CHAPTER - 1
REVIEW OF LITERATURE

Tobacco cultivation has a history of about 8000 years (IIIM, 2012). Europeans were introduced to tobacco when Columbus landed in America in 1492 (www.tobacco.org). Portuguese traders introduced it in India in the late 16th or nearly 17th century (Din prakash et al., 2010).

Beedi industry is spread across the country, concentrated in the states of Madhya Pradesh, Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Gujarat, Kerala, Orissa, Bihar, Rajasthan, Assam, Tripura and Delhi (Giriappa, 1987; Prasad and Prasad, 1985). Beedi manufacturing is the second largest industry in India (Shimkhada et al., 2003).

Beedi industry provides employment to millions of women and children mostly from the poor socio economic strata (Shimkhada et al., 2003; Aghi, 2003). Among community groups the backwards caste and muslims dominate in beedi work (Koli, 1990; Jhabvala et al., 1985; Mohandas, 1980; Gopal, 1997). 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, 1990; Pande, 1990; Karunanidhi, 1997; Datar et al., 1985). Most of the beedi workers belong to the poor, landless (Koli, 1990; Mohandas, 1980; Gopal, 1997).
A descriptive report on exploiting women and children, focused on various problems faced by women and children employed in beedi industries. According to government estimates, beedi rolling employs nearly 4.45 million people, of whom 65% are women (Samsherganj, 1990) and 15 to 25% are children. Women often face discrimination and are paid less than men. Children are even worse with no wage structure and usually get paid the least. Most families in the beedi industry live below the poverty line. Bhuvana (2000) records 6 lakh women in nellai district of Tamilnadu itself.

The production of beedi under the home based system using women and children is quite old. The Royal Commission on Labour (1931) has mentioned that beedi rolling is carried out in the dwelling of workers as well. Lakshmidevi (1985) has also mentioned that outwork and contract system has been prevalent since 1930s. Beedi manufacturing on a commercial basis is about a century old, although beedi making for own consumption must have been practiced even earlier. Till today, the range of beedi manufacturing varies from individual self-employed beedi workers to the large branded beedi companies (Rustagi, 1991).

Even within the factory system, women workers predominate in the task of beedi rolling. Although beedi rolling has been identified as a hazardous occupation, the health and working conditions of beedi workers has not been in the forefront of public consciousness. The reasons for this could be the lack of mobilization among beedi workers themselves. Beedi workers eke out a living like helpless puppets amid unspeakable poverty, unemployment and hunger, unable to raise their voices (Sudarshan et al., 1999).

Beedi rolling is just inhalation of tobacco dust that causes health problems, but other factors that affect their health like lack of nutritious food, clean environment and
pollution and working in a dark, ill ventilated room affects health adversely (Rao, 1992). Unlike the other areas of diseases especially occupational health hazards no research is done on diseases caused by exposure to tobacco. Women work during advanced stage of pregnancy also affect the unborn child (Suman et al., 2007). Occupational health hazards have been 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 workers are often objects to respiratory infections (Aghi, 2001).

A project report by Karunanidhi (1997) discloses that since the children engaged in the beedi workers have malnutrition, they are highly susceptible to the respiratory infections resulting in frequent cold and cough. The children suffering from these health problems, are often suspected to have the problem of chronic bronchitis. Beedi making inherently poses 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 as household members since the living and working places are the same for home-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 number to a static construction of back muscle, resulting in head, neck, leg and back aches as these is no body movement. Workers also suffer from piles and rheumatism (Dharmalingam, 1993). The long hours of work and the sitting posture while rolling beedis are said to cause back pain and certain gynaecological problems to
women beedi workers (Rajasekhar et al., 2002). The nature of beedi work is such that it causes severe strains to the eyes of the beedi workers resulting in loss of impairment of eyesight, as they grow older (Avachat, 1978).

The Factory Advisory Services and Labor Institute in Bombay, a unit of the Labour Ministry of India, found the incidence of bronchial asthma and tuberculosis to be higher among beedi workers than any other group in the general population. Mittal et al., (2006) found that 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%). Ignacak et al., (2002) revealed 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. Barman (2007) revealed that continuous exposure to the tobacco processing environment reduced the workers lung volume and peak expiratory flow rates. Kolarzyk et al., (2006) revealed that, exposure to tobacco dust increases the risk of chronic obstructive pulmonary diseases.

Sen (2011) found that beedi workers experienced pain in limbs and shoulders, headache, backache and continuous cold, allergy, eye problems, gas trouble and asthma. Beedi industry in India, found that the beedi workers in indore suffered from dizziness, pain in the abdomen, menstrual problems, leucorrhoea and anaemia. Sen (2011) found that beedi workers head aches and pain, cough, stomach pain, piles, urinary burning, white discharge, swelling, fever, palpitation and wheezing. International Labour Office Geneva (2003) found that beedi workers has allergic growth of boils in the mouth. Bharathi (2010) found that beedi rollers are at a higher risk for genotoxic hazards due to occupational exposure to unburnt tobacco.
Kumar et al. (2010) have recorded musculoskeletal problems, respiratory complications, eye irritation, dermatitis and malnutrition. Kumar et al. (2010) showed that majority of the women were suffering from hazardous health problems like backache, spondilitis, asthma, tuberculosis. Srinivasulu (1997) reported that 90% of beedi workers are women. When beedis are stored in the house, food spoils quicker and family members experience nausea and headache (Panchamukhi, 2000). Popescu et al. (1964) reported that exposure to tobacco leaves may cause allergic toxic and possibly irritative effects. Ghosh et al. (1980) observed occupational illness among 89% of tobacco farmers due to the handling of green tobacco leaves. Ghosh et al. (1985) described non respiratory occupational health complaints among tobacco processing workers such as vomiting, giddiness and headache that were associated with high urinary nicotine and cotinine levels. Kjaergaard et al. (1989) Nakkeeran et al. (2010) reports complaints and objective changes of the conjunctiva in tobacco workers. Sen (2011) reported that the women beedi workers were affected by aches and pains, coughs, giddiness, stomach related pains.

Kaur and Ratna (1999); Aghi and Gopal (2001) reported induration of the hands and complications of pregnancy in women beedi rollers. Bagwe et al. (1992); Bhisey and Bagwe (1995); Mahimkar and Bhisey (1995) and Umadevi et al. (2003) researched on the cytogenetic toxicity caused by occupational exposure to tobacco. Although a number of occupational health problems have been reported for the women beedi rollers. Khanna (1993) discovered large amount of nicotine, a tobacco specific compounds found its way into bloodstream of beedi rollers. A compound formed when nicotine is broken down in the liver found in the urine and saliva of beedi rollers who did not consume tobacco. Ranjithsingh and Padmalatha (1995) reviewed that beedi rollers were affected by respiratory disorders, skin diseases, gastrointestinal illness,
gynaecological problems, lumbosacral pain and are susceptible to fungal diseases, 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); Kuruvila et al., (2002) and Mittal et al., (2006) found that postural pain, eye problems and burning sensations in the throat are common ailments in women beedi rollers.

Bhisey et al., (2006) recorded that inspirable dust of tobacco factory was associated with chronic bronchitis in workers. Considering the high content of nicotine and other chemicals in beedi tobacco these workers are at an extremely high risk of developing systematic illness (Malson et al., 2001).

The constituents of tobacco get absorbed into the body, get bioactivated and result in increased risk of developing ailments for which tobacco consumption is a major risk factor, including chronic obstructive pulmonary disease, cardiovascular system abnormality, carcinomas and premature death (U.S Department of Health and Human services, 2004).

Kuruvila et al., (2002) found that dermatological observations included callosities seen in beedi workers on fingers and feet, nail changes like pigmentation, paronchia, dystrophy which were more prominent on the right index finger, fungal infections and eczema and 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. Schievelbein et al., (1984) observed occupational groups exposed to carbon monoxide(co) and from experiments with animals chemically treated with co(or)nicotine, the conclusion can be drawn that
neither (or) nor nicotine is likely to play a role in the development and progression of coronary heart disease in these concentration normally found in passive smokers.

Ghosh et al., (2005) reported that beedi workers have most frequent pain in shoulder followed by back pain and neck pain. Apart from that knee, aches, elbow and wrist pain have also been reported. Yasmin et al., 2010, Kumar et al., (2010) found that beedi rollers suffered from eye, gastrointestinal, neurons, respiratory and osteological problems. Jadhau (2012) recorded that thousands of beedi rollers in Solapur suffer from occupational hazards like gastrointestinal and nervous problems, throat burning, cough and respiratory problems.

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 (NIOH), Ahmedabad revealed that the main hazard in the beedi industry is tobacco dust, burning of the eyes, conjunctivitis, bronchitis and emphysema (Mittalet et al., 2008).

Beedi workers are highly prone to respiratory problems. Most of them suffer from tuberculosis, chronic bronchitis, asthma and so on. Most beedi workers eventually die of one of these ailments (Avachet, 1978). Many studies report 20-30 percent or less workers having these diseases, while all highlight the high likelihood of workers suffering from them (Datar, 1990; Gopal, 1997; Pande, 1990; LabourBureau, 1996; Karunanidhi, 1997).

In India workers engaged in the processing of tobacco for the manufacture of beedis are chronically exposed to tobacco flakes and dust via the cutaneous and morphological routes (Mahimkar et al., 1995). They receive massive chronic exposure
to unburnt tobacco, mainly by the cutaneous and nasopharyngeal routes which may develop pulmonary function impairments among the workers exposed to the environment (Bagwe et al., 1992). According to Bagwe and Bhisey (1991) and Swami et al., (1995) beedi rollers are exposed to unburnt tobacco mainly through the cutaneous and nasopharyngeal route. Viegi et al., (1986) also reported that tobacco workers experienced a decrease in forced and expiratory flows associated with work duration. Lorenzo et al., (1988) found that 13% of the tobacco workers diffuse intestinal pulmonary fibrosis or clinical symptoms of occupational asthma. Mukhtar et al., (1991) studied tobacco workers and found that tobacco dust may cause the constriction of smaller airway. Chattopadhyay et al., (2006) Popovic et al., (1992) and Yanev (1987) reported lower results of lung function tents mostly of the obstructive type in tobacco workers. Behera et al., 1995 studied T4, T3 and their ratio were significantly lower in both beedi and cigarette smokers. Circulating TSH and T4 and T3 were lower in both beedi and cigarette smokers. Beedi rolling is just inhalation of tobacco dust that causes health problems, but other factors that affect their health like, lack of nutritious food, clean environment, pollution, working in a dark and illventilated room affects health adversely (Rao, 1992).

Nicotine deposit primarily in the mouth and upper respiratory tract. To use extent that ammonia increases the deposition of nicotine into the arterial blood stream and to the central nervous system (Seeman et al., 2008). Nicotine consumption increases a resting heart rate, as soon as 30 minutes after puffing and the higher the nicotine consumption the higher the heart rate (Rose, 2002). Smokers heart have to work harder than consumption non smokers heart. Nicotine consumption increases blood pressure (Ross, 2001) older male smokers have been found to have higher systolic blood pressure than non smoking men do. Nicotine, one of the harmful
constituents of Tobacco, is metabolized rapidly and extensively in the liver, 70% is converted to cotinine, which has a half life of approximately 16 hours. The presence of cotinine in serum is considered the best marker of smoking and is preferred to other markers such as carboxy haemoglobin or thiocyanate (Jeemon et al., 2010).

Nicotine increases the amount of bad fats (LDL triglycerides, cholesterol) circulating in the blood vessels and decreases the amount fats (HDL) available (Mitchell, 1999). These silent effects begin immediately and greatly increase the risk for heart disease and stroke. In fact, smoking 1-5 cigarettes per day presents a significant risk for a heart attack (Mitchell, 1999).

There are reveal factors that can accelerate artherosclerosis. Nicotine and other toxic substances from tobacco smoke are absorbed through the lungs into the blood stream and are circulated throughout the body. These substances damage the blood vessel walls which allow plaques to form at a faster rate they would in a non smoker (Mitchell, 1999).

In this way, smoking increase the risk of heart diseases by hardening artherosclerosis. In addition a recent study in Japan showed a measurable decrease in the elasticity of the coronary arteries of non smokers.

Smoking increases the number of circulating oxidants it also increase the consumption of existing antioxidants (Goldman, 2000). Smoking immediately causes oxidant stress in blood while the anti oxidant potential is reduced because of this stress (Durak, 2000). In addition a National Cancer Institute study found that beta carotene supplements, which contain precursors of vitamin A1 mostly increase of lung cancer and overall mortality in cigarette smokers (Albanes, 1999).
Component of tobacco smoke hasten the breakdown of some blood thinners, anti depressants and anti seizure medications and tobacco smoke also decreases the effectiveness of certain sedatives, painkillers, heart, ulcer and asthma medicines (Behrman, 2000).

Some studies have shown a link between ETS in childhood and a higher prevalence of asthma in adulthood. Children exposed to ETS are at increased risk of many infections, most commonly middle ear and respiratory infections patients with sickle cell anaemia who smoke and known to have increased incidence of Acute Chest Syndrome.
1.1 GENERAL INTRODUCTION

Tobacco related industry is a major commercial enterprise around the world (Shimkhada et al., 2003). Production of tobacco leaf increased by 40% between 1971, during which 4.2 million tons of leaf were produced in 1997, during which 5.9 million tons of leaf were produced (FAO, 2003). According to the Food and Agriculture Organisation of the UN, tobacco leaf production was expected to hit 7.1 million tons by 2010. This number is a bit lower than the record high production of 1992, during which 7.5 million tons of leaf were produced (FAO, 2010). The production growth was almost entirely due to increased productivity by developing nations, where production increased by 12.8% (Jacobs et al., 2000). During that same time period, production in developing countries actually decreased (FAO, 2010).

China’s increase in tobacco production was the single biggest factor in the increase in world production. China’s share of the world market increased from 17% in 1971 to 47% in 1997. This growth can be partially explained by the existence of a high import tariff on foreign tobacco entering China. While this tariff has been reduced from 64% in 1991 to 10% in 2004 (Mao et al., 2006) it still has led to local, Chinese cigarettes being preferred over foreign cigarettes because of their cost. Every year 6.7 million tons of tobacco are produced throughout the world. The top producers of tobacco are China (39.6%), India (8.3%), Brazil (7.0) and the United states (4.6%) (CBFTS, 2005).
India’s Tobacco Board is headquartered in Guntur in the state of Andhra Pradesh. India has 96,865 registered tobacco farmers (Shoba et al., 2002) and many more who are not registered. Around 0.25% of India’s cultivated land is used for tobacco production (CTRI, 1999). Since 1947, the Indian government has supported growth in the tobacco industry. India has seven tobacco research centers that are located in Chennai, Andhra Pradesh, Punjab, Bihar, Mysore, West Bengal, and Rajamundry (Shoba et al., 2002). Rajamundry houses the core research institute. The government has set up a Central Tobacco Promotion Council, which works to increase exports of Indian tobacco.

India accounts for only 4 percent of the world exports of raw tobacco. Total export earnings from both leaf tobacco and manufactured products in India have increased almost 25 fold, from Rs 326 million at the beginning of the 1970s to about Rs 8100 million in 1998/99 (kulkarni, 2001). This was partly due to the general increase in tobacco prices at world level. During the last decade, tobacco export earnings increased almost three fold, from Rs 1900 million to Rs 6300 million. However, for manufactured tobacco products they rose by only 145 experiment, from Rs 699 million to Rs 1700 million. Among tobacco products, exports of hookah paste accounts for around 80 percent in volume but only 40 percent in value terms. The share of cigarettes has declined since 1993 /94, following the reduced demand from the former Soviet Union, with which Indian had a bilateral trade agreement.

Nearly two thirds of exports of raw tobacco were to European countries, with Russia being a leading importer. Saudi Arabia is the single largest importer of hookah paste. Bahrain, Oman, Singapore and the United Arab Emirates import beedis from India. Russia has been the largest importer of Indian made cigarettes.
India is the world’s third largest producer of leaf tobacco. It is also a very large consumer of tobacco products. Tobacco is one of the important cash crops in the country, and makes a significant contribution to the Indian economy in terms of employment, income and government revenue (Kulkarni, 2001). It generates nearly Rs 20 billion of income per annum. The economic importance of the crop can be considered at three levels; farm households engaged in tobacco growing and processing; major tobacco producing states; and central government level. Tendu leaf accounts for 74 percent by weight of beedi. Dark and sundried tobacco varieties are used in beedi production. Almost 80 percent of beedi tobacco comes from Gujarat, and the rest comes from Karnataka. Beedis account for over 50 percent of total tobacco use, compared with less than 20 percent by the cigarette segment. There are an estimated 2,90,000 growers of beedi tobacco. The collection of tendu leaf that is used to wrap beedis forms an important link for the industry. Tendu leaf is almost wholly grown on government owned forestland with around 62 percent of tendu leaf being grown in Madhya Pradesh.

Annual production of tendu leaf in 1994/95 had an estimated value of Rs 14,700 million. About 2 million people are engaged in leaf collection, while another 4.4 million people are employed directly for beedi rolling. Beedi rolling is concentrated in the states of Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Uttar Pradesh and West Bengal. Beedis are manufactured largely in the independent smallscale and cottage industry sector. There are a few large manufactures of branded beedi, which tend to be closely-held, family–run businesses. The beedi industry is estimated to have used 2,68,000 tonnes of tobacco in 1998/99, 54.4 percent of the total apparent tobacco use (Indian Market Research Bureau Report, 1996).
Beedi is a leaf-rolled cigarette made of coarse uncured tobacco, tied with a string at one end. Beedis dominate the smoking market of India for every cigarette ten beedis are smoked (Emil, 2008).

There is no historical record of the exact period during which the practice of smoking tobacco rolled in leaves started in India. The cultivation of tobacco started in southern Gujarat in the late 17th century. Beedis were developed soon after, possibly around the Kheda and Panchamahal districts of Gujarat, where cultivation of tobacco was high. Labourers would roll leftover tobacco in leaves of astra tree and smoke at leisure. Communities across India experimented using leaves of Mango, Jack fruit, banana, Sal, Pandancus and Palash (Anon, 1942). Initially, communities in Gujarat made beedis only for their own consumption but their increasing popularity inspired some to make it into a home base business. Soon beedis made locally became more popular than hookahs, largely because beedis overcome the obstacle of sharing the hookah, as individual could smoke without hurting caste and religious sentiments and also because they were portable and did not require assembling and extensive preparation to light up (Anon, 1879). The early business model of the beedi industry in Gujarat involved the businessmen and their workers rolling their own beedis putting them in a tray and selling them along with tobacco and matches in local markets. Gujarati families that had settled down in Bombay saw the potential of the beedi business and soon started manufacturing beedis on a large scale. Beedi has penetrated into other parts of the country outside of Bombay, but until 1900 beedi manufacturing was largely restricted to Bombay and southern Gujarat (Lal, 2009).

Beedi tobacco growing is concentrated in Kaira in Gujarat, and Belgaum and Nipani in Karnataka, while most manufacturing clusters are in Mangalore, Mysore and
Nipani (Karnataka); Pune and Nashik (Maharashtra); Jabalpur, Damoh and Sagar (Madhya Pradesh MP); Raipur (Chhattisgarh); Tirunelveli and Chennai (Tamil Nadu); Cannore (Kerala) and Nizamabad, Karimnagar, and Warangal (Andhra Pradesh) (Shoba, 2008). By the mid 1970s, production of beedis had reached nearly the same level as of today, between 800 billion and 1.2 trillion beedis. While new clusters were being created rapidly, several old clusters like Vidarbha dissipated. Even strong holds like Madhya Pradesh, which accounted for more than half the beedis produced till the 1980s, have lost out to new epicenters of beedi rolling like West Bengal, Bihar and Orissa, where labour is cheaper (Desai, 1997).

According to government estimates quoted by international labour organisation, there are close to 5 million workers involved in rolling of beedis in India. Tamilnadu is the major hub for beedi industry. There are nearly 6 lakhs beedi workers in Tirunelveli district of Tamilnadu (Bhuvana, 2000). These individuals work in small industries or at house hold based enterprise in an environment laden with tobacco dust, of which 90% are home based women workers (Prasad and Prasad, 1985).

It is estimated that over 2.3 million persons depended on this sector for their livelihood. The annual wage bill in these enterprises averaged Rs 4300 million and annual wages per worker varied from Rs 8400 in beedi factories to Rs 55,730 in cigarette, cigar and cheroot factories. The total net value added by all enterprises averaged Rs 15,000 million per annum, of which beedi factories contributed 41.2 percent, and cigarette and allied industries 34.3 percent. The total annual wage bill in the cigarette and allied industries, despite wages per worker being substantially higher, was only 4 percent of its gross value of output, compared to 16 percent in the beedi factories, because beedi manufacturing is more labour intensive. Beedi manufacturing
is estimated to provide employment to more than 4.4 million workers, a large number of whom are women and children. If the forward and backward economic linkages are taken into account, beedis generated 1310 million workdays, whereas cigarettes generated 340 million workdays (Indian Market Research Bureau Report, 1996).

Over 3 million Indians are employed in the manufacture of beedis, a cottage industry that is typically done by women in their homes. Workers roll an average of 500-1000 beedis per day, handling 225-450 grams of tobacco flake and inhaling tobacco dust and other volatile components present in the work environment (Ghosh et al., 2007; Mahimkar et al., 1995). Studies have shown that cotinine levels in the body fluids of beedi workers are elevated even among those who do not use tobacco (Khan et al., 2002). By the middle of the 20th century beedi manufacture had grown into a highly competitive industry. This stage of commercial production at the height of the beedi’s popularity saw the creation of many new beedi brands as well as beedi factories employing upwards of one hundred primarily male beedi rollers (Cornell International Report, 1998). In India there are large number of beedi industries spread across the length and breadth of the country (Suman et al., 2007). Majority of these workers are women and these women belong to low socioeconomic status which compels them to work and earn money to supplement their family income (Ghosh, 2005).

It is estimated that 3,25,000 children work rolling beedis despite beedi manufacture being classified by the Indian Child Labour Prohibition and Regulation Act as hazardous work (American Medical Association, 2000).

Beedi making is a skilled job. Beedis are made from processed tobacco wrapped in the tendu leaves. The leaves are moistened by soaking them in water
overnight. The wet leaves are then cut into pieces roughly rectangular in shape and in size depending on the length of the beedi. The processed tobacco in powdered form is thoroughly mixed by hand and then rolled on a piece of tendu leaf. A thread is then tied around it towards the narrower and to maintain the shape of beedi (Chattopadhyay et al., 2006).

Major problems faced by the beedi workers were peripheral poverty, very low wages, no wage bargaining system, no access to entitlement benefits and gratuity, delayed payments, illiteracy, hidden child labour, constant exposure to tobacco dust, postural pain and induration of the hands. Hazards of beedi workers remained neglected since long time and there is a need to study health hazards among beedi workers and to reduce it, if not eliminate the hazards of beedi workers for greater safety and health (Bagwe et al., 1993).

Children who work for hours sitting crosslegged making beedis often suffer from backaches and knee problems. Initially tobacco dust often makes them feel giddy, and over the long term, many develop chronic bronchitis, asthma and even tuberculosis. Some complain of a burning sensation in the eyes and throat. They also suffer from rheumatic syndromes besides allergies, stomach troubles and piles (Chauhan, 2001; Aghi et al., 2001).

Suffering from green tobacco sickness form of nicotine poisoning when wet leaves are handled, nicotine from the leaves gets absorbed in the skin and causes nausea, vomiting and dizziness. Children were exposed to 50 cigarettes worth of nicotine through direct contact with tobacco leaves. The level of nicotine in children can permanently alter brain structure and function (ILO, 2003).
Currently, 1.3 billion people worldwide smoke or use other tobacco product and nearly 5 million die as a result. Eighty four percent of the world’s tobacco users live in countries with developing or transitional economics. An average men who smoke beedi, the popular hand rolled cigarettes that contain about one quarter as much tobacco as a full sized cigarette shorten their lives by about six years. There are approximately 120 million smokers in India about 37 percent of all men and 5 percent of all women between the ages of 30 and 69. The projected increase in smoking related deaths in India is part of a global trend, according to the World Health Organization (WHO) which estimates that smoking related death worldwide will suppress 9 million annually by 2020 with 7 million of those deaths occurring in developing nations. Most beedi smokers are illiterate and malnourished which makes them more vulnerable to smoking related morbidity and mortality (Rahman et al., 2000). Tobacco smoke contains over 4000 chemicals in the form of particles and gases (United States Environmentnal Production Agency, 1992). Many potentially toxic gases are present in higher concentrations in side stream and nearly 85% of the smoke in a room results from side stream smoke. Smoking has numerous immediate health effects on the brain and on the respiratory, cardiovascular, gastrointestinal, immune and metabolic systems. Smokers brain cells especially brain cell receptors have been shown to have dopamine receptors (Dagher, 2000).

Occupational exposure to unburnt tobacco may occur during tobacco manufacture particularly in beedi factories in India which are often small scale industries that have poor working conditions. The workers are mainly women and are exposed to tobacco by dermal contact and also have air borne exposure to tobacco dust and volatile components. Studies of such industries have mainly reported in the concentration of tobacco dust and particulate matter in the ambient air in the factories
as well as biomonitoring of the workers, but no epidemiological studies on tobacco related health risks in these workers have been carried out.

Eventhough occupational hazards and other health hazards such as, pulmonary, skin problems and cancer ailments were prevalent among the beedi worker population especially among women and children much reports were not available based on the haematological parameters. Blood profile analysis of beedi workers regarding thyroid dysfunction was not reported eventhough few reports are available in smokers (Behera et al., 1995). Since, women constitute a major role of beedi rollers and are susceptible to thyroid disorders a detailed clinical examination and tests for thyroid profile was carried out in the respondents. Screening of serum TSH level T₃ and T₄ and FT₃, FT₄, AMA, and ATG were measured and analysed. Quite apart from the health impacts of smoking or chewing tobacco are the health hazards of working with tobacco. The nicotine inhaled from smoking or absorbed through the skin when harvesting tobacco, leading to a condition called “Green tobacco sickness (GTS). GTS has been reported to occur in 1-10% of us tobacco workers and younger workers are at higher risk. Symptoms of GTS include weakness, headache, nausea, vomiting, dizziness, abdominal cramps, breathing difficulty, abdominal temperature, paller, diarrhoea, chills, fluctuation in blood pressure or heart rate and increased persperation and salivation (Mc Bride et al., 1998).

Many people are convinced that other factors are at paly in the development of thyroid disease. Some suggest it might be linked to stress. Others suggested it might be the result of viral or bacterial infection, or the result of physical trauma to the thyroid gland (Shomon, 2012).
Some studies have also reported smoke related changes in thyroid hormone levels; that is, increased $T_3$ and free $T_4$, $FT_4$, as well as decreased TSH levels (Ericsson et al., 1991, Fisher et al., 1997 and Knudsen et al., 2002), yet published data are inconsistent. Iodine status appears to play a role in the relationship between active smoking and thyroid function, whereas some studies reported no effects of smoking on $T_3$, $FT_4$ and TSH (Ericsson et al., 1991; Fisher et al., 1997 and Muller et al., 1995). Concomitantly, it is unclear whether changes in thyroid hormone levels are associated with the aforementioned smoke induced increase in resting energy expenditure (REE). It was reported that the exposure to passive smoke was accompanied by a statistically significant increase in $T_3$ and $FT_4$ levels. TSH showed a non significant decrease in both conditions.

Active and passive exposure to cigarette tobacco smoke is associated with a mild inhibitory effect on the thyroid reflected in higher serum $T_4$ and $T_3$ in nonsmokers compared to smokers in this cohort women. The relation between tobacco smoking and thyroid function is not well understood.

Secondhand smoke (SHS) induced effects on thyroid function is characterized by a mild inhibition of thyroid hormone levels (Soldin et al., 2009). Neither the components in tobacco that may cause the thyroid effects nor their mechanisms of action are clear. Nicotine causes sympathetic activation, which can increase thyroid secretion (Robert et al., 1998).

Eventhough, the impact of tobacco smoke containing many components, cause anomalies of thyroid function with respect to active and passive smoking are available, continuous exposure to unburnt tobacco and its constituents on thyroid function it practically unavailable. More studies are required to confirm the minimal data published and clearly identify the long term effects of unburnt tobacco dust and
their constituents in beedi rollers. As a pioneer study which is undertaken presently to determine the effects of nicotine of tobacco dust on the thyroid function in beedi workers is evaluated to assess the risk of thyroid disorders. Since blood parameters serve as very good indices in the assessment of the health profile, efforts were undertaken in the present study to evaluate the health status of beedi worker population based on the blood profiles such as electrolyte level, liver function test, lipid profile with special emphasis to thyroid profiles and related parameters. The study may enlighten about the impact of handling tobacco during beedi rolling on the health status of a selected beedi worker population in Melapalayam, Tirunelveli District.

OBJECTIVES

- To interrogate with a proper questionnaire among a selected beedi worker and to know the health status, along with their socioeconomic background population in Tirunelveli.
- To identify the occupational hazards of beedi rolling age wise due to working postures through contact and inhalation.
- To assess the impact of dermal contact and inhalation of raw tobacco dust among the beedi worker community.
- To investigate the health condition of beedi workers through haematological indices with a special emphasis to thyroid profile and compare with normal population.
- To analyse the thyroid abnormalities due to inhalation tobacco smoke by smokers and compare the risk of thyroid disorders in women beedi rollers due to the inhalation of raw tobacco dust and highlight the impact of tobacco.