Gynecol 1973;41:243-5.
74. Swartz HM, Reichling BA. Hazards of radiation exposure for pregnant women. JAM 1978;239:1907-8.
75. Turner AF. The chest radiograph in pregnancy. Clin Obstet Gynecol 1975;18:65-74.
76. Rutsky EA, Rostand SG. Mycobacteriosis in patients with chronic renal failure. Arch intern med 1980;140:57-61.
77. Anonymous. Tuberculosis in chronic renal failure. Lancet 1980;1:909-10.
78. Varughese A, Brater DG, Benet LZ, Lee CC, Ethambutol kinetics in patients with impaired renal function. Am Rev Respi Dis 1986;134:84-8.
79. Line DH, Poole GW, Waterworth PM, Sreum streptomycin levels and dizziness. Tubercle 1970;51:76-81.
80. Mitchison DA, Ellard GA. Tuberculosis in patients having dialysis. British medical journal. 1980 May 10;280(6224):1186.
81. PMDT guidelines in India 2017table 9.3 anti TB drugs in renal failure 97-98.
82. Kiefer EM, Shao T, Carrasquillo O, Nabeta P, Seas C. Knowledge and attitudes of tuberculosis management in San Juan de Lurigancho district of Lima, Peru. The Journal of Infection in Developing Countries. 2009 Nov 13;3(10):783-8.
83. Chakaya JM, Meme H, Kwamanga D, Githui WA, OnyangoOuma WO, Gicheha C, et al. Planning for PPM-DOTS implementation in urban slums in kenya: knowledge, attitude and practices of private health care providers in Kibera slum, Nairobi. Int J Tuberc Lung Dis 2005;9:403-8.
84. Singla N, Sharma PP, Singhla R, Jain RC, Survey of knowledge, attitudes and practices for tuberculosis among general practitioners in Delhi, India. Int J Tuberc Lung Dis 1998;2(5):384-9.
85. Hong YP, Kwon DW, Kim SJ, Chang SC, Kang MK, Lee EP, et al. Survey of knowledge, attitudes and practices for tuberculosis among general practitioners. Tubercle Lung Dis 1995;76:431-5.
86. Fatemah Behnaz, Golnaz Mohammadzade, Razieh S, Mousavi-e-roknabaadi,Mahmoud Mohmmadzadeh, assessement of knowledge, attitudes and practices regarding tuberculosis among final year students in Yazd , central Iran.
87. Knowledge and practices of medical students to prevent tuberculosis transmission in Rio de Janerio, Brazil.
88. Bai LQ, Xiao SY, Xie HW, Yang GF, Wang YZ, Knowledge and practice regarding tuberculosis among final-year medical students in Hunan China ZhonghuaJie He He Hu Xi ZaZhi 2003;26(8):458-61.
89. Masud Rana, Reazul Karim, Md Abu Sayem, Nurul Islam, Assessment of knowledge regarding tuberculosis among non-medical university students in Bangladesh:A cross-sectional study.
90. Assessment of doctors' knowledge regarding tuberculosis management in Lucknow, India: A public-private sector comparison N. Vandan , M Ali, R, prasad, C. Kuroiwa.
91. Singha N, Sharma PP, Singha R, Survey of Knowledge, attitude and practices of general practitioner in Delhi, India. Int J Tuberc Lung Dis 1998; 2:384-9.