Cost-effectiveness of a community anti-smoking campaign targeted at a high risk group in London

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SUMMARY

Surveys of Turkish speaking people in London found 74% of men and 45% of women were smokers, and knowledge of the health effects of smoking was low. Camden and Islington Health Authority has a substantial Turkish community. We report an economic evaluation of a community smoking cessation intervention, aimed at the Turkish community, undertaken by Camden and Islington Health Promotion Agency. The intervention aimed to highlight the dangers of smoking, and to reduce the amount smoked and the number of current smokers. It included a play, a poster and media campaign, and purpose-designed leaflets. A panel survey of the Turkish population determined smoking habits, attitudes to smoking and knowledge about the health effects at baseline and 12 months. The intervention effect was estimated from the changes between baseline and final surveys. To allow for the non-response to the second survey we analysed effectiveness in two ways: first by assuming that the responders represented the true situation, and secondly by making a more pessimistic assumption that there was no change in the non-responders. Fifty-seven per cent of the Turkish population were smokers at baseline, compared with 39% in the general population of Camden and Islington. Levels were particularly high in younger women. At follow-up there was a net reduction in smokers of 6.4% [95% confidence interval (CI) 0–13.6%] in responders. When all study subjects were included the net reduction was 2.9% (CI 0–6.3%). Most quitters were light smokers to start with. At follow-up, 51% of respondents recognized at least one of the Turkish language interventions. The estimated cost-effectiveness of this intervention was £105 (range £33–391) per life year gained. Campaigns targeted at groups with high smoking prevalence may be more cost-effective than general population campaigns.

Key words: campaign; cost-effective; London; smoking; Turkey

INTRODUCTION

Smoking in adults in the UK has been declining for some time (although smoking in the youngest cohorts is becoming a matter of increasing concern). However, there remain a few minority groups with very high rates of smoking, which present a challenge to the public health services. One such group is people of Turkish origin. A survey of smoking habits amongst Turkish speaking people living in Hackney found that some 74% of men and 45% of women of Turkish descent were current smokers (Atun and Jenkins, 1991). Other national research on the attitudes of ethnic minorities towards smoking found that members of the Turkish communities were heavy smokers, and that smoking was considered normal in Turkish communities (Health Education Authority, 1990). A further study in Hackney showed that knowledge of the health effects of smoking was lower in the Turkish community than in the local population (Health Promotion Unit, City and Hackney HA, 1992). These findings led Camden and Islington Health Authority (the neighbouring health authority to Hackney) to identify the smoking prevalence in their Turkish population as a priority for action.

Camden and Islington Health Authority borders Hackney and covers two inner London boroughs, both with high ethnic diversity and high levels of deprivation. There is a substantial Turkish community. The average Jarman score for Camden and Islington is +42, compared with a North Thames average of only +19 (Hamm, 1997). The highly mobile population ranges between 340 and 360 000 (Camden and Islington HA, 1996), some 40 000 of whom are without permanent accommodation and defined as transient.

We report here an economic evaluation of a community intervention aimed at the Turkish community and undertaken by Camden and Islington Health Promotion Agency on behalf of Camden and Islington Health Authority. The intervention's primary aim was to 'promote non-smoking as the norm', i.e. to change attitudes to smoking within the community. A secondary aim was to reduce the prevalence of smoking. The campaign aimed to increase awareness through a variety of methods from poster campaigns to targeting specific groups for direct action. At the same time as undertaking the Turkish-focused intervention the agency also undertook a number of other small scale interventions aimed at eating establishments, pregnant women, women on low incomes, Pakistani men, workplaces and schools. A few members of the Turkish community may have come into contact with some of these interventions, but none of them were in the Turkish language or targeted Turkish speaking groups. We do not consider any of these other interventions in this paper.

METHODS

The intervention

The intervention was community based and had two aims:

- to highlight the dangers of smoking in terms of health; and
- to reduce the amount smoked and the number of current smokers in the community.

The intervention included a 10 minute play, a poster campaign, a media campaign and a series of purpose-designed leaflets. The campaign centred on the play '*Tiryaki Kukla*' (Puppet the Addict), and the rest of the campaign was designed to increase awareness of the play and hence awareness of issues of smoking and health. The play, which aimed to change perceptions of smoking in the Turkish and Kurdish community, was written in conjunction with a local Turkish writer, and performed by a local Turkish drama group Tiyatro Ala-Turka. During the campaign the group performed the play in 20 local Turkish venues (cafés, advice and community centres), with a total audience of ~1500 people, and the play was also broadcast three times during No Smoking Week on local Turkish radio. The poster campaign featured the central character from the play. During the Turkish-targeted campaign there was considerable media interest, with 31 articles in the Turkish press.

Evaluating the effectiveness of the intervention

Camden and Islington Health Promotion Agency contracted a market research firm, NOP, to carry out a panel survey of the Turkish population, using Turkish speaking interviewers, to determine smoking habits, attitudes to smoking and knowledge about the health effects of smoking. No control group was available in this evaluation, since the intervention was aimed at the entire Turkish community, using mass media techniques, among others. A before and after evaluation was therefore chosen.

A panel method, rather than a cross-sectional survey method, was used because it was more sensitive to change than two separate cross-sectional surveys and therefore would provide greater power to detect change within the limited budget available.

The first survey, which provided the baseline data, took place between May and August 1996. The sampling procedure used the community network rather than sampling from a sampling frame, since no available sampling frame identifies Turkish speakers. Community centres where Turkish speakers were likely to attend were approached to allow the interviewers to conduct the interviews in the centres. The yield from this was not adequate, so interviewers then went out to carry out doorstep interviews in areas identified as having a high proportion of Turkish speakers by analysis of the addresses provided by the respondents interviewed in the community centres. Broad quotas on age and sex were set to ensure that a cross-section of the Turkish speaking community was included. By these means a total of 303 Turkish speakers were contacted and agreed to be interviewed.

Twelve months later, in 1997, the survey was repeated. The effect of the interventions was

estimated from the changes observed between the baseline and final surveys.

Costing the intervention

The costs associated with the initiative were taken from actual expenditure figures for the project, rather than budget estimates (see Table 1). Most of the resources were aimed at the Turkish speaking community and directed towards Turkish-resident areas of the boroughs. We assumed that the campaign had minimal effect on non-Turkish residents of the area.

Data analysis

Because the response rate to the second panel survey was low, and because we expected that the non-responders to the second survey might have

Table 1: Turkish smoking initiatives expenditure

Costs	Amount
Salary cost	£23 365
Other labour costs	£26 520
Non-pay costs	£23 034
Total direct cost	£49 554
Overheads	£7433
Total cost	£56 987

been those least likely to have changed their attitudes and habits, we analysed effectiveness in two ways. First, we assumed that the responders represented the true situation, so the effect was estimated from the change between baseline and follow-up for responders only. We have referred to this as the 'responders analysis'. Secondly, we made the assumption that there was no change in the non-responders, and the effect was estimated from the change between baseline and follow-up including all the baseline responses, but assuming no change if no follow-up information was available. We have referred to this as the 'all study subjects analysis'.

Assessing the cost-effectiveness of the targeted Turkish campaign

To assess the relative cost-effectiveness of the intervention we derived assumptions from published literature to estimate the effects of the intervention in terms of both cost per quitter and cost per life year gained. These assumptions are described in Table 7. Cost-effectiveness ratios were calculated by simulation of probability distributions around the estimates of effectiveness. A decision-analytical framework was produced (Figure 1), which shows all the possible combinations of outcomes. From this framework, a
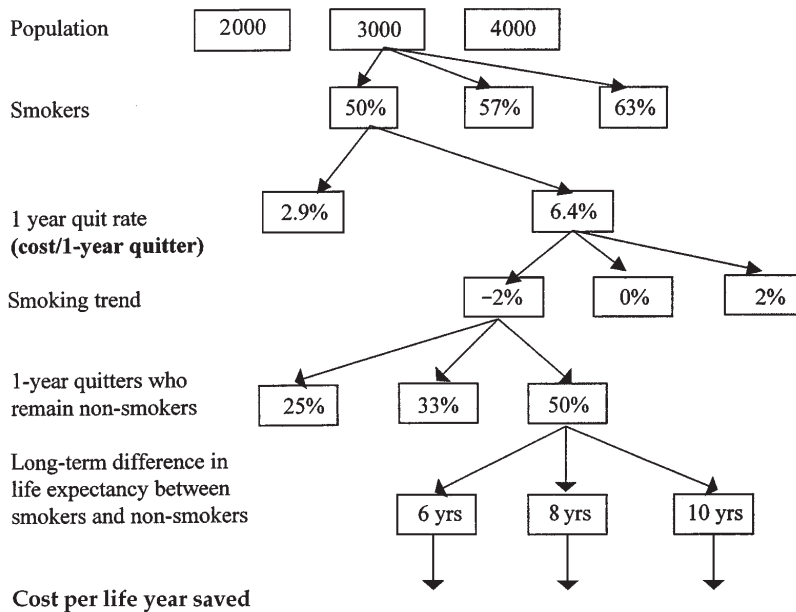

Fig. 1: Algorithm of outcomes.

Table 2: Percentage of current cigarette smokers, by age group and gender

Age group (years)	Men (%; *n* = 186)	Women (%; *n* = 117)	Total sample (%; *n* = 303)
15–24	40.5	53.8	46.0
25–34	58.6	63.2	60.4
35–44	65.2	82.4	69.8
45–54	42.9	28.6	35.7
55–64	50.0	20.0	36.4
65+	33.3	40.0	37.5
Total	55.4	59.0	56.8

Table 3: Class distribution of total population and smokers

Social class	Total population	Percentage smokers
AB	3%	50%
C1	17%	61%
C2	22%	60%
DE	58%	54%

Monte Carlo simulation was run to estimate both cost per 1-year quitter and cost per life year saved (Briggs and Gray, 1999).

The trend in smoking in the UK is either generally downwards (2% per annum), flat (0% per annum) or, in the case of some first or second generation immigrant populations, upwards (2% per annum) (Northridge *et al.*, 1998). We conducted a sensitivity analysis using all these options. Further details of the assumptions made in the sensitivity analysis are given in the Results section.

RESULTS

The baseline survey

Smoking habits

Smoking levels were high at 57% overall compared with a prevalence of 28% observed in the North Thames Region in the Health Survey for England in 1993 and a prevalence of 39% in a general population survey in Camden and Islington. Levels were particularly high in younger women (Table 2). The higher rates of smoking in the Turkish community are not explained by differences in manner of smoking (e.g. use of Hookas), since almost all (99%) of the smokers in the Turkish sample smoked cigarettes. Ex-smokers make up only 23% of those who have ever smoked. There was no indication of any trend with social class (Table 3).

Attitudes to smoking

The baseline survey asked about: awareness of any anti-smoking campaign; opinions on smoking and awareness and knowledge of the health effects; and smokers' beliefs with respect to the effects of smoking on their health. Forty per cent of the Turkish speaking sample reported that they had 'seen or heard any advertising or publicity about stopping smoking', and this was not significantly higher when only those respondents who smoked were considered; 42% of smokers were aware of such publicity.

Respondents were asked if they were aware of any detrimental effect of smoking on immediate and future health. The majority of non-smokers appeared to be unaware of any relationship between smoking and ill-health, and while the smokers showed greater awareness, the majority of them still denied any long-term detrimental effect of smoking on health. When asked specifically whether smokers risked becoming ill with heart disease 'a great deal', only 39% of both smokers and non-smokers, thought that this was true.

In summary, the Turkish speaking community had high rates of smoking, and a relatively low awareness of the dangers, presenting an important target for a smoking intervention.

The post intervention survey

Response rate

It proved difficult to re-contact the participants who had been interviewed at baseline because the population was highly mobile. Just under half (47%) of the original interviewees completed a follow-up interview. Table 4 shows the response rate by age, sex, employment status, and measures of social status. The response was higher among females than males and among those in work compared with those not working. There is

Table 4: Response rate at follow-up (total *n* = 303)

Follow-up response rate	Percentage (*n*)
All	47 (142)
Age band (years)	
15–24	25 (16)
25–34	49 (71)
35–44	67 (42)
45–54	43 (6)
55–64	45 (5)
65+	25 (2)
Social class	
ABC1	56 (33)
C2DE	44 (107)
Age left full-time education (years)	
15–16	41 (45)
17–18	51 (28)
19–20	0 (0)
21+	60 (67)
Employment status	
Working:	
male	72 (50)
female	98 (41)
Not working:	
male	18 (21)
female	40 (30)

a positive relationship with education and social class. There was a higher response in older age-bands.

As described in the section entitled 'methods of evaluation', we adopted two methods of analysis: the 'all study subjects analysis', which was most pessimistic about change; and the more optimistic estimate based on responders only, the 'responders only analysis'. The true effect is likely to be somewhere between these two estimates.

Smoking habits

There was a net reduction in smokers among those responding to the follow-up questionnaire. While 13% (95% CI 7–18%) of the responders had quit smoking, 6% (95% CI 2–11%) had started smoking, giving an overall reduction of 6% (95% CI 0–14%). When the data included all study subjects, the estimated number quitting smoking was 6% (95% CI 3–9%) and the estimated number taking up smoking was 3% (95% CI 1–5%), giving a reduction in smoking prevalence of 3% (95% CI 0–6%). However, most of those who gave up smoking were light smokers to start with. In the second survey with responders who continued to smoke, mean cigarettes smoked per day fell from a mean of 10.4 to 8.6 cigarettes per day at weekends (difference 1.8; 95% CI 0.2–3.5), and from 9.5 to 8.2 on weekdays (difference 1.3; 95% CI 0.2–2.8). There was no

movement to low tar cigarettes. The quit rates and take-up rates are based on unverified self-report.

Table 5 shows the net reduction in smoking by various demographic factors. The numbers in each category in the table are small, and none of the differences are statistically significant. Most cessation was in people aged 25–34 years. Older groups showed virtually no change in smoking. Similarly, most cessation was in people who completed education after the age of 21, with little sign of smoking reduction in those with a shorter education. In households with children, the proportion of smokers increased by between 2 and 3%, which was explained by high take-up rates (7–13%) rather than a low quit rate (5–10%).

Awareness of the Turkish smoking campaign

Questions were asked about the level of awareness of specific initiatives, events and advertising. Overall, awareness of smoking prevention activities was unchanged. Forty-two per cent of the Turkish sample at baseline and at follow-up reported that they had 'recently seen or heard any advertising or publicity about stopping smoking'. However, when prompted, just over half (51%) recognized a Turkish language play, poster or leaflet. The play was the most commonly recognized (38%), followed by the poster (36%) and then the leaflet (28%) (Table 6). There were no significant differences by age but class was a significant factor. Sixty-four per cent of the ABC1 group reported having seen at least one aspect of the campaign, mainly the play or posters, compared with just 48% in the C2DE group. There was a higher awareness of the material in non-smokers (57%) than in smokers (44%). Those smokers who quit during the intervention showed a relatively high awareness of the material (61%), although 44% of those who took up smoking also noticed the materials.

Assessing cost-effectiveness of the intervention

The Turkish population of Camden and Islington is estimated at ~8500, of which ~7000 are aged 15 years or above. Table 6 shows there were 57% smokers at baseline, giving an estimate of 3990 Turkish speaking smokers in Camden and Islington. The 1-year (self-reported) quit rate is likely to lie somewhere between the estimate of 2.9% (95% CI 0–6.3%), from the analysis including all subjects, and the estimate of 6.4% (95% CI 0–12.8%) from the analysis including

Table 5: Net reduction in smoking by demographic factors (%)

	All study subjects			Responders		
	Given up (*n* = 18)	Taken up (*n* = 9)	Net	Given up (*n* = 18)	Taken up (*n* = 9)	Net
All	6	3	3	13	6	7
Male	6	2	4	14	5	9
Female	5	4	1	12	10	2
Age (years)						
15–24	2	4	–2	6	13	–7
25–34	8	1	7	16	1	15
35–44	5	5	–	7	7	–
45+	3	3	–	23	23	–
Age left full-time education (years)						
15–16	5	4	1	11	9	2
17–18	2	6	–4	6	17	–11
19–20	4	4	0	10	10	0
21+	10	1	9	16	2	14
Working:						
male	4	4	0	8	8	–
female	5	2	3	9	4	5
Not working:						
male	8	1	7	18	2	16
female	5	5	0	14	14	0
Children in home:						
none	7	1	6	15	1	14
some	5	7	–2	10	13	–3

Table 6: Prompted awareness of the Turkish play, poster and leaflets amongst responders to the follow-up survey (%)

	Proportion of sample who had heard of the play (*Tiryaki Kukla*)	Proportion of sample who had seen the poster	Proportion of sample who had seen the leaflet	Proportion of sample who had seen any of these
All	38	36	28	51
Ages (years)				
15–24	48	40	40	52
25–34	40	40	28	57
35–44	42	32	26	52
45+	6	25	19	31
Social class				
ABC1	45	45	27	64
C2DE	36	34	29	48
Education (years)				
15–16[a]	24	33	29	33
17–18	50	44	44	61
19–20	60	40	10	60
21+	40	36	27	57
Employment				
Working:				
male	37	37	29	53
female	39	43	35	65
Not working:				
male	47	39	25	53
female	21	24	28	34
Smokers	33	32	24	44
Non-smokers	41	39	31	57
Given up	50	39	33	61
Taken up	22	44	33	44

[a]Age left full-time education.

Table 7: Assumptions and sensitivity used in the model

Assumption	Source	Sensitivity range
Turkish population (aged 15+ years)	Camden and Islington	2000–3000–4000
Smokers (57%)	Current data	51–57–63
1-year quit rate	Current data	2.9–6.4
Smoking trend	Literature[a,b]	(2)–0–2
1-year quitters who remain non-smokers	Literature[c]	25–33–45
Life years saved	Literature	6–8–10 years

[a]Office of National Statistics (1997).
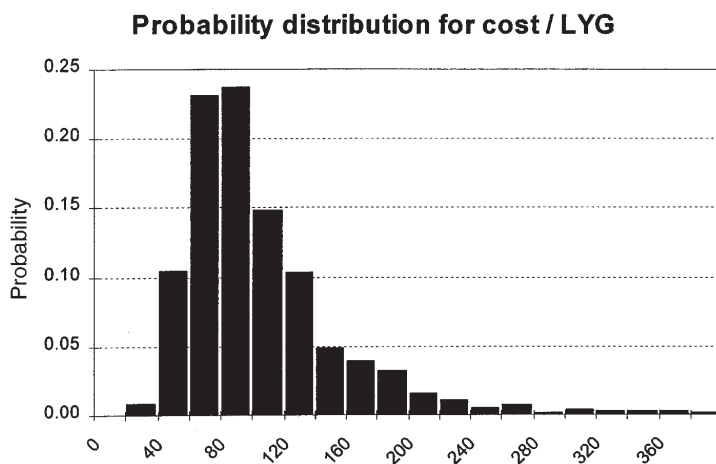[b]Doll *et al.* (1994).
[c]Peto *et al.* (1996).

Probability distribution for cost / LYG

Fig. 2: Histogram of sensitivity analysis—cost per life year gained.

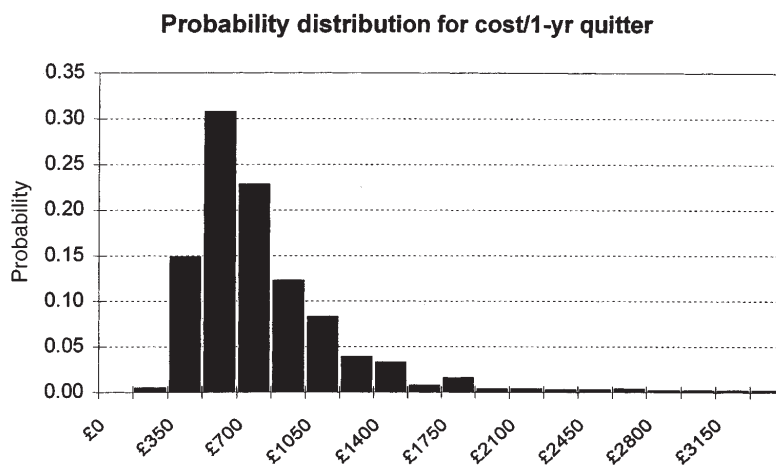### Probability distribution for cost/1-yr quitter

Fig. 3: Histogram of multi-variable sensitivity analysis—cost per 1-year quitter.

only those subjects who responded to the follow-up questionnaire.

An algorithm was used to identify all 54 possible combinations of outcomes, using the different assumptions about effect (Table 7). A simplified version of the algorithm is shown in Figure 1.

Figures 2 and 3 show a histogram of all possible outcomes under the limitations set by the sensitivity analysis. The cost of the intervention was £56 987 (Table 1). The mean cost-effectiveness per life year gained, drawn from the probability distribution of all possible outcomes (Figure 2), is just over £105 per life year gained (95% CI £33–391). The modal value is £90 per life year gained. The probability distribution drawn from the simulation for the cost per 1-year quitter shows a mean of £825 (95% CI £300–3500) (Figure 3).

DISCUSSION

The intervention appears to have been moderately successful, with a reduction in smokers of between 3 and 7%, mostly amongst light smokers. The quit rate was greater if the youngest age group, where some people may be taking up smoking for the first time, is excluded from the analysis. The quit rate for Turkish respondents aged 25 years or more was between 5 and 12%. Quit rates are high in those groups with the highest number of smokers. Smokers are most likely to be aged 25–44 years, non-working, highly educated males with no children. These are also the most common characteristics of those who have given up.

Particular areas of success for the community intervention have been in people not in full-time employment (quit rate 16%), and in men as compared with women due to the high (14%) take-up rate in women. People who reported having taken up smoking were predominantly young and less educated. The intervention was less successful with those in full-time employment and the very young (15–24 years).

The awareness of the campaign itself was high, particularly in terms of awareness of the play, *Tiryaki Kukla*. Almost 40% of respondents were aware of the play, with the highest awareness levels in the young (15–24 years) and the higher social classes. Awareness of it was twice as high in those giving up smoking (50%) as in those taking it up (22%).

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