REVIEW OF LITERATURE

Chapter- 03

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"He who would learn to fly one day must first learn to stand and walk and run"

- Friederich Nietzsche

The Review of literature provides a background for understanding current knowledge and illuminates the significance for the new study. The understanding of the literature also prevents repeating previous errors or redoing work which has already been done. It will also give insights into aspects of research which might be worthy of exploration and future research.

TOBACCO

"Tobacco – Weapon of Mass Destruction"

Introduction:

Adolescents are the most vulnerable population to initiate tobacco use. It is now well established that most of the adult users of tobacco start tobacco use in childhood or adolescence. There has been a perceptible fall in smoking in the developed countries after realization of harmful effects of tobacco. The tobacco companies are now aggressively targeting their advertising strategies in the

developing countries like India. Adolescents often get attracted to tobacco products because of such propaganda. There has been a rapid increase in trade and use of smokeless tobacco products in recent years in the country, which is a matter of serious concern to the health planners. It is important to understand various factors that influence and encourage young teenagers to start smoking or to use other tobacco products. The age of first use of tobacco has been reduced considerably. However, law enforcing agencies have also taken some punitive measures in recent years to curtail the use of tobacco products.[32,75,172-184]

History:

The word '*tobacco*' is reported to derive from the Spanish word '*tobago*' or '*tobaca-a*' a term used by the Spanish to describe a *'Y'* shaped instrument used by early American Indians to inhale snuff of various types into the nostrils. Similar instruments may be found in use today in Central and South America.[36,180,186]

The world-wide distribution and cultivation of the plant did not occur until the Spanish and Portuguese introduced the plant to the world in the late Fifteenth century. The tobacco plant is thought to have originated in the region of Central America. Use of the plant for a variety of therapeutic and non- therapeutic purposes was well known to the Indians of Central and South America by the time Europeans arrived in their country. Tobacco (picietl) was used by the early American Indians to relieve toothache, to treat skin

wounds and insect bites, as an anti-fatigue agent, and as a tooth-whitening agent. After the 'discovery' of tobacco by the Spanish, the plant was rapidly disseminated throughout, both the non-tropical and tropical world where it remains the basis of major industry in many countries and forms the basis of a variety of habits in many cultures. For many decades during this century, tobacco habits have been the focus of international concern with respect to the causation of disease in the world's population (WHO 1985, 1986).[36] These diseases include respiratory diseases, cardiovascular disease, lung and other visceral cancers, and oral diseases such as Leukoplakia, Nicotina stomatitis, Periodontal disease and Oral squamous cell carcinoma. Concern about tobacco usage is not new.[150,161,170]

At various times during the sixteenth and seventeenth centuries various governmental and religious groups in Japan, China, Turkey, Russia, and several countries in Europe passed laws prohibiting the use of tobacco. Punishments for those found using tobacco sometimes were severe and included jail, loss of property, physical punishment, and death by hanging, beheading or starvation. Tobacco is referred to as *'kaddipudi'* and *'hogesoppu'* in Karnataka, *'kadapan'* in Orissa and West Bengal, and *'pattiwala'* in Uttar Pradesh.[3,91,93]

Constituents of Tobacco: [1,12,139,151,160]

Tobacco is manufactured in various forms of smoking tobacco, chewing tobacco and tobacco snuff. It is chiefly derived from two species of the plant Genus Nicotina. The two species are N. tabacum and N. rustica. The addictive property of tobacco is due to one of its component alkaloids, Nicotine. Raw & processed tobacco has been shown to contain over 2500 different chemical constituents.

Constituents of tobacco – [37]

- Nicotine
- Specific Nitrosamines
- Polycyclic Aromatic Hydrocarbons
- N- Nitrosonornicotine
- Volatile Nitrosonor Compounds
- Tar
- Carbon Monoxide
- Phenol
- Hydrogen Cyanide
- Benzopyrine
- Nitrogen Oxide
- Formaldehyde
- Indole

- Carbazole
- Catecol Vinyl Chloride
- Ammonia
- Metals- Nickel, Arsenic, Lead
- Radioactive Compounds

Forms of Tobacco:[36,37,38]

The main forms of Tobacco habit encountered around the world are

1. SMOKING TOBACCO
2. SMOKELESS TOBACCO

1. SMOKING TOBACCO:[38]

The smoking of tobacco is a widespread habit practised by people from most cultures and societies throughout the world. While the custom of tobacco smoking is almost universal in its occurrence, there is considerable variation with respect to the amount of tobacco smoked, the form in which it is smoked and the gender distribution of the habit. Tobacco smoke contains over 3800 individual chemical constituents including known carcinogens. The association between tobacco smoking and human disease was first formally recognized in the late eighteenth century. However, little interest in the association between tobacco

smoking and disease was evinced until the 1920s. Since that time an enormous quantity of research has established causal links between the habit of tobacco smoking and a range of human diseases.

Tobacco is smoked in the following form[36,37,38]

1. Bidi
2. Cigarette
3. Cigar
4. Pipe
5. Hookah
6. Chilam
7. Chutta Smoking

2. SMOKELESS TOBACCO:

The term smokeless tobacco is used to describe tobacco that is consumed without heating or burning at the time of use. Smokeless form is available in Dry form & in Moist form. Smokeless tobacco can be used orally or nasally.

A. Dry form of smokeless tobacco -

1. Snuff
2. Mainpuri tobacco
3. Tobacco and slaked lime (khaini)
4. Chewing tobacco

5. Snus

B. Moist form of smokeless tobacco -

1. Betel quid (Paan with tobacco)
2. Tobacco quid (tobacco, arecanut & slaked lime)
3. Mawa

Tobacco products for application -

1. Mishri (mashiri)
2. Gul
3. Bajjar
4. Lal dantmanjan
5. Gudhaku
6. Creamy snuff
7. Tobacco water
8. Nicotine chewing gum.

ARECANUT

Introduction:

Arecanut is a compound of natural substances chewed for its psycho stimulating effects. Because of its ancient history, its use is socially acceptable among all sections of society, including women and quiet often, children.[23] Approximately 200 million persons chew arecanut regularly throughout the western Pacific basin and south Asia.[24,25] Arecanut is the fourth most common psychoactive substance used in the world after nicotine, ethanol, and caffeine.[26,23]

Ancient History:

The origin of the habit of chewing areca nut is Southeast Asia, possibly Malaysia where the name of the province of Penang means 'Arecanut'. Ancient writings describe well-established betel practices from China and India more than two millennia ago. Betelnut is a misnomer used for Arecanut. In traditional Indian medicine, or Ayurveda, betel—both the quid collectively and the areca nut alone—is recommended for its laxative and carminative effects. Other traditional attributes of arecanut are listed below[27,28]

Uses of Areca nut in Industry:

- **Building materials (palm trunks)**
- **Dye (red and black)**
- **Housing insulation (areca husks)**

- Leather tanning
- Roofing materials (palm leaves)

Uses of Areca nut in Traditional Medicine (e.g. Ayurveda)

- Antihelmintic and vermifuge
- Aphrodisiac
- Appetite stimulant
- Astringent
- Breath freshener
- Cardiac tonic
- Carminative (expels flatus)
- Dentifrice
- Diarrhoea prevention
- Diuretic
- Emmenagogue (induces or increases menstrual flow)
- Laxative
- Nervine tonic
- Strengthen gums
- Treat urinary disorders

Epidemiology of Use of Areca nut:[28,29,133,140]

Areca nut is used as a masticatory substance by approximately 600 million people worldwide. It is estimated that 10 ± 20% of the world's population chew areca nut in some form, often mixed in

betel quid. A challenge facing researchers documenting the prevalence of areca nut use in populations is the difficulty in documenting patterns of areca nut use as separate from betel quid chewing which often contain a variety of ingredients, including tobacco. Thus estimating the population frequency of areca use by itself is often frustrating, as some authors do not record this explicitly in their publications. As areca is often the primary ingredient in betel quid many studies describing population data for betel quid chewing is taken as a valid reference value. While there are no nationwide surveys reported on the prevalence of this habit. India has the largest areca-consuming population in the world. Much of the data arise from extensive population studies conducted by the TIFR group[9] in the 1960s and 1970s. Data were collected in a series of house-to-house surveys conducted in rural areas from individuals aged 15 years or over with approximately equal proportions of males and females. Interviews were conducted in five districts in India, Gujarat, Andhra Pradesh, Bihar and Kerala, involving 50915 people. The proportion of chewing betel quid varied from 3.3% in Srikakulam in Andhra Pradesh to 37% in Ernakulam in Kerala. Among 50915 people surveyed in five districts, 0.6% of those chewed areca nut alone (supari), compared with 11.6% who chewed betel quid with tobacco. The other large-scale study conducted in India by Malaowalla *et al*[29] on 57,518 industrial workers in Ahmedabad, Gujarat. a population different to the above studies in that these were mostly urban male textile

workers reported pan and supari chewing by 26% of 85% who admitted to an oral habit. In a study of 99598 adults (> 35 years) in Mumbai, some 32.1% reported chewing betel quid with tobacco, whereas only 0.5% reported chewing areca nut or betel-quid without tobacco.[30]

Botanical Aspect: [111,168,171,173]

There are several palms under the genus *'Areca' native* to South, South-East Asia and Pacific islands. This tropical palm tree bears fruit throught out the year. Areca nut for chewing is obtained from *'Areca catechu'*. It is believed that Areca catechu may be native to Ceylon (Sri Lanka), West Malaysia and Melanesia.[31] Areca nut is consumed in large variety of ways and can be used by itself. When ripe it is orange-yellow in colour and the seed (endosperm) is separated from fibrous pericarp. The nut may be used fresh, or dried and cured before use, by boiling, baking or roasting. In some areas, especially Eastern India and southern Sri Lanka, fermented Areca nut is also popular. In Taiwan, areca nut is often used in the unripe stage when it is green, like a small olive. Areca nut is known colloquially in the Indian subcontinent in Hindi and Bengali as *Supari*, in Sri Lanka it is called *'Puwak'*, in Thailand as *'Mak'*, in Sarawak as *'Pinang'* and in Papua New Guinea as *'Daka'*. Areca nut chewing is practiced in several different ways in various countries and often mixed with several ingredients to make up a

betel quid known as *Pan* in Hindi. The most popular accompaniments are the leaf of '*Piper betle*' (betel leaf), lime, catechu and tobacco. The most common accompaniment globally is the leaf of *Piper betle*. This has led to Areca nut being labelled erroneously as betel nut in the English literature. Apart from the leaf other parts of the betel vine such as stem, inflorescence (flower; pods) or catkins are also consumed with the nut. Lime (calcium hydroxide) is often used with areca nut in combination. Lime is obtained in coastal areas by heating the covering of shellfish (sea shells) or harvested from corals. In central areas of a country, it is quarried from limestone. In the Asian markets, lime is sold as a paste mixed with water which is white or pink. In Papua New Guinea lime is available in the powdered form. Catechu is an extract of the Acacia tree *A. catechu* or *A. suma*. Catechu is often smeared on the betel leaf that is used to wrap areca nut flakes. Cut tobacco is consumed with areca nut often in the quid mixture. This type of chewing tobacco is made from sun-dried and partly fermented coarsely cut leaves without further processing. Pan Masala is the generic term used for areca nut-containing products that are manufactured industrially and marketed commercially. These are available in small convenient sachets for individual use.

Pharmacology & Systemic Effects:

The active ingredient of the arecanut is arecoline , an alkaloid with properties that mimic acetylcholine. The hydrolyzing action of lime

on arecoline produces arecaidine, a central nervous system stimulant, which in combination with the betel piper produces mild euphoria.[28] Along with the mild euphoria, chewers experience cholinergic effects such as diaphoresis, lacrimation, pupillary constriction, and occasionally diarrhea.[32] Arecoline can cause bronchoconstriction and may trigger asthma attacks.[33] Excessive salivation leads to the expectoration of red betel juice. Betel appears to be psychologically and physiologically addictive.[34] "Amateurs in betel chewing usually experience a disagreeable combination of symptoms including constriction of the oesophagus, sensation of heat in the head, red and congested face and dizziness."[35] More acculturated chewers acquire a "suffused appearance, feeling of well being, good humour and the undoubtedly increased capacity for activity."[28]

Effect on Oral Health –

Effect on Hard Tissue:

The habitual chewing of areca may result in severe wear of incisal and occlusal tooth surfaces, particularly the enamel covering. The degree of attrition is dependent upon several factors, which include the consistency (hardness) of the areca, the frequency of chewing and the duration of the habit. this is likely to be a consequence of the increased masticatory load that is placed upon the teeth and is not direct effect of areca.[66] Among areca chewers, extrinsic staining of teeth due to areca deposits is often

observed particularly when good oral hygiene prophylaxis is lacking and where regular dental care is minimal. The masticatory forces generated during chewing areca may be transmitted to the TMJ and subsequently may give rise to joint arthrosis.[67]

Effect on Soft Tissue:

In vitro studies have demonstrated that Areca extracts containing arecoline inhibit growth and attachment of, and protein synthesis in, human cultured periodontal fibroblasts.[68,69] On the basis of these findings the investigators proposed that areca may be cytotoxic to periodontal fibroblasts and may exacerbate pre-existing periodontal disease as well as impair periodontal reattachment. there is an increased risk of developing precancerous condition like Oral Submucous fibrosis in subjects consuming areca nut preparations. The relative risk was noted to rise with an increasing frequency of the areca chewing habit, suggesting a dose ± response relationship.[70,71] There is historical evidence dating back nearly a century that suggests that the areca nut may be involved in the development of Oral squamous cell carcinoma. Due to these ill effects of Arecanut chewing, early prevention is required.

Areca nut Preparations:

Some Areca nut preparations are chewed without the inclusion of tobacco, but this practice may be present concurrently with the

use of Smokeless Tobacco or Tobacco Smoking. Alkaloids present in Areca nut are known to give rise to carcinogenic nitrosamines and Areca nut has recently been evaluated as a human carcinogen by the World Health Organization (WHO)[22]. The use of Areca nut by itself appears to be mildly addictive but when used with Tobacco, the effect multiplies manifold. Chewing of areca nut products is very common in India.

1. Plain Areca nut (raw/ baked)

2. Sweet / Flavoured Supari

3. Pan masala

4. Gutkha

5. Mawa

6. Paan with arecanut

7. Paan with arecanut and tobacco

Definitions of various tobacco habits and products: [28,35,39,82,87]

Habits	Definitions
Beedi	Beedi is a cheap smoking stick, handmade by rolling a dried, rectangular piece of temburni leaf (*Diospyros melanaxylon*) with 0.15-0.25 g of sun-dried, flaked tobacco filled into a conical shape and the roll is secured with a thread. The length of a beedi varies from 4.0-7.5 cm. Beedis are commercially available in small packets.
Cigarette	Cigarette smoking is the second most popular smoking form of tobacco used in India. The prevalence varies greatly among different geographic areas and subgroups such as rural-urban.
Hookah	Hookah (a hubble bubble Indian pipe) is an indigenous device, made out of wooden and metallic pipes, used for smoking tobacco. The tobacco smoke passes through water kept in a spherical receptacle, in which some aromatic substances may also be added. Hookah smoking is a common method of socializing among the village folk, especially in the northern and eastern parts of India.
Pipe	Pipe is a tube with a hollow bowl at one end used for smoking tobacco.
Chillum	Chillum is a conical clay-pipe of about 10 cm long. The narrow end is put inside the mouth, often wrapped in a wet cloth that acts as a filter. This is used to smoke tobacco alone or tobacco mixed with *ganja* (marijuana) in northern parts of the country.

Cigars	**Cigars are made of air cured, fermented tobacco, usually in factories, and are generally expensive. Cigar smoking is predominately an urban practice.**
Ganja	**Marijuana, the most commonly used illicit drug; considered a soft drug prepared from the flowering tops and leaves of the hemp plant; smoked or chewed for euphoric effect.**
Charas	**Charas is the name given to hand-made hashish in Afghanistan, Pakistan, Nepal and India. It is made from the extract of the cannabis plant (*Cannabis sativa*).**
Gutka	**Gutka is a manufactured smokeless tobacco product (MSTP), a mixture of areca nut, tobacco and some condiments, marketed in different flavours in colourful pouches.**
Khaini	**Khaini consists of roasted tobacco flakes mixed with slaked lime. This mixture is prepared by the user keeping the ingredients on the left palm and rubbing it with the right. The prepared pinch is kept in the lower labial or buccal sulcus. Its use is common in eastern India.**
Zarda	**Zarda is hygienically processed & packed chewing tobacco.**