Use of pharmacotherapy in smoking cessation

Nicotine replacement therapy, bupropion and varenicline are pharmacotherapies that are effective in people who want to stop smoking, doubling quit rates.

In this article...

- An overview of approaches to smoking cessation
- An outline of smoking cessation pharmacotherapies
- Common side-effects of nicotine replacement therapy

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Nurses can make a significant contribution to improving public health and reducing health inequalities by helping patients to quit smoking. This article outlines the main options to support patients, including pharmacotherapy.

Some 10 million adults smoke cigarettes in Great Britain and around half will eventually die from smoking-related causes (Action on Smoking and Health, 2011a). Smoking is the leading cause of preventable disease and premature death. It is one of the most significant factors in health inequalities and ill health, causing around 90% of deaths from lung cancer, 80% of deaths from bronchitis and emphysema, and 17% of deaths from heart disease (Action on Smoking and Health, 2011b). In addition, passive smoking kills over 12,000 people in the UK every year (Royal College of Physicians, 2005).

Smokers who quit improve their health and that of their families, as well as substantially reducing the likelihood that their children will become smokers (Department of Health, 2011a). The public health white paper Healthy Lives, Healthy People recognised the devastating impact of tobacco use on public health (DH, 2010); it set out to maximise efforts to reduce this via the Tobacco Control Plan, which outlines national ambitions to reduce smoking among adults and young people, and during pregnancy (DH, 2011a).

Although more than six out of ten smokers indicate a desire to quit, fewer than half of these will attempt to do so within a year (DH, 2011a). Most smokers make several attempts to quit before they succeed, so health professionals should maintain contact with them and offer re-treatment after relapse (DH, 2011b).

Overview of approaches

Smoking cessation interventions include brief interventions, individual behavioural counselling, group behaviour therapy, self-help materials, telephone counselling, helplines, mass-media campaigns and pharmacotherapy. Guidance on the standards for training in smoking cessation treatments defines three levels of smoking cessation advice (Health Development Agency, 2003):

- Level 1 – includes brief interventions;
- Level 2 – intensive one-to-one support and advice;
- Level 3 – group interventions.

Levels 2 and 3 involve face-to-face weekly meetings between an individual smoker or a group of smokers and a trained smoking cessation counsellor, usually continued for at least four weeks after the agreed quit date. Both of these are usually combined with pharmacotherapy.

Hard copy or electronic self-help materials may be used by individuals, groups or during a brief intervention/behavioural therapy session. They may be tailored so are useful when targeting specific groups, such as minority ethnic groups or when language may be a barrier.

Telephone counselling and quit lines can be proactive (counsellors can call a client) or reactive (a client may call a service). Psychological support such as counselling and brief interventions are valuable in strengthening motivation and offering coping strategies to avoid, escape or minimise the urge to smoke. Psychological support is often combined with pharmacotherapy and, together, they have a 49% successful quit rate; the quit rate is only 5% in those who quit with psychological support but without the use of pharmacotherapies (DH, 2011b).
Assessing patients
Smokers should be assessed for their motivation to quit and degree of nicotine dependence. This lets health professionals estimate the severity of potential nicotine withdrawal symptoms and the amount and type of support needed. The tool most often used to assess the degree of nicotine addiction is the Fagerström Test for Nicotine Dependence (FTND) (Heatherton et al, 1991) (Box 1). The Heaviness of Smoking Index asks just the first and fourth questions of the FTND (Heatherton et al, 1989).

Biochemical markers can be used to measure smoking status; measuring carbon monoxide in expired air is the most cost-effective and least invasive method (DH, 2016). A pre-quit test and a four-week post-quit reading should be made (NICE, 2008).

### Pharmacotherapies
Pharmacotherapies to support smoking cessation include nicotine replacement therapy (NRT), bupropion (Zyban) and varenicline (Champix). NRT is available as a patch (24-hour and 16-hour), gum, lozenges, sublingual tablet, nasal spray, oral spray and inhalator. It can be used instead of cigarettes after stopping smoking suddenly or to reduce the number of cigarettes smoked before a quit attempt (Royal Pharmaceutical Society and British Medical Association, 2011). No NRT product is significantly more effective than any other, but research has suggested abstinence is higher with tablets or lozenges than gum, and that nicotine nasal spray is slightly more effective than gum (DH, 2016).

Before recommending treatment, health professionals should consider:
- Which treatments a smoker may prefer;
- Whether the smoker has tried to quit before;
- Which products, if any, the smoker has tried previously;
- Whether there are any medical reasons why a particular pharmacotherapy should not be prescribed (NICE, 2008).

Smokers with a high level of nicotine dependence or who have failed previously with NRT may benefit from a combination of an immediate-release NRT product and nicotine patches (RPS and BMA, 2011). Table 1 gives examples of the advantages and disadvantages of different NRT routes.

#### Cautions
Most warnings for NRT also apply to continued smoking but the risks of smoking outweigh those associated with NRT (RPS and BMA, 2011).

NRT should be used with caution in patients who are haemodynamically unstable and hospitalised with severe cardiac arrhythmias, myocardial infarction or cerebrovascular accident, and in those with phaeochromocytoma or uncontrolled hyperthyroidism (RPS and BMA, 2011). Care should also be taken in patients with diabetes (blood-glucose concentrations should be monitored closely when starting NRT) and in those with moderate to severe hepatic impairment or severe renal impairment (RPS and BMA, 2011).

Smoking cessation in pregnancy should initially be tried without NRT, using non-pharmacological methods; if this fails, NRT should be considered, as using NRT in pregnancy is preferable to continued smoking (RPS and BMA, 2011). Products providing intermittent NRT are preferable to nicotine patches; liquorice-flavoured products should be avoided. In women with pregnancy-related nausea and vomiting, patches may be the better option.

While nicotine is present in breastmilk, the amount to which the baby is exposed is small and less hazardous than exposure to second-hand smoke (RPS and BMA, 2011).

### BOX 1. THE FAGERSTRÖM TEST FOR NICOTINE DEPENDENCE

How soon after you wake up do you smoke your first cigarette?
- After 60 minutes (O)
- 31-60 minutes (1)
- 6-30 minutes (2)
- Within 5 minutes (3)

Do you find it difficult to refrain from smoking in places where it is forbidden?
- No (0)
- Yes (1)

Which cigarette would you hate most to give up?
- The first in the morning (1)
- Any other (O)

How many cigarettes per day do you smoke?
- 10 or less (0)
- 11-20 (1)
- 21-30 (2)
- 31 or more (3)

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

Do you smoke even if you are so ill that you are in bed most of the day?
- No (0)
- Yes (1)

O-2 = very low dependence, 3-4 = low dependence, 5 = medium dependence, 6-7 = high dependence, 8-10 = very high dependence

Source: Heatherton et al (1991)

### TABLE 1. EXAMPLES OF ADVANTAGES AND DISADVANTAGES OF THE DIFFERENT ROUTES OF NICOTINE REPLACEMENT THERAPY

<table>
<thead>
<tr>
<th>Product</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotine gum</td>
<td>Patient controls nicotine intake; dose reduction can be achieved by gum substitution or reducing amount used</td>
<td>Taste and texture are unacceptable to some; correct chewing technique must be used; not suitable for those with dentures</td>
</tr>
<tr>
<td>Nicotine patches</td>
<td>Discreet and easy to apply; 24-hour patch may benefit patients who smoke within 20 minutes of waking</td>
<td>Patches do not mimic the peaks and troughs achieved by smoking</td>
</tr>
<tr>
<td>Nicotine nasal spray</td>
<td>Patient controls the dosage; nicotine is absorbed rapidly</td>
<td>Side-effects are common</td>
</tr>
<tr>
<td>Nicotine inhaler</td>
<td>Patient controls the dosage; useful in habitual smokers</td>
<td>Side-effects are common</td>
</tr>
<tr>
<td>Nicotine sublingual tablets</td>
<td>Patient controls the dosage; discreet and easy to use</td>
<td>Side-effects are common</td>
</tr>
<tr>
<td>Nicotine lozenge</td>
<td>Patient controls the dosage; discreet and easy to use</td>
<td>Side-effects are common; Nicotinell lozenges must not be used by individuals under the age of 18 years without recommendation from a doctor</td>
</tr>
</tbody>
</table>

Source: Based on National Prescribing Centre (1999)
### Side-effects

Side-effects of NRT are often difficult to distinguish from nicotine withdrawal symptoms (RPS and BMA, 2011). As nicotine is an irritant, the following may occur:

- Mild skin reactions when using patches;
- Throat irritation when using oral preparations and inhalation cartridges;
- Gastrointestinal disturbances such as nausea, vomiting, dyspepsia and hiccup if nicotine is swallowed (RPS and BMA, 2011).

NRT may induce palpitations and using nicotine patches may result in abnormal dreams; this may be reduced by using a 16-hour patch or removing a patch before going to bed. Table 2 outlines other possible side-effects.

### Metabolism of nicotine

Smoking stimulates a liver enzyme responsible for metabolising certain medicines. This means their metabolism is increased, resulting in lower blood levels, reduced therapeutic effects and a possible need for higher doses. Examples of these medicines include some antidepressants, antipsychotics, benzodiazepines, insulin, opiates, tamoxifen theophylline, warfarin and verapamil (RPS and BMA, 2011).

It is vital to review patients’ medication before starting cessation treatment, and to consider and plan for possible dosage reduction after quitting. Some people metabolise nicotine faster than others, so may need higher doses of NRT (DH, 2011b) (Table 3).

### Bupropion

Bupropion (Zyban) raises successful quit rates (Hughes et al, 2007). Licensed for adults over 18 years, it is prescription only.

Bupropion has antidepressant properties but some people may experience depression as a side-effect. Its use is not recommended in combination with NRT or other smoking cessation medicines (RPS and BMA, 2011) and it should not be used during pregnancy or breastfeeding. Its dose should be reduced in renal and hepatic impairment; there are also other cautions and contraindications (RPS and BMA, 2011).

Common side-effects include dry mouth, gastrointestinal upset, agitation, dizziness, depression, headache, impaired concentration, insomnia (avoid dose at bedtime), tremor, fever, pruritis, rash and sweating (RPS and BMA, 2011).

### Varenicline

Varenicline (Champix) blocks nicotine receptors, and so reduces withdrawal effects. It is a prescription-only medicine, licensed for adults aged over 18 years. Its use is not recommended in combination with NRT or other medicines used in smoking cessation (RPS and BMA, 2011), or during pregnancy or breastfeeding, and its dose should be reduced in renal impairment.

Varenicline increases the chances of long-term abstinence from nicotine two to threefold and is more effective than bupropion (Cahill et al, 2011). Common side-effects include nausea (subsides over time), changes in appetite, dry mouth, taste disturbance, headache, drowsiness, dizziness, sleep disorders and abnormal dreams (RPS and BMA, 2011).

Suicide-related events have been reported by the Medicines and Healthcare products Regulatory Agency (2010) in people with no psychiatric history. Patients should be advised to stop treatment and seek prompt medical advice if they develop agitation, depressed mood or suicidal thoughts. People with a history of psychiatric illness should be monitored closely (RPS and BMA, 2011; MHRA, 2010).

### Conclusion

Cessation pharmacotherapies - NRT, bupropion and varenicline – are effective in people who want to stop smoking. On average, successful quit rates are doubled by using these products (Cahill et al, 2011; Hughes et al, 2007; NPC, 1999). These rates improve significantly further when combined with level 2 or level 3 smoking cessation support. Nurses should encourage people to attend a level 2 or 3 service.

### References

Action on Smoking and Health (2011b) Facts at a Glance: Smoking and Disease. tinyurl.com/smoking-disease
Cahill K et al (2011) Nicotine receptor or partial agonists for smoking cessation. Cochrane Database of Systematic Reviews; 2011: 2, CD000603.
Heatherton TF et al (1989) Measuring the heaviness of smoking: using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. Addiction; 84: 7, 791-800.

### Tables

#### Table 2. Some side-effects of nicotine replacement therapy preparations

<table>
<thead>
<tr>
<th>Preparation</th>
<th>Side-effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gum</td>
<td>Increased salivation</td>
</tr>
<tr>
<td>Lozenge</td>
<td>Bloating, chest pain, constipation, diarrhoea, dry mouth, dysphagia, gastritis, gingival bleeding, halitosis, hot flush, increased salivation, mouth ulcer, oesophagitis, taste disturbance, thirst</td>
</tr>
<tr>
<td>Nasal spray</td>
<td>Coughing, epistaxis, nasal irritation, sneezing, watery eyes</td>
</tr>
<tr>
<td>Oral spray</td>
<td>Dry mouth, flatulence, gingival bleeding, increased salivation, mouth ulcers, taste disturbance</td>
</tr>
<tr>
<td>Patch</td>
<td>Abnormal drama, arrhythmia, arthralgia, chest pain, dry mouth, myalgia, sweating</td>
</tr>
<tr>
<td>Sublingual tablet</td>
<td>Dry mouth</td>
</tr>
</tbody>
</table>

#### Table 3. Nicotine metabolism factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Women metabolise nicotine 15% faster than men</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Women metabolise nicotine up to 60% faster when pregnant</td>
</tr>
<tr>
<td>Oral contraceptive</td>
<td>Women metabolise nicotine 40% faster when using an oral contraceptive</td>
</tr>
</tbody>
</table>

Source: DH (2011b)