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The Dutch Heart Health Community Intervention 'Hartslag Limburg'

Effects on smoking behaviour

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Background and Methods: A pretest–posttest control group design with two posttests was used to evaluate the effects of a regional Dutch Heart Health Community Intervention on smoking behaviour and its determinants. At baseline, a cohort research population of 1,200 smokers was recruited in the intervention region and in a control region. Data was gathered by means of short structured telephone interviews. **Results:** No significant differences were found between the intervention region and the control region on smoking behaviour and its determinants. **Conclusion:** It is concluded that the regional intervention was unable to exceed secular trends in smoking cessation.

Keywords: cardiovascular diseases, community-based prevention, effect study, evaluation, smoking behaviour

In 1998, a regional cardiovascular diseases (CVD) prevention programme, integrating a community strategy and a high-risk strategy, was started in the Maastricht region of the province of Limburg, called 'Hartslag Limburg' (Dutch for Heartbeat Limburg). Hartslag Limburg is a joint project of the municipal authorities of the Maastricht region, the Maastricht Regional Public Health Institute (RPHI), community social work organizations, the regional community health care organization, general practitioners, Maastricht University, the University Hospital, and various local organizations, clubs and companies. In January 2001, the World Health Organisation (WHO) selected Hartslag Limburg as one of twelve so-called 'field projects', based on its potential to meet pre-established criteria of the WHO project 'Towards Unity for Health'.¹ The major goal of community intervention is to reduce CVD risk among the 180,000 inhabitants of the region by encouraging behavioural change, i.e. dietary fat reduction, increased physical activity, and smoking cessation. The project is to continue at least until 2003.

The implementation of the Hartslag Limburg community intervention in the Maastricht region involved several smoking cessation activities. The most important was the regional mass media-led smoking cessation campaign 'Proficiat' ('Congratulations') implemented in January and February 2000 and 2001.² This campaign, organised by the RPHI, consisted of radio commercials, advertisements and messages in papers, billboards along roads, and posters and postcards in waiting rooms and public buildings. Additionally, there were smaller local activities, organised by working groups consisting of representatives of local organizations, such as a non-smoking campaign for the parents of children in playgroups.² It was supposed that the inhabitants

of the Maastricht region would feel more involved with these regional activities than with a national mass media-led smoking cessation campaign 'Dat kan ik ook' ('I can do that too') that was implemented around the turn of the century in the Netherlands. This national campaign consisted of various television programmes, an info line, non-smoking courses, mailings to various organizations, billboards in bus shelters, brochures, posters, etc. This report presents the effects of the Hartslag community intervention on smoking behaviour. A description of the full project has been published elsewhere.³

METHODS

Design and sample

To assess differences between the Maastricht and a control region (where there was no community intervention), a pretest–posttest control group design was used, with two posttests.⁴ The baseline measurement was conducted in April 1998, the first posttest in April 2000, and the second posttest in April 2001. At baseline, a cohort research population of 1,200 smokers (age 18 and over) was recruited in each region by taking a stratified random sample of 6,500 inhabitants in each region from the computerized telephone registers, based on the number of inhabitants in each municipality included in the region. The control region was comparable with respect to the incidence and prevalence of CVD, number of inhabitants, number of municipalities, and degree of urbanisation.

The questionnaire

Data on smoking behaviour and its determinants was gathered by means of short structured telephone interviews. Smoking behaviour was assessed by asking respondents whether they had smoked in the last seven days (yes/no). Only smokers were further questioned at baseline. Smokers were asked if they had made quit attempts in the past year. Measurements of a selection of psychosocial determinants of smoking behaviour were included in order to assess intermediate intervention effects. The selection of these psychosocial factors was based on the Theory of Planned Behaviour and the Transtheoretical Stages of Change.^{5,6} Smokers were asked to evaluate their attitudes towards smoking cessation on a 'bad–good' scale, and on an 'unpleasant–pleasant' scale. Furthermore, smokers were asked if they intended to stop smoking in the future (intention), how confident they were about their ability to stop smoking (self-efficacy), and if they experienced support from important others to stop smoking (perceived social support). All items, with

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the exception of perceived social support (yes/no), could be answered on bipolar five-point scales.

Smokers were also asked if they intended to stop smoking within the next six months (yes/no) and, if so, whether they planned to do this within the next 30 days (yes/no). Afterwards, they were classified into three stages of change: 'in preparation' if they reported the intention to stop smoking within 30 days, 'in contemplation' if they intended to stop smoking within six months but not within 30 days, and 'in precontemplation' if they had no intentions to stop smoking.

Furthermore, the posttests included questions measuring respondents' familiarity with smoking cessation campaigns. Finally, respondents were questioned about their age and education.

STATISTICAL ANALYSIS

A multiple logistic regression analysis was conducted to identify potential dropout bias (with attendance versus dropout as the dependent variable and baseline values for gender, age, education, and condition as the independent variables). Further multiple logistic regression analysis was used to identify potential baseline differences between the Maastricht region and the control region. The independent variables in this analysis were the baseline values for gender, age and education. Only respondents who completed all surveys were included. These preliminary analyses were performed using the SPSS 10.0 statistical package.⁷

Differences in smoking behaviour and its psychosocial determinants between the Maastricht region and the control region at posttests were studied with multilevel regression analysis, using the MLwiN statistical package.⁸ Multilevel regression analysis was used to take into account possible dependencies among individuals within the same municipality.⁹ If the multilevel analysis revealed that individuals within municipalities could be regarded as independent, analyses were repeated using 'ordinary' regression within the SPSS statistical package.⁷

The main independent variable included in all effect analyses was condition. In addition, the pre-intervention score of the

outcome variable, gender, age, and education were included as independent variables in all analyses. The intention at baseline to quit smoking in the future was included as a further independent variable in the analyses of behavioural change. Differences were considered to be statistically significant if $p < 0.05$.

RESULTS

Respondents

Overall, 8,939 inhabitants (4,242 in the Maastricht region and 4,697 in the control region) were reached by telephone. The proportion of current smokers in this group was 34.6% (35.4% in the Maastricht region and 34.0% in the control region). Of those who smoked 21.6% refused the interview (19.1% in the Maastricht region and 24.0% in the control region). Attrition rate from baseline (T0) to second posttest (T2) was 37.9%. The net attrition rate (after the exclusion of unreachable respondents) from T0 to T2 was 18.7%. Overall, 1,508 respondents completed all three questionnaires: 772 in the experimental region and 736 in the control region. Attrition did not differ between the two regions. Moreover, there were no significant differences between dropouts and those who participated in all three measurements with respect to age, gender and education. Respondents from the Maastricht region were significantly older, more often female, and were more highly educated than respondents from the control region (table 1).

Familiarity with the regional smoking cessation campaign in the Maastricht region was much higher in 2001 (T2) than in 2000 (T1) ($\chi^2(1) = 38.46; p = 0.000$). Familiarity with the national smoking cessation campaign, which was only measured at T1, was high in both regions (table 1).

Differences between the Maastricht and the control region

There were no overall condition effects on smoking behaviour and its determinants, although some indications of a minor intervention effect on social support (OR=1.23; $p = 0.099$) and stage of change (OR=1.28; $p = 0.084$) were present at T2 (table 2).

Table 1 Baseline demographic characteristics, smoking behaviour, and familiarity with smoking cessation campaigns in the Maastricht region (n=772) and the control region (n=736)

Variable	Group	T0	T1	T2
Age (mean and SD in years) ^a	Maastricht	49.8 (13.6)		
	Control	45.7 (14.1)		
Gender (% and number) ^a	Male	Maastricht	39.2 (303)	
		Control	46.6 (343)	
	Female	Maastricht	60.8 (469)	
		Control	53.4 (393)	
Education (% and number) ^a	Low	Maastricht	35.5 (274)	
		Control	36.7 (270)	
	Intermediate	Maastricht	47.2 (364)	
		Control	50.3 (370)	
	High	Maastricht	17.4 (134)	
		Control	13.0 (96)	
Smoking behaviour (% and number of smokers)	Maastricht	100.0 (772)	87.7 (677)	81.3 (628)
	Control	100.0 (736)	85.7 (631)	81.4 (599)
Familiarity with regional campaign (% and number familiar)	Maastricht		16.8 (130)	42.4 (327)
Familiarity with national campaign (% and number familiar) ^b	Maastricht		70.7 (546)	
	Control		76.2 (561)	

a: Significant baseline (T0) differences between Maastricht and control region (logistic regression analysis).

b: Only measured at T1.

DISCUSSION

The present study found no significant differences between the Maastricht region and a control region on smoking behaviour and its determinants. A possible explanation for the lack of intervention effects are secular trends, i.e. there may not have been enough additional exposure in the Maastricht region to exceed secular trends like the national smoking cessation campaign or spontaneous abstinence. Secular trends are frequently mentioned as a possible explanation for modest or absent intervention effects in community CVD prevention programmes.^{10,11} Process data of the Hartslag Limburg Community Intervention revealed that the focus of the intervention had mostly been on intervention activities aimed at nutrition and physical activity. Fewer activities for smoking cessation were developed and implemented.

Furthermore, the (reported) participation in smoking cessation activities was greater in the control region than in the Maastricht region. The multiple risk factor approach in Hartslag Limburg may have reduced the potential effect on smoking behaviour because intermediaries as well as the target population may have preferred diet or physical activity as more attractive targets for behaviour change.

The present study had some limitations. First, the results are based on self-reports. Further, the psychological factors were measured with single items. Finally, although the regions were matched on several characteristics, the study included only one intervention and one control region, and there were differences in gender, age and education. In an attempt to overcome this design weakness to some extent, the pre-intervention score of the outcome variables, gender, age, and education were included as independent variables in the effect analyses.

In conclusion, the results of the present study do not show a

significant impact of the Hartslag Limburg intervention on smoking, i.e. the regional intervention could not accelerate the secular trend.

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Table 2 Smoking behaviour, and psychological determinants (only smokers included in analyses) at T1 and T2; parameter estimates^a (binary and ordinal logistic regression estimates)

Variable (measurement level)	Smoking ^b (dichotom) ^d		Quit attempts ^c (dichotom)		Attitude (good) ^c (ordinal)		Attitude (pleasant) ^c (ordinal)		Social support ^c (dichotom)		Self-efficacy ^c (ordinal)		Intention ^c (ordinal)		Stage ^c (ordinal)	
	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Pre-intervention score			1.505 (p=0.000)	1.105 (p=0.000)	0.856 (p=0.000)	0.808 (p=0.000)	0.426 (p=0.000)	0.491 (p=0.000)	1.308 (p=0.000)	1.324 (p=0.000)	0.758 (p=0.000)	0.835 (p=0.000)	0.866 (p=0.000)	0.706 (p=0.000)	1.275 (p=0.000)	1.271 (p=0.000)
Condition (Maastricht region=1, control region=0)																0.243 (p=0.084)
Age				0.015 (p=0.003)	-0.016 (p=0.001)	-0.015 (p=0.001)			-0.011 (p=0.010)	-0.015 (p=0.001)	-0.011 (p=0.004)		-0.010 (p=0.003)	-0.016 (p=0.000)		
Gender (female=1, male=0)							0.325 (p=0.016)	-0.230 (p=0.039)				-0.242 (p=0.032)				
Education 1 (low=1, high=0)							0.393 (p=0.039)					-0.492 (p=0.004)				
Education 2 (intermediate=1, high=0)							0.380 (p=0.040)					-0.374 (p=0.023)				
Intention (T0)	-0.356 (p=0.000)	-0.178 (p=0.000)	0.393 (p=0.000)	0.363 (p=0.000)												

a: Positive parameter estimates reflect a positive association between the dependent and the independent variables.

b: Lower score indicates less smoking.

c: Higher score indicates more quit attempts or more positive determinants.

d: dichotom = dichotomous