



# Smoking cessation intervention in emergency neurology - introduction of a new practice

Hanne Tønnesen<sup>1</sup>, Bente Munkholm Nelbom<sup>2</sup>, Bente Wind<sup>3</sup>, Vibeke M Olsen<sup>3</sup>,  
Trine Madsen<sup>1</sup>, Vibeke Backer<sup>3</sup>

## Abstract

**Introduction** Emergency neurological patients are rarely given opportunities for smoking and alcohol intervention. However, both are relevant in the acute phase as well as in future rehabilitation.

**Objectives** The aim of this study was primarily to illustrate the implementation of motivational counselling in an acute neurological department and also to predict factors influencing this motivation.

**Methods** During a four-month period, 100 smoking emergency patients, including 18 patients with hazardously drinking patterns, were admitted with acute neurological illness, offered behavioural counselling before discharge, participated in a six week hospital-based smoking cessation or alcohol intervention programme, and followed-up after six months.

**Results** Of the 100 patients studied, 87 accepted counselling regarding smoking and 16 patients received counselling for both smoking and alcohol. The younger patients had the highest level of motivation. Sixty (69%) patients were contactable at follow-up; of these, 18 patients had continuously quit smoking for six months and the other 15 patients had ceased or reduced their smoking habits. The followed-up group included only 6 (38%) with hazardous drinking patterns.

**Conclusion** The majority of smokers admitted due to emergency neurological illness accepted an offer for motivational counselling followed by a six week smoking cessation programme. The results indicated that this counselling led a significant proportion of the patients to cease or reduce their smoking habits.

## About the AUTHORS

1 WHO-CC, Clinical Health Promotion Centre, Bispebjerg Hospital, University of Copenhagen, Copenhagen, Denmark & Lund University, Skåne University Hospital, Malmö, Sweden

2 Department of Neurology; Bispebjerg Hospital, University of Copenhagen, Copenhagen, Denmark

3 Department of Lung Medicine; Bispebjerg Hospital, University of Copenhagen, Copenhagen, Denmark

### Contact:

Hanne Tønnesen  
hanne.tonnesen@bbh.regionh.dk

Clin. Health Promot. 2012; 2:64-9

## Introduction

Smoking is a major risk factor for stroke and other neurological disorders, and the international guidelines recommend smoking cessation intervention as a strategy for secondary prevention (1-4). In general, all services of the healthcare system should include counselling aimed at smokers (5), but emergency patients in neurological departments are seldom offered a smoking cessation programme. The prevalence of smokers among patients with neurological illness is higher than that of the background population because smoking is an aetiological factor for the development of several neurological diseases, especially stroke and transient ischemic attack (6;7). Alcohol is also an important risk factor for haemorrhagic stroke together with hypertension. A comprehensive treatment is recommended internationally, which includes intervention of the risk factors (1).

Over the last decade, Bispebjerg Hospital in Copenhagen has been a model hospital for health promotion, as this hospital implements the WHO Standards for Health Promotion in Hospitals (HPH) (8). All patients in contact with the hospital receive written information about smoking and alcohol intervention as an important part of the treatment, the effect of stop smoking and drinking on the specific diseases and the contact persons. Accordingly, smoking and other health determinants are recorded in the patients' medical records. The lifestyle intervention programmes are, however, mostly offered to elective patients, including patients undertaking rehabilitation programmes. Most patients acutely admitted to neurological departments are not terminally ill, and therefore, smoking cessation is equally relevant for these patients in both the acute phase (9) and the subsequent rehabilitation phase.



## Research and Best Practice

We aimed to evaluate the potential for implementing clinical guidelines for motivational counselling as an entry to the smoking cessation programme for elective patients and its acceptance among acutely admitted neurological patients. The motivational counselling did therefore not stand alone, but was an introduction to the intensive 6 weeks Gold Standard Programme (GSP) that has been shown to be rather robust across different social group of smokers (10). The primary aim was to illustrate the implementation of motivational counselling in an acute neurology ward provided by a trained nurse counsellor from the Smoking Cessation Clinic at the hospital, and the second aim was to predict factors for motivation.

### Material and Methods

#### Patients (see Figure 1 for trial profile)

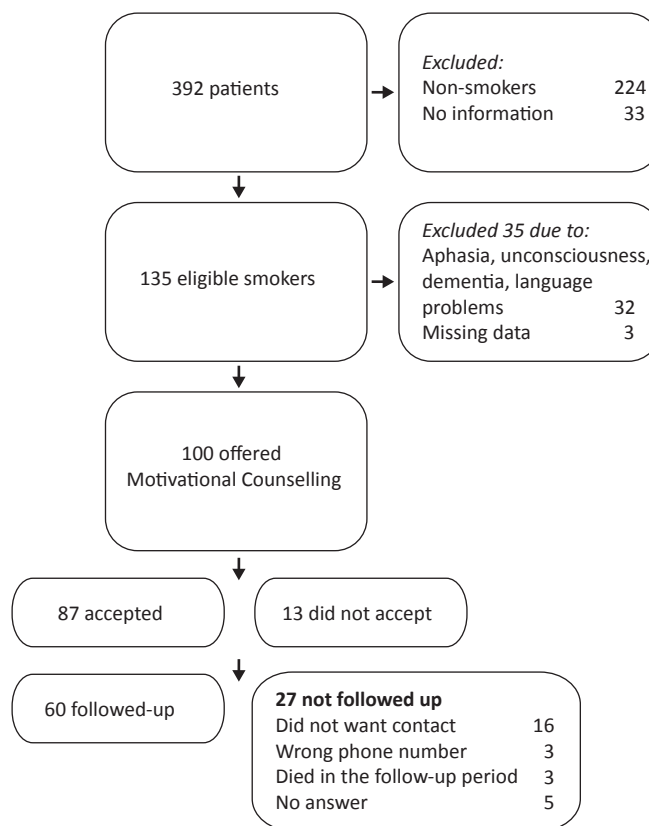
A total of 392 emergency patients were admitted to an acute neurological ward over a period of four months. The majority of the patients (224; 57%) did not smoke, and 135 eligible patients (34%) were smokers. No information on smoking status was available for 33 patients (8%). Smoking was defined as current daily smoking. Hazardous drinking was defined as the intake of more than 21 units per week for men and more than 14 units per week for women. We consecutively contacted all the smokers, with the exception of 3 patients who were not present on the ward. We did not offer counselling to thirty-two patients due to aphasia, unconsciousness, dementia, and language difficulties; the remaining 100 smokers were offered motivational counselling.

#### Methods

This was a non-controlled feasibility study. As a part of the hospital admission procedure, doctors routinely ask all patients about their smoking and drinking habits. The neurological admission diagnoses were registered along with the level of education, gender, age, current employment status, daily tobacco consumption, alcohol intake, and any earlier attempts at smoking cessation or reduction of alcohol consumption. The number of pack-years and the Fagerström score for nicotine dependence were calculated (11). Hazardous drinkers were identified according to the amount of alcohol intake per week, which is the recommended method in Denmark (12). The characteristics of the patients are given in Table 1.

A nurse with special training reviewed all the emergency files at the day of admission or the weekday after to ensure that all the smokers were offered behavioural counselling prior to discharge from the emergency ward or transfer to other wards.

**Figure 1** Trial profile



**Table 1** Trial characteristics. Characteristics of the 100 smokers admitted to the neurological department for emergency reasons and offered motivational counselling, given as median (range) or numbers (per cent)

	Acceptors (n = 87)	Non-acceptors	p-value
<b>Gender</b>			
Males	50 (58%)	8 (62%)	NS
Females	37 (42%)	5 (38%)	
<b>Age</b>	<b>54 (18) (SD)</b>	<b>65 (13) (SD)</b>	<b>&lt; 0.05</b>
<b>Neurological disease</b>			
Stroke	37%	75%	NS
Concussion	14%	0	
Epilepsy	11%	0	
Cerebral tumour	15%	0	
Other neurological illnesses	23%	25%	
<b>Years of smoking</b>	<b>37.7 (18.6)</b>	<b>35.6 (21.0)</b>	<b>NS</b>
<b>Pack years</b>	<b>30.3 (21.0)</b>	<b>28.5 (18.4)</b>	<b>NS</b>
<b>Fagerström (points)</b>	<b>4.0 (2.7)</b>	<b>4.1 (3.1)</b>	<b>NS</b>
<b>Hazardous alcohol intake<sup>A</sup></b>	<b>21%</b>	<b>13%</b>	<b>NS</b>

<sup>A</sup> > 21 units of alcohol per week for men and 14 for women (1 unit containing 12 gram of ethanol).

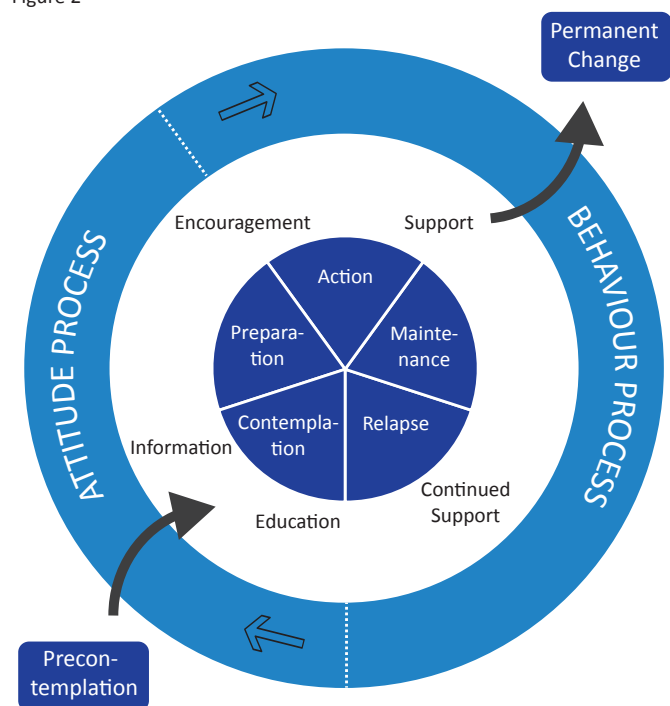


## Research and Best Practice

Before and 20 minutes after motivational counselling, the patient's degree of motivation was recorded, according to the methods described by Prochaska and DiClemente (13). The individual counselling took 10- 30 minutes, and the content was related to the degree of motivation (see Figure 2) (14).

After the counselling, the patients were offered to join a regular smoking cessation programme (five to six visits, supported by nicotine replacement therapy and followed-up by a telephone interview after 6 months) in the Smoking Cessation Clinic within the same hospital. The Alcohol Clinic was also located in the hospital area and was open for both in- and outpatients. If the patient could not enter the clinic, the staff would visit the patient at the neurological department.

Figure 2



Inside the blue circle the different stages between the precontemplation and the permanent change are shown. In the white circle, different kinds of action from the clinician are indicated. The outer light blue circle gives an overview of the stages related to changes of attitude and behaviour.

Following the counselling session, we obtained permission to contact all patients six months after discharge, according to the guidelines for documentation and registration in the national smoking cessation database (15). We specifically noted smoking cessation, the degree of motivation, and willingness for referral to the Smoking Cessation Clinic.

A non-parametric test was used to compare independent groups. The results were given as the median value and range. The level of significance was set to  $p < 0.05$ . Univariate analyses were used to identify significant associations between patient characteristics and motivation. Consequently, a multiple regression analysis with backward elimination was performed to identify potential factors influencing motivation. These results were given as the odds ratio (OR) with a 95% confidence interval (CI), where OR with CI not including the value of 1 was considered significant. All statistical analyses were performed using SPSS 18.

### Results

The prevalence of daily smokers among the acutely admitted neurological patients was 34.4-42.9% (135/392 -168/392, Figure 1). We offered counselling to 100 consecutively admitted smokers, including 58 men and 42 women, with acute neurological diseases during a four-month period. The most frequent cause for admission (37%) was stroke/transient ischaemic attack (Table 1).

Of the 100 smokers, 87 accepted and undertook counselling before they were discharged or transferred from the emergency ward. The nurse spent approximately one hour daily with each patient during the project period. We found no difference in the characteristics between acceptors and non-acceptors, with the exception that the acceptors were of a younger age (Table 1). Overall, 34% of the patients were employed, and the remaining patients were either unemployed, received a pension or otherwise not related to a workplace. The motivational levels are shown in Table 2. In a multiple regression analysis with backward elimination, the only significant factor for potential influence on motivation was a lower age ( $p < 0.01$ ), whereas a low daily intake of alcohol showed a non-significant trend ( $p < 0.08$ ). In contrast, lifetime pack-years, daily tobacco consumption, number of years as a smoker, Fagerström score, employment, education, disease and gender did not significantly influence motivation.

At enrollment, there was no significant difference in motivation between men and women. A positive change in motivational counselling was observed in 12 (14%) patients. Furthermore, 17 patients, including 10 men



## Research and Best Practice

**Table 2** Level of motivation before and 20 minutes after the motivational counselling (30) of the 87 participating smokers.

	Motivation before	Motivation after				
		A	B	C	D	All
A	26	24	2	0	0	26
B	22	0	14	7	1	22
C	27	0	0	25	2	27
D	12	0	0	0	12	12
<b>All patients</b>	87	24	16	32	15	87
<b>Patients subsequently referred to cessation clinic</b>	-	0	0	9	8	17

A = Not motivated, B = Precontemplation, C = Contemplation, D = Preparation.

and 7 women, requested referrals to a Smoking Cessation Clinic, and all of these patients participated in the programme. The referred patients showed no significant differences regarding their characteristics. Of those 17 patients, 12 patients had demonstrated the highest level of motivation prior to counselling, 2 patients demonstrated one altered step in motivation, and 3 patients were unchanged.

Of the 60 (69%) patients who were contactable for follow-up after 6 months, 18 (21%) had quit smoking, including 17 patients who quit after participating in the full programme and 1 patient who quit after receiving the motivational counselling. The patients were all ex-smokers at the time of follow-up. An additional 15 patients had either quit for a shorter period of time or had reduced their smoking habits. Of the remaining 42 smokers, 14% requested referrals to the Smoking Cessation Clinic at the time of follow-up.

Eighteen smokers also requested motivational counselling for hazardous drinking, and 16 patients (including 6 women and 10 men, with an average of 54 years of age) underwent combined counselling. Two patients (both men) wished to be referred to the alcohol unit immediately after the motivational counselling. Among the six patients contactable for follow-up at six months, none quit hazardous drinking, but two patients reduced their intake by 50%. However, these numbers were too small to perform reasonable statistical tests.

### Discussion

Of the 100 patients admitted to the department of acute neurology, 87 accepted and undertook motivational counselling for smoking prior to discharge from the hospital. This high rate could have been due to a support-

ive effect from the local smoke-free surroundings and a health promoting hospital (16). Furthermore, some smokers wished to stop smoking before the counselling, and previous studies have shown that competent and non-smoking nurses provide better outcomes in smoking intervention (17;18). Furthermore, the outgoing nurse, who was familiar with the entire study programme from the hospital-driven Smoking Cessation Clinic, may have overcome potential barriers among the local staff. In addition, the programme was well established for elective intervention (19;20).

During two decades Bispebjerg Hospital was profiled as a model hospital for health promotion in the city of Copenhagen. Very early, guidelines, standards and indicators for all patients regarding smoking and hazardous drinking were developed, implemented and followed up at the hospital (21). Nutrition and physical activity were included soon after. A new Clinical Department of Health Promotion was established end of 1998 to support the local, regional and national HPH network. This work was further developed and disseminated to other hospitals in Denmark together with the Danish National Board of Health and the Danish HPH Network (22) was used as a template for the following international working group on WHO/HPH Standards for Health Promotion (23).

The observed long-term effects of the counselling and smoking cessation programmes on acute neurological patients is consistent with the findings of previous studies, in which approximately half of the acutely admitted patients who received similar programmes quit smoking within six months, although only one of six patients remained smoke-free for the entire six months (9).

Previous studies have also suggested that acutely admitted patients welcome information concerning changes in their lifestyle; for example, 97 of 100 smokers acutely admitted to an internal medical ward and 121 smokers acutely admitted to an emergency ward for orthopaedic surgery accepted and fulfilled motivational counselling (17;24).

However, recent reviews have questioned the effect of brief intervention (BI) in hospital settings (25;26). In the present study, we investigated motivational counselling in combination with an offer to joining a hospital-based smoking cessation intervention programme. We have not been able to identify other studies on emergency stroke patients using BI as in introduction to an intensive programme targeting alcohol and smoking. A recent review has evaluated rehabilitation programs including BI regarding smoking for cardiovascular patients in pri-



## Research and Best Practice

mary care (after the emergency period). The benefit was marginal (27).

The prevalence of smoking in the patient group was high; at least one of three acutely admitted neurological patients smoked daily. The prevalence of smoking in the Danish population is approximately 20-23% for both men and women, and this frequency is increased to 30% for the local community surrounding Bispebjerg Hospital (28).

Another explanation for the high smoking prevalence in our study is that some of the patients suffered from conditions that were attributable to smoking (7). The smoke-free hospital environment and the high prevalence of smokers combined with the need for rapid initiation of secondary prevention including smoking cessation (6) supports the necessity of offering smoking cessation interventions to acutely admitted patients at their first hospital contact. However, follow-up may take place during a consultation with a family doctor or at the rehabilitation centre after discharge.

In our study, age was the only significant factor influencing the level of motivation; we found that younger patients were the most motivated, which is consistent with other studies (29;30). Younger patients in general may be more flexible to lifestyle changes and more informed of the health risks of smoking in comparison to older smokers. Interestingly, gender, smoking habits and hazardous drinking were not significantly related to motivation.

The primary strength of our study was that it was conducted in a busy clinical setting using outgoing staff from our hospital-based Smoking Cessation Clinic. The trained counselling nurse performed BI and afterwards invited patients to participate in the 6 weeks GSP in the Smoking Cessation Clinic (10). The workload of the trained counselling nurse was rather low, at approximately one hour per day. This could easily be implemented in hospitals with a smoking cessation clinic. Another possibility would be to bridge the community and invite/hire an experienced nurse to offer the counselling inside the hospital. A study has shown that using an experienced nurse from a smoking cessation clinic double up the success rate of counselling in the emergency room (24). However, there were several limitations to our study: 1) acutely admitted patients were not available in the department; 2) only a proportion of the patients allowed us to contact them for follow-up; and 3) the extent to which our results can be generalised is

unknown. Although the follow-up for smoking was not validated using biomarkers such as CO levels, the difference between self-reporting with and without CO validation is relatively low (approximately 4% after 6 months and 3% after 1 year) (31;32). Therefore, the outcome of our study was likely overestimated, but only to a minor degree. Furthermore, this study was not large enough to evaluate the effect of simultaneous alcohol intervention. Alcohol counselling alone has been shown to affect alcohol abusers admitted to trauma centres (33;34).

However, it is important to consider how and to which groups of acutely admitted patients the intervention should be addressed and in what context the counselling should be given. This consideration should include information from the patient's perspective, which would be an important next research step. In addition, greater numbers of hazardous drinkers should be included in future studies.

### Conclusion

The majority of smokers admitted for an emergency neurological illness accepted motivational counselling in the form of an introductory a six-week smoking cessation intervention programme, and a significant proportion of these patients ceased or reduced their smoking habits.

### Acknowledgements

We acknowledge the financial support of IMK Almene Fond and Bispebjerg University Hospital, although the funding sources were not involved in the work. The technical officer Rie Raffing from WHO-CC is acknowledged for technical assistance.

### Contribution Details

HT, BMN, BW, VMO, and VB designed the study, HT, BMN, and VB performed the research, BMN and BV collected the data, TM and VB analysed the data, HT wrote the paper, and BMN, BW, VMO, TM, and VB edited the paper.

**Competing interests:** None declared.

### References

- (1) Mendis S, Adegunde D, Yusuf S, et al. WHO study on Prevention of Recurrences of Myocardial Infarction and Stroke (WHO-PREMISE). *Bull World Health Organ* 2005; 83:820-9.
- (2) Wiedemayer H, Triesch K, Schafer H, Stolke D. Early seizures following non-penetrating traumatic brain injury in adults: risk factors and clinical significance. *Brain Inj* 2002; 16:323-30.
- (3) Sacco RL, Adams R, Albers G, et al. Guidelines for prevention of stroke in patients with ischemic stroke or transient ischemic attack: a statement for health-care professionals from the American Heart Association/American Stroke Association.



## Research and Best Practice

tion Council on Stroke: co-sponsored by the Council on Cardiovascular Radiology and Intervention: the American Academy of Neurology affirms the value of this guideline. *Circulation* 2006; 113:e409-e449.

(4) Shinohara Y, Yamaguchi T. Outline of the Japanese Guidelines for the Management of Stroke 2004 and subsequent revision. *Int J Stroke* 2008; 3:55-62.

(5) Fiore MC, Bailey WC, Choen SJ, et al. Treating tobacco use dependence. Clinical practice guidelines. Rockville, MD: US Department of Health and Human Services; 2000.

(6) Romero JR, Morris J, Pikula A. Stroke prevention: Modifying risk factors. *Ther Adv Cardiovasc Dis* 2008; 2:287-303.

(7) Shah R.S., Cole J.W. Smoking and stroke: The more you smoke the more you stroke. *Expert Rev Cardiovasc Ther* 2010; 8:917-32.

(8) Groene O, Jorgensen SJ, Fugleholm AM, Moller L, Garcia-Barbero M. Standards for health promotion in hospitals: development and pilot test in nine European countries. *Int J Health Care Qual Assur Inc Leadersh Health Serv* 2005; 18:300-7.

(9) Ovbiagele B. The emergency department: first line of defense in preventing secondary stroke. *Acad Emerg Med* 2006; 13:215-22.

(10) Neumann T, Rasmussen M, Ghith N, Heitmann BL, Tønnesen H. The Gold Standard Programme: smoking cessation interventions for disadvantaged smokers are effective in a real-life setting. *Tob Control* 2012 Jun 16.

(11) Fagerstrom KO, Schneider NG. Measuring nicotine dependence: a review of the Fagerstrom Tolerance Questionnaire. *J Behav Med* 1989; 12:159-82.

(12) Fonager K, Sabroe S. A comparative analysis of different methods for obtaining estimates of alcohol consumption in a Danish population survey. *Scandinavian Journal of Public Health* 2001; 29:256-62.

(13) Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: Toward an integrative model of change. *J Consult Clin Psychol* 1983; 51:390-5.

(14) Hanne Tønnesen (ed.). Engage in the Process of Change; Facts and Methods. Who Regional Office for Europe. Copenhagen 2011.

(15) Danish National Smoking Cessation Database. [www.scdb.dk](http://www.scdb.dk) 9-10-20012. Ref Type: Internet Communication

(16) Health promotion in hospitals: Evidence and quality management. WHO Regional Office for Europe; 2005.

(17) Nelbom BM, Tønnesen H, Backer V. Motivational counseling. Possible in an emergency department? *Ugeskr Laeger* 2004; 166:2791-5.

(18) Willaing I, Jørgensen T, Iversen L. How does individual smoking behaviour among hospital staff influence their knowledge of the health consequences of smoking? *Scand J Public Health* 2003; 31:149-55.

(19) Kjær NT, Evald T, Rasmussen M, Juhl HH, Mosbech H, Olsen KR. The effectiveness of nationally implemented smoking interventions in Denmark. *Prev Med* 2007; 45:12-4.

(20) Olsen KR, Bilde L, Juhl HH, et al. Cost-effectiveness of the Danish smoking ces-

sation interventions : Subgroup analysis based on the Danish Smoking Cessation Database. *Eur J Health Econ* 2006; 7:255-64.

(21) Iversen L. Prevention and health promotion at Bispebjerg Hospital. Status Report 1994-1997. Copenhagen: Bispebjerg Hospital; 1998.

(22) Tønnesen H, Roswall N, Odgaard MD, et al. [Basic registration of risk factors in medical records. Malnutrition, overweight, physical inactivity, smoking and alcohol]. *Ugeskr Laeger*. 2008; 170:1747-52.

(23) Groene O (ed.). Implementing health promotion in hospitals: Manual and self-assessment forms. World Health Organization; 2006

(24) Backer V, Nelbom BM, Duus BR, Tønnesen H. Introduction of new guidelines for emergency patients: motivational counselling among smokers. *CRJ* 2007; 1:37-41.

(25) Rigotti NA, Munafo MR, Murphy MF, Stead LF. Interventions for smoking cessation in hospitalised patients. *Cochrane Database Syst Rev* 2003; (1):CD001837.

(26) McQueen J, Allan L, Mains D, Coupar F. Brief interventions for heavy alcohol users admitted to general hospital wards. *Cochrane Database of Systematic Reviews : Protocols* 2005 Issue 2 John Wiley & Sons , Ltd Chichester, UK DOI : 10.1002/14651858.CD005.2005.

(27) Crouch R, Wilson A, Newbury J. A systematic review of the effectiveness of primary health education or intervention programs in improving rural women's knowledge of heart disease risk factors and changing lifestyle behaviours. *Int J Evid Based Healthc* 2011; 9:236-45.

(28) Danish Cancer Registry <http://www.cancer.dk/>. 9-10-2011. Ref Type: Internet Communication

(29) Clark MA, Rakowski W, Kviz FJ, Hogan JW. Age and stage of readiness for smoking cessation. *J Gerontol B Psychol Sci Soc Sci* 1997; 52:S212-21.

(30) Hyland A, Borland R, Li Q, et al. Individual-level predictors of cessation behaviours among participants in the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2006; 15 Suppl 3:iii83-iii94

(31) Ferguson J, Bauld L, Chesterman J, Judge K. The English smoking treatment services: one-year outcomes. *Addiction* 2005; 100 Suppl 2:59-69.

(32) Simon JA, Carmody TP, Hudes ES, Snyder E, Murray J. Intensive smoking cessation counseling versus minimal counseling among hospitalized smokers treated with transdermal nicotine replacement: a randomized trial. *Am J Med* 2003; 114:555-62.

(33) Antti-Poika I, Karaharju E, Roine R, Salaspuro M. Intervention of heavy drinking - a prospective and controlled study of 438 consecutive injured male patients. *Alcohol Alcohol* 1988; 23:115-21.

(34) Gentilello LM, Rivara FP, Donovan DM, et al. Alcohol interventions in a trauma center as a means of reducing the risk of injury recurrence. *Ann Surg* 1999; 230:473-80.