Chapter 16

Tobacco Products and Nicotine Addiction

Introduction

- First settlers began to experiment with tobacco and by 6,000 B.C.E. use was widespread across the Americas
- First European explorers carried smoking back across the Atlantic
  - Met with strong skepticism
- 15th century Europeans physicians believed there must be some medicinal properties
- Smoking gains some sophistication and status in Europe and the Americas
- 20th century began serious examining the long-term effects of its use

A very short history of tobacco use in the US

- Cultivated in South America as early as 8,000 years ago
- European colonies in the New World were largely fueled by demand for tobacco
- Functioned as a currency in some American colonies
- During Civil War soldiers from both sides would call truces to barter for tobacco for other “necessities”
- Tobacco crop yield rose and mechanical manufacturing increased the supply of cigarette, dramatically reducing the price

Scope of the problem of tobacco use

- Globally, $400billion/year industry
- 1 billion men and 250 million women around the world smoke daily
- 10 million cigarettes sold each minute
- In the US, smokers consume 387.6 billion cigarettes annually
- 20.6% of the population now smokes compared to almost 50% in 1950

Pharmacology of cigarette smoking

- Primary method by which tobacco is used is smoking. Chewing and cigar smoking is popular in certain sectors
- Variables influencing the chemistry of tobacco
  - Exact composition of the tobacco
  - How densely it is packed
  - Length of column tobacco
  - Characteristics of the filter being used
  - The paper being used
  - The temperature at which the tobacco is burned

Nicotine

- With each puff, a small dose of nicotine enters the circulation that reaches the brain within seconds
- Binds with acetylcholine receptors leading to widespread activation of other systems
- Blood concentrations peak within minutes and biological half-life is 2 hours allowing smoker to titrate dose to maintain a preferred blood level

The effects of nicotine use on the smoker's body

- Quite toxic
  - Lethal dose of nicotine for the average adult is 40-60mg
  - Average cigarette contains approximately 10 milligrams (mg) of nicotine
- Nicotine addiction
  - activate the nucleus accumbens that make up part of the reward system in the brain
  - Neurochemical changes in the brain after a few cigarettes – suggesting the addictive quality.
    - Children who smoke 4 or more cigarettes stand a 94% chance of continuing to smoke

The effects of nicotine use on the smoker's body

- Nicotine addiction
  - 90-95% of smokers demonstrate symptoms of addiction
    - Tolerance
    - Characteristics of a withdrawal syndrome
    - Drug-seeking behavior
  - Regular users titrate their smoking to maintain a fairly constant level of nicotine in their blood

The effects of nicotine use on the smoker's body

- Nicotine withdrawal symptoms begin as soon as 2 hrs of last cigarette and peak in 24 hrs and declines over the next 10 days
- Approx. 24% report no significant distress
  - Sleep problems, irritability, impatience, difficulties in concentration, restlessness, fatigue and/or drowsiness, strong "craving" for tobacco, GI upset and/or constipation, headache, increase coughing
- Extended withdrawal symptoms may continue for 6 months, though intensity may vary between individuals

Complications of the long-term use of tobacco products

- Body of cigarette smoker appears 5-10 years older than chronological age
- Average US male smoker loses 13.2 years of his life because of smoking-related illness; female 14.5 years
- Approx. 443,000 deaths annually in the US
  - Including 15,000 nonsmokers through “passive” or “secondhand” smoke
- Globally, 5 million cancer-related deaths annually

Complications of the long-term use of tobacco products

- Cigarette smoking exacerbates the development of cancer in the body
- In the US, cigarette smoking cause:
  - 17%-30% of the deaths caused by cardiovascular disease
  - 24% of deaths caused by pneumonia and/or influenza
  - 10% of infant deaths

Complications of the long-term use of tobacco products

- The mouth, throat, and pulmonary system
  - 10-15 times more likely to develop long cancer vs. nonsmoker
  - 27 times more like to develop laryngeal cancer
  - Increased chance for bronchitis, pneumonia, COPD
- Digestive tract
  - Cause of half of gum disease and tooth loss

Complications of the long-term use of tobacco products

- Cardiovascular system
  - Leading factor in coronary heart disease
  - Increased risk for hypertension
- The skin
- The central nervous system
- The reproductive system
- Other complications

Chewing tobacco

- Three types of “smokeless” tobacco
  - Moist snuff
  - Dry snuff
  - Chewing tobacco
- An est. 3.5% of tobacco users
- Some established smokers trying to quit smoking
- Predominantly male 99.6%
- Increased risk of oral cancers

Second-hand smoke

- Passive smoker
- Exposed to many of the same toxins as smokers
- almost *88 percent of nonsmokers* demonstrated cotinine, a metabolite of nicotine, in their blood
- Nonsmokers who are exposed to significant amounts of environmental tobacco smoke are at higher risk for developing pulmonary disorders such as lung cancer or tuberculosis
- Researchers believe that 2nd hand smoke causes approximately 6,100 deaths in children each year in the US.

Smoking cessation

- Only 4-7% are able to quit without assistance
- 70-80% will relapse in first 6 months
- Normally 5 to 10 serious attempts to quit prior to success
- More than 80% of smokers have tried to quit at least once
- “Cold Turkey” is the hardest way to quit.
- relapse triggers are a factor in more than 50 percent of the cases where the former smoker relapses

Smoking cessation

- There is a poorly understood relationship between depression and cigarette smoking
- Many smokers have learned to cope with negative emotions through smoking
- Cigarette cessation and weight gain
  - 80% will gain some weight
  - Those attempting to quit, on average, take in 200 more calories per day
  - Nicotine ups metabolism 10%
  - One would need to gain 50-100lbs to counteract the positive cardiovascular effects gain through cessation

Tobacco use and the DSM-V

- Tobacco use disorder
- Tobacco withdrawal
- Other tobacco-induced disorder
- Unspecified tobacco-related disorder