Research Article

Effects of different types of smoking cessation behavioral therapy in disadvantaged areas in the Netherlands: an observational study

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ABSTRACT

BACKGROUND Smokers in disadvantaged areas smoke more and make less successful quit attempts than smokers in other areas. Smoking cessation behavioural therapy (SCBT) +/- pharmacotherapy, can increase quit success, however, several different types of counselling are available. Settings also differ. The type of counselling which best assists smokers in disadvantaged areas to quit is unknown. We investigated the effect of four different types of SCBT offered in disadvantaged areas of the Netherlands (individual face-to-face, telephone, rolling group and fixed group counselling), and explored differences of effect between intervention types.

METHODS Data from 415 participants were collected from Dutch SCBT programmes serving disadvantaged areas. Settings included hospital, community, and primary care. Data collection included repeated survey and medical record research. Participants' self-reported and CO-validated continuous abstinence prevalence per intervention type initially, and at 6 and 12 months were calculated. Predictors of continuous cessation at 12 months were analysed using logistic regression analysis.

RESULTS Overall, 19% of participants were of low educational level. There was a 30% overall self-reported continuous abstinence prevalence at 12 months, which was highest in rolling group counselling (41%) and individual face-to-face counselling (35%). Fixed group counselling in hospital setting was more effective than in other settings. Both group counselling types were equally effective in a hospital setting.

CONCLUSION Group counselling in a hospital setting is the most successful type of intervention in supporting smokers in disadvantaged areas to quit. We recommend that services in disadvantaged areas concentrate on offering group counselling, given in a hospital setting, where possible.

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INTRODUCTION

Tobacco is a risk factor for six of the eight leading causes of death worldwide and is responsible for one in every ten adult deaths worldwide[1]. In high income countries, those living in disadvantaged areas smoke more[2-4] and make less successful quit attempts,[5,6] than those living in the most advantaged areas. Intensive smoking cessation behavioural therapy (SCBT), with or without pharmacotherapy, can increase the chance of a successful quit attempt[7-10]. However, there are many types of intensive SCBT available, including courses of individual face-to-face, telephone, rolling group or fixed group counselling.

Each type of SCBT has advantages and disadvantages. Group counselling, provided to a group of smokers by a trained smoking cessation counsellor, provides the opportunity for participants to experience group support and social learning[8,9] but can also possibly lead to demotivation due to unhelpful group processes (e.g. rivalry, envy, fear of failure/loss of face)[8,11,12]. Group counselling can be provided in a fixed group or rolling group format. In fixed (closed) group counselling, a group is assembled and no new participants enter the group once the counselling has started. Often the start date of the course is set once a minimum group number has been reached. This has the advantage of the group being able to develop a strong social support network as they see each other regularly. However, it can mean waiting to start[13] and, if there is a high level of drop-out, participants may feel demotivated as the group gets smaller[11]. Rolling group counselling (also called open group), involves the continuous sequential repetition of sessions throughout the year. This enables participants to stream in and out at any time, so they can start straight away[13] and there is a chance to catch up on any session they miss because the sessions are repeated regularly. The regular change of participants may enable newcomers to learn from the experiences of experienced participants[13] however, it could also prevent the development of

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a strong mutual support network.

Individual counselling, either face-to-face or by telephone is provided to smokers on an individual basis by trained smoking cessation counsellors[10, 14]. Individual counselling provides the opportunity for tailoring to the patients individual needs (i.e. free-choice topics can be selected by the participant based on their needs)[14] while also covering the general course material. However, it does not provide the group benefits, as mentioned previously. While both individual forms are more flexible than group counselling, allowing appointments to be scheduled when suitable for the participant, telephone counselling is very flexible, as a participant does not have to be present in a certain place at a certain time[15] and can possibly reschedule appointments at short notice[11]. This may be suited to people who find it difficult to attend set appointments in person, such as mothers with little support or people with busy or irregular jobs[11]. However, some smokers may be suspicious about the confidentiality of such a service or may not be able to envision themselves being helped over the telephone[15].

It is possible that different intervention types may differ in their effectiveness. In the UK, group counselling has been found to be more effective than individual counselling[16,17]. However, type of group counselling is also of importance, with one UK study finding that the best results overall and in those of low socioeconomic status (SES) could be found in rolling (open) group counselling in comparison with one-to-one, drop-in clinic, and fixed group counselling[18]. No significant effect of area disadvantage on quitting was found in this UK study[18].

In addition, SCBT may be delivered in a range of different physical settings, including primary care[19,20], pharmacy[21], community[20] or hospital settings[22]. Differences in success of SCBT by setting has been found in the UK, where specialist clinics were found to be more effective than therapy provided in other settings, such as primary care or pharmacy settings[17]. However, the actual physical location of these specialist clinics was not indicated[17].

The aim of this paper is to examine the effects of four different types of SCBT offered in disadvantaged areas of the Netherlands. In the Netherlands, one course of intensive SCBT per smoker (with or without pharmacotherapy) is reimbursed each year in the basic health insurance package. Evidence-based intensive behavioural therapy can be delivered in several formats, including the aforementioned individual "and group counselling types," and in different settings[23]. We will examine 12 month continuous abstinence status by type of SCBT intervention (individual face-to-face, telephone, fixed group or rolling group counselling) and explore the differences between different types of counselling in different settings.

METHODS

Participants & counselling type

Data from 415 participants of ≥18 years of age, who had commenced SCBT, were collected from four smoking cessation services located in urban areas of the Netherlands (Figure 1). Two of these services, located in disadvantaged areas[24] were offered in primary care (Service A) and community settings (Service B). Further information on the recruitment of these participants and the sites involved can be found in Benson et al.[25]. The other two services (Services C & D), with catchment areas including disadvantaged areas, were specialist smoking cessation clinics in hospital settings. Examples of these setting types can also be found in other areas of the Netherlands[26]. Information about the intervention offered at each service can be viewed in Tables 1 & 2.

All counsellors had received training in smoking cessation counselling. Group courses had 8-15 participants. The course structure of group counselling varied between Services A,B & C, who offered a standard fixed group counselling course[12] and Service D, which offered a course whereby participants must first read a book or listen to a CD about smoking cessation,[27,28] followed by filling in a step-by-step plan, finalising the plan and then choosing group or individual counselling.

Despite this, all interventions used similar content, including self-analysis, analysis of tempting situations/pitfalls, behavioural change, rewards, cravings, dealing with social pressure and relapse prevention.

Pharmacotherapy was discussed with all participants at all services early in the counselling, except for Telephone counselling at Service A, where it was only discussed with those smoking >10 cigarettes per day. Some services provided participants with prescriptions for pharmacotherapy, while participants of others needed to organise the pharmacotherapy themselves (Tables 1 & 2).

Data from Services A & B were gained from repeated cross-sectional surveys. The surveys were taken at baseline (pre-intervention), and then 4-6 weeks, 6 months and 12 months after their agreed quit date. Informed consent was gained from all participants at these two sites. Further details can be seen at Benson et al.,[25]. CO-validation was done at sites A & B by interviewers using a Bedfont piCO+ Smokerlyzer device. CO readings were taken during interviews by trained interviewers. Data from services C & D were gained through patient medical records, where all participants from the smoking cessation clinics who had been referred by the General Practitioner (GP) were included.

This was supplemented by follow-up data provided by the

services. Under Dutch law, medical ethical approval is not required for scientific research which does not undertake an intervention[29]. Recruitment took place from May 2011-October 2013.

Variables & Analysis

Socioeconomic status (SES)

Highest education level attained was used as a proxy for SES[30]. The following categories were used:no/primary/lower secondary education was considered low SES, mid/upper secondary education was considered middle SES, and tertiary education was considered high SES. This information was missing for approximately one third of participants in service C and two thirds in service D.

Average cigarettes per day

Average cigarettes per day was used as a proxy for nicotine dependence[31].

Quit status - Self- reported

Self-reported continuous abstinence status was measured at 3 moments: initial, 6 and 12 months. For two of the services (C&D), self-reported follow-up was gained by phoning participants, and asking whether they had stopped smoking. For the other two services (A&B), quit status was determined through questions from the interviewer-led questionnaire. At 4-6 weeks participants were asked: "Have you smoked in the last 14 days, even if it was just one cigarette or self-rolled cigarette or only one puff?" This allowed for a 2 week grace period.[32]. And at 6 and 12 months: "Have you smoked since your agreed quit date, even if it was only one cigarette or self-rolled cigarette or only one puff?" Those smoking 0-5 cigarettes in the entire period were considered non-smokers, while those smoking >5 cigarettes were considered smokers[32]. Participants were categorised as smoking, quit or unknown for each measure.

The timing of the initial measurement after the agreed quit date differed between services. Service C followed up immediately, Services A & B at 4-6 weeks, and Service D at 3 months.

Self-reported continuous abstinence status was calculated such that participants who reported that they were smoking at a follow-up (Service C&D) or they had smoked >5 cigarettes in the entire period (Service A&B), were considered to be smokers for that period and the rest of the follow-up period. Participants who missed a follow-up at 3 or 6 months were considered to be unknown for that follow-up (neither smoker or non-smoker and remaining in the denominator). If at a

Table 1: Description of the group counselling offered by each service.

	Service A	*Service B*	*Service C*	*Service D*
Setting	Primary care	Community	Hospital	Hospital
Language offered	Dutch & Turkish	Dutch	Dutch & English	Dutch
Intervention type	Fixed	Fixed	Fixed	Rolling
Number of sessions of 1.5-2 hours duration.	9 standard weekly sessions. Some courses had 2 additional sessions on lifestyle topics chosen by the participants (e.g. stress management).	9 standard weekly sessions.	Approximately 14 sessions spread over 12 months, with the first seven sessions in the first four months.	2-3 individual sessions with the smoking cessation counsellor and then 7 group sessions.
Timing of official stop date	Session 4	Between session 3-4.	Between sessions 3-4	Between session 1–2
Permitted to keep participating if not stopped on official stop date	Yes	Yes	Yes	No
Pharmacotherapy	Topic is discussed early in the counselling. Prescriptions are provided to participants who wish to use it. Prescriptions must be filled by the participants themselves.	Topic is discussed in the first session. Information on pharmacotherapy is also available in the course material. Participants must organise pharmacotherapy themselves.	Topic is discussed with participants in second session. Participants advised to use pharmacotherapy and, if they choose to do so, the prescription is provided. Prescriptions must be filled by the participants themselves.	Topic is discussed in the pre-reading (book/CD) and with the counsellor early in the counselling. Participants must organise pharmacotherapy themselves.

subsequent follow-up they were found to be 'abstinent', they were considered to be abstinent for the entire period, at that time point. Participants who missed the 12 month follow-up were considered to be smokers for the entire period[32].

Quit status - CO-validated

At two of the services (A&B), CO-validation of self-reported continuous abstinence status was done. A participant was considered CO-validated quit if they had smoked <5 cigarettes for the entire period and their CO-meter reading was .9ppm, which is the standard cut-off [32].

Pharmacotherapy

Participants who used pharmacotherapy were coded as having used pharmacotherapy if they had used either varenicline, bupropion or nicotine replacement (patches, lozenges, chewing gum or nasal spray).

Attendance

When attended completely, all interventions consist of ≥7 sessions. Attendance was dichotomised as intensive (at least 4 sessions of at least 40 minutes duration in total) and non-intensive (less than 4 sessions and/or less than 40 minutes in total) according to the Dutch Guideline for Treatment of Tobacco Addiction[33].

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics, Version 21 (Release 21.0.0.1). Differences between participant characteristics between counselling types were tested using Pearson's Chi Square test and one-way ANOVA, excluding missing values. Self-reported and CO-validated continuous abstinence prevalence per intervention type was calculated using: successful quitters/total participants. Univariate logistic regression analysis was used to explorer whether 12 month self-reported continuous abstinence prevalences differed per intervention type, taking into account setting characteristics and controlling for confounders. Confounders included age[16, 18] gender,[34] SES[16,18] average cigarettes per day[35] pharmacotherapy use[17] and attendance[36]. Variables with a *p*-value of .0.2 in a univariate model and which changed the Odds Ratio of quitting for a specific intervention type by >10% were included in a multivariate logistic regression analysis. To prevent loss of data due to complete case analysis, in variables with large amounts of missing data, such as educational level, those with missing data were put into a separate category.

RESULTS

The characteristics of participants differed between intervention types (Table 3). There was a significant difference in educational level (p=0.00). Fixed group and telephone counselling had

Table 2: Description of the individual counselling offered by each service.

	Service A	*Service C*	*Service D*
Setting	Primary care	Hospital	Hospital
Language offered	Dutch & Turkish	Dutch & English	Dutch
Intervention type	Telephone	Face-to-face	Face-to-face
Number of sessions and course duration	7 standard sessions over 3-4 months with up to 5 extra sessions if relapse occurs or the participant has not stopped after the first session.	Approx. 16 sessions over 12 months, with two extra sessions in the second year if the participant is still abstinent and feels the sessions are necessary.	7-8 sessions with the smoking cessation counsellor over 12 months, 6 of which occur in the first 4 months of that year.
Timing of official stop date	Between sessions 1-2	After sessions 2 or 3.	Between sessions 1-2.
Permitted to keep participating if not stopped on official stop date	Yes	Yes	Yes, but if the agreed stop date is missed approximately twice participants must have a time-out.
Permitted to continue if relapse	Yes	Yes	Yes, but after approx. 2 relapses they must have a time-out of minimum 3 months.
Session duration	Session 1: 30 minutes (mins). Subsequent sessions: 15 mins.	Session 1: 1 hour. Subsequent sessions: 30 mins.	Session 1: 40 mins. Subsequent sessions: 20 mins.
Pharmacotherapy	Topic is discussed early in the counselling with participants smoking >10 cigarettes per day. The participant must organise this themselves. Forms were provided (excluding 2012) to help participants gain reimbursement for medication costs.	As per group therapy at this service.	As per group therapy at this service.

the highest proportions of participants with low educational level (both 40%). Individual face-to-face counselling had the highest proportion of highly educated participants (26%).

Gender was approximately evenly split in the total group, with the highest percentage of female participants being in the telephone counselling group (≥58%). There was a significant difference in pharmacotherapy use (p=0.00). Pharmacotherapy use in telephone counselling (45%) was lower than in other intervention types (53%). There was a significant difference in attendance between intervention types (p=0.00), with telephone and rolling group counselling having lower attendances (Means of 2.9 and 5.0 respectively) than the other intervention types (Means of ≥6.8). Average cigarettes per day were very similar amongst all intervention types. There was a large amount of missing data on educational level (33%), marital status (45%) and pharmacotherapy use (22%).

Table 4 shows the self-reported and CO-validated continuous abstinence prevalences, both overall and per intervention type. Overall, the self-reported continuous abstinence prevalence at 12 months was 29.9%. The self-reported continuous abstinence prevalence at 12 months was highest for rolling group (41%) and individual face-to-face counselling (34.7%). Lower self-reported 12 month continuous abstinence prevalences were reported for fixed group (15.4%) and telephone counselling (7.9%). Twelve month CO-validated continuous abstinence prevalences were lower than the self-reported prevalences, namely 6.4% overall, 7.0% for fixed group and 5.3% for telephone counselling respectively. In the participants as a group, approximately a third of participants dropped out (Table 4). Drop-out differed per intervention type, with the highest experienced in telephone counselling (66%) and the lowest in rolling group counselling (12%).

After controlling for individual and intervention characteristics, we found that telephone and fixed group

Table 3: Participant characteristics, overall and per counselling type.

Characteristics		*All (n=415)*	*Individual face-to-face (n=216)*	*Telephone (n=38)*	*Fixed group (n=78)*	*Rolling group (n=83)*	*p-value comparing counselling types*
	n(%)						
Gender	Male	198(48)	99(46)	16(42)	45(58)	38(46)	0.27*
	Female	215(52)	115(53)	22(58)	33(42)	45(54)	
Educational status	Low	79(19)	28(13)	15(40)	31(40)	5(6)	0.00*
	Middle	120(29)	54(25)	19(50)	31(40)	16(19)	
	High	80(19)	55(26)	4(11)	15(19)	6(7)	
	Missing	136(33)	79(37)	-	-	56(68)	
Marital status	No Partner	100(24)	42(19)	20(53)	38(49)		0.44*
	Partner	87(21)	29(13)	18(47)	40(51)		
	Missing	228(45)	145(67)	-	-		
Pharmacotherapy	Yes	245(59)	137(63)	17(45)	47(60)	44(53)	0.00*
	No	79(19)	25(12)	7(18)	16(21)	31(37)	
	Missing	91(22)	54(25)	14(37)	15(19)	8(10)	
	Mean(SD)						
Age (years) (n=408)		49.5 (11.7)	49.4 (11.1)	45.5 (12.9)	49.4 (13.2)	51.8 (10.7)	0.54**
Cigarettes per day (n=379)		21.7 (10.1)	21.3 (9.2)	22.3 (11.8)	23.4 (12.2)	20.6 (8.7)	0.31**
Sessions attended (n=368)		6.2 (5.0)	6.8 (5.9)	2.91 (1.4)	6.9 (3.8)	5.0 (2.9)	0.00**

NA = not available *Pearson's Chi Square test **One-way ANOVA

counselling were significantly less effective than the reference group individual face-to-face counselling (Odds Ratio (OR): telephone counselling 0.18[0.05-0.66] *p*-value=0.01 and fixed group 0.31[0.15-0.63] *p*-value=0.00)) (Table 5). Rolling group counselling had a tendency to be more effective, though did not differ significantly, from individual face-to-face counselling (OR:1.62[0.92-2.83], *p*-value=0.09) (Table 5). The effect of setting could only be examined in participants of fixed group counselling. We found that fixed group counselling was significantly less effective in a primary care setting (OR:0.15[0.02-1.03], *p*- value=0.02) and borderline significantly less effective in a community setting (Odds Ratio(OR): 0.07[0.01-0.64], *p*-value=0.053) than in a hospital setting (reference category) (Table 6).Within a hospital setting, fixed group had the tendency to be more effective than rolling group counselling (OR fixed group compared to rolling group (reference category): 8.87[0.80-98.84], *p*-value=0.08)(Table 7).

DISCUSSION

The self-reported 12 month continuous abstinence prevalence for the group as a whole was 29.9%. For the subgroup of participants on which CO-validation was performed, the CO-validated 12 month continuous abstinence prevalence was 6.4%. Using self-reported data, rolling group and individual face-to-face counselling had the highest 12 month continuous abstinence prevalences in disadvantaged areas (41% and 34.7% respectively). CO-validated continuous abstinence prevalences were lower than self-reported prevalences, but the effectiveness of interventions in relationship to one another were preserved. Group counselling, regardless of type, is more effective in a hospital setting.

A strength of this study is that it provides evidence on the effect of various types of SCBT, which has been collected in "real life" settings in disadvantaged areas, rather than effects found in the often non-representative participants and carefully controlled treatment conditions of randomised controlled trials (RCTs)[37]. However, a disadvantage is that it is observational data which in no way mimics an RCT. A disadvantage of not using an RCT design is that the characteristics of the participants in each counselling type might differ as a result of the area characteristics of each service or the self-selection of participants resulting in selection bias. We controlled for this in the analysis, however, it was not a complete control because there was no overlap in some cases (e.g. telephone counselling was only offered in one service). However, we would not recommend an RCT, as the aim was not to find the absolute differences in magnitude of effect between interventions. Also, missing values were retained in the multivariate models so as not to lose sample size. Sensitivity analysis using repeated single imputation gave some altered

Table 4: Self – reported and CO – validated continuous abstinence prevalences, and drop–out at three post – quit date time periods, per counselling type.

		*Initial***	*6 months*	*12 month*
Self-reported continuous abstinence prevalence (%)	All (n=415)	57.6	37.6	29.9
	Individual face-to-face (n=216)	57.9	41.2	34.7
	Telephone (n=38)	28.9	7.9	7.9
	Fixed group (n=78)	56.4	23.1	15.4
	Rolling group (n=74)	71.1	55.4	41.0
CO-validated* continuous abstinence prevalence (%)	All (n=109)	37.6	8.3	6.4
	Telephone (n=38)	21.1	5.3	5.3
	Fixed group (n=71)	45.1	9.9	7.0
Drop out during follow-up n(%)	All (n=415)	59 (14)	100 (24)	119 (29)
	Individual face to face (n=216)	27 (12.5)	45 (21)	55 (26)
	Telephone (n=38)	14 (36.8)	21 (55)	25 (66)
	Fixed Group (n=78)	13 (17)	26 (33)	29 (37)
	Rolling Group (n=74)	5 (6)	8 (10)	10 (12)

Only two sites did CO validation, hence the decreased total numbers in the final three columns
**** This varied between services, from immediate follow-up to follow-up at 3 months.**

results, but did not change the conclusions (results not shown), thus any bias introduced was not worse than missing at random.

A limitation of this study is missing data. In the case of the medical record research, though information on all patients visiting the service between particular dates was available, not all information which we wished to collect was always recorded by both clinics (e.g. highest educational level or Fagerström Test of Nicotine Dependence)[38]. In the case of the survey research, information was missing due to a high percentage of drop-out from the research. Substantial drop-out of participants of low socioeconomic status attending smoking cessation therapy is a known phenomenon[36, 39], and extends to research follow-up as well[40]. Drop-out in this study was highest in telephone counselling, which can have high rates of drop-out after relapse[41]. We do not feel that this drop-out has led to bias in this study, however, because the expectation would be that those who remained would do better than those who dropped out. Missing data were highest in those areas where telephone and fixed-group counselling were given. The 12 month continuous abstinence prevalences in these areas were already lower than in the other intervention types. One of the variables not available at all sites was motivation to quit. This was generally high for the sites where this data was available (Services A & B), with average motivation on a 1-10 scale being 8.82 (SD 1.402).

Another limitation of this study is that all four counselling types could only be compared using self-reported rather than CO-validated quit status. Self-report can lead to socially desirable answers in smoking cessation intervention groups[42]. Though in the general population, there is some but not excessive overestimation of the quit prevalence using self-reported data[42, 43] we are not aware of any study looking at this specifically for those of low SES. However, we would not expect the results to change if the CO-validation was available for all intervention types for two reasons. Firstly, the quit prevalences recorded by individual face-to-face and rolling group counselling, for which no CO-validation was available, were considerably higher than those reported by telephone counselling and fixed group counselling. While they might decrease with CO-validation, we would not expect them to drop below the levels of fixed group and telephone counselling. Secondly, the relationships found in the self-reported data were preserved in the CO-validated data for the interventions for which data was available.

Use of pharmacotherapy was highest in counselling types provided by clinics where prescriptions were provided to participants, rather than where the participants had to organise their own prescriptions. In all cases the participants had to fill the prescriptions themselves. It is possible that 12 month continuous abstinence prevalences at these clinics are therefore higher than they would otherwise be. However, neither of these clinics had the highest continuous self-reported continuous abstinence prevalence and pharmacotherapy use was controlled for in the analysis.

By comparison with the estimated background smoking cessation prevalence in the general population (1-4%)[44, 45], all the intervention types mentioned here had higher continuous abstinence prevalences than the background prevalence of abstinence. However, the magnitude differed greatly, with rolling and individual face-to-face counselling showing much greater abstinence prevalences above the background prevalence than telephone and fixed group counselling. The continuous abstinence prevalences found in this study are also similar or better than those found in SCBT interventions in comparable

Table 5: Multivariate models for predictors of self – reported continuous abstinence at 12 months

Characteristic		*Model 1*	*Model 2 – including individual characteristics*	*Model 3 – including intervention characteristics*
Counselling type	Individual face-to-face	1.0	1.0	1.0
	Telephone	0.16(0.05-0.54)*	0.15(0.04-0.52)*	0.18(0.05-0.66)*
	Rolling group	1.30(0.78-2.19)	1.57(0.90-2.73)	1.62(0.92-2.83)
	Fixed group	0.34(0.17-0.67)*	0.32(0.16-0.66)*	0.31(0.15-0.63)*
Education	Low		1.0	1.0
	Middle		1.98(0.94-4.14)	1.93(0.91-4.06)
	High		2.23(1.02-4.89)*	2.15(0.98-4.73)
	Missing		1.05(0.49-2.26)	1.09(0.50-2.36)
Attendance	≤3			1.0
	>3			1.76(1.04-2.99)*
	Missing			1.48(0.59-3.71)

*$p<0.05$

groups elsewhere,[13, 18, 46, 47].

Rolling group counselling had the highest 12 month continuous abstinence prevalence compared with the other intervention types. This supports the results of Hiscock et al., who found that in most clients, and in particular, in most disadvantaged groups, rolling (open) group counselling gave the highest 4 week quit prevalences[18]. For fixed group counselling the 12 month continuous self-reported abstinence prevalence was lower than either rolling group or individual face-to-face counselling. This differs from Hiscock et al. who found that fixed-group counselling was not significantly different to individual face-to-face counselling at four weeks[18] which was also suggested for the different interventions in the UK services overall[13]. However, when employed in a hospital setting, fixed group counselling appeared to have a similar effect or probably even larger effect than rolling group counselling. Individual face-to-face counselling had a high 12 month self-reported continuous abstinence prevalence, which was similar to that found at 4 weeks in one study[18] and approximately double the CO-validated prevalence at 12 months found in another study[48]. Telephone counselling had a comparatively low 12 month self-reported and CO-validated continuous abstinence prevalence compared with the other intervention types considered. Also, the highest level of drop-out from the research was experienced in this group. The 12 month self-reported continuous abstinence prevalence in this study was slightly lower than that found in European quitlines in general (9.4%)[49] and similar to that found in a study in a similar disadvantaged target group[47]. The CO-validated prevalence was similar to the self-reported prevalence for this intervention type. If we consider these similar success prevalences, telephone counselling, which is an efficient way to provide individual face-to-face counselling to large numbers of the citation after, people[9] may also hold potential for widespread promotion and use in disadvantaged areas in the Netherlands. However, as better results were obtained in other intervention types in this study, we would recommend focussing on these first.

Table 6: Multivariate model for predictors of self – reported continuous abstinence at 12 months in those who attending fixed group counselling in various setting types.

Characteristic		Model 1
Education*	Low	1.0
	Middle	0.93(0.17-5.15)
	High	1.82(0.28-11.80)
Attendance	≤3	1.0
	>3	0.28(0.03-2.75)
	Missing	0.17(0.01-2.84)
Service setting	Hospital	1.0
	Primary care	0.07(0.01-0.64)**
	Community	0.15(0.02-1.03)***

*The missing category was removed for this calculation because it contained only one participant. **$p<0.05$ ***$p=0.053$

Both clinics in hospital settings were also specialist smoking cessation services. Specialist clinics have been found to be more effective than other service settings in the UK[17]. It is possible that the specialist nature of the clinics contributed to the results found here. However, given the large differences in the physical locations of the clinics, we are cautious to make this link. Entering a hospital for SCBT, where patients and medical staff are a visible reminder of possible future consequences of continued smoking, may have a very different effect on a smoker considering quitting,

Figure 1: Participants and Counselling Type

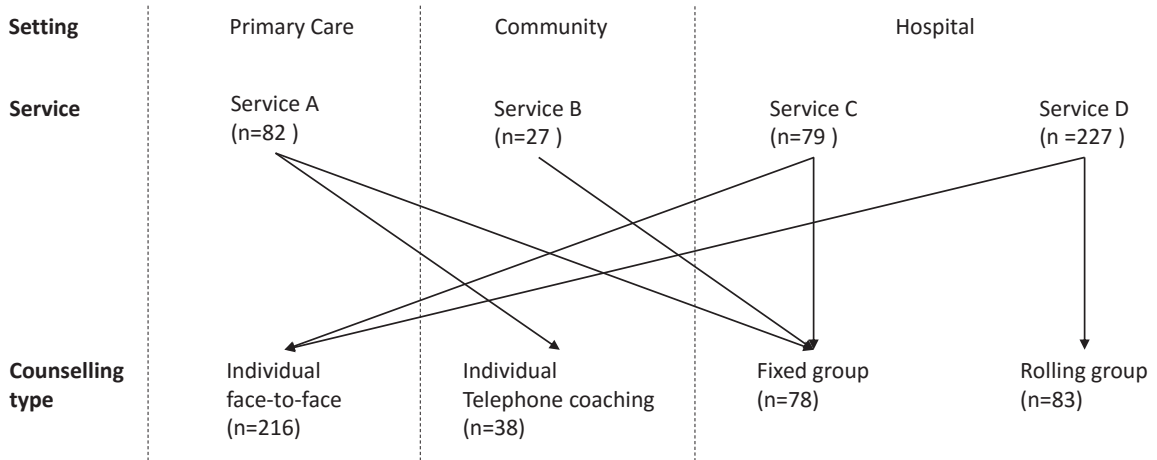

Table 7: Uni – and multivariate models for predictors of self – reported continuous abstinence at 12 months in those who attended group counselling in a hospital setting.

Characteristic		Model 1 – univariate model	Model 2 – including individual characteristics	Model 3 – including intervention characteristics
Counselling type	Rolling group	1.0	1.0	1.0
	Fixed group	1.92(0.40-9.14)	8.39 (0.79 -89.39)	8.87(0.80-98.84)
Education	Low		1.0	1.0
	Middle		1.93(0.24-15.67)	2.05(0.25-16.79)
	High		0.23(0.01-3.75)	0.25(0.02-4.14)
	Missing		2.57(0.36-18.14)	2.51(0.35-17.97)
Attendance	≤3			1.0
	>3			0.69(0.26-1.82)
	Missing			1.25(0.21-7.30)

compared to entering a community centre or GP surgery, where many people are not visibly seriously ill. Hospitalization is known to be a 'teachable moment' for smoking cessation in patients[50] and perhaps it could also work this way for smokers motivated enough to enter the hospital for SCBT.

We targeted smokers in disadvantaged areas. However, not all participants were of low educational level. Area disadvantage predicts higher smoking prevalence and lower quit success independently of other SES measures, such as education and income[2,6]. However, if the aim of a study is specifically to recruit smokers with individual-level low SES characteristics, in addition to being from disadvantaged areas, then further measures must be taken to target those groups.

These results, which, as discussed previously, partially support those found in the UK, are generalisable to other disadvantaged areas in the Netherlands because of the representation of different types of disadvantaged areas, for example with respect to the proportion of ethnic minority residents. Also, while not all counselling types were available in all areas, some were available in most (fixed group counselling) or half (individual face-to-face counselling) the areas. While the magnitude of the results may not be directly generalizable to other countries, it is possible that the finding that rolling group counselling is very effective at 12 months in disadvantaged areas, and that hospital setting may be influential, is generalizable to other high income countries.

These findings have implications for smoking cessation practice in disadvantaged areas. Group and individual face-to-face counselling offered in a hospital setting are more effective than fixed group and telephone counselling offered in a primary care and community setting respectively. Because in group counselling a greater number of smokers are seen by the therapist in the same amount of time than in individual face-to-face therapy[51] the population impact of smoking cessation services in disadvantaged areas is likely to be larger if they focus more on group therapy, and, if possible, in hospital settings. This is as long as uptake is adequate[8].

We would also recommend the development of a standard for data registered by smoking cessation services across the Netherlands, as is the case in the UK[52]. This should include recommendations for follow-up of participants in terms of techniques used (for example, using CO-validation on a sample of participants) and minimum targets (e.g. in the UK the recommendation is CO-validation of 85% of patients at 4 weeks)[52]. This would aid services in their quality assurance procedures by enabling direct comparison between clinics, and, would at the same time, aid research in this area.

CONCLUSION

Smoking cessation behavioural therapy provided in a group format in a hospital setting is the most successful intervention type in disadvantaged areas in the Netherlands. Individual counselling provided in a hospital setting is also very effective. However, given the higher number of smokers which can be treated in the same time period using group therapy in comparison with individual therapy, we recommend that services in disadvantaged areas concentrate on offering group therapy and do so in a hospital setting, where possible.

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CONFLICT OF INTEREST
The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

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All authors conceived the study. All authors designed the study. FB prepared and analysed the data. All authors contributed to the interpretation of the data. FB drafted the article. All authors contributed to critical revision of the manuscript. All authors approved the final version of the manuscript.

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