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Smoking cessation therapy

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Abstract
Tobacco is the second major cause of death in the world. The increased use of tobacco is one of the greatest public health threats. It is currently responsible for the death of one in ten adults worldwide. Half the people that smokes today, that are about 650 million people will eventually be killed by tobacco. In India, nearly 200 million people use various forms of tobacco including more than 110 million who smoke. Tobacco use is much more prevalent among men than among women. It is more prevalent in rural areas than in urban areas among both men and women. The main reasons why people want to stop smoking are obvious: concern about health –their own, their family and the money. Many people also recognize that smoking is deeply unpleasant habit. Tobacco addiction is a chronic disease that often requires multiple attempts to quit. Although some smokers are able to quit without help, many others need assistance. Nicotine addiction is perhaps the commonest chronic disease in the developed world. In order to improve smoking cessation rates, more effective treatments are needed. Both behavioural interventions (counselling) and medication can help smokers quit; but the combination of medication with counseling is more effective than either alone.

Keywords: Tobacco, tobacco addiction, tobacco cessation, smoking

Introduction
Tobacco is the second major cause of death in the world. The increased use of tobacco is one of the greatest public health threats. It is currently responsible for the death of one in ten adults worldwide. Half the people that smokes today, that are about 650 million people will eventually be killed by tobacco. In India, nearly 200million people use various forms of tobacco including more than 110 million who smoke. Tobacco use is much more prevalent among men than among women. It is more prevalent in rural areas than in urban areas among both men and women. The main reasons why people want to stop smoking are obvious: concern about health –their own, their family and the money. Many people also recognize that smoking is deeply unpleasant habit.

Benefits of Tobacco Cessation – Timeline
Immediate benefits: The immediate health benefits of quitting smoking are substantial. Heart rate and blood pressure which are abnormally high while smoking begin to return to normal. Within a few hours, the level of carbon monoxide in the blood begins to decline. Within a few weeks, people who quit smoking have improved circulation and lung function.

Long term benefits of tobacco cessation: Quitting smoking reduces the risk of cancer and other diseases such as heart and lung diseases. People, who quit smoking regardless of their age, are less likely than those who continue to smoke to die from smoking-related illness. Studies have shown that quitting at about age 30 reduces the chance of dying from smoking-related diseases by more than 90%. People who quit at about age 50 reduce their risk of dying prematurely by 50%. Even people who quit at age 60 or older live longer and financially strong [1].

Fig 1: Benefits of Tobacco Cessation – Timeline

Tobacco Cessation Therapy

Tobacco addiction is a chronic disease that often requires multiple attempts to quit. Although some smokers are able to quit without help, many others need assistance. Nicotine addiction is perhaps the commonest chronic disease in the developed world. In order to improve smoking cessation rates, more effective treatments are needed. Both behavioral interventions (counseling) and medication can help smokers quit; but the combination of medication with counseling is more effective than either alone [2].

Contraindications

- Smokers under age 18 years,
- Women who are pregnant or nursing (nicotine gum is FDA approved for use in pregnancy)
- Other medical conditions like immediate post-myocardial infarction period, severe arrhythmias, severe or worsening angina, kidney or liver disease.
- Who is taking any other medicines especially, those containing Theophylline, tacrine, clozapine).

I. Nicotine Replacement Therapy

Nicotine replacement therapies (NRTs) were the first pharmacological treatment approved by the Food and Drug Administration (FDA) for use in smoking cessation therapy. Nicotine replacement therapy (NRT) works by making it easier to abstain from tobacco by partially replacing the nicotine previously obtained from tobacco. They were most successful when used in combination with behavioral treatments.

Mechanisms by Which NRT Could Be Effective Include:

Reduces either general withdrawal symptom, thus allowing people to learn to adjust without cigarettes.

- Reduces the reinforcing effects of tobacco-delivered nicotine.
- Provides some psychological effects on mood and attention states.

1) Transdermal Nicotine Patches:

Nicotine patches deliver nicotine through the skin at a relatively steady rate. The first patch appeared in the 1990s. Currently, patch formulations are on the market; they vary widely in their design, pharmacokinetics and duration of wear (i.e., 24- and 16-hwear). Smokers who use more than 10 cigarettes per day should use the 21-mg/d patch for the first 6 weeks, move to the 14-mg/d strength for 2 weeks, and then use the 7-mg dose for the final 2weeks.

Fig 2: Transedermal Nicotine Patch

2) Nasal Spray

They are marketed as individualized prescription medication; the nasal spray delivers nicotine more rapidly than other NRTs and delivers acute craving relief. Used as multi-dose bottles with pumps which deliver 0.5 mg of nicotine per 50-µL squirt. Eachdose consists of 2 squirts, one to each nostril. Most patients are started with 1 or 2 doses per hour, which may be increased up to a maximum of 40 doses per day.

Fig 3: Nasal Spray

Orally Administered Products

Lozenge Nicotine containing lozenges are available as 2 and 4 mg formulations since 2002. Nicotine from the lozenge is absorbed slowly through the buccal mucosa.

Fig 4: Lozenge

Inhaler

Nicotine inhalers are currently marketed as prescription medication in the United States. The inhaler consists of a mouthpiece and a plastic cartridge containing nicotine. Each inhaler cartridge contains 10 mg nicotine, of which 4 mg can be delivered and 2 mg is absorbed. Nicotine is not delivered to the bronchi or lungs, but rather it is deposited and absorbed in the mouth, like nicotine gum. Most people use between 6 and 16 cartridges a day, the recommended duration of treatment is 3 months, after which patients may be weaned by gradual reduction over the following 6-12 weeks.

Fig 5: Inhaler

Vaporizer

A vaporizer is a device used to release the active ingredients of plant material, commonly cannabis or tobacco. Rather than burning the herb, which produces numerous harmful by-products, a vaporizer heats the material, ideally to 180°C (356°F), so that the active compounds contained in the plant melt and convert into an aromatic vapour. Vapours may be filtered and cooled further using a water pipe or an inline water/ice attachment. The vapours are then inhaled directly; through a hose or pipe or "balloon", thus little or no smoke is produced and second hand smoke can be greatly reduced or eliminated.

Fig 6: Vaporizer

Sublingual tablet

The product is designed to be held under the tongue, where the nicotine in the tablet is absorbed sublingually. The levels of nicotine obtained by use of the 2 mg tablet and 2mg nicotine gum are similar. It is recommended that smokers use the product for at least 12 weeks, after that the number of tablets used is gradually tapered.

Fig 7: Sublingual Tablet

Nicotine Gum

Nicotine gum is a chewing gum formulation containing nicotine. It was first available in the 1980s and is a non prescription formulation. The gum is available in doses of 2 mg and 4 mg, which provides 1mg and 2mg of nicotine. Since about 50% of the nicotine in gum is absorbed, a fixed schedule of 10 pieces per day, a smoker receives about 10 mg or 20 mg of nicotine per day using the 2-mg or 4-mg gum, respectively. Users are instructed to use a piece of gum every 1-2 hours for the first 6 weeks, then to reduce use to one piece every 2-4 hours for 3 weeks, and one piece every 4-8 hours for 3 weeks. In highly dependent smokers, the 4-mg gum is superior to the 2-mg gum. The slow absorption of nicotine from the gum does not produce extremely high levels of nicotine [3].

Fig 8: Nicotine Gum

Nicotine Gum (Nicotex) Dose: 2mg and 4mg

Nicotine gum that helps people who smoke/who chew tobacco and gutka quit the habit. It works on the proven principle of "Nicotine Replacement Therapy (NRT)". Nicotine is a chemical present in tobacco leaves. When it is smoked/chew tobacco, nicotine enters the blood and goes to brain. It activates the part of the brain which produces feelings of pleasure and happiness. After sum time as the nicotine levels fall, the feel good effect reduces and the body starts craving for the next cigarette/tobacco.

Nicotex action: Each piece of nicotine gum provides the nicotine that normally get from cigarettes/chewing tobacco. The level of nicotine is lower than that in the cigarettes/chewing tobacco. It allows the body to gradually adjust to having less nicotine until they no longer need any and thus helps to quit smoking/chewing tobacco. 2mg is appropriate for those who smoke 20 cigarettes a day or less. 4mg is appropriate for those who smoke more than 20 cigarettes a day. 4mg should be used as advised by the doctor for 2mg 8-12 pieces can be used a day.

Sample dosage schedule: 1-6 weeks: 1gum/1-2 hours; 7-9 weeks: 1gum/2-4 hours; 1-6 weeks: 1gum/4-8 hours

Steps to chew nicotine chewing gum:

1. Chew the gum slowly until there is a nicotine taste.
2. Once felt nicotine taste, keep the gum in between the cheek and teeth.3. Nicotine is released from the gum which gets absorbed through the cheek.
4. Chew the gum again when the taste fades.

Note: Do not eat or drink or use removable dentures with the chewing gum in the mouth. Avoid having any drinks for 15min before the chewing gum is used. Caution: Do not use more than 24 pieces of gum a day. The general symptoms of nicotine overdose include head ache, sickness, diarrhoea and stomach pain. Storage: Store below 250C. Protect from sun light. Keep out of sight and reach of children.

Side Effects: Common side effects such as:

- Headache
- Nausea
- Hiccups
- Stomach discomfort
- Sore mouth or throat
- Jaw muscle ache
- Sleep disturbances [4]

Overall NRTs increase the rate of quitting by 50-70% and appear to be independent of the additional support. Therefore, all of the commercially available forms of NRT (gum, transdermal patch, nasal spray, inhaler, and sublingual tablets/lozenges) increase the chances of successful smoking cessation)

II) Non-Nicotine Therapies

1) Bupropion The drug bupropion was introduced by Glaxo-SmithKline containing aid to smoking cessation and has been shown to approximately double rates of cessation. It acts by enhancing the central nervous noradrenergic function and is equally effective for men and women. The medication is equally effective for men and women. Bupropion also is effective for patients in whom nicotine replacement therapy fails33. Like NRT products, bupropion has been endorsed by the US Clinical Practice Guideline as a first-line therapy. It has also been shown that bupropion combined with nicotine replacement medications may increase cessation rates relative to bupropion alone. It is used as a non–nicotine (300 mg/d, given as 150 mg bid).

2) Varenicline The drug Varenicline tartarate was introduced by Pfizer. It was developed as a nicotine receptor partial agonist and helped smokers quit by preventing withdrawal symptoms as moderate levels of dopamine are maintained in the brain. With varenicline the dopamine burst is smaller and long-lasting [5].

3) Nortriptyline Nortriptyline is used as a second-generation tricyclic antidepressant (TCA) and used as a second-line therapy to quit nicotine. The potential efficacy of nortriptyline for smoking cessation in smokers without history of major depression.

4) Clonidine Clonidine is used as an alpha-2-noradrenergic agonist used to treat hypertension and has been shown to diminish symptoms of both opiate and alcohol withdrawal symptoms.

5) Cytisine Cytisine is an original Bulgarian preparation of plant, intended for the treatment of tobacco smoking. The preparation is developed on the basis of the alkaloid Cytisine, contained in the plant *Cytisus laborinum* L. (Golden Rain acacia). Cytisine possesses a structure and mechanism of action that are similar to those of nicotine, but it has much lower toxicity.

III) Novel Therapies One novel approach is provided by immunization against nicotine. Antibodies induced by the vaccine bind nicotine in the blood, thus preventing it from

reaching the nicotine receptors in the brain and breaking the cycle of nicotine addiction.

1) Anti-Smoking Vaccine (Nic VAX): It is a novel anti-smoking vaccine named as NicVAX. It is a nicotine conjugate vaccine intended to reduce or eliminate physical addiction to nicotine and is presently in clinical trials. NicVAX consists of the hapten 3'-aminomethylnicotine which has been conjugated (attached) to Pseudomonas aeruginosa exoprotein A. According to the National Institute on Drug Abuse, NicVAX can potentially be used to inoculate against addiction.

2) Green Smoke Electronic Cigarette Green smoke electronic cigarette has been in existence for almost three years and is a clever device aimed at providing smokers with a healthier option which is also useful in helping to reduce and quit smoking altogether. These are healthier than traditional cigarettes and are legal. Furthermore, electronic cigarettes allow you to smoke with no fears of inflicting harm on others due to second hand smoke. The good thing about green smoke electronic cigarette as opposed to any nicotine containing product is that e-cigarettes produce the same tactile sensation and oral fixation that smokers desire, while satisfying ones' tobacco cravings as well.

IV) Behavioral Therapy Behavioral interventions can play an integral role in nicotine addiction treatment. In general, behavioral methods are employed to

(a) Discover high-risk relapse situations
(b) Create an aversion to smoking
(c) Develop self-monitoring of smoking behavior
(d) Establish competing coping responses.

Other key factors in successful treatment include avoiding smokers and smoking environments and receiving support from family, friends and must also be ready to apply those skills in a crisis.

V) Activity While attempting smoking cessation, exercise has been shown to help curb weight gain and to help alleviate nicotine withdrawal symptoms.

VI) Hypnosis Over the years, there have been many different programs designed to help the user drop the smoking habit and several hypnosis programs. Hypnotism is said to be an excellent aid in helping a user to finally break the habit of smoking.

VII) Acupuncture Acupuncture treatment is also considered a genuine and powerful aid in stopping nicotine and smoking addiction, although it's not the most popular and that apparently has no side effects.

VIII) Motivational Therapies Self-help books and websites can provide a number of ways to motivate smokers to quit smoking. One well known example is calculating the monetary savings. Some people have been able to find the motivation to quit just by calculating how much money they will save after they quit [6].

Conclusion

Tobacco use is much more prevalent among men than among women. It is more prevalent in rural areas than in urban areas among both men and women. The main reasons why people want to stop smoking are obvious: concern about health –their own, their family and the money. Many people also recognize that smoking is deeply unpleasant habit. In order to improve smoking cessation rates, more effective treatments are needed. Both behavioral interventions (counseling) and medication can help smokers quit; but the combination of medication with counseling is more effective than either alone.

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