The history of global tobacco trade is integrally linked with the history of India. It was to discover a sea route to this fabled land, reputed for its spices, silk and gems, that Christopher Columbus set sail in 1492. His wayward journey took him to India instead to America. This 'discovery' of the 'New World' was accompanied by the discovery of tobacco by Portuguese sailors. This plant, treasured by the American 'Indians' for its presumed medicinal and obvious stimulant properties, was eagerly embraced by the Portuguese who then moved it to the 'Old World' of Europe. Even though their quest for easy access to Indian spices was delayed by some years, the Europeans did not fail to recognize the commercial value of this new botanical acquisition.

When the Portuguese eventually did land on India's shores, they brought in tobacco. They introduced it initially in the royal courts where it soon found favour. It became a valuable commodity of barter trade, being used by the Portuguese for purchasing Indian textiles. The taste for tobacco, first acquired by the Indian royals, soon spread to the commoners and, in the seventeenth century, tobacco began to take firm roots in India. Thus, tobacco travelled to the 'real' Indians from their curiously named American cousins, through the medium of European mariners and merchants who sailed the seas and spanned the continents in search of new markets and colonies.
It was with the establishment of British colonial rule, however, that the commercial dimensions of India's tobacco production and consumption grew to be greatly magnified.

The general belief that tobacco is a profitable crop is the principal reason for farmers taking to it. Once they begin, despite the hardships they face, farmers cannot easily switch to other crops, due to lack of awareness and knowledge about cultivating other crops and the inability to access loans and other services, including assistance in selling the crop. The entire process of tobacco cultivation is input intensive, which makes it an expensive crop to grow. The high cost of cultivating this crop means that farmers often have to access loans or credit from external sources. These marginal farmers borrow when the tobacco growing season begins and repay once the produce has been sold. The share of proceeds that they are left with barely lasts them till the next tobacco season, which forces them to borrow again. Thus, they are trapped in a vicious cycle of indebtedness, from which they find it difficult to extricate themselves (Gopal, 2000).

Tobacco farming began in India in the 17th century. Initially grown in just two districts of Gujarat, other states joined in and today nearly 370,000 hectares land is devoted to tobacco farming. The annual production is around 700 million Kg and the country ranks third in the world in production after China and Brazil.

Tobacco offers employment opportunities and provides livelihood to millions of people in India. The Central Tobacco Research Institute (CTRI) has estimated that about 6 million farmers and 20 million farm labourers are engaged in tobacco farming spread over 15 states. However the net gain or loss to the government in terms of disability, disease and death due to tobacco has not been properly and comprehensively
quantified. In addition to causing damage to an individual’s health tobacco use results in severe societal costs, such as reduced productivity, health cost burden and environmental damage.

Though most people are aware of the hazards of smoking, far fewer are informed about the hazards of tobacco farming, but in terms of health of the farmer and of the environment. Dermal absorption of nicotine while harvesting the wet green leaves leads to an illness called Green Tobacco Sickness or GTS (Ballard et al., 1995). They symptoms of GTS include nausea, dizziness, vomiting, headache, weakness, abdominal cramps and difficulty in breathing, as well as fluctuations in blood pressure and heart rate. Working with tobacco causes a wide range of diseases as well as early death (Firdousi and Debra Efroymson, 2007).

A document produced by the study group of the Conference of the Parties (COP) to the World Health Organization’s Framework Convention on Tobacco Control (WHO FCTC) Article 17 and 18 mentions that tobacco growing entails a number of irreversible costs to farmers, which not only seriously damage their living standards but also erode their long-term prospects. Health risks, working conditions, contractual arrangements, the use of children in tobacco growing, and the environmental practices of tobacco growing have negative impacts on human capital and land, the two crucial assets in rural livelihoods. The social disruption caused by tobacco growing must be addressed from a development perspective, taking into consideration poverty, unfair contracts, child and bonded labour.

In a study conducted by Suvarna and Naveen Thomas (2002) in the Shimoga and Davanagere districts of Karnataka, one of the leading tobacco farming states in Southern India, illustrates that tobacco growing can provide the funds for basic
existence. But tobacco farming also keeps the poor entrenched in a cycle of poverty, as can be seen in the cases of those whose children are illiterate labourers like themselves.

While the owners benefit from a continuing pool of desperate people with no better source of livelihood, tobacco cultivation is obviously not benefiting the economic development of the country. The intensive, difficult, and health-harming nature of the work means that people are happy to make a move from tobacco growing to something more remunerative.

A WHO (2004) paper on Tobacco and Poverty explains the plight of tobacco growers and the problems related to tobacco farming around the world. According to the WHO, for decades the tobacco industry has encouraged countries and families to grow tobacco, claiming that it will bring them prosperity. For many households, the reality has been quite different. All over the world, and especially in developing countries, the expansion of tobacco farming, encouraged and in some cases financed by major cigarette companies, has created a situation where more and more farmers are competing to sell tobacco to companies at increasingly lower prices. While some large-scale tobacco farmers have undoubtedly become wealthy, many are barely making a living producing a crop that is labour and input intensive, bringing with it a host of health and environmental dangers from pesticide exposure to nicotine poisoning. Moreover, while tobacco farming is not unique in its use of child labour, the particular hazards posed by tobacco cultivation places these children at increased risk of injury and illness. Tobacco contributes to poverty not only through the money wasted on its purchase but also through lost educational opportunities. The use of child labour in the tobacco fields is common practice in many tobacco-producing countries. Among poor families who depend on tobacco, children work on tobacco farms or factories from a
very early age, missing out on vital educational opportunities that could help life them out of poverty.

Plan International (2008) conducted a study to find out how children experience work on the tobacco farms and their understanding of why they are involved in this work. Malawi is one of the world’s biggest tobacco producers and relies on tobacco as its main export product, representing 70% of the nation’s export income and the second largest source of total income following foreign aid. Most of the tobacco in Malawi is cultivated by farmers on small holdings, by tenants and by casual farm workers.

The actual beedi rolling is done mostly by female home based workers who work under a contractor; the contractor collects the raw material from the manufactures, drops off the materials to the rollers, and collects the previous day’s output. Each roller is equipped with a leaf cutting die- a rectangular piece of aluminum about 2-1/2 by 1 inch dimensions used to cut the leaf for rolling it into a beedi. A roller can make about 1000 beedis a day and is paid Rs 40 to 80 (US$ 1 to US$ 2) for the day’s work.

The beedi making process starts with tendu leaf (locally known as tendu patta or beedi patta) which is used for wrapping the tobacco to make beedis. Tendu leaves form nearly 70% of the weight of the beedi. These leaves are grown in the remote forest of Madhya Pradesh, Chhatisgarh, Uttar Pradesh, Bihar, Jharkhand, Gujarat, Andra Pradesh, Orissa and some part of West Bengal. Leaf plucking begin when the leaves turned golden brown in the hot sun in early May and continues up to June till the onset of the monsoons. Collecting tendu leaf from the forests is thus another form of tobacco-related employment involving about 2.2 million tribal and rural people in India.
(Prasad and Vinayak 2007). Around 150,000 tonnes of tobacco and 30,000 tonnes of tendu leaves are used annually for the manufacture of beedis (Sharma, 2008).

The leaves are obtained from the tendu tree (*Diospyros melanoxylon* Roxb) belonging to family ebenaceae which is endemic to the Indian sub-continent. It is one of the most characteristic trees of the dry deciduous forests throughout India, covering the entire Indian Peninsula. The area of distribution extend up to Nepal in sub-Himalayan tracts including the Indian plain, Gangetic plain, Madhya Pradesh, Maharashtra, Western coast up to Malabar and Eastern west up to coromandel.

In Bangladesh, beedis are rolled in paper but in India, the tendu leaf is considered most suitable as it is easy to roll and is widely available leaves of several other plants like *Butea monosperma*, *Shorea robusta* etc. also find use as beedi wrappers in different parts of the country, but the wide scale use of the tendu leaves in the beedi industry is mainly based on their agreeable flavour, flexibility, resistance to decay and capacity to retain fire. The broad morphological characteristics on which leaves are selected and categognized for beedi making are size, thickness of leaves, texture, and relative thickness of the midtrib and lateral vein.

The production related health hazards from tobacco are also a matter of serious concern in India, millions of tobacco farmers, tobacco-farm workers and beedi workers are ignorant about the adverse health consequences they face. In the organised sector, the government has legislated the right of workers through such legal means as the factories Act and the Mining Act, but there are no such enabling provisions for unorganized tobacco farm workers. It is well documented that workers engaged in tobacco cultivation suffer from an occupational illness known as "green tobacco
sickness” (GTS), largely due to absorption of nicotine through the skin (Prasad and Vinayak, 2007).

Tobacco farming in India involves several arguably irreversible costs to farmers and their families, including child labour, bonded labour, and environmental degradation. In India, as in many other developing countries, trees are cut down to provide fuel for the curing process and for the construction of the curing barns. An estimated 200,000 hectares of woodlands are removed by tobacco farming each year worldwide (Geist, 1999).

Men women and children who cultivate tobacco experience long hours of labour, straggling dept, regular exposure to nicotine and frequently poor health rather than enriching farmers tobacco cultivation in many way increases poverty and contributes to perpetual under development not only of individual farmers but also of entire families, communities and countries. In India, according to a report by the advocacy group in New Delhi, Global March Against Child Labour, an estimated 20,000 children work on tobacco farms and another 27,000 work in beedi making or in cigarette packing industries.

A national survey study was conducted by the Directorate General of Factory Advice Service and Labour Institute on ‘occupational health profile of beedi workers and ergonomic interventions’. The study was conducted in three phases including three states. Phase I in Maharashtra with 246 samples, Phase II in Mangalore and Kannur with 25 samples and Phase III in Jabalpur and Kanpur with 31 samples. Data was collected using observation and questionnaires. The study recognised that incidence of health problems was high among female workers than males and that problems includes musculoskeletal problems, respiratory complications, eye irritation, dermatitis
and malnutrition. Results revealed that majority (70 percent) of beedi rolling women were suffering from musculoskeletal pain and among that back pain constitutes the highest proportion (79.7 percent). Over 60 percent of them suffered from respiratory complications. The study concluded that an immediate establishment of a healthy working station for women for reducing hazards of beedi rolling (Gupta et al., 2005).

An exploratory study was conducted on the present condition of beedi rolling women in India in 4 states – Madhya Pradesh, Gujarat, Andra Pradesh and Kerala. The sample selected was 280 beedi rolling women from these states. Data was collected by using focus group discussion and individual home interview techniques. The study results showed that majority of the women were suffering from hazardous health problems like backache, spondilitis, asthma, tuberculosis and miscarriage. The researcher concluded that enough consideration should be given to female beedi workers for the elimination of these health problems.

An experimental study was conducted on respiratory impairment among beedi rolling workers at Aurangabad, UP. The sample comprised 108 workers, in which 54 were in control group, doing other jobs and 51 in the experimental group directly engaged in beedi rolling. Pulmonary function status assessment was done using Spirometric method. The study results showed that pulmonary function abnormalities were found higher in exposed beedi workers as compared to the control group. The researcher concluded that respiratory impairment among beedi workers might be due to their exposure to work environment (Chattopadhyay et al., 2006).

A descriptive study was conducted on the occupational health issues of women in beedi industry in Madhya Pradesh among beedi rolling women. A health survey was conducted for data collection. They study revealed that there were widespread health
problems like low backache, headache, joint pain, eye problems like watering, burning and poor vision. About 50-70 percent reported gynaecological related problems. The researchers concluded that apart from physical improvement in home and working environment, symptoms and chronic problems should be monitored and treated by government mobile clinics.

A controlled biological monitoring study was conducted on the effect of occupational exposure to unburnt beedi tobacco on tobacco processors in Mumbai. The samples comprised 20 female tobacco processors. Data collection done by testing the urinary mutagenicity and estimating urinary cotinine, a marker of tobacco absorption. The study results demonstrated that tobacco processors were exposed to a wide spectrum of mutagens. The study called for continuous monitoring of the exposure rates of these workers.

Study done by Mittal et al., (2006) which included 310 females actively involved in beedi rolling presenting with eye symptoms to tertiary eye care hospital Tirunelveli, Tamilnadu has shown that 62.9% of beedi workers presented with defective vision, 53.5% with headache, 38.1% with irritation/foreign body sensation in eyes, 6.5% with redness of eyes, 6.5% with watering/discharge from eyes, 3.5% with photophobia, and associated systemic illness, 22.9% with skin tanning, 11.9% with rough skin, 11.6% with peripheral neuropathy, 5.8% with obstetric diseases, 4.8% with miscarriages, 1.6% with tuberculosis, 2.3% with upper respiratory tract infection, 1.9% with joint pain, 0.6% migraine, 0.6% with diabetes mellitus, 0.3% hypertension.

A study report by Chattopadhyay et al., (2006) among male beedi workers in Aurangabad, West Bengal has showed that out of total subjects studied (n=107) 56 were control subjects and 51 were beedi workers. Respiratory symptoms like cough
with breathlessness, morning cough, cough throughout the day, chest tightness were significantly higher among exposed subjects compared to controls. A trend of gradual decline of lung volume was found in exposed subjects as the duration of exposure increased, mean values of lung volume and flow rates of control subjects were higher than the exposed workers, only PEFR (peak expiratory flow rate) showed significantly higher values in control subjects compared to exposed workers. Respiratory impairments like restrictive, obstructive and combined restrictive and obstructive type among exposed workers as off whole were much higher (23.53%) compared to control (3.56%).

A survey done by Sen (2007) in Sagar district, Madhya Pradesh which included 70 beedi rollers, of which 72.86% were female beedi rollers and 27.14% were male beedi rollers, has shown that 64.29% workers were earning less than Rs. 25,000 per annum and 34.71% were earning Rs. 25 to 50,000 per annum from beedi rolling, 67.14% beedi workers experienced pain in limbs and shoulders, 62.86% reported headache while working and after that, 51.43% of workers had back pain, 44.29% had continuous cold and allergy, 20% had eye problems, 17.57% had gas trouble, and 11.13% had asthma.

Occupational exposure to tobacco or other lung irritants, such as air pollution, chemical fumes, or dusts in the working settings constitutes a significant risk of developing respiratory diseases especially COPD. The World Health Organization (WHO) estimates that tobacco caused 5.4 million deaths in 2005 and 100 million deaths over the course of the 20th century. Tobacco use leads most commonly to diseases affecting the lungs, with smoking being a major risk factor for COPD (Including emphysema and chronic bronchitis).
The process of rolling beedis releases large amounts of coarse particles and dust, resulting in respiratory problems among beedi workers. Rollers do not wear protective clothing, gloves or masks, and are exposed to tobacco dust through by inhaling the harmful particles and by skin also. Women and children engaged in rolling beedis also have to content with occupational health hazards. Beedi workers roll an average of 500-1000 beedies per day, handling 225-450 grams of tobacco flake, and inhaling tobacco dust and other volatile components present in the working environment. Studies have shown that nicotine levels in the bodily fluids of beedi workers increased largely (International Labour Office, 2003).

A comparative study conducted in Patna, India and studied the health problems of 197 female beedi rollers to ascertain the effects of beedi rolling on health. The study found that more than 70% of the respondents suffered from respiratory problems including COPD and asthma, while more than 40% of the beedi rollers suffered from eye, gastrointestinal and nervous problems and more than 25% of the respondents faced osteological problem. Workers showed a significantly higher prevalence of wheezing, attacks of shortness of breath with wheezing, dyspnoea etc. Total RBC, WBC and platelet counts and Haemoglobin levels of the beedi rollers were significantly lower in comparison to the control subjects. SGPT (ALT) enzyme concentration, a parameter of liver dysfunction was significantly higher in the beedi rollers as compared to the control group. Thus, the study concluded that beedi rolling may cause significant health hazards, especially respiratory diseases like COPD (Yasmin et al., 2010).

A comparative study conducted in China, to investigate the relationship between occupational chronic exposure to tobacco dust and respiratory function in 40 tobacco factory workers (47.5% women and 52.5% men) aged 25-59 years (mean 36.5)
chronically (5-31 years, mean 12.6) exposed to tobacco dust. Control group consisted of 30 subjects (46.7% women, 53.3% men) aged 25-60 years (mean 36.6) not exposed to tobacco leaves dust. The study found, FEV1/VC was significantly lower in tobacco industry workers chronically exposed to tobacco dust than in the control group. These subjects were also characterized by higher occurrence of severe bronchial obstruction (FEV1/VC<88% and FEV1 > 70%) which was present in 30% tobacco factory workers and in 6.7% of control group (p=0.035). The study concluded that occupational chronic exposition to the dust of tobacco leaves is associated with significant increase in the occurrence of chronic obstructive ventilatory disturbances like COPD and asthma (Ignacak et al., 2002).

An exploitory study was conducted in a factory in Baguihati, Kolkata, India, to assess the pulmonary and respiratory problems of workers in a beedi factory. A total of 70 permanent beedi workers (50 manufacturing workers and 20 office ones) were studied. The study included (a) completion of a questionnaire (on pulmonary and respiratory problems), (b) measurement of physical parameters, (c) spirometry and (d) measurement of peak expiratory flow rate. Many beedi manufacturing workers complained of respiratory symptoms. Continuous exposure to the tobacco processing environment reduced the workers lung volume and peak expiratory flow rates. The study results that beedi manufacturing workers will have respiratory and pulmonary disorders related to exposure to tobacco dust in their work environment (Ghosh and Barman, 2007).

A cross sectional study conducted in Lucca (Tuscany), to investigate the respiratory effects of occupational exposure to tobacco dusts in a sample of 156 male and 25 female workers at a cigar and cigarette factory and it showed a significantly
higher prevalence of wheezing, attacks of shortness of breath with wheezing, dyspnoea, and bronchitis than in a reference population. A trend towards a decrease in forced and expiratory flows according to smoking habit and work duration was evident. Positive skin prick tests were observed in 26% of men and 23% of women and were positively associated with duration of work and negatively with cigarette smoking. Thin interstitial space involvement was observed on chest x-ray examination in almost half the female workers with more than 5 years exposure. These findings suggest that prolonged exposure to tobacco dust have negative health effects on the health of workers with major respiratory disease like COPD (Viegi et al., 1986).

A comparative study conducted in the woman beedi rollers in Tamilnadu with the objective to explore the level of health hazards experienced among them. A total of 388 usable responses obtained from women beedi rollers comprising from the beedi rollers concentrated in Tirunelveli, Tuticorin, Tiruchirappalli and Vellore districts taken up for study revealed that more than 60% of the beedi rollers suffered from respiratory problems, while more than 30% of the respondents suffered from eye, gastrointestinal and nervous problems mostly throat burning and cough. More than 45% of the respondents faced osteological problems. The study concluded that the health hazards level is very high especially respiratory disease like COPD are more common among them (Nakkeeran et al., 2010).

Women’s involvement in beedi rolling has been linked to the ease of learning the skill, its manual operations, the fact that work can be carried out at home and so on. However, there are references to women and children being better at the job, especially girl children (Nair et al., 1990; Pande et al., 1990; Karunanidhi, 1997; Datar and Chhaya, 1985). According to government estimates, beedi rolling employs nearly 4.45
million people, of whom 65% are women and 15-25% are children (Samsherganj, 1990).

Occupational health hazards have recently given more importance because of the increase in occupational disease. For instance, the beedi workers are affected by diseases like tuberculosis, chronic bronchitis, nutritional anaemia, back-pain, head ache and eye irritation. It is reported that children engaged in beedi work are often subjects to respiratory infection (Aghi and Gopal, 2001). Beedi making inherently possess tremendous health risks for the workers who are constantly exposed to tobacco dust and fumes. The risk is even more in the case of children both as workers and a household members since the living and working places are the same for some based workers. Two factors that cause health hazards are first, the raw materials, especially tobacco and secondly the nature of work, working conditions and the workplace (Bharathi, 2010).

The nature of work involves prolonged sitting with forward trunk bend, the excessive use of fingers and the constant high tension levels to meet targets cause a number of health problems. The sitting postures leads to a static construction of back muscle, resulting in head, neck, leg and back ache. Ranjithsingh and Padmalatha (1995) reviewed that beedi rollers were affected by respiratory disorders, skin diseases, gastrointestinal illness, gynaecological problems, lumbo sacral pain and susceptible to fungal disease, peptic ulcer, haemorrhoids and diarrhoea, numbness of fingers, breathlessness and stomach pains including cramps and gas have also been reported in beedi rollers (Dikshit and Kanhere, (2000); Kurvila et al., (2002) and Mittal et al., (2006) found that postural pain, eye problems and burning sensation in the throat are common ailments in women beedi rollers.
Voluntary Health Association of India reported that beedi rollers are constantly exposed to tobacco dust and hazardous chemicals. They experience exacerbation of tuberculosis, asthma, anemia, giddiness, postural and eye problems and gynaecological difficulties. A study conducted by the National Institution of Occupation Health, Ahmedabad revealed that the main hazards in the beedi industry is tobacco dust, burning of the eyes, conjuctivitis, bronchitis and emphysema (Mittal et al., 2006). Sen (2007); Kumar and Subburethina (2010) reported that the women beedi workers were affected by aches and pains, coughs, giddiness, stomach related pains. The high content of nicotine and other chemicals in beedi tobacco there workers are at an extremely high risk of developing systemic illness (Malson et al., 2001).

Kuruvila et al., (2002) found that dermatological observations included callosities seen in beedi workers on fingers and feet, nail changes like pigmentation, dystrophy which were more prominent on the right index finger, fungal infections, callosities and localized nail changes can be considered to be occupational marks in beedi rollers correlated to use of scissors for cutting leaves and use of gum and artificial metallic nail for rolling beedis.

Tobacco use causes a wide range of major diseases which impact nearly every organ of the body (U.S. Department of Health and Human Services, 2004). These include several types of cancers, heart diseases and lung diseases. Public health researchers have been substantiating these findings and discovering more and more damaging evidence about the disease consequences of tobacco use for over half a century.
The total number of premature deaths caused by tobacco during the twentieth century has been estimated at about 100 million and, if current trends of tobacco use continue during the twenty-first century, the death toll is projected to go up to one billion. The World Health Organization (WHO), which provides these estimates, also predicts that India will have the fastest rate of rise in deaths attributable to tobacco in the first two decades of the twenty-first century. Many of these deaths will occur in the productive years of adult life, as a consequence of an addiction acquired in youth.

According to estimates made by the WHO, currently about 5 million people die prematurely every year in the world due to the use of tobacco, mostly cigarette smoking. These deaths are currently divided somewhat evenly between developed and developing countries. More important is the fact that this epidemic of disease and death caused by tobacco is increasing very rapidly. By 2030, it is estimated that the number of premature death attributable to tobacco would double to 10 million deaths every year, with about 7 million of the deaths taking place in developing countries. Among people alive today in the world, about 500 million would die prematurely due to tobacco use; most of these are children and young adults of today.

The prevalence of tobacco use among men has been reported to be high from almost all parts of India. Women from most part of India report smokeless tobacco and the prevalence varies between 15% and 60% (Bhonsle et al., 1992). Among 13-15 years old school going children, the current use of any tobacco product varies from 3.3% in Goa to 62.8% in Nagaland (The Global Youth Tobacco Survey Collaborative Group, 2000). In the late 1980s, the number of tobacco attributable deaths in India was estimated as 630,000 per year (Gupta, 1988).
On conservative estimates, the tobacco-attributable deaths currently range between 8,00,000 and 9,00,000 per year. The cost of the tobacco-attributable burden of just three groups of diseases - cancer, heart disease and lung disease was estimated as Rs. 277,611 billion (US$ 6.5 billion) in 1999 (Rath and Chaudhry, 1999). This increased to Rs. 308.33 billion (US$ 7.2 billion) in the year 2002-2003.

The global literature is only of limited help in assessing the problem of tobacco use in India, since the dominant and the most researched form of tobacco use globally is cigarette smoking. In India, cigarette smoking comprises a small part of the tobacco smoking problem and a minor part of the overall tobacco problem. The major smoking problem in India is beedi smoking, and a large part of the overall tobacco problem is the oral use of smokeless tobacco products. All forms of tobacco use are inferred to be unsafe for human health. While much of the biological avocations between tobacco and disease are applicable across the world, the varied patterns of tobacco use and the diversity of socio-economic determinants substantially influence the profile of tobacco-related diseases.

India is one of the biggest tobacco markets in the world, ranking third in total tobacco consumption behind only the markets of China and the United States. However, capita consumption in the country is 0.9 Kg compared to the world average of 1.8 Kg (Indian Institute of Foreign Trade, 2002). Domestic unmanufactured tobacco consumption has increased from 483,360 tonnes in 1998-1999 to 488,130 tonnes in 2003-2004. Tobacco usage in India is country to world trends since chewing tobacco and beedi are the dominant forms of tobacco consumption, whereas internationally, cigarette is the dominant form of tobacco use.
In almost every study, tobacco use was found to be higher in the lower socioeconomic groups. Beedis are the most popular smoking form of tobacco in India. Thirty four percent of the tobacco produced in India is used for making beedis. Beedis are puffed more frequently than cigarettes to prevent them from going out. Beedis are made by rolling a dried, rectangular piece of tendu leaf with 0.15-0.25g of sundried, flaked tobacco (Bhonsle et al., 1992).

Both tobacco and tobacco smoke contain a large variety of chemicals. Nearly 3000 chemical constituents have been identified in smokeless tobacco while close to 4000 are present in tobacco smoke. These include alkaloids such as nicotine, nornicotine, cotinine, anatabin, anabasin; aliphatic hydrocarbons present in the waxy leaf coating and hundreds of isoprenoids that give the aroma to tobacco. Phytosterols such as cholesterol, campesterol, etc. and alcohols, phenotic compounds, chlorogenic acid, rutin, carboxylic acids and several free amino acids are present in tobacco (Mishra and Shaikh, 1983).

Dependency on tobacco use is related to the pharmacological effects of nicotine present in tobacco leaves and in tobacco smoke. There are atleast 15 additional alkaloids that are structurally related to nicotine. Nornicotine and anabasin have a similar pharmacological action to that of nicotine but only 20% - 75% potency. The alkaloids nicotine and nornicotine give rise to carcinogenic N-nitrosonornicotine (NNN), while another potent carcinogen 4-methys-nitrosamino-1 (3 pyridyl)-1 butanone. (NNK) is derived from nicotine. N-nitresoanatabin (NAT) and N-nitrosanabasin are other N-nitrosamines derived from the alkaloids anabasin and anatabin, respectively. Secondary amines are also known to combine with nitrates to form carcinogenic nitrosamines. N-nitrosamines are formed during the fermentation
and curing of tobacco, i.e., during processing, as well as storage. Both NNN and NNK are present in high concentrations in smokeless tobacco and tobacco smoke.

Alkaloid levels were also two-fold higher in beedi tobacco fillers than in cigarette fillers or processed beedi tobacco. Tobacco smoke is composed of a volatile gaseous and a particulate phase. Some 500 gaseous compound including nitrogen, oxygen, hydrogen, methane, carbon monoxide, carbon dioxide, ammonia, hydrogen cyanide and benzene have been identified in the volatile phase of cigarette smoke, which account for about 95% of the weight of cigarette smoke; the other 5% is accounted for by particulate matter.

At the alkaline pH, nicotine is detected in gaseous phase also, which seems to aid its absorption. The vagour phase also contains volatile carcinogenic aldehydes, ketones, nitric oxides and volatile nitrites along with additional minor constituents.

There are about 3500 different components in particulate phase, of which the major one is the alkaloid nicotine. Other alkaloids include nornicotine, anatabin and anabasin. Particulate matter without its alkaloid and water content is called tar. Many carcinogens, including poly-cyclic aromatic hydrocarbons, N-nitrosamines including TSNAs, and aromatic amines have been identified in tobacco smoke. Chlorinated hydrocarbon insecticidies, N-alkylcarbazaols fluoranthenes, benzofluorones, phenyllindane, pyrenes and cyclopenteno-phenanthrenes have been detected in a subfraction of smoke tar. The major carcinogens present in the particulate phase of tobacco smoke are polonium-210, volatile/ non-volatile N-nitrosamines and TSNAS.

One health study found that beedis contain two or three times the tar and nicotine as regular cigarettes. In their study, smoke from regular cigarettes and beedis
was given to Swiss albino mice beedi smoke reliably caused cancer in doses small enough that regular cigarette smoke in the same doses left the mice apparently healthy.

Cardiovascular diseases, as a group, are the leading cause of death in the world. Tobacco use is a major known risk factor for CVD and leads to a high burden of early death and disability. CVD is also the largest contributor to tobacco related deaths, in terms of absolute numbers. In many countries, deaths due to CVD considerably out number cancer related death.

Cardiovascular diseases accounted for 16.7 million or 29.2% of the total global deaths in 2002, according to the World Health report 2003. Around 80% of deaths due to CVD took place in low and middle income countries. By 2010, CVD will be the leading cause of death in developing countries (Reddy and Yusuf, 1998).

India contributed to 17% of the World Wide CVD mortality in 1990 (Reddy and Yusuf, 1998) CVD related deaths in India are expected to rise from about 3 million in 2000 to 4.8 million in 2020 (Leeder et al., 2004). By 2020, about 42% of the total deaths in India are projected to be due to cardiovascular causes (Murray and Lopez, 1996). During the period 2000-2030, about 35% of all deaths due to CVD in India are projected to occur in the age group of 35-64 years. Tobacco, as a major cause of premature CVD, becomes especially relevant in this context. There is also increasing evidence that the lower middle class and urban poor are becoming highly vulnerable to CVD as the epidemic advances in India (Reddy, 2004).

The major constituents of tobacco smoke which are responsible for the cardiovascular effects are nicotine and carbon monoxide. Other chemicals cause vascular injury includes nitrogen oxide, hydrogen cyanide, and tar with cadmium, zinc and carbon disulphide being minor contributors (Gupta, 1987). Smoking causes
endothelial dysfunction (blood venal cannot dilate normally), lipid alterations (raised
levels of bad fats in the blood) and platelet activation, leading to a prothrombotic state
(increased tendency of the blood to clot). Tobacco use also increases the risk and
severity of vascular diseases by increasing the risk of diabetes, which itself damages
the vessels by accelerating atherosclerosis (Tsiara et al., 2003).

In a study done in 52 countries, smokers were found to be 2.87 timer increased
risk of CHD compared to non-smokers. The evidence was consistent across countries.
The study also revealed a dose responsible relationship. Individuals smoking more than
40 cigarettes per day had a 9 times increased risk of CHD compared to never smokers
smoking even 5 cigarettes per day was associated with an increased risk of CHD.
Smoking accounted for about 35.7% of the population attributable risk of CHD
worldwide (Yusuf et al., 2004).

A meta- analysis of 32 studies revealed that the overall risk of stroke increased
by 1.5 times of cerebral infarction by 1.9 times and of subarachnoid haemorrhage by
2.9 times in smokers (Shinton and Beevers, 1989). In a study from china, it was seen
that a 10% increase in the prevalence of cigarette smoking was associated with a 19%
higher mortality from stroke (He et al., 1995). The limited number of studies available
so far has shown conflicting results regarding the relationship between smokeless
tobacco use and the risk of fatal MI. While study found no relationship, smokeless
tobacco use was linked with higher risk of dying from CVD in another prospective
study (Accortt et al., 2002; Bolinder et al., 1994).

In a case control study conducted in Bangalore, it was found that the most
important predictor of acute myocardial infarction was current smoking of cigarette or
beedi. It was also found that compared to individuals without risk factors, those with
multiple risk factors had a markedly increased risk. In another unpublished care control study conducted in hospitals in New Delhi and Bangalore, it was seen that, compared to never smokers, current cigarette smokers who smoked 22 cigarettes per day had an 18 fold increased risk of CHD. Independent association was also found between beedi smoking and CHD risk, with those consuming 25 beedis per day having a 10 fold increased risk.

In the Global Inter heart study data for south Asia were analyzed separately. Tobacco smoking was found to be associated with CHD; those who smoked were 2.4 times more likely to be at risk for CHD compared to non-smokers. Smoking accounted for about 37% of population attributable risk of CHD in South Asia (Yusuf et al., 2004). Cross sectional survey conducted in urban and rural communities have also attempted to relate smoking with the risk of CHD. A survey in Jaipur observed 1.33 times increased risk of CHD among male smokers (Gupta et al., 1995). In a stroke registry in Hyderabad, 28% of patients with ischemic stroke had a history of smoking (Kaul et al., 2000). In another study, smoking was found to be a significant factor for acute ischemic stroke with an odds ratio of 1:8 (Sridharan, 1992).

Tuberculosis is one of the world’s leading infections causes of death. It has been reported that currently, one third of the World’s population is infected with the TB bacillus and approximately 2 million individuals die each year of TB, with more than 90% of infection and deaths occurring in low and middle income countries. About 80% of all new tuberculosis cases are seen in 23 countries; more than half are concentrated in 5 countries, Bangladesh, China, India, Indonesia and Nigeria (DeAngelis and Flanagin, 2004). Chronic obstructive pulmonary diseases (COPD), bronchial asthma,
respiratory infections and some interstitial lung diseases. Some of these problems are also reported in non-smokers who are exposed to second hand smoke.

COPD is a leading cause of morbidity and mortality worldwide (Murray and Lopez, 1996; Hurd, 2000). It is also a major cause of economic burden in both developed and developing countries (Sullivan et al., 2000). It accounted for 5.8% of total deaths in 1990 and is expected to rise to 9.3% of deaths by 2020 (Murray and Lopez, 1996). Tobacco smoking is the most important cause of the development of COPD. This relationship was first established in the 1960s through several population based epidemiological studies (Royal College of Physicians of London, 1962; United states public Health Service, 1964). It is universally accepted now that tobacco smoking accounts for over 80%-90% of cases of COPD (US Surgeon General, 1984). In a study specifically examine beedi smoking, COPD was observed in 34.6% beedi and 45.4% of cigarette smokers versus 3% of non-smokers, the differences in the prevalence of COPD among cigarette and beedi smokers was not significant (Malik, 1974).

Some studies related to smoking and tuberculosis had been conducted in developed countries, where pulmonary tuberculosis as a cause of death had already become uncommon. In developing countries, the major increase in smoking is relatively recent for the full hazards to have materialized (Doll et al., 1994; Liu et al., 1998; Lam et al., 2001). In India, as in many other countries, TB still remains a major cause of premature death, both in early adult life and in middle age, particularly among men who smoke.
TB occurs predominantly among socially and economically disadvantaged people and in immune compromised patients. Smoking diseases immune defences and increases susceptibility to pulmonary TB (Stratton et al., 2001). Cigarette smoking has been found to affect pulmonary function; it can damage the respiratory mucosa, thereby impairing host resistance to infection (Bieber and Kavanaugh, 2004).

The National Family Health survey (NFHS-2) was conducted among a representative sample of 492,197 persons in 92,486 households in India. The survey results indicated that the overall prevalence of tuberculosis in India was 0.6% in rural areas and 0.4% in urban areas. The prevalence was 0.62% among males and 0.46% among females, and increased with age. It was estimated that about 2 million people in India develop tuberculosis each year (International Institute for Population Sciences, 2000; Dye et al., 1999). It has long been established that one constituents of tobacco nicotine has a considerable influence on increasing the lipid levels in blood (Gorden and Castelli, 1977). Higher level of cholesterol is associated with coronary heart disease (Goldbourt and Holtlman, 1985).