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TOBACCO RELATED DISEASES : SO FAR SO BAD

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Introduction

Tobacco is probably the single greatest cause of non-communicable diseases, (Bau K. 1989). It is likely to produce a world pandemic which has necessitated an early preventive action.

The origins of tobacco has attracted great deal of controversy, and in recent times some of the researchers have tried to sort out the historical aspects of tobacco in the year 1492 Columbus was offered some dried leaves by the inhabitants of Arawaks. Though there is a point of view that Chinese were growing and using tobacco much before Columbus invented America, but it has not been convincingly evidenced. The cultivation of tobacco dates back to more than 3000 years in the American continent. The expansion of its cultivation is ascribed to the Spanish and Portuguese in the continents of Europe, Africa and Asia. By the end of world war I, the mass production of cigarettes had begun and the mass consumption of tobacco products began in the late 1930s.

There are about sixty four species of tobacco originating from the botanical genus Nicotine. Out of these varieties only, two major types are grown widely all over the globe, namely, Nicotine tabacum and, Nicotine rustica.

Tobacco is considered to be one of the widely grown commercial non food plant in the world. The major portion of the plant which gets consumed is the leaf. The leaf of the plant contains about 85-90 per cent of water. For storage and use the leaf need to be dried. After the stage of drying curing would be taken up to make it fit for various consumption purposes. The curing is done to enhance the desirable qualities of the leaf and diminish the bad ones. The flue curing is more quicker and quite regulated while the process of air curing depends on natural weather conditions. Though curing makes the tobacco fit for consumption, the leaf would be more tastier due to fermentation over the period of years. It has been established that nearly for five years the leaf would be intact without losing its characteristics.

There is a distinction between dark and light tobacco which is based on the colour of the respective tobacco. Light one which is generally a midder variety is used for producing cigarettes. The dark tobacco has greater strength and its use is for various purposes. The following explains various types of tobacco, method of curing and the purpose of their use.

Method of curing	**type**	**use**
Air	Virginia	pipe, chewing
	Barley	Cigarettes & snuff
	Amarelo	
	Cigar	Cigars
	Local	All uses
Sun	Oriental	Cigarettes, pipe
Fire	Local	All
	Virginia	Pipe, cigarette & chewing
Flue	Virginia	Cigarette, pipe
	Amarelo	

Air curing refers to the exposure of the picked leaves to the natural atmosphere by suspending in a shaded structure. This may be in the form of a roof or a carefully constructed barn. Sun curing consists of exposing the picked leaf to the full rays of the sun for the majority of the curing period. Majority of the oriental tobacco is of the sun cured type. In case of flue-curing as soon as the leaves are picked from the plant the moisture is completely removed using the charcoal instead of wet wood. As soon as the curing is complete the tobacco does not become useful for consumption, the manufacturer blends various tobacco types to make the finished product for the consumer.

Economic Considerations of Tobacco

The present state of Virginia in U.S.A. owes its initial settlements to the growth of tobacco. Tobacco was considered as the currency on which all other values were based. In the agricultural scenario tobacco occupies a unique position though the area under this crop is relatively small. Tobacco products are produced on a massive scale all over the world and it is estimated that approximately 1000 cigarettes are produced for each man, woman and child on earth. Tobacco is consumed mostly in the form of smoking. The smokeless tobacco consumption consists of tobacco leaf and variety of flavoring and other ingredients which are used either orally or nasally. Around 120 countries all over the globe produce tobacco in about 0.3 per cent of the world's arable land (Jamison et. Al. 1993). Of the total area under production of tobacco 80 per cent of the land is in the developing countries.

India is the third largest producer and 8^{th} largest exporter of tobacco in the world. The All India Co-ordinated Research Project on Tobacco under the auspices of Gujarat Agricultural University estimated that India produces about 550 million Kgs of tobacco, in an area of about 0.4 million hectares which accounts for about 0.23 per cent of the total cropped land in the country. Tobacco contributes Rs. 3000 crores as excise duty and about Rs. 450 crores through the foreign exchange to the national exchequer. It generates employment to about 30 million people and about 6 million farmers are directly or indirectly involved in its production, pre and post harvest operations as well as processing.

Of the total indirect taxes (before distribution to the states) for the year 1990-91, the tobacco excise duty constituted about 5.93 per cent. In the year 1993-94 one Kg. Of cigarettes accounted for about Rs. 415 of the revenue and the same quantum of bides accounted for about Rs. 10 and other products earned about Rs. 14.

The following economic benefits make a case for the cultivation of tobacco.

The following table gives an account of Central Excise Revenue and export Revenue from tobacco and tobacco related products.

Central Excise Revenue from Tobacco and Tobacco Related Products

Rs Mins

Product	1950-51	1960-61	1970-71	1980-81
Cigarette	13.0	263.5	1909.8	1908.81
Bide	7.8	143.4	231.2	1195.07
Chewing Tobacco	3.4	63.8	92.0	166.02
Other products	5.8	14.2	229.6	7853.04
Total	30.0	584.9	2260.8	7553.04

Export Revenue from Tobacco & Tobacco Products

Rs Mins

Type of tobacco	1950-51	1960-61	1970-71	1980-81
Unmfd.,	130.5	146.0	314.0	1244.1
Mfd.,	21.6	11.6	11.6	162.7
Total	152.1	157.4	325.6	1406.8

Source: Sanghvi L.D. (1992) Challenges in Tobacco Control in India: A Historical Perspective, in Gupta P.C. and others (eds) Control of Tobacco Related Cancers and other Diseases, Oxford University Press, Bombay.

a. income for farmers,
b. employment in the tobacco manufacturing industry,
c. employment for wholesalers, distributors & retailers,
d. taxes raised on tobacco,
e. export earnings of tobacco.

Though the cultivation of tobacco is beneficial to the economy the production and ultimate consumption of tobacco leads to many economic losses which need an in-depth analysis. For example losses can be in the form of,

a. direct health care costs-the cost of treating the diseases related tobacco consumption,
b. indirect costs of lost productivity-lost income due to illness and premature death attributable to tobacco,
c. non medical costs i.e. accidental fires and loss of wood and charcoal for curing of tobacco.

In the ultimate analysis even if the benefits outnumber the losses, the real consideration for reducing tobacco consumption are the diseases and suffering and not the economics.

Tobacco Consumption and Related Diseases: An Overview Pattern of Tobacco Consumption in India

In the Indian context smoking is practiced in the form of cigarettes, bide, chutta, dhumti, hookhi, chillum and hookah. Cigarette smoking is a habit which has come from the west. There are about 100 brands of Cigarettes which are produced out of 30 per cent of the tobacco produced in India. (Lee 1975). Smoking of cigarettes in India is concentrated in urban areas with very few people opting for it in rural areas. Bides are the most popular form of tobacco use in rural areas. Bides are made by rolling a dried tendu leaf 0.15 to 0.20 grams of sun-dried tobacco into a conical shape which tied with a thread. The flat end of the bide which hardly contains any tobacco is kept in the mouth during smoking. Bides are smoked throughout India and some of the studies have shown that about 67 per cent of men and about 13 percent of women smoke bides in rural areas (Bhonsale et. Al. 1992). Cigars are made of air cured fermented tobacco which are expensive and hence found only in urban areas.

Cheroots are small cigars made up of heavy bodied tobacco without any wrapper. Very few people consume tobacco in this form. Chuttas are the raw form of cheroots which are made by rolling a tobacco leaf into a cylindrical shape. The consumption of this is mainly found in coastal areas of Andhra, Tamil Nadu and Orissa. In some specific regions of these states people smoke chutta in the reverse manner, i.e. the burning part of the chutta would be inside the mouth atleast for the initial puffs. In the Konkan belt we find smoking of Dhumti which is made by rolling tobacco in the leaf of a jack-fruit leaf, banana leaf. Yet another form of smoking is found in the form of Hookhi, which is a clay pipe with wooden tip towards the mouth. Such type of smoking is found in the state of Gujarat. In the northern part of India we find Hookah in which tobacco is passed through water before inhaling because of the belief that it is safe to use tobacco after passing it through the water. At the top of the hookah we find a clay bowl to hold tobacco and this is joined to a wooden stem which brings in tobacco to the water container at the bottom. A wooden smoking pipe is attached to the water container from which people inhale tobacco.

Apart from these various smoking habits tobacco is also used orally and such smokeless use of tobacco is widely prevalent all over India. In the ancient times the consumption of such tobacco was in the form of 'PAN' or the betel-quid. The pan consists of betel leaf, areca nut, slaked lime and catechu. As the time lapsed tobacco became an important element of pan. In recent times we find large scale of consumption of tobacco in the form of Pan Masala which contains tobacco nick-named as Zarda. Apart from these various forms tobacco is also consumed in the form of Mawa, a raw preparation of tobacco quid along with lime, areaca nut and other ingredients.

Though many diseased associated with tobacco have been for more than thirty years, only in recent years the association has been confirmed. Some of the studies which have dealt with this relationship have concluded that tobacco use is a significant cause of disability and premature death (WHO 1986, USDHHS 1989). World wide about 3 million premature deaths are resulted from the use tobacco. In case of mortality, diseases like lung cancer and ischemic heart diseases are considered to be causing greater damage.

The toxic elements present in tobacco are considered to be the sources for the diseases that result from its consumption.

Tobacco Carcinogens

Consumption of tobacco leads to various sorts of health hazards, especially due to the fact that tobacco contains carcinogenic elements. Smokeless tobacco contains several known carcinogens (Hoffman D. & others 1992) like,

Volatile aldehydes
N-nitrosomines
Lactones
Nickel
Cadmium
Radioactive plutonium

The presence of these elements is excessively found in snuff. Betel quid with tobacco contains tobacco specific carcinogens and genotoxic agents derived from the areca nut. Snuff has shown to be carcinogenic in oral cavity of rats. Laboratory test have proved that betel quid with tobacco would induce tumors.

About 4000 chemicals have been found in tobacco smoke and 45 of these are known to be carcinogenic.

Toxic Chemicals in Tobacco Products

Chewing Tobacco: N. Rustica which is used mainly in chewing and smoking hookah has higher levels of tobacco specific nitrosomines as compared to N.Tobacum,

Bide: The smoke of bidi contains large amount of tat, nicotine and toxic chemicals. A regular 60mm bidi delivers 25 mg of tar and 1.0 to 1.8 mg of nicotine.

Following are some of the diseases related to the use of tobacco.

Neoplasm
Lip,oral cavity, pharynx
Esophagus
Pancreas
Larynx
Tranchea, lung, bronchitis
Cervix, urinary bladder
Kidney, other urinary

Cardiovascular
Hypertension
Ischemic heart diseases
Other heart diseases
Other arterial diseases

Respiratory
Pneumonia, influenza
Bronchitis, emphysema

Chromonia obstruction
Other respiratory diseases

Since tobacco is mostly consumed in the form of smoking it causes greater damage to the health status of the individuals concerned. The US Surgeon-General's Report of 1964 is considered to be the first major attempt to bring out the ill-effects of tobacco consumption. The WHO estimate has revealed that nearly 3 million deaths occur in the world due to tobacco consumption. In India it is estimated about 6,30,000 deaths occur per year. There are also health hazards by consuming tobacco in the form of chewing, snuff dipping and other smokeless forms of tobacco. The consumption of tobacco poses greater challenge due to the fact that people get addicted to it as in the case of alcohol and drugs. In the year 1988 the 20th Report of the Surgeon-General on the Health Consequences of Tobacco in the United States confirmed the fact that tobacco is an addictive substance and to persuade people to stop its consumption is a formidable task. The addiction is attributed to the presence of nicotine in tobacco which is considered as a psychoactive drug.

Evidence from the Literature

Some of the epidemiological studies have established the relationship between the sue of smokeless tobacco and oral cancer (Winn et.al. 1981). Other attempts in the United States have also brought the fact that there is a strong association between drinking and cigarette smoking (Bolt et.al 1988). The laboratory experiments have shown that there is a good deal of carcinogens in the tobacco which cause cancer to the consumer. The International Agency for Research on Cancer. National Institutes of Health Consensus Conference Panel of the U.S. and the Advisory Committee to the U.S. Surgeon General have brought out number of studies establishing a link between smokeless tobacco and the occurrence of cancer. Cigarette smoking causes variety of medical complications in the form of coronary heart disease, chronic obstructive pulmonary disease, cancers of the lung, larynx, esophagus, oral cavity and pharynx (paffenbarger and others & Gortmaker and others 1992). In India, the tobacco associated risk ranged from 70 per cent to 84 per cent for or pharyngeal cancers (Jayant and Yeole 1992).

The debate about the occurrence of oral cancer from smokeless tobacco is still inconclusive. However some studies have documented the a causal relationship between oral soft-tissue lesions and the use of smokeless tobacco (Green and Poulson 1983). It was found in the U.S. that school going children who were using smokeless tobacco were detected to be having Oral lesions which was found by the trained oral examiners. As the smokeless tobacco contains high percentage of nicotine it may lead to other health hazards also. Increased blood pressure and heart rate can be considered as an aftermath of smokeless tobacco consumption. An epidemiological study has reported that smokeless tobacco can led to hypercholesterolaemia (Tucker 1989).

A study on smokeless tobacco (Winn D.M. 1992) revealed that in recent times there has been a revival in the use of smokeless tobacco in USA. This habit usually preludes smoking and alcohol drinking. Smokeless tobacco contains carcinogens of which tobacco specific nitrosomines are quite significant. The study quotes many clinical evidences showing tobacco as a high risk factor for oral cancer, for example the following table gives the details about prevalence of oral soft tissue lesions among non-smoking tobacco users.

Prevalence of Oral Soft-tissue Lesions in Smokeless Tobacco Using Youth and Adults

Population	Percentage
Rural students in Colorado	63
Urban students in Colorado	44
Students in Georgia	23
Finnish military recruits	44

Source: Winn D.M. (1992)

A study by Sasco A.J. (1992) tried to estimate the tobacco related cancer burden, and in so doing it felt the need to have a data base on the following,

a. ,mortality or preferably morbidity,
b. prevalence of tobacco use in various forms,
c. the precise relationship between tobacco use and diseases.

Depending on the availability of the data the study made use of various approaches and estimated that there were about 6.35 million incident cases of the most frequent cancers in 1980. Of these 49% occurred in the developed and 51% in developing countries. It was also estimated that 1 to 1.5 min cancers per year are due to tobacco use. The study also found that substantial reductions in the incidence of cancer can be achieved by the elimination of tobacco. The following table gives possible reduction in the incidence of the cancer due to elimination of tobacco.

site of cancer	Possible reduction (%)
Oral cavity	60-80
Oesophagus	75
Pancreas	30
Lung	80-80 (males) 60-80 (females)
Larynx	85
Cervix	20-25
Bladder	30-70
Kidney	30-40

The large scale cohort study carried out in Japan from 1966-1981 revealed that 9106 deaths occurred among 91405 non-smoking wives who had smoking husbands. Lung cancer, ischancemic heart disease and other selected cases of death were measured according to the extent of the husband's smoking habit. In addition to lung cancer the study revealed significatantly elevated risks for nasal sinus cancer, brain tumor, in non-smoking woman with heavily smoking husbands as compared to those with non-smoking husbands.

A study by Jayant & Yeole examined the site specific rates of cancers of the upper alimentary and respiratory tracts over two decades among males in Bombay and it was found out that the incidence of the cancer of the tongue oraphrynx and larynx have

decreased significantly. Whereas that of oral cancer excluding the tongue has remained more or less stable. The study also worked out the risk factors arising out of the tobacco consumption which is shown in the following table.

Risk Factors in smokers and chewers for tobacco Related cancer

Site of cancer	Type of Tobacco usage			
	S	C	SC	Cgs
Oral cavity Excluding base base of tongue	2.8	6	10.1	1.5-3.0
Pharynx Oraphrynx inlcuing the base of tongue	11.8	3.3	31.7	
Hypopharynx	3.6	6.2	16.9	
Oesophagus	2.2	2.5	6.2	
Larynx	7.7	4.6	20.1	
Lung (Bidis)	3.4			
(Cigarettes)	2.4			

S= smokers C=chewers SC = smokers & chewers Cgs=cigarettes
Source: Jayant K. and B.B.yeole Challenges in Tobacco Control in India: A Historical Perspective, in Gupta P.C. and others (eds) Control of Tobacco Related Cancers and Other Diseases, Oxford University Press, Bombay.

A study by Gortmaker S.L. & others (1992) carried out by the Harvard School of Public Health and Harvard School of Medicine, found out that smoking during pregnancy leads to higher infant mortality by increasing several risks including that of low birth weight. It estimated that about 10 per cent of infant deaths and 19 per cent of low birth weights of babies could be prevented in the USA if smoking by mothers during pregnancy could be eliminated. The study also documented the fact that about 22-31% of very low birthweight births, 17% of childhood asthma and 38% of childhood asthama requiring medication could also be prevented if maternal smoking were eliminated.

A study by Krishamurthy S.1992 in which clinical evidence has been established, which shows that smoking by mothers can affect the feotus during pregnancy via an intrauterine pathway or after childbirth through passive smoking via airborne pathway or breast feeding. It was found out that maternal smoking has a risk of 98% for coronary heart diseases, 77% for total cardiovascular diseases. The risk keep on increasing steadily as the doses of smoking increase.

The epidemiological studies reviewed by Notani P.N. (1989) have established beyond doubt that cigarettes smoking is the major cause of cold and among non-smokers clinically significant cold is a rare event. Clinical examination of the smokers has revealed that irritants in the smoke are found to cause airway resistance which ultimately leads to pathologic changes in the airways. The studies which have probed the bidi smokers have shown that the immediate effect of smoking is seen more on central airways and the effect on peripheral airways is equal to both bidi and cigarette smokers. The conclusions reached form the studies indicate that the risk of cold in bidi and cigarette smokers is likely to be similar and that there is also a like likelihood that the disease may get initiated early in bidi smokers.

Based on the limited data it has also been estimated that (Jayant K and A.A Mahashur 1989) the morbidity due to cold ranges between 15 to 29 million and mortality between 0.25 min to 0.4 min.

Based on the secondary data Krishnamurthy S.(1989) estimates that 10-60% of 15 to 44 year old women chew tobacco. The impact of such tobacco use and the resulting preventable reproductive outcome is estimated to be approximately 17% of the perinatal mortality. Besides such direct effects the study also highlighted indirect effects of such tobacco use like,

Infantile and childhood morbidity and mortality
Low birthweight and maturity.

Malnutrition due to diversion of scanty purchasing power from nutrition to tobacco.

Other associations with maternal or parental smoking are,

Infant death syndrome.
Nicotine transfer via breast feeding and excretion by the neonate in saliva and urine.
Infantile bronchitis and pneumonia.
Impaired physical, mental and emotional development.

The above discussion tries to highlight the effects of tobacco consumption, which are quite damaging to the health status of the community. Some of the studies which have probed the issue further have attempted to establish the linkage between various diseases arising out of the consumption of tobacco as well as passive consumption of tobacco. Many studies have shown that tobacco leads to cardiovascular diseases, cancer and accidents. It has also been concluded that use of tobacco causes disability are also quite significant, which only means that cessation of tobacco would be beneficial not only individuals in particular but also to the society as a whole. In this context it may be useful to take note of the findings of the study by USDHHS (1985),

Smokers take 50 percent more sick leave;
The risk of death is double for smokers than non-smokers;
2 to 6 percent working hours are lost due to smoking;
suffering to the non-smoking workers.

Such dark effects of tobacco make a strong case for not only reduction of its consumption at the earliest, but also its production in a phased manner from our society.

Section B.

In order to understand different facets of tobacco consumption, and the factors which would influence addiction to tobacco consumption, a total of 500 respondents consuming tobacco were surveyed. Out of this total sample 50% of the respondents were selected randomly from the rural areas and rest of the 50% from taluka headquarters representing urban areas.

This selection of consumers of tobacco in the chosen regions was done randomly by planting the investigators near the 'distribution centers' of tobacco products that is pan shop, cigarette/bidi shops etc. We followed this method because there does not seem to be any alternative method of identifying who is a tobacco consumer and where he/ she stays. Consumers of tobacco so selected were followed to his / her respective residence to collect the necessary socio-economic data about the person and the family members.

A closer look at the data reveals that the habit of tobacco consumption gets started at the average age of 21 for males and 22 females. The overall mean age of initiation of tobacco habit takes place at 21 years. The following table shows us the social category wise consumption of tobacco.

Table -1

Social Category	Cigarette	Biddi	Gutkha	Raw Tobacco	Snuff	Total
Sc/ ST	14.12	22.35	23.53	38.82	1.18	100
OBC	8.47	26.27	22.88	41.53	0.85	100
Others	9.58	20.66	26.05	42.81	0.9	100

From the above table we can note that people belonging to socially backward groups (SC/ ST and OBC) are consuming large doses of tobacco as compared to the socially forward groups. Within different varieties of tobacco consumption greater concentration is found in the consumption of Bidi and Gutkha. This may be due to the fact that these are cheaper varieties of tobacco suitable to the income levels of socially backward people.

The age sex consumption of consumers reveals the following pictures as depicted below.

Table -2
Age Sex Composition of Tobacco Consumers

Age	Cigarette			Bidi			Gutkha			Raw Tobacco		
Group	M	F	Total	M	F	Total	M	F	Total	M	F	Total
<15	0	0	0	0	0	0	3	0	3	0	0	0
16-34	32	0	32	27	0	27	115	1	116	89	1	90
35-54	18	0	18	62	0	62	9	0	9	72	12	84
55+	4	0	4	30	0	30	6	0	6	47	4	51

From the table we can note that females are very few in number as far as tobacco consumption is concerned, and they absolutely do not consume smoking tobacco in this particular region. The mean age of initiation of tobacco habit which is 21 coupled with greater concentration of consumers in the age group of 16 to 34 and 35 to 54 indicates that the working population is more addicted to the consumption of tobacco, of any variety. The table also shows that younger population of 16 to 34 is inclined towards consumption of Gutkha while the older age group of 35 to 54 is likely consumption of raw tobacco or betel quid. People above the age of 55 either smoke bidi or take up consumption of raw tobacco.

Table -3
Educational Status and Tobacco Consumption
(Percentage)

Educational Status	Smoking	Chewing
Illiterate		
1-4	16	19
5-10	23	12
11-12	38	23
Graduate	9	9
and above	9	2

From the table we can see that about 16% of smokers are illiterate and majority of smokers are found in primary and higher secondary educational levels. Some pattern is also found for chewers of tobacco. From the table we can also note that as the education

level increases the percentage number of tobacco consumers is declining. From this we may infer that as the educational level increases there is a likelihood that the habit of tobacco consumption will decline.

The following table shows that break-up of domestic consumption expenditure on different items including expenditure on tobacco consumption.

Table-4

Items of Expenditure	% of Expenditure
Food	52.04
Clothing	23.04
Education	5.99
Festivals	11.85
Tobacco	7.07
Any other	0.01
Total	100.00

It can be noted from the above table that food and clothing are the major items of expenditure of the family of tobacco consumers. The expenditure on tobacco consumption constitutes about 7% of the domestic expenditure.

This indicates that quite a significant amount is spent on tobacco which otherwise would have been used for other family expenditure in support of the family members.

With regard to episodes of sickness experienced by the consumers, it should be noted that we were not able to directly link the sickness experience with tobacco consumption. But we wanted to know whether the consumers of tobacco have experienced sickness episodes during the reference period (that is one months) which probably might be related to the consumption of tobacco. The following table gives us the percentage number of consumers who experienced and also duration of sickness.

Table-5

(Percentage)

Nature of Consumption	Number of Sick	Duration of Sickness
Smoking	32.03	46.42
Chewing	43.26	46.42

The table shows that greater percentage of consumers experienced sickness episodes who chewing tobacco as against smokers. As against this the quantum of duration of sickness was more in case of smoking than chewing, which probably indicates that sickness would be more prolonged for smokers. As a corollary to this we tried to understand the subjective opinion of tobacco consumers about the self evaluation of their own health status before and after the initiation of tobacco consumption habit. The responses were quite interesting which are produced in following table.

Table-6

(Percentage)

Option About Health Status

Status	Good	Average	Bad
Before Consumption of Tobacco	72	21	26
After Consumption of tobacco	46	45	46

The table shows that 72% of the consumers opined that their health status was good before taking up tobacco consumption and only 46% felt that their health status is good after they have started consuming tobacco. About 26% of the consumers felt that their health status was bad before addiction to tobacco consumption and their number increased to 46% after the habit got initiated. Thus the overall message is that people considered themselves to be in good status of health prior to the habit of tobacco consumption and as they started addicted to tobacco there was an increase in the number of consumers who felt that they are experiencing a bad state of health. This gives us an indirect measure of tobacco consumption and health status and also the awareness among the people that tobacco consumption is injurious to health.

Finally, we also tried to capture why individuals take up consumption of tobacco, or what factors motivate them to start taking tobacco products. The responses have revealed that influence of the friends and parental consumption are the major factors influencing the non-consumers of tobacco to take up the consumption of tobacco. This is illustrated in the below mentioned table.

Table-7

Reasons for Consuming Tobacco	Percentage of Responses
1. Produced at home	2.8
2. Habit by Parents / other family members	25.6
3. Influence of friends	53.7
4. Experiencing Psychological Tensions	7.2
5. Advertisemenst	0.6
6. Any other	9.9

In sum we can say that the behaviour of the tobacco consumers reveals that on an average the consumption of tobacco as a habit gets initiated at the age of 21 years. People belonging to socially backward groups are consuming more than the socially forward groups. As far as smoking is concerned females have abstained from consumption of tobacco. Large number of consumers are found in the age group of 16 to 34 and 35 to 54. The education status of the consumers broadly reveals that there is a likelihood of reduction in the consumption of tobacco as the consumers education status improves. On an average about 7% of domestic expenditure is spent on tobacco related products. The episodes of sickness though may not be directly related to the consumption of tobacco gave some interesting clues in knowing an indirect effect of tobacco consumption on the health status of the people. Those who smoked tobacco have reported greater duration of episodes of sickness as against those who were chewing tobacco. The self evaluation of health status by the consumers indicated the fact that after people take up consumption of tobacco they have started feeling that heir health status has been deteriorating. This subjective expression is hinting at the awareness of the people about health hazards of tobacco consumption. Finally, the influence of friends' and parental consumption emerged as the major factors which induce non-consumers of tobacco to get started with tobacco consumption .

The US Surgeon General's reports on smoking and health has generated a good deal of debate on health hazards of tobacco consumption. As a result of this there were many efforts which aimed at understanding why people become addicted to the consumption of tobacco and how best we can concentrate our efforts to reduce its consumption.

Some of the studies related to this issue have tried to estimate the effects of cigarette prices and taxes on smoking participation and cigarette consumption. The general message which has emerged from these studies is that as the prices of cigarettes increases there is a significant reduction in smoking. The overall price elasticity of cigarette smoking was in the range from –0.3 to –0.5 (National cancer Institute 1993) other studies which have supported this argument are Lewis et. All (1981) and Grossman et all (1983). However some of the other studies could not confirm the hypotheses of price sensitivity to smoking. Wasserman et-al (1991) and Chaloupka (1991) concluded the smokers behave more myopically and they were less responsive to cigarette prices. The literature which is developing on this issue is still not clearly indicating the effect of cigarette prices on smoking or the effect of any other government measure (banning of smoking in public places) on the smoking habits. In this background we have attempted to understand the factors which determine the habit of tobacco consumption, and we have taken past years of tobacco consumption as the surrogate for addiction to tobacco consumption.

To know more about the addiction behaviour of the consumers of tobacco, an attempt was made to understand the factors which would influence the addiction behaviour of the consumers. A multiple regression model was used to examine the addiction of different kinds of tobacco consumption. The model is described below

$$Y = \propto+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\beta5X5+\beta6X6+\beta7X7+\beta8X8+u$$

Where,

Y = number of past years of tobacco consumption
(Considered as proxy for addition to tobacco consumption)

X1 = Sex of the consumer
(dummy variable, if Male=1, O=otherwise)

X2 = Age of the consumer in actual years.

X3 = Caste of the consumer
(dummy variable, if Backward =1 O=otherwise)

X4 = Education status of the consumer
(in actual years of schooling)

X5 = Occupation status of the consumer
(dummy variable if Employed =1 O=otherwise)

X6 = Expenditure on tobacco
(percentage of tobacco expenditure out f total consumption expenditure)

X7 = Frequency of consumption of tobacco.

X8 = Perceived health status of the consumer
(dummy variable if Good=1, O=otherwise)

Separate regression equations were run for different kinds of tobacco consumption (Bidi, Cigarette, Raw tobacco, Gutkha etc.) ad dependent variable.

These were,

Years of consumption of Bidi

Years of Consumption of Cigarette

Years of Consumption of Gutkha

Years of Consumption of Raw tobacco

Years of Consumption of Tobacco all forms of consumption takes together)

The independent variable for all the equations were same as explained above. α, $\beta 1 \ldots\ldots \beta 8$ are respectably the constant and the coefficients to be estimated and u is the error term.

Regression results:

The regression results (presented at the end of the report) are as expected, and in all the equations the R2 value varies from 0.33 to 0.64 indicating that the models are good fit. Regression results for Bidi indicate that 47 per cent of the variation in addiction is explained by the independent variables. Of all the independent variables age is positive and statistically significant. Even hough other variables indicate expected signs they are not statistically significant. Sex did not enter into the equation because there are no female consumers in the sample.

In case of cigarette consumption, independent variables explain 41 per cent of variation. Like the previous equation, age is having direct relation with addiction. It is remarkable here tote that if the frequency of consumption of cigarettes increases by one unit addiction also shows an increase. As regards Gutkha consumption the variation is to the extent of 33 percent and again age being the major influencing factor. The educational status is this equation indicates that with increases in education addiction to Gutkha consumption declines.

Raw tobacco has the highest R2 value i.e. 64 per cent of the variation is explained by the independent variables. Here again age has the major dominance. In this equation education status indicates that as education increases addiction to raw tobacco is likely to come down. The same is true o addiction to tobacco in general (all varieties taken together).

It is to be noted that no variables have come out significantly in determining consumers addictions behaviour. Age and education do have some influence on the addiction to various kinds of tobacco consumption.

Regression Results for Tobacco Consumers

Y= f (X1, X2, X3, X4, X5, X6, X7, X8)

EQ1= Years of Past Consumption of Bidi
EQ2= Years of Past Consumption of Cigarette
EQ3= Years of Past Consumption of Gutkha
EQ4= Years of Past Consumption of Raw Tobacco
EQ5= Years of Past Consumption of Tobacco

X1- Sex of the consumer - Male - 1, female - 0
X2 - Age of the Consumer
X3 - Caste of the Consumer - Backward -1, Forward - 0
X4- Years of schooling of the consumer

X5 - Occupational Status of the consumer - Employed-1, Unemployed -0
X6 - Exp. On Tobacco (%)
X7 - Bidi, Cigarette, Gutkha, Raw Tobacco, total tobacco
X8- Health Status of the consumer - Good-1, bad-0

Variables	R Square	Constant	Sex	Age	Caste	Education in Years	Occupational Status	Exp. On tobacco (%)	Evaluation of Health	Freq. Of Bidi Consumption	Freq. Of Cig Consumption	Freq. Of Gutkha Consumption	Freq. Of Tob Consumption	Total	N
EQ 1	0.47	-9.87	-	0.73*	1.79	0.11	-0.14	-0.068	2.23	-0.05					117
		(-1.50)		-8.67	(0.85)	(0.49)	(0.05)	(-0.84)	(0.81)	(-0.59)					
EQ 2	0.41	-1.71	-	0.32*	1.17	0.01	-2.21	-0.08	-1.61		0.75*				53
		(-0.29)		-3.48	(0.63)	(0.03)	(-0.83)	(-1.04)	(-0.24)		(3.04)				
EQ 3	0.33	12.33	-7.02	0.36*	-0.58	-0.61*	-2.13	-0.06	1.51			0.30**			133
		-1.62	(-0.99)	-5.38	(-0.45)	(-2.83)	(-1.46)	(-1.27)	(0.73)			(1.98)			
EQ 4	0.64	-9.92	2.36	0.67*	0.43	-0.38*	-0.46	-0.05	1.80				0.19		224
		(-2.80)	-1.08	-16.05	(0.37)	(-2.99)	(-0.22)	(-1.42)	(0.90)				(1.75)		
EQ 5	0.58	-6.50**	1.66	0.64*	0.40	-0.29*	-1.84	-0.04	1.60					0.09**	478
		(-2.37)	(0.77)	(20.48)	(0.48)	(-2.89)	(-1.63)	(-1.34)	(1.17)					(1.98)	

* - Significant at 1% and ** - Significant at 5% level

Figures in the bracket indicate t values

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