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PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.823489>Available online at: <http://www.iajps.com>**Research Article****SMOKING AND A 5 YEAR RELAPSE RATE OF
TUBERCULOSIS: A CASUAL COMPARATIVE ANALYSIS****Hafsa Nusrat^{1*}, Reda Ansari² and Kapeel Nawani³**^{1, 2 & 3}LUMHS Research Forum^{1, 2 & 3}Liaquat University Hospital, Hyderabad^{1, 2 & 3}Liaquat University of Medical & Health Sciences, Jamshoro**Abstract:**

Objective: To study the relative effects of previous and current smoking habits on the 5 years relapse rate of Tuberculosis.

Methods: This multi-center, retrospective study comprised of 200 patients (64.8% males and 35.2% females) chosen via simple random sampling and undergoing treatment for relapsed tuberculosis at different T.B centers namely: Government T.B Sanatorium Kotri, Bhattai Hospital Hyderabad, Civil Hospital Hyderabad and Civil Hospital Mirpurkhas, from 1st December 2014 to 10th February 2015. Verbal informed consent was obtained before administering structured self-administered questionnaires. The data obtained was analyzed using SPSS v. 19.0 and Microsoft Excel 2013.

Result: Incidence of relapse of T.B within 5 years in Non-Smokers is 73% while much more extensive rate of incidence of relapse T.B is seen in people who continue to smoke during and after treatment which is up to 92%. Similarly past smokers showed up to 80% incidence of relapse and the people who had left smoking due to the disease showed incidence of up to 86% of T.B relapse within 5 years. The frequency of cigarette packets consumed by smokers per day who are currently suffering from relapse T.B within 5 years is estimated which concluded that 14% of patients consume 2 packets per day, 11% consume 1 packet per day, 3% consume 1/2 of packet per day and 1% consume 1/3 of packet per day.

Conclusion: The analysis produced evidence that incidence of relapse T.B within 5 years among smokers is greater than non-smokers. Smoking is a risk factor for relapse T.B which should be incorporated as a preventive intervention by Tuberculosis control policies in the future.

Keywords: Tuberculosis, Relapsed Rate, Cigarette Smoking, Tobacco Smoking, Tuberculosis Relapse

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INTRODUCTION:

Tuberculosis has been a major health concern worldwide for many years now [1]. What is even more worrying is the fact that identification and treatment of most of the cases still eludes us, and without this, controlling the disease is a far cry. Treatment regimens are long, tiring and very testing for the patients, and even when patients manage to get through the treatment process (all the while facing some side-effects), the disease can always relapse if they let their guard down, needing yet again another bout of treatment. It is no surprise that the greatest need today is for researchers to help identify factors that may hike the probability of a relapse of the disease i.e. tuberculosis, after primary completion of the treatment process. As stated earlier, there is a minor probability of relapse after a successful treatment, but, the treatment is not always successful to begin with, thus the probability of relapse too varies with the level of success that the treatment has achieved. The treatment outcome is classified in various ways. The treatment is considered successful when the patient achieves a negative sputum smear report in two consecutive tests, or at least one in the last months of treatment. The treatment may be labelled a failure if and when the patient still has a positive smear five months after start of treatment or later. Death too can be an outcome if the patient dies for any reason during the course of treatment. Another outcome is “default” when the patient bails on the treatment and halts it for two or more months consecutively. Finally there are patients who have completed their treatment and have no symptoms, but do not fulfill the criteria to be classified as successful owing to the absence of a negative sputum test in the last month of treatment, usually because a sputum test was not conducted or the patient could not produce sputum) [2].

Our study settings, namely Government T.B Sanatorium Kotri, Bhattai Hospital Hyderabad, Civil Hospital Hyderabad and Civil Hospital Mirpurkhas, where this study is conducted, we included only previously successfully treated cases that had faced a relapse after successful completion of initial treatment. This is the hallmark of the countries in the underdevelopment parts of the world [2]. To date, published literature has identified many

factors thought to hike the probability of relapse [3], namely, treatment deficiencies (irregular treatment regimens, erroneous medication, correct medications but taken in inappropriate doses), non-seriousness of patients in attending all necessary consultations, incidences of side effects of drugs taking tolls on the patient and finally limited access to healthcare professionals and medication in the third world countries [4]. Most serious however (in terms of the ability to hike up the probability of relapse is tobacco smoking [5]. Smoking has also been cited as a risk factor that may lead to the development of primary tuberculosis via a mechanism that decreases the resistance of macrophages, in the alveoli, to *Mycobacterium tuberculosis* owing to the functional and morphological changes [6].

Our research retrospectively studies at length, 200 cases relapsed tuberculosis and the history, type and course of smoking before, during and after the initial successfully completed treatment and the effect it cast on their disease relapse.

METHODOLOGY:

This multi-center, cross-sectional study comprised of 200 patients (64.8% males and 35.2% females) chosen via simple random sampling and undergoing treatment for relapsed tuberculosis at different T.B centers namely: Government T.B Sanatorium Kotri, Bhattai Hospital Hyderabad, Civil Hospital Hyderabad and Civil Hospital Mirpurkhas, from 1st December 2014 to 10th February 2015. Verbal informed consent was obtained before administering structured self-administered questionnaires. The data obtained was analyzed using SPSS v. 19.0 and Microsoft Excel 2013.

RESULTS:

Incidence of relapse of T.B within 5 years in Non-Smokers is 73% while much more extensive rate of incidence of relapse T.B is seen in people who continue to smoke during and after treatment which is up to 92%. Similarly past smokers showed up to 80% incidence of relapse and the people who had left smoking due to the disease showed incidence of up to 86% of T.B relapse within 5 years.

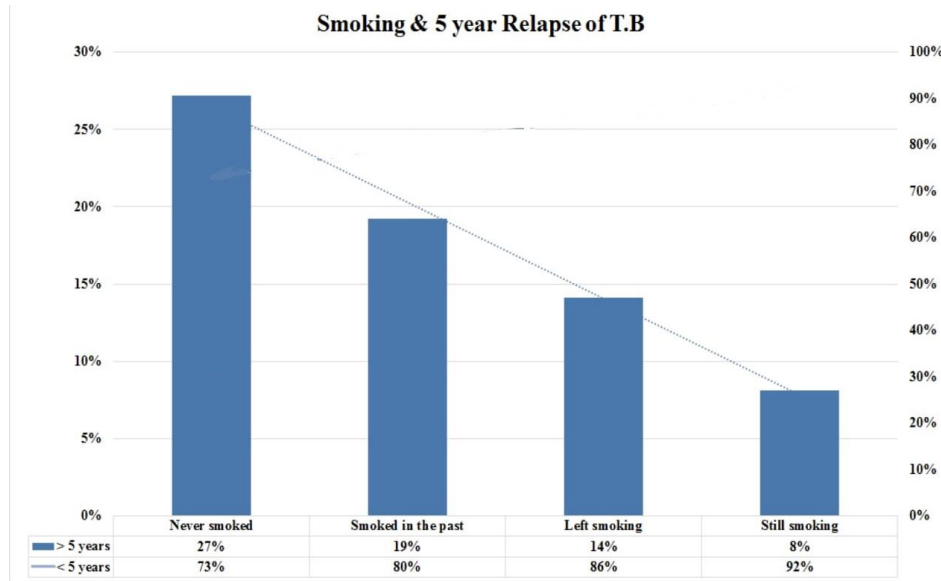


Fig 1: The line graph represents the chances of relapse among different types of smokers and non-smokers within five years of completion of treatment. A linear increase was seen from 73% incidence of relapse in people who never smoked to 92% incidence of relapse in people who continued to smoke during and after treatment.

The frequency of cigarette packets consumed by smokers per day who are currently suffering from relapse T.B within 5 years is estimated which concluded that 14% of patients consume 2 packets per day, 11% consume 1 packet per day, 3% consume 1/2 of packet per day and 1% consume 1/3 of packet per day.

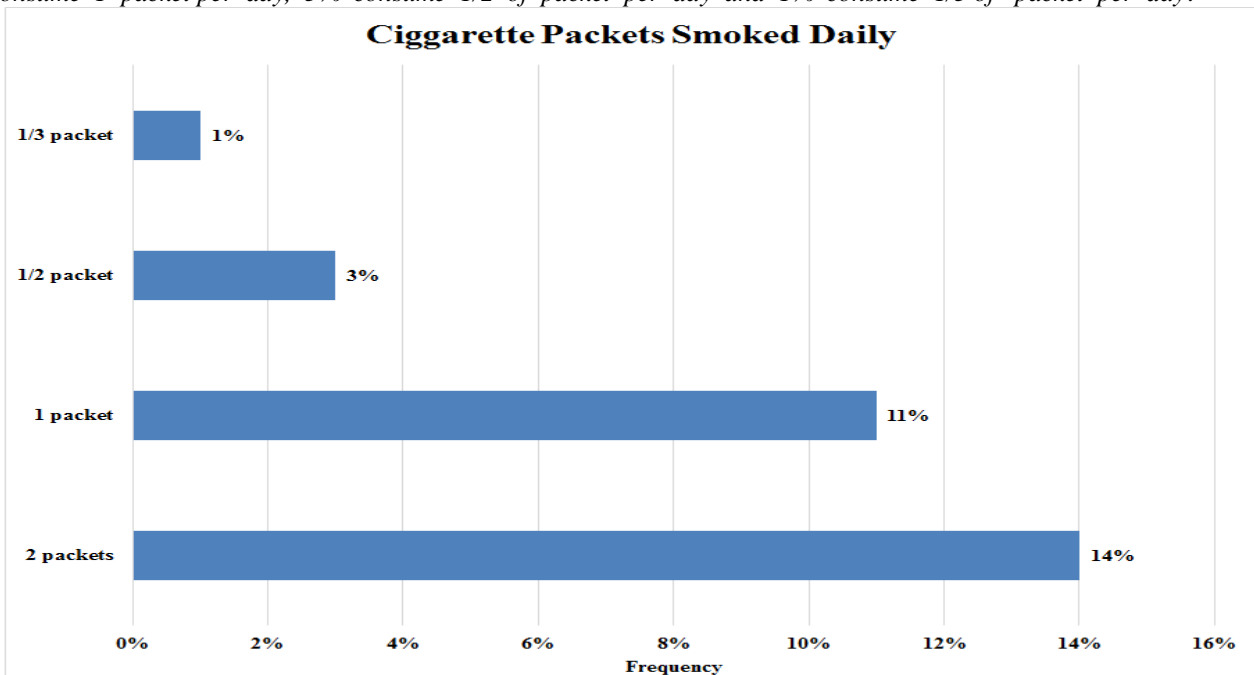


Fig 2: A total of 29% of the respondents smoked cigarettes despite the continued warnings by doctors. This reflects the lack of will on part of the patients to quit smoking and also the failure of the health authorities to adequately counsel the smokers.

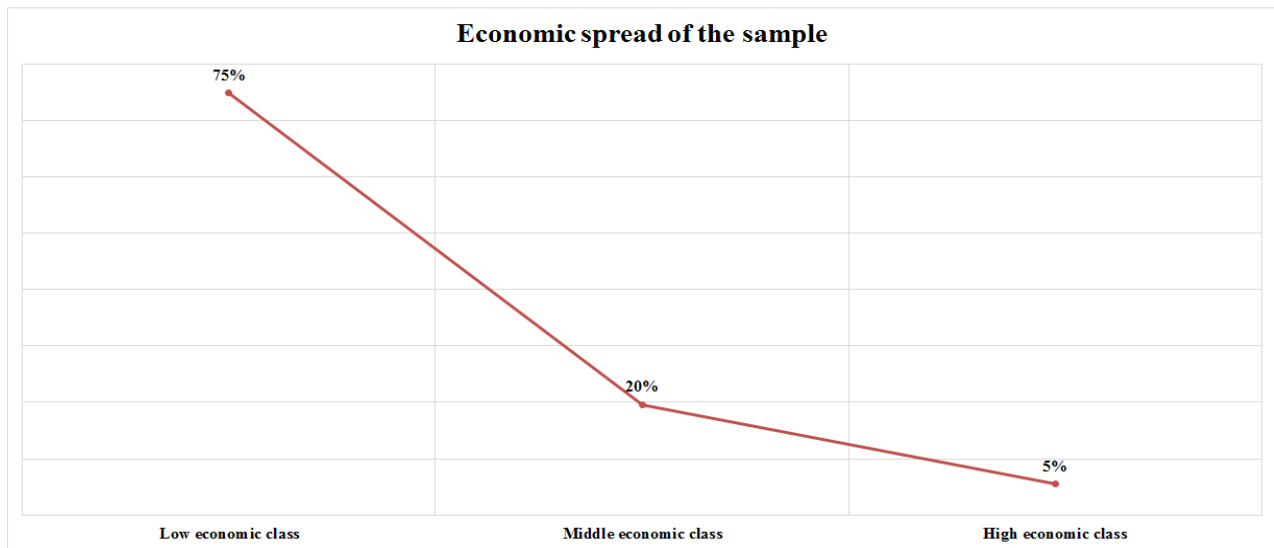


Fig 3: The practice of smoking decreased with increasing socioeconomic status. The increase was not linear yet marked and well defined, falling from 75% in respondents belonging to higher socioeconomic class to 5% in respondents in high socioeconomic class.

DISCUSSION

In our retrospective analysis of patients' history, the relapse incidence was higher than what Thomas *et al* reported for both, smokers (92%) and non-smokers (73%), in his study that was based on patients residing in South India (12.3% and 6.2% for both groups respectively) [7].

Recently, much evidence surfaced in the international literature pool hinted towards a link between development and relapse of tuberculosis and tobacco smoking [8-14]. Even more recently, researchers have attempted to investigate and consequently unearthed evidence that smoking is a valid factor capable for increasing the probability of disease progression from latent tuberculosis infection to full-fledged disease [15]. The association between smoking and death from tuberculosis remains controversial; while in the review of Chiang *et al.* smoking was associated with increased TB mortality [16], Bates *et al.* described no clear effect of smoking on the case fatality rate in those with active TB [17].

Smoking was found to be significantly associated with relapse in the present study corroborating the finding of Thomas *et al.* who described a similar association [18]. Several studies highlight the association between smoking and the development of tuberculosis [19-23] and the mechanism proposed to explain this association is the neutralization of the tumour necrosis factor α (TNF- α) in the pulmonary macrophages by substances of the tobacco, leaving

the patient more susceptible to a progressive development of disease from latent tuberculosis infection [24]. The reduction in the TNF- α in this group may be explained by the high level of iron in the broncho-alveolar macrophages of smokers [25]. This mechanism may also be behind the development of relapse [26].

CONCLUSION:

The analysis produced evidence that incidence of relapse T.B within 5 years among smokers is greater than non-smokers. Smoking is a risk factor for relapse T.B which should be incorporated as a preventive intervention by Tuberculosis control policies in the future.

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