



Prevalence of Tuberculosis and Associated Clinical Features among the Population of Central Part of Bihar

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ABSTRACT:

Background: Tuberculosis is one of the top five fatal diseases mostly occur in reproductive age group. Infertility is the commonest symptoms in GTB cases. 90% cases of genital organ get infected by hematogenous spread. Big challenging problem is to be ruled out tuberculosis in asymptomatic patient in shortest possible time. Prevalence is high in either undeveloped or developing countries and less in developed countries. To be safe from tissue damaged in genitourinary organ and other complication it is essential to be ruled out in early stage. Culture and Histopathological examination are said to be gold standard. But there are many people who are physically and pathologically suspected but on the other hand confirmatory tests are usually fails to detect.

Methods: This study was carried out during January 22 to April 23. Upon 342 subjects selected by inclusion and exclusion criteria. This study is based on classification of patient on their symptoms and clinical history. Further classification of patient done on their pathological examination.

Results: In our study 45 (13.1 %) patients out of 342 are found positive. In which male and female positive cases are 5.8 % and 7.2 % respectively. We also found that there are many cases where due to lack of money only one person went for treatment and other all waiting for his recovery so that they can start their treatment.

Conclusion: Tuberculosis of any form should be ruled out in shortest duration of time to escape from different types of complication. Some can easily be identified by their physical appearance and pathological investigation but some are undiagnosed even after clinical history. There is not a single test available which can rule out MTB accurately in shortest duration of time.

1. Introduction

TB is one of the top 5 death causing disease in female at her reproductive stage. Besides of modern medicine and diagnostic tools nearly 1000 death occur only due to it in India. 5 lakhs women died in 2015 due to it in which 28% had HIV⁷⁵. One of the world's biggest health associated problems is tuberculosis. Only tuberculosis alone is responsible for maximum number of deaths in younger age. Nearly one third of world population is suffering and affecting due to tuberculosis³. Reports of WHO (2014) told that 9.6 million people got ill due to TB and 1.5 million death occur only due to it^{36,37,38}. It causes different types of complications like pulmonary tuberculosis, extra pulmonary tuberculosis, genital tuberculosis, tissue involvement results organ damage and other complications in lymph node, skeletal system, fertility

etc. and even death⁷⁻¹¹. Prevalance of tuberculosis is more in economic lower class family due to malnutrition leads to weak immunity and due to comparatively lower living standard. Prevalence is less in economic higher class due to strong immunity. Similarly, prevalence of tuberculosis is more in developing countries and less in developed countries. World's 90% of incidents comes from undeveloped and developing countries. Prevalence of TB is 1% in developed countries and 13% or more in developing countries. Lowest prevalence was found in Australia (0.69%) and in India prevalence is very high up to 19%⁵⁵. Incidence of GTB is 192 to 232 per 01 lakh population and 19 to 30 deaths per 01 lakh population in developing countries⁴. In case of male genital urinary tuberculosis commonest effected organ is kidney and usually occur in 40-50 years age group^{6,14,15}. In case of female genital tuberculosis commonest effected organ is



fallopian tubes and it commonly occur in reproductive age group (20-40). It is very common form of extra pulmonary tuberculosis. 27% of all cases worldwide are of FG TB and it is 9% of all extra pulmonary cases. In all cases of infertility all over the world 10% are due to GTB. Prevalence of tuberculosis is increased from 19% (2011) to 30% (2015) according to ICMR³³. One of root cause of tuberculosis and death due to it, is early age marriage. 50% of marriage occur in early age between period of 1998 to 99 and it reduced to 44.5% in 2006 according to NFHS-III. In Jharkhand state it was 71 % and in Bihar it was 65.2%. So probably due to it prevalence of tuberculosis in these states are very high. Recent study reveals that prevalence of FG TB with infertility was 26% and infertility with FG TB was about 42% in New Delhi. In India 3 to 16% GTB patients were infertile²⁶. Among all infertile patient 3% were suffering with GTB, whereas infertility due to tube damage is 41%³⁵. 20 to 50% of HIV patient at reproductive age also have active TB mostly extra pulmonary^{5,6}. All over the world 15% of TB patient have also HIV and 75% of GUTB have HIV in HIV endemic area^{40,41}.

Transmission

Tuberculosis bacilli transmitted from infected to health person through air droplets during coughing, sneezing, or talking. Healthy person inhales these infected air droplets and get infected^{55,61}. After that they reached to alveoli of lungs and form ghon focus that leads to primary tuberculosis. Primary tuberculosis is the beginning of all complications. After that by hematogenous spread these tuberculous bacilli reaches to different organ and cause tissue damage due to morphological changes in it. About 90% of transmission occur by hematogenous spread, 7% by descending mode and 3% by ascending pathway. In case of male common involve organ due to hematogenous spread is kidney 80% followed by epididymis 22-55%. But other organ like bladder, urethra, penis, lymph nodes, pleura and skeleton systems are also affected. Globus minor is the site from where disease usually starts to grow. In male transmission of bacilli to genital organ is responsible for male infertility. In case of female due to hematogenous spread bacilli spread to different organs and causing untreatable organ damage. Common involve organ due to hematogenous spread is ampullary region of fallopian tube (90 to 100%) followed by endometrium (50 to 80%) ovaries (20 to 30%) cervix (5 to 15%) and vaginal rarely up to

1%^{34,56,57,59,60}. Among all extrapulmonary tuberculosis cases GTB causes morphological changes in fallopian tube resulting infertility, PID and menstrual disturbance etc. Most dangerous thing is that they cause irreversible changes in genital organ. It can also remain in body up to 20 years without causing any abnormalities. But when these latent forms get once activated disease appeared. Breakdown of host immunity occur due to low vitamin d level leads to reactivation of latent form. Tuberculous bacilli commonly cannot directly infect genital organ without involvement of pulmonary organ. Transmission of disease in GTB almost always secondary to pulmonary infection. 7% of transmission occur through peritoneum bowel and lymphatic mesenteric route, rest 3% of transmission occur by ascending route. In ascending route female partner get infected by using sputum as a lubricant during sex.

Clinical Features

Clinical sign and symptoms may be same or different in all types of tuberculosis. Commonest symptoms of genital tuberculosis are infertility^{7,5,16,27,58,60,65,76,87}. There are no any sign and symptoms are in genital tuberculosis patient. They look healthy but most of the cases are came in to knowledge when they came for treatment for infertility. In case of female genital tuberculosis up to 11% may be asymptomatic^{24,35,58}. So GTB of female is called as silent and chronic disease because bacilli can alive in body as latent form up to 20 years without causing any symptoms. In case of pulmonary tuberculosis common symptoms are coughing, weight loss, feeling bad, sweating at night, fever etc. But in case of latent TB there is no any sign and symptoms or some symptoms may be present. In case of extra pulmonary tuberculosis above symptoms may or may not be present. Vaginal discharge, PID and fever are the common complication in acute stage. Infertility, menstrual disturbance, vaginal discharge after sex, loss of pregnancy, abdominal pain, distension, chronic pelvic pain and tumor are other clinical symptoms^{30,53,60,81,82}. Fitz hug Curtis syndrome occur due to PID tuberculosis. Symptoms of FG TB at post-menopausal are bleeding, leucorrhea, pyometra etc^{26,81,83}. Menorrhagia and intermenstrual bleeding are the typical symptoms of active tuberculosis. Destruction nature of tuberculosis is the major problem leads to fibrosis.



2. Method

This study was carried out during Jan 22 to April 23 upon 342 subjects selected by the inclusion and exclusion criteria from camping at different part of Begusarai district.

Exclusion Criteria:

1. Age > 50 years

Inclusion Criteria:

1. Person having symptoms of infertility, mild fever in evening, chronic coughing, weight loss, loss of aptitude.
2. Primary and secondary infertile female
3. Post menopause women with abnormal uterine bleeding (AUB)
4. Irregular menstrual cycle
5. Presence of lymph node or gland.
6. Past history of tuberculosis either subject or family member.

We include symptomatic patient and family members either symptomatic or asymptomatic of both treated and under treatment MTB patients in our study. Patients are primarily classified on the basis of their clinical history and physical appearance in to two groups-

- A. **Asymptomatic**-252 patients-Further classify in to 3 subgroups on the basis of pathological findings-

- A1. Asymptomatic clinically healthy -192 patients
- A2. Asymptomatic clinically mild suspected - 49 patients
- A3. Asymptomatic clinically strong suspected- 11 patients

- B. **Symptomatic**-90 patients- Further classify in to 2 subgroups on the basis of pathological finding-

- B1. Symptomatic clinically mild suspected -70 patients
- B2. Symptomatic clinically strong suspected -20 patients

A1. Asymptomatic clinically healthy-

192 patients are classified as asymptomatic patient clinically healthy. They are close relatives of MTB patients. They look physically fit and fine. Almost all belongs to middle class family. It is also noticed that almost all from whom they are supposed to be infected is

above the age of 50 years. It proves that in economically middle-class family TB came in active form after reproductive stage. Due to comparatively weak immune system. These 192 patients (130 male and 62 female) are further classified on the basis of pathological findings.

Pathologically Normal (Total=156)	Pathologically mild Suspected (Total=28)	Confirmed Cases (Total=8) 8 asymptomatic patients are POSITIVE
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RESULT

3 out of 130 males are positive=**2.3%**

5 out of 62 females are positive=**8.06 %**

Total confirmed positive cases out of 192 are =**8 (4.16%)**

A2. Asymptomatic clinically mild suspected - 49 patients- Patients of this group are usually weak and underweight. Their physical appearance seems that they are suspected. Based on their physical appearance and economical status patients are classified in this group. Further several required investigations are done like MT, Hb, TLC DLC, ESR and on the basis of these investigations' patients are further classify into these subgroups-

Pathologically Normal (Total=32)	Pathologically Suspected (Total=11)-MT POSITIVE	Confirmed Cases (Total=6)
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RESULT

2 OUT OF 32 MALES ARE POSITIVE=**6.25 %**

4 OUT OF 17 FEMALES ARE POSITIVE=**23.5 %**

TOTAL POSITIVE CASE ARE OUT OF 49 = **6 (12.2 %)**

A3. Asymptomatic clinically strong suspected- 11 patients- These 11 peoples are close contact to MTB patients under treatment. They belong to lower economic class and all are very weak and underweight. All are asymptomatic but some people are giving wrong information.



Pathologically Normal (Total=06)	Pathologically Suspected (Total=01)	Confirmed Cases (Total=04)
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RESULT

2 OUT OF 4 MALES ARE POSITIVE=**50.0%**

2 OUT OF 7 FEMALES ARE POSITIVE=**28.5 %**

TOTAL POSITIVE CASES ARE = **4 (36.3 %)**

B. Symptomatic -90 patients (39 Male and 51 female)-
Further classify in to 2 subgroups on the basis of
pathological finding-

B1. Symptomatic clinically mild suspected -70 (30 male
and 40 female) patients B2. Symptomatic clinically
strong suspected -20 (9 male and 11 female) patients

B1. Symptomatic clinically mild suspected – Clinical
symptoms and pathological findings of these 30 males
symptomatic and clinically mild suspected patients-

Clinical Symptoms	Number of Patients	Pathological findings
Fever, Coughing, Weight Loss	20	TLC=8500 TO 11500 Hb=11 to 14 gm% ESR=20 to 60 mm MT=8 POSITIVE Sputum AFB= 2 POSITIVE X Ray= 1 POSITIVE TB Gold= 1 POSITIVE
Lymph node (Total = 7 Patient) a. Cervical Lymph node	4 Patients have cervical lymph node without fever	TLC=8800 TO 15600 1=Neutrophilia (82%) 3=Lymphocytosis (55 to 62 %) Hb=9.6 to 14 gms ESR=20 to 100 mm MT=2 POSITIVE Sputum AFB=Negative TB Gold=All Negative FNAC=Negative
	01 have cervical lymph node with history of fever	TLC=12800 DLC=Lymphocytes=66% MT= Positive FNAC=Negative TB Gold= POSITIVE
b. Inguinal Lymph node with fever	02 Patients	TLC=8800 & 12400 DLC=Lymphocyte (58%) & Neutrophil (78%) Hb=10.8 & 12.0 gm% ESR=40 mm & 60 mm MT= Both Positive (16 mm & 20 mm) FNAC=Both Negative TB Gold=1 st Negative, 2nd Positive



Azoospermia	02	TLC DLC= within normal Limit Hb > 12 gm% MT= Negative TB Gold= Negative Patient have no other sign and symptoms. Patient is looking fit and fine.
Breast Lump With family history No fever, weight loss	01	Hb=12.8 gm% MT=Negative FNAC=Gynecomastia TB Gold = Negative

B1. Symptomatic clinically mild suspected – Clinical symptoms and pathological findings of 40 female symptomatic clinically mild suspected patients-

Symptoms	Total Patients	Pathological Finding
Irregular Menstruation-15 patients	10-without history of fever	TLC DLC-Normal Hb-9.0 to 11.0 gm% ESR-20 to 40 mm MT-6 POSITIVE PAP SMEAR- ALL NEGATIVE TB GOLD-ALL NEGATIVE X Ray- ALL NEGATIVE
	5-with history of fever	TLC-9000 TO 13500 DLC-Within normal limit ESR-30 to 68 mm 1 st hr Hb- 8.0 to 11.0 gm% AFB-1 POSITIVE X Ray- 1 POSITIVE
Cervical Lymph node	02	TLC -14200 & 19200 DLC-Neutrophilia (56% & 80%) ESR- 60 mm & 120 mm 1 st hr MT- Both Positive (16 & 18 mm) X Ray- Negative both AFB- Negative both TB Gold- POSITIVE 1 st TB Gold- NEGATIVE 2 nd FNAC-NEGATIVE 1 st FNAC-Acinic Cell Carcinoma 2 nd
Breast Lump	02	TLC-5000 to 10000/cumm DLC- within normal limit



Symptoms	Total Patients	Pathological Finding
History of Fever and weight loss,		ESR- 10 to 18 mm in 1 st hr MT- Positive both FNAC-Negative both TB Gold- Negative both
Primary Infertility	Total=07 05= without fever	TLC DLC- Normal Hb- 9 to 11 gm% ESR- 10 to 50 mm 1 st hr MT- POSITIVE-01 TB Gold- POSITIVE -01
	02- with fever, weight loss and family history	TLC-11500 & 15000/cumm HB- 11 to 9 gm% Lymphocyte- 52 % & 60 % MT- Both Positive AFB-Both Negative TB Gold- POSITIVE (01)
Coughing and weight loss	14 Patients Some have history of fever all have family history	TLC=11000 to 15000/cumm DLC-10 have neutrophilia (70 to 80%) 4 have lymphocytosis (50-60 %) Hb- 9 to 11 gm% MT- POSITIVE-06 X Ray -Negative all AFB- POSITIVE-02 10 Patient samples are collected for TB Gold- POSITIVE-01 One patient has fever, coughing, weight loss, family history but X Ray, AFB, TB Gold is Negative, only MT is positive and her physical appearance shows that she must be MTB positive. So, Gene xpert - test done and we got POSITIVE result.

TOTAL POSITIVE CASE = 15 out 70	21.42 %
6 males out of 30 are positive	20%
9 females out of 40 are positive	9 %

B2. Symptomatic clinically strong suspected -20 (9 male and 11 female) patients-

We classify all patient whose physical appearance and symptoms shows that they must suffering with MTB. In

this group all are from economically lower class, living in house made of soil. Most of all were wearing torn and old cloths. All are uneducated highest qualified person is 5th std pass. All females are uneducated and not aware about personal hygiene and sanitary pads. All are labor or rickshaw puller.



Clinical symptoms of male patients-

Symptoms	No of Patients	Pathological Findings
Coughing mixed with blood, fever and weight loss	02	TLC-14200 & 16400 Hb- 9.2 & 9.0 gm% ESR- 70 mm & 120 mm MT- Both Positive AFB- Both Positive
Coughing, fever, weight loss	06	TLC-6700 to 11400/cumm DLC- 4 has neutrophilia > 75 % 2 has lymphocytosis 55 to 65% Hb-9.0 to 11.5 gm% ESR- 60 to 110 mm 1 st hr MT- POSITIVE -04 AFB- POSITIVE-02 Rest four patients are strongly suspected. So, their blood samples are collected for TB Gold, out of 4 one patient is TB Gold- POSITIVE-01 Rest 3 patients are also very suspected but TB Gold is Negative. So their sputum samples are collected for gene xpert. We got Gene xpert- POSITIVE-01 But rest two patient are pathologically negative.
Penis sore	01	One patient has sore in his penis. He has family history of tuberculosis. History of fever and weight loss. Pus discharge from penis. He has five children. His wife is also positive by AFB smear examination. All five children are very weak and underweight they are under precaution treatment from RNTCP. Pathological findings are- TLC-13500/cumm, DLC – Neutrophilia (85%) Hb- 10.0 gm% , ESR-80 mm 1 st hr MT- POSITIVE TB GOLD- POSITIVE-01 ZN Stain of pus- Negative

Clinical Symptoms of female patient (11)

Symptoms	Number of Patients	Pathological findings
Vaginal discharge, abdominal pain, fever, weight loss and one patient is primary infertile	05	TLC- 4500 to 8000/cumm Hb-6.2 to 9.0 gm% ESR-70 to 120 mm 1 st Hr. Pap smear-01 suggestive of tuberculosis.



Symptoms	Number of Patients	Pathological findings
		5 pap smears are collected by gynecologist and done cytological examination. But 4 are negative and one is suggestive of tuberculosis. All 5 these patients blood samples are collected for TB Gold test. Result TB Gold- POSITIVE-02 . In these two positive patient one is that primary infertile patient.
Amenorrhea+ fever+ weight loss.	01	Our team visited a home where a women found lying on bed. She is very weak, unable to walk and unable to coughing. She is unmarried and underweight. Her father was old TB patient. Pathological findings are- TLC-5100 DLC-Lymphocyte-62% Hb-6.8 gm% MT- POSITIVE AFB Sputum- Unable to give sputum sample. TB Gold- Negative
Coughing and weight loss	03	TLC-11400 DLC-Neutrophils-82% MT- POSITIVE-01 X Ray- POSITIVE-01 Sputum AFB- POSITIVE-01 Total POSITIVE cases-02
Secondary Infertile coughing, history of fever and weight loss.	02	TLC-8600 & 11700 DLC-within normal limit & Neutrophilia-76% Hb-10.8 gm% & 9.4 gm% AFB-Negative & POSITIVE TB Gold 1 st -Negative Gene Xpert- Negative

Total Positive Case (12 out of 20)	60 %
7 males out of 9 are positive	77.7 %
5 females out of 11 are positive	45.4 %

3. Results

342 patients are selected by inclusion and exclusion criteria and after intense counseling and pathological and radiological findings output of our work is-

45 patients are positive=13.1%

20 males out of 342 are positive =5.8 %

25 females out of 342 are positive=7.2 %

4. Discussion

Tuberculosis of any form should be ruled out in shortest duration of time to escape from different types of complication like infertility, PID, tissue damage etc. It has also observed that living standard and personal hygiene is the main root cause of tuberculosis and other diseases. In developed countries where living standard and personal hygiene is well, prevalence of tuberculosis is very low but in other hand in undeveloped countries and developing countries prevalence is high due to comparative lower living standard and personal hygiene status. At present there is not a single test which can diagnose tuberculosis in any stage. Even sometimes



when all clinical symptoms are suggestive of tuberculosis in other hand all investigations are negative. So, most of the diagnosis has done on the basis of clinical history and many radiological and pathological investigations.

5. Recommendations

In our study symptoms and results of all kinds of investigations are summarized in one place. After analyzing all results and symptoms we found that history taking and routine investigations are very important tools to differentiate between infected and healthy person. Also, we can't differentiate latent and active phases by any investigations. About all available diagnostic tools have their own limitations and usually fails to detect disease in acute stage. So that further study should be carried out to develop technology which can ruled out the disease in its initial stage with accuracy even from asymptomatic infected person. We found during counselling that in most of the cases female members are ignoring for treatment but send all male members sometimes only working male members for treatment. So, awareness campaign at block level should be done to aware all people especially female that without treatment they can also spreading tuberculosis to their love ones.

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