Depression and anxiety as risk factors for failure in smoking cessation attempt among personnel of Tartu University Hospital 2010-2012

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Introduction

• Results of existing research on smoking show that smoking can:
  – lead to a number of physical health problems
  – lead to psychological problems

• Results of research have found:
  – that individuals who smoke have higher rates of both depression and anxiety than non-smokers

ICD

• Smoking is a disease, classified as mental and behavioural disorder due to use of tobacco F17.25

• *International Statistical Classification of Diseases and Related Health Problems, WHO 1992*
Smoking – only style of living?

• Many smokers (71%) are thinking about smoking as a way of living and 78% are smoking believing that it's only a habit

• A smoker feels euforic directly after smoking a cigarette due to the neurobiologic stimulus of nicotine (“pipe of peace”)
The addiction pathways

‘Reward’ pathway
(mesolimbic dopamine system)

‘Withdrawal’ pathway
(locus coeruleus)
Neurobiologic stimulus by nicotine in central nervous system

Nicotin activates N-acetylcholine receptors

Presynaptic release of dopamin (●)

Dopaminergic stimulation in mesolimbilic system

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Desirable level of nicotine for a highly dependant smoker

- **Cigarettes**
- **Nicotine patch**
- **Habitual concentration on nicotine**

*Time (approx)*

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Mechanisms of addiction

Key: DA = dopamine  NA = noradrenaline

Adapted from: Benowitz et al, CNS Drugs 2000.
Quitting

• Depression and anxiety may be felt by quitters as withdrawal symptoms
• The aim of our study was to evaluate whether smokers with underling emotional disorders are more likely to relapse in quitting process
Aim of the study

• To evaluate the influence of depressive mood or anxiety on the process of quitting smoking among hospital staff
Materials and methods
Participants and assessment

• Time period: 2010–2012
• Target group: 83 hospital workers
• Cessation program: motivational support, periodic visits, telephone contacts
• Cessation medication: NRT or bupropion or varenicline delivered by the employer
• The main outcome variable
  – Probability of continuous abstinence at 12 months
• Independant variables
  – Depression and anxiety disorder
  – measured by self-reported questionnaire (Emotional State Questionnaire, EST-Q)
Typical smoking clinics procedure

• First visit face-to-face individual or pairs, exceptional by e-mail:
• incl Questionnaires for nicotine dependence and emotional state
• medicine prescription if needed;
• At least 5 follow-up visits (as needed: face-to-face, or by telephone or by e-mail): preQuit, Day1, W2, W8, W24, W48;
• Exhaled CO is monitored
Counselling includes:

- Motivational interview
- The knowledge of neurobiologic addiction
Bupropion SR
(Zyban/elontril/Wellbutrin)

• Noradrenergic and dopaminergic properties
• inhibit the neuronal transports for dopamine and noradrenaline
• potentiates their effects in the brain
• an effective aid to smoking cessation

Martin et al. Psychopharmacology 1990
Bupropiooni toime kesknärvisüsteemis

Bupropioon päärsib dopamiini (○) tagasihaaret presünapsisse

Nikotiini vajadus puudub

Dopamiinergiline stimulatsioon mesolimbilises süsteemis

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Varenicline (Champix)

- Varenicline binds with high affinity and selectivity at the \(\alpha_4\beta_2\) neuronal nicotinic acetylcholine receptor, where it acts as a partial agonist. Its binding both alleviates symptoms of craving and withdrawal, and reduces the rewarding and reinforcing effects of smoking by preventing nicotine binding to \(\alpha_4\beta_2\) receptors.
Varenikliini toime kesknärvisüsteemis

Varenikliin aktiveerib N-atsetüülkoliini retseptorid, samas blokeerib retseptori lisanikotiinile.

Presünapsist vabaneb dopamiin (○)

Nikotiini molekulid ei saa aktiveerida retseptoreid

Dopamiinergiline stimulatsioon mesolimbilises süsteemis

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Process of quitting

preconsidering

considering

preparing

realizing

smoking

slip

Primary (short term) achievement

Permanent effect
Fagerström Test for Nicotine Dependence

- How soon after you wake up do you smoke your first cigarette?
  - within 5 minutes (3 points)
  - 5 to 30 minutes (2 points)
  - 31 to 60 minutes (1 point)
  - after 60 minutes (0 points)

- Do you find it difficult not to smoke in places where you shouldn’t (in church, school, movie, at library, on bus, in court, hospital)?
  - Yes (1 point)
  - No (0 points)

- Which cigarette would you most hate to give up; which cigarette do you treasure the most?
  - The first one in the morning (1 point)
  - Any other (0 points)

- How many cigarettes do you smoke each day?
  - 10 or fewer (0 points)
  - 11 to 20 (1 point)
  - 21 to 30 (2 points)
  - 31 or more (3 points)

- Do you smoke more during the first few hours after waking up than during the rest of the day?
  - Yes (1 point)
  - No (0 points)

- Do you still smoke if you are so sick that you are in bed most of the day, or if you have a cold or the flu and have trouble breathing?
  - Yes (1 point)
  - No (0 points)
The Emotional State Questionnaire (EST-Q-2)

• To select the quitters with major depressive episode or anxiety
• Indicate how often each problem has bothered during the past month
• Contains subscales of Depression, Anxiety, Agoraphobia-Panic, Fatigue and Insomnia,
## Subscale of depression (cut-point >12)

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>All the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feelings of sadness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Feeling no interest in things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Feelings of worthlessness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Self-accusations</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Recurrent thoughts of death or suicide</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Feeling lonely</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Hopelessness about the future</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Impossible to enjoy things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
### Subscale of anxiety (cut-point >12)

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>All the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling easily irritated or annoyed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Feeling anxious or fearful</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Tension or inability to relax</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Excessive worry about several different things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Feeling so restless that it is hard to sit still</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Easily startled</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Materials and methods

Data analysis

• Descriptive analysis
  – Frequency

• Probability of continuous smoking abstinence
  – Kaplan-Meier method (curves)

• Relationship between smoking abstinence and depression/anxiety
  – Cox proportional hazard model
  – Hazard ratios (HR) and the corresponding 95% confidence intervals (95% CI) were computed
Results
Description of the participants

- Gender: 78% women
- Average age: 41.8 years (22–70 years)
- Average pack-years smoked: 16.6 py
- Nicotine dependence (Fagerström test):
  - Weak 21%
  - Moderate 36%
  - Strong 43%
Results
Description of the participants

• Potential depression: 30,1%
• Potential anxiety disorder: 33,7%
• Both depression and anxiety: 22,9%
• Medication prescribed:
  – NRT 24,1%
  – Bupropion, varenicline 75,9%
Results

Probability of continuous smoking abstinence

![Graph showing probability of continuous smoking abstinence over time (months)].

- 90.1% at 0.5 months.
- 80.3% at 2 months.
- 52.1% at 6 months.
- 38.0% at 12 months.
Results

Smoking abstinence associated with depression

Depression

<table>
<thead>
<tr>
<th>HR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO 1</td>
</tr>
<tr>
<td>YES 1.25 (0.66–2.35)</td>
</tr>
</tbody>
</table>

![Graph showing the probability of continuous smoking abstinence over time with and without depression.](graph_image)
Results

Smoking abstinence associated with anxiety

![Graph showing the probability of continuous smoking abstinence over time for participants with and without anxiety disorders. The graph includes a table with the HR (95% CI) values: NO: 1, YES: 1.29 (0.70–2.37).]
Results

Smoking abstinence associated with medication

![Graph showing the probability of continuous smoking abstinence (%) over time (months). The graph compares Bupropion/varenicline and NRT (Nicotine Replacement Therapy). The hazard ratios (HR) and 95% confidence intervals (CI) are provided for each medication.]

- **Bupropion/varenicline**: HR = 1 (CI: 1.47 (0.76–2.85))
- **NRT**: HR = 1.47 (CI: 0.76–2.85)

The graph illustrates the probability of continuous smoking abstinence (%) over time (months), with time points at 0, 0.5, 2, 6, and 12 months.
Conclusion

• Risk for relapses is more probable among smokers with underlying depression or with underlying anxiety, but not statistically significant in our small study group

• further investigations needed
  – with larger group
  – to find the appropriate farmacological aid for special subgroups of smokers