VOLUME - 12, ISSUE - 04, APRIL - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Respiratory Medicine

INTENSIVE CASE FINDINGS OF TUBERCULOSIS AND DIABETES MELLITUS IN PATIENTS ATTENDING TERTIARY CARE HOSPITAL IN TRIBAL AREA IN GUJARAT

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ABSTRACT Tuberculosis (TB) in association with Diabetes Mellitus (DM), TB may get worsen as increased relapse rates, delayed sputum culture conversion, increase in the case fatality rates etc. Conversely, TB may increase the incidence of DM, and worsen glycaemic control in diabetes patients. A cross-sectional cohort study conducted at Medicine and Pulmonology department of ZMCH DAHOD for a period of nine months in June 2020- February 2021. All TB patients were screened for DM and vice versa. All TB patients were followed-up for treatment outcome of TB and all DM patients were followed-up for glycaemic control. Relative risk was calculated using incidence of outcome or control of disease in TB with DM patients to TB patients and DM with TB patients to DM patients. Of 256 TB patients, 38 (14.8%) were TB with DM cases. All 256 patients were followed-up for TB treatment outcome, 100% TB patients without DM had recovery, whereas 97.3% TB patients with DM had recovery after two months of therapy. Relative risk of DM on TB outcome was 0.97. Of 256 DM patients screened, 9 (3.5%) had been newly diagnosed with TB. All 256 people were followed-up for impact on glycaemic control. Relative risk of TB on glycemic control was 1.87. Bidirectional screening would potentially improve care and prevention of TB and DM.

KEYWORDS : Tuberculosis, DM.

INTRODUCTION

Every year, more than 9 million people become sick with this infectious disease, and approximately 2 million die because of it. TB in India contributes to one-fourth of the global burden. The prevalence of TB in India is 24 lakh cases . Access to TB diagnosis and treatment is a major concern in people with TB residing in rural areas as it may get delayed. Hence it is essential to understand the epidemiology for appropriate interventions. In recent decades, with the increasing prevalence of DM cases in the world along with TB, the association is re-emerging as a public health priority. The connection of DM and TB is more significant in developing countries where TB is indigenous and the prevalence of DM is on rise . TB co-morbidities, especially Human Immunodeficiency Virus (HIV), Diabetes and Tobacco have been prioritised. These risk groups are to be considered for screening TB. Guidelines are already existing for detecting TB in people living with HIV (PLHIV) and for screening their contacts and in people with DM. The primary objective of TB screening is to ensure early detection of TB and to initiate treatment promptly, with an eventual aim of reducing the incidence of improper treatment outcomes and other adverse ill-effects of TB, as well as helping to decrease the TB transmission. Hospital outpatient and inpatient departments and primary healthcare centres are the preferred sites and groups for screening TB as described by the NTEP. DM, a chronic metabolic disease is growing in number globally, particularly in places where burden of TB is also high. In association with DM, TB may get worsen as increased relapse rates, delayed sputum culture conversion, increase in the case fatality rates etc. even on completion of treatment. With the increase in the number of people with diabetes, care and control of TB may be compromised; chiefly in areas with high burden of these diseases.

The risk increases on delay in the diagnosis. Systematic screening can be advantageous for both the groups. Theoretically, DM and TB may complicate each other at many levels. The clinical picture of TB in people with diabetes may change and latest diagnostic algorithms may be needed. Diabetes may quicken the appearance of drug-resistant TB, especially multidrug resistant TB (strains of TB resistant to two first line drugs, rifampicin and isoniazid) among those receiving TB treatment, although the proof is narrow. Reciprocally, TB may increase the incidence of DM, and exacerbate improper glycaemic control in diabetes patients. Moreover, TB drugs may have drug interactions with the treatment of diabetes, and diabetes may impede with the action of certain antiTB medication. This study also aligns to the recommendation from the NTEP, to screen for prevalence of TB in people with DM in medium and high TB burden places with an average TB prevalence exceeding 100/100,000 population. With many benefits of early detection and intensive case finding, the present study was aimed for intensive case finding of TB and DM by bidirectional screening and also to identify the effect of TB and DM on their outcome and control in the present study.

MATERIAL AND METHODS

A cross-sectional screening and prospective cohort study was conducted at Medicine, Chest and TB outpatient departments of ZMCH DAHOD for a period of nine months in June 2020-February 2021. Prevalence of DM and TB co-morbidities is considered at 20% as the prevalence of DM in TB population ranged from 1.9-45% with a precision of 0.05 and Z score of 1.96. A probability of 5% (alpha), at which results were considered statistically significant, 95% power was applied. The sample size derived for both the groups based on the above measures was 256 each from Medicine, and chest and TB department, respectively. 10% were also added to the sample size for follow-up study.

A total of 564 patients were screened and 512 patients were included in the study. Inclusion criteria: All newly registered TB patients and all newly diagnosed or previously known DM patients with no previous history of TB of age >18 years attending the outpatient department were included after taking informed consent. Exclusion criteria: In the DM patients group, known TB patients were excluded to avoid duplication.

Patients who were lost to follow-up were also excluded from the study. A total of 256 DM patients from Medicine department and 256 TB patients from TB and chest department of age >18yrs were studied and followed-up by the end of the study after exclusion and lost to follow-up. A total of 52 patients were excluded. Various objectives of the study, methodology used, benefits and probable risks of present study were explained to the participants.

RESULTS

A total of 512 patients, 256 TB and 256 DM patients, respectively were studied for characteristics after excluding 52 patients. Among them Male TB patients were 152 (59.4%), higher in number when compared to female TB patients who were 104 (40.6%). DM prevalence in TB was slightly higher among males 25 (16.4%) than females 13 (12.5%). Similarly, Male DM patients, 147 (57.4%) were higher in number than female DM patients, 109 (42.6%). Prevalence of TB was also high in males 9 (6.1%) compared to females 0 in DM group.Characteristic features of TB patients and DM patients like age, sex, social and demographic factors, symptoms (DM symptoms in TB and TB symptoms in DM) and medication were compared with the characteristics of TB with DM and DM with TB patients, respectively.Significant p-value (<0.05%) was noticed in variables such as age and symptoms.Higher DM prevalence is shown in pulmonary TB 32 (84.2%) than in extrapulmonary TB patients 5 (13.2%) and military TB patients 1 (2.6%).The results of screening of DM in TB patients are summarized. A total of 256 TB patients registered under the study were screened for DM by RBS. Among them 37 (14.4%) people had RBS >200 mg/dL. Of the 256 patients, 27 (10.5%) were known DM patients and 229 (89.5%) patients had unknown diabetic status. Among the 27 (10.5%) known DM patients, 14 (51.9%) patients had RBS>200mg/dL, in them 12 (44.4%) had HbA1C>6.5. In the remaining 229 (89.5%) patients, 13 (5.7%) had RBS>200mg/dL, among them 11 (4.8%) had HbA1C>6.5%. Therefore, 11 newly identified and the 27 (10.5%) known DM cases, a total of 38 (14.8%) TB with DM patients was sent to the medicine OPD for DM care. All 256 TB cases were followed-up after two months of initiation of ATT drugs.Intensive case finding of TB in DM patients: A total of 256 DM patients, have been screened for symptoms of TB and also sent for X-ray, of which 42 (16.4%) patients were diagnosed as presumptive TB basing on symptoms and in them 28 (10.9%) showed X-ray findings of TB. All 42 (16.4%) presumptive TB patients were sent to the TB clinic for further diagnosis and treatment. Among them 7 (16.7%) were smear positive and 2 (4.8%) were diagnosed with extra pulmonary TB. The 9 (3.5%) DM patients confirmed with TB were started on ATT drugs. A total of 256 TB patients came for follow-up, among them only one patient had not recovered from TB (had smear positive after the intensive phase). The patient was a known Diabetic and had improper glycaemic control. So, 218 (100%) of 218 TB patients without DM had recovery, whereas 37 (97.3%) of the 38 TB patients with DM were recovering after two months of ATT therapy. Relative risk of DM on TB outcome was 0.97. Of the 256 DM patients tested for HbA1C after two months, 115 (48%) had HbA1C >6.5%. Of them, 8 (7%) were DM with TB patients. Of the 9 (3.5%) DM patients with TB, 8 (88.8%) had impaired glycaemic control which was more compared to 107 (46.6%) showed improper glycaemic control among 247 (96.5%) DM without TB patients.

DISCUSSION

The finding of the study provides valuable insights into TB-DM prevalence and the impact of each other on treatment outcome. First, bidirectional screening was implemented for TB and DM. All TB patients were screened for DM and vice versa. The reason why all participants registered could be screened was close proximity of TB clinics and Medicine department in a tertiary care centre. But, when follow-up was done to know the impact on treatment outcome of TB and DM, there were drop outs because of the loss or change in contact number of the patients. To overcome this 10% more patients were screened so that number of patients studied and follow-up remains the same in both the groups.About 14.8% TB patients registered for the study had DM. Nearly 2/3rd of all identified DM patients were known diabetic. According to literature, the DM prevalence in TB patients varies from a maximum of 29% in Puducherry to a minimum of 6.1% in Kashmir valley . A large metacentric study found 13% prevalence of DM among TB across India. The present study was in correlation with other studies, but showing slightly less prevalence than studies conducted at other places of South India where it is from 12.1% in Bangalore to 29% in Puducherry . As this study was conducted in a rural area, there were less number of cases reported; this may be due to more physical activity in people living in rural area compared to the people in urban areas. However prevalence has regional variations, which may also be one reason . In present study, nearly 16.4% of DM patients screened had symptoms suggestive of TB. This was higher than in general population, as it was evaluated as 2-3% of patients had TB symptoms. Present study found only few TB cases (3.5%), may be due to adequate glycaemic control in patients attending tertiary care centre there could be a low risk of TB in them. Other reason for the low detection rate may be due to nonperformance of CBNAAT or Acid Fast Bacilli (AFB) culture for smear negative cases. Inspite of this, these results are correlating with other studies done in DM clinics all over India .Infections are common when there is impaired glucose tolerance, TB is common among them.The relative risk of DM on TB treatment outcome of TB patients was noted in the study as 0.97. This can be due to absence of unrecovered patients in the control group (TB without DM). Nine studies assessed the effect of DM on prolonged positivity of TB bacilli at 2-3 months of treatment, among them six study groups in different studies have expressed relative risks (RRs) of >2 and three studies stated RRs of <1. Relative risks of improper recovery of TB was ranging from 2.95 in Hispanics,1.31 in non Hispanic Whites, and 0.93 in non Hispanic Black patients .The impact of TB on glycaemic control is clearly noticed in the present study as 88.8% of DM patients had impaired glycaemic control where as 46.6% of DM patients without TB had impaired glycaemic control. This results correlates with the study by Krishnappa D et al. Relative risk noted as 1.87 in present study. The treatment of the DM is affected may be because of the hampering of drug efficacy or increased survival of the Mycobacteria or due to antitubercular drugs used for TB.

CONCLUSION

Our study reports that DM and TB have bidirectional relationship. Considering the increasing burden of DM, particularly in areas with highly prevalent TB, these studies will be helpful for intensive case finding. Interdepartmental collaborative activities would also potentially improve care and prevention.

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