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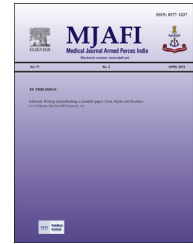
Original Article

Determinants of adverse treatment outcomes among patients treated under Revised National Tuberculosis Control Program in Wardha, India: Case–control study

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ABSTRACT

Background: Tuberculosis (TB) leads to a considerable loss of lung functions and Quality Adjusted Life Years. Several factors are associated with adverse treatment outcomes from TB which further increases this loss. We undertook the study to study the determinants of adverse treatment outcomes among tuberculosis patients treated under the Revised National Tuberculosis Control Program in a tuberculosis unit in India.

Methods: 88 cases and 187 controls from among patients registered in Wardha Tuberculosis Unit in the year 2014 were interviewed to study the determinants of adverse treatment outcomes of tuberculosis. All patients with adverse treatment outcomes were taken as cases. Controls were chosen from relapse free successfully treated patients using simple random sampling.

Results: On multivariate analysis indoor air pollution, pulmonary TB, discrimination due to TB and poor satisfaction with services significantly increased the odds of adverse treatment outcomes whereas the senior treatment supervisor visiting the patients during treatment was protective.

Conclusion: Appropriate new interventions and strengthening of the existing mechanisms to reduce treatment interruptions along with proper implementation of the program will help in reducing the adverse treatment outcomes and improving program performance.

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Introduction

Tuberculosis (TB) was declared a global emergency in 1993 by World Health Organisation (WHO).[1] India has registered a Treatment Success Rate (TSR) of >85% in New Sputum Positive (NSP) cases of TB. But the TSR of ∼70% in retreatment cases is comparatively less.[2] Retreatment patients are at greater risk of death and further adverse treatment outcomes.[2,3] Furthermore, treatment interruptions and defaults are associated with drug resistance which further deteriorates the treatment outcomes.[4] TB has a negative impact on the physical and social aspects of a person's life and leads to a considerable loss in Quality Adjusted Life Years with every episode.[5]

Several factors like increasing age, male sex,[3,6] addictions,[3,7] type of disease,[8] previous history of TB,[9] poor compliance and treatment interruptions,[7,10] comorbidities,[8–11] and side effect of drugs[6] have been associated with various adverse treatment outcomes. Lower education levels,[11] dissatisfaction with services,[12] poor information sharing by service providers and work related factors[13] have been associated with defaulting from treatment.

As it is important to understand the local epidemiology for appropriate control measures, the present study was undertaken to study the determinants of adverse treatment outcomes among TB patients treated under RNTCP in Wardha Tuberculosis Unit (TU).

Materials and methods

The present case control study was carried out from November 2015 to September 2016 in Wardha TU in Central India. The district has 3 TUs spanning across 8 administrative blocks. The study was carried out in one of the TU (population ∼5 lakh). The study population consisted of patients registered under RNTCP in the TU in the year 2014.

All patients with any adverse treatment outcome (deaths, defaults, relapse, treatment failure, shift to category IV) were selected as cases (n = 91). Simple random sampling was employed for selection of controls from the successfully treated, relapse free patients. The number of controls selected (n = 182) were twice the number of cases and an additional 15% (15% of 182 i.e. 27) to account for loss to follow up and non-participation. Thus, the final sample size was 300 (Fig. 1).

The list of patients along with their illness and treatment details was extracted from the District TB office (DTO). Details about socio-demography, illness, treatment, addiction, work and provider related factors, were obtained by contacting the selected participants individually, using a structured questionnaire and after obtaining written informed consent for participation. The treatment outcomes were determined according to the RNTCP definitions.[14] The area of residence was classified according to census definitions of statutory and census towns.[15] Occupation was classified as unemployed and students, unskilled labours, semi-skilled or skilled labours, and clerical or professional.[16] For socio-economic status (SES) ration cards issued by Government of Maharashtra, under the Public Distribution System was checked (yellow card for Below Poverty Line (BPL) families, orange and white card for Above Poverty Line (APL) families).[17] Indoor air pollution was considered as present only when the family used solid fuel predominantly for cooking purposes, and cross ventilation was lacking in the house.[17] Diseases other than acute infectious conditions e.g. hypertension, diabetes, ischaemic heart disease, HIV, anaemia, chronic respiratory diseases, psychiatric illness etc. were considered as co-morbidities.

Data was analysed using SPSS 12.0. The characteristics of patients were expressed as frequencies (%), and median (IQR). Univariate logistic regression was performed to study the determinants of adverse treatment outcomes and the strength of association was expressed as Odds Ratio (OR) with its 95% confidence intervals. Multiple logistic regression was performed to derive the adjusted OR to explain the effect of independent determinants on adverse treatment outcomes. All the variables were considered for multiple logistic regression. Multicollinearity was tested using tolerance and variance inflation factor and subsequently the variables type of disease (new/retreatment), smear conversion at end of Intensive Phase (IP), HIV, diabetes, co-morbidities, travel cost, delays
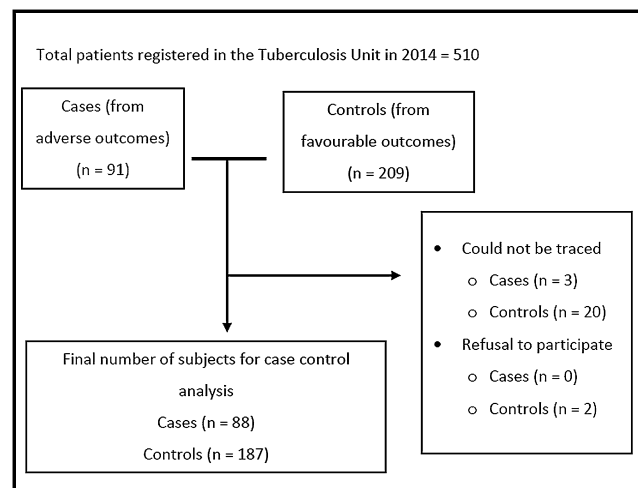

Fig. 1 – Patient flowchart for studying the determinants of adverse treatment outcomes.