TB & Tobacco

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Abstrak

Sepertiga penduduk dunia telah terinfeksi tuberkulosis dan terdapat lebih dari 8 juta orang yang menderita TB setiap tahunnya. Sementara itu, 3 juta orang meninggal akibat kebiasaan merokok setiap tahunnya di dunia ini. Indonesia sendiri sebenarnya adalah penyumbang kasus TB ke-3 terbesar di dunia. Indonesia juga menduduki peringkat keempat dalam jumlah perokok di dunia. Hubungan antara kebiasaan merokok dan tuberkulosis telah diketahui sejak lama, walaupun bukti epidemiologis belum amat menunjang, demikian juga dengan penjelasan patofisiologis serta perubahan biomolekuler yang terjadi. Dewasa ini makin banyak kita temukan data epidemiologis yang menyokong hubungan antara tuberkulosis dan kebiasaan merokok. Penelitian lebih lanjut amat diperlukan guna menggali lebih dalam aspek-aspek hubungan ini dan menghilangkan faktor pengganggu yang mungkin berpengaruh. Harus dilakukan kerja sama yang harmonis untuk dapat melaksanakan program penanggulangan tuberkulosis dan penanggulangan merokok secara sinergistik. Tuberkulosis –di mana Indonesia menduduki peringkat ke-3 di dunia– dan masalah merokok –di mana Indonesia menduduki peringkat ke-4 di dunia- adalah dua masalah kesehatan masyarakat yang penting bagi bangsa kita. Bila memang ada hubungan asosiatif antara keduanya maka masalah kesehatan itu bahkan akan makin besar. Kita perlu menguasai pengetahuan tentang tuberkulosis dan juga tentang kebiasaan merokok pada populasi Indonesia untuk meningkatkan status kesehatan masyarakat. Program penanggulangan tuberkulosis dan program penanggulangan masalah merokok merupakan modal yang amat penting untuk derajat kesehatan bangsa Indonesia. ***(Med J Indones 2003; 12: 48-52)***

Abstract

One third of the world population is infected with tuberculosis, and over 8 millions people were developing each year. On the other hand tobacco is responsible for 3 millions death in the world. For Indonesia, our country has the third biggest TB cases in the world. Whereas Indonesia is ranked as having the fourth largest number of smokers in the world. A relationship between smoking and TB has been suspected for a long time, even though the epidemiological evidence has not been convincing so far, as well as the pathophysiology and the biomolecullar changes. At present time there are more and more epidemiological data to suggest relationship between TB and tobacco. Further research should be done to get more indepth relationship as well as avoiding the confounder factor. To be able to perform TB control as well as tobacco control successfully there should be emphasize on synergistic public health approaches. Tuberculosis –which Indonesia got 3rd rank in the world- as well as smoking problem –which Indonesia got 4th rank in the world- are two important public health problem for the country. If there are relationship between tobacco and tuberculosis, health problem faced by Indonesian even become bigger. Knowledge about tuberculosis as well as tobacco among Indonesian population is very essential to improve the public health situation. Tuberculosis control programme as well as smoking control programme are essential tools for the well being of Indonesian people. ***(Med J Indones 2003; 12: 48-52)***

Keywords*: tobacco, tuberculosis, epidemiological data*

According to the World Health Organization, a third of the world's population is infected with tuberculosis. The disease is responsible for nearly 2 million deaths each year, 9 percent of these deaths occur in developing countries. By the year 2000 over 8 million were developing active diseases. Moreover, according to WHO (2000), tuberculosis deaths are estimated to increase to 35 million between 2000-2020. Up to now, TB continued to exact its remorseless toll.[1]

Tuberculosis is one of the most common causes of death in Indonesia and also in many other developing countries. Indonesia's TB cases number is the third biggest in the world, after India and China. Every minute there is one new TB cases in Indonesia, every 2 minutes there will be one new smear positive cases and every 4 minutes one people died in Indonesia due to tuberculosis.[2]

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Whereas, tobacco is responsible for 3 million deaths and is projected to more than triple by the year 2030 with 7 million of these deaths occurring in developing countries (WHO 1997).Tobacco is becoming one of the single biggest causes of death worldwide. By 2030 it is expected to kill 10 million people per year; half aged 35-69. The epidemic is increasingly affecting developing countries, where most of the world's smokers (82% or 950 million) live. Close to half of all men in low-income countries smoke daily and this has been increasing. For example, smoking prevalence among Chinese men increased from 40% in the 1950s to 63% in 1996 (Chinese Academy of Preventive Medicine 1996). Women's smoking rates are also increasing fast. By 2030, developing countries will account for 70% of all tobacco deaths. Many deaths and much disease could be prevented by reducing smoking prevalence.[3] There is no doubt that smoking–related diseases are the leading cause of death currently and will remain so in the future.

Number of cigarette smokers in Indonesia is quite high. Most of the smokers smoke kretek cigarettes which have quite high tar and nicotine content. According to WHO (2001), Indonesia is ranked as having the fourth largest number of smokers in the world.[4]

Other important issues related to tobacco and TB is poverty. Episodes of ill health, the costs of health care, and premature death are frequently cited by poor people as their gravest concerns, and as the precipitating cause that pushes families into poverty. Smoking prevalence tends to be higher among men with less education and lower incomes, so they bear a greater health risk. Also, the opportunity cost of money spent on cigarettes is obviously higher for people living on low incomes – money spent on tobacco products could help feed families. Tobacco is often a significant part of family expenditure.[3] On the other hand, poverty is a window for predatory diseases like TB. TB strikes at poor and vulnerable people in what should be their most productive year and inflicts economic hardship on individuals, families and communities. TB's economic toll exceeds US$ 12 billion annually in the world. TB is a giant poverty producing mechanism.[2] Decreasing tobacco use is a priority for both the World Health Organization (WHO) and the World Bank as part of their missions to improve health and reduce poverty.[3]

A relationship between smoking and TB has been suspected for a long time. However, the epidemiological evidence has not been convincing so far. There are now recent results from ongoing cohorts and case control studies that demonstrate a strong relationship between smoking and tuberculosis mortality. These results are potentially important because they indicate the need for interaction between two important health programmes in developing countries, Tuberculosis control and Tobacco control.

EPIDEMIOLOGICAL DATA

The prevalence of tuberculosis was found to be significantly higher among smokers. Few epidemiological studies suggest a plausible link between smoking and tuberculosis. Evidence from mortality studies in India, South Africa, Russia, Hong Kong, the UK Doctors study and China suggest a 1.4 - 5 fold higher risk of mortality from pulmonary tuberculosis among smokers than non-smokers. Evidence from retrospective studies assessing the prevalence of smoking among TB patients in India suggests that smokers have about a three fold higher risk of what is reported or diagnosed as tuberculosis. In a recent article by Nuorti et.al , a link between smoking and invasive pneumococcal disease has been postulated on the basis of a case-control study from the USA. In this study, invasive pneumococcal disease was associated with cigarette smoking (odds ratio 4.1) and passive smoking among non- smokers (odds ratio 2.5).[5]

Evidence from retrospective and prospective epidemiological studies in India, South Africa and China appear to suggest about a 2 to 3 fold higher risk of what are coded as deaths from tuberculosis. Independent ongoing studies from different parts of India provide evidence on the link between smoking and tuberculosis. In a large case-control study in Chennai, preliminary results show a 4 to 5 fold higher risk for tuberculosis deaths among smokers. Interim results from a cohort study of 100,000 tobacco users in Mumbai, show high and significant excess of tuberculosis deaths among smokers, the relative risk was 1.91 for smokeless tobacco, 2.75 for smoking and 3.62 for bidi smoking. On the basis of case-fatality rates, the incidence of tuberculosis and the relative risk was estimated to be high among smokers. Preliminary results from a large retrospective study in Chennai, Tamil Nadu - India of the smoking habits of 48, 000 adults who died recently and of 48, 000 live controls suggest that, in middle age, smokers have age-standardized death rates from tuberculosis about twice the of non-smokers, i.e., that half of all the male

smokers who die of tuberculosis in middle age would not have done so at non-smoker tuberculosis death rate.[6] Evidence from a prospective study in the same city suggests that self-reported tuberculosis is about three fold more common among smokers.

A retrospective study in South Africa found significantly increased relative risks for deaths from tuberculosis, suggesting about 30% of male and 8% of male tuberculosis deaths would have been avoided at non-smoker tuberculosis death rates. A retrospective study of 1 million deaths in China found smaller elevated RRs for tuberculosis deaths among middle-age smokers (RR=1.2 for male, and RR=1.3 for female), with a clear dose response relationship with amount smoked and age of onset 5-8 percent of all deaths in China attributable to tobacco were due to tuberculosis.[7]

Taken together, the early evidence appears to suggest smokers have about a two to three fold higher risk of what is coded as tuberculosis deaths. More limited studies suggest that smokers have a higher incidence of what is reported as tuberculosis (but larger prospective studies are required to ascertain the link to tuberculosis incidence). There is no evidence as of yet that smoking increases the case-fatality rate from tuberculosis. In fact, if smoking increased the case fatality rate in those with clinical tuberculosis, then the prevalence of tuberculosis would be lower among smokers than among non-smokers.

FURTHER DATA

Anderson et al found smokers were more likely to have become tuberculin skin test converters during incarceration than nonsmokers (odds ratio [OR] = 1.78, 95% confidence intervals [CI = 0.98, 3.21). Inmates who smoked 1 to 20 cigarettes per day prior to incarceration (OR = 1.32, 95% CI = 0.76, 2.31), and those who smoked > 20 cigarettes per day prior to incarceration (OR = 1.75, 95% CI = 0.83, 3.71) were more likely to have become converters during incarceration than nonsmokers, suggesting a dose-response effect. Converters were found to have reduced their number of cigarettes smoked per day since incarceration. Those inmates smoking 1 to 10 cigarettes per day (OR = 1.88, 95% CI = 0.96, 3.69), and those who smoked > 10 cigarettes per day since incarceration (OR = 1.87, 95% CI = 0.92, 3.78) were more likely to have become converters than nonsmokers. Interestingly, inmates who smoked for 15 years or less were more likely to have become tuberculin skin test converters than nonsmokers (OR = 1.60, 95% CI = 0.81,3.16), while those smoking for more than 15 years were more likely to have become converters than nonsmokers while incarcerated (OR = 2.12, 95% CI = 1.03,4.36). As a conclusion, this finding suggests that the cumulative effects related to the duration of smoking may be more important than the number of cigarettes smoked with regard to tuberculin skin test conversion. This is consistent with the understanding that long-term exposure to cigarette smoking has an adverse effect on the lung's defense mechanisms, namely mucocilliary clearance of potential pathogens, such as Mycobacterium tuberculosis.[8]

Altet perform a resent to assess the effect of passive smoking on the development of active pulmonary tuberculosis (PTB) in children immediately following infection by Mycobacterium tuberculosis within the family. The design was an unmatched case-control study in which 93 contacts who became cases (active PTB diagnosed) and 95 contacts who did not became cases (tuberculin-positive children without evidence of active disease) were included. All were household contacts of a new case of pulmonary bacillary tuberculosis. Smoking habits were investigated by a questionnaire. Urinary cotinine was analyzed. Odds Ratio (OR) was adjusted for age and socio-economic status using multiple logistic regression analysis. The result showed Passive smoking was a risk factor for PTB (OR: 5.29; 95% confidence interval (CI): 2.33-12.82; P <0.00005). The adjusted OR was 5.39 (95% CI: 2.44-11.91; P < 0.00001). The risk increased when contacts were passive smokers both at home and outside the home within the family (OR: 6.35; 95% CI: 3.20, 12.72; P < 0.00001). Contacts 0-4 and 5-9 years old showed a significantly higher risk than those aged > or = 10.There was a dose-response relationship between the risk of developing active PTB immediately following infection and the number of cigarettes smoked daily by the household adults (P < 0.001). Mean (SD) urinary continine detectable concentrations (ng/ml) were different between disease contacts (119.46 [68.61]) and non diseased contacts (91.87 [73.10]). The difference was statistically significant (P < 0.001. As conclusion, passive exposure to tobacco smoke in children was associated with an increased risk of developing pulmonary tuberculosis immediately following infection. This is an association of great concern requiring health education programmes and anti-tobacco medical advice.[10]

Perform a research to find the association between smoking and pulmonary tuberculosis has not often been studied so much. Objective of the study done by Alcaide et al.[11] was to assess the influence of cigarette smoking on the development of active pulmonary tuberculosis in young people who were close contacts of new cases of smear-positive pulmonary tuberculosis. This study was a case-control study in which 46 'cases' (patients with active pulmonary tuberculosis: isolation of Mycobacterium tuberculosis or clinical and/or radiographic evidence of current pulmonary tuberculosis, with a positive tuberculin skin test) and 46 'controls' (persons with positive tuberculin reaction, negative bacteriological test and without clinical and/or radiological evidence of pulmonary tuberculosis) were included. Smoking habits were investigated by questionnaire. Univariate and multivariate analysis was performed, and odds ratio (OR) was adjusted for age, gender and socio-economic status. Result of this study showed statistically significant differences were found in active smokers (occasional and daily smokers) (OR: 3.65; 95% CI, 1.46 and 9.21; $P < 0.01$), daily smokers (OR: 3.53; 95% CI, 1.34 and 9.26; $P < 0.05$), and individuals who were both passive and active smokers (OR: 5.10; 95% CI, 1.97 and 13.22; $P < 0.01$) and passive and daily smokers (OR: 5.59; 95% CI, 2.07 and 15.10; $P < 0.001$). There was a dose-response relationship between the number of cigarettes smoked daily and the risk of active pulmonary tuberculosis. As a conclusion the data studied show that cigarette smoking is a risk factor for pulmonary tuberculosis in young people, with a dose-response relationship with the number of cigarettes consumed daily.[11]

Shprykov and Zhagmoff[12] performed case records analyzed for 297 smokers and 141 nonsmokers with new-onset infiltrative pulmonary tuberculosis revealed strong relationships between smoking and the disease course, relevant treatment results. In smokers the disease took more severe and disseminated pattern with pulmonary tissue destruction and bacterial discharge. Involution of the specific process in smokers advanced slowly and prolonged hospital stay to 1.2 month. Discontinuation of bacterial discharge took place in 90.1% of smoking patients and in 100% of nonsmokers, the destruction caverns got closed in 58.2% and 76.4%, respectively. Educational anti-smoking activity and smoking treatment promotion in smoking patients with pulmonary tuberculosis are needed.[12]

FURTHER STEP

Further studies in diverse populations are required to better document the link between smoking and tuberculosis incidence and death. It is unclear if the association is as strong when tuberculosis deaths are stratified by definite sputum positive or sputum negative, and if there is confounding by other factors, such as alcohol, socioeconomic status, or crowding.

Further epidemiological research is needed to answer the following questions:

- Does smoking increase the risk of infection given exposure?
- Does smoking increase the risk of disease given infection?
- Does smoking impair the process of treatment given disease?
- Does smoking increase the risk of relapse given cure?

Confounders such as alcohol, HIV infection, nutrition, and socio-economic status and crowding need to be better addressed in future studies. Although some studies did adjusted for education as a proxy for socio-economic status.

The findings on tuberculosis and smoking, if generalized, would have important implications for public health in general, and tuberculosis control and tobacco control in particular. The implication for tuberculosis control follows what is already known, namely that tuberculosis patients have high smoking rates. Encouraging cessation among tuberculosis patients is likely to yield reductions in tobacco-attributable diseases.

To date, smoking cessation services are not yet routinely offered to patients attending respiratory care facilities. However, we envision that through the TB program's Lung Health Initiative, this will become a routine practice and a common standard of care.

- TB and tobacco control programs should give high priority to reducing the smoking attributable mortality and morbidity from TB
- Both programs should capitalize on the unmet opportunities by making cessation therapy available through the DOTS framework or through other respiratory treatment and control efforts.

TB and tobacco control programs should emphasize on common and synergistic public health approaches to reduce smoking attributable mortality and morbidity among TB patients and among those with respiratory health illnesses. Priority should be given to treating tobacco dependence among TB and respiratory care patients should be given priority.

Tuberculosis –which Indonesia got 3rd rank in the world- as well as smoking problem –which Indonesia got 4th rank in the world- are two important public health problem for the country. If there are relationship between tobacco and tuberculosis, health problem faced by Indonesian even become bigger. Knowledge about tuberculosis as well as tobacco among Indonesian population is very essential to improve the public health situation. Tuberculosis control programme as well as smoking control programme are essential tools for the well being of Indonesian people.

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