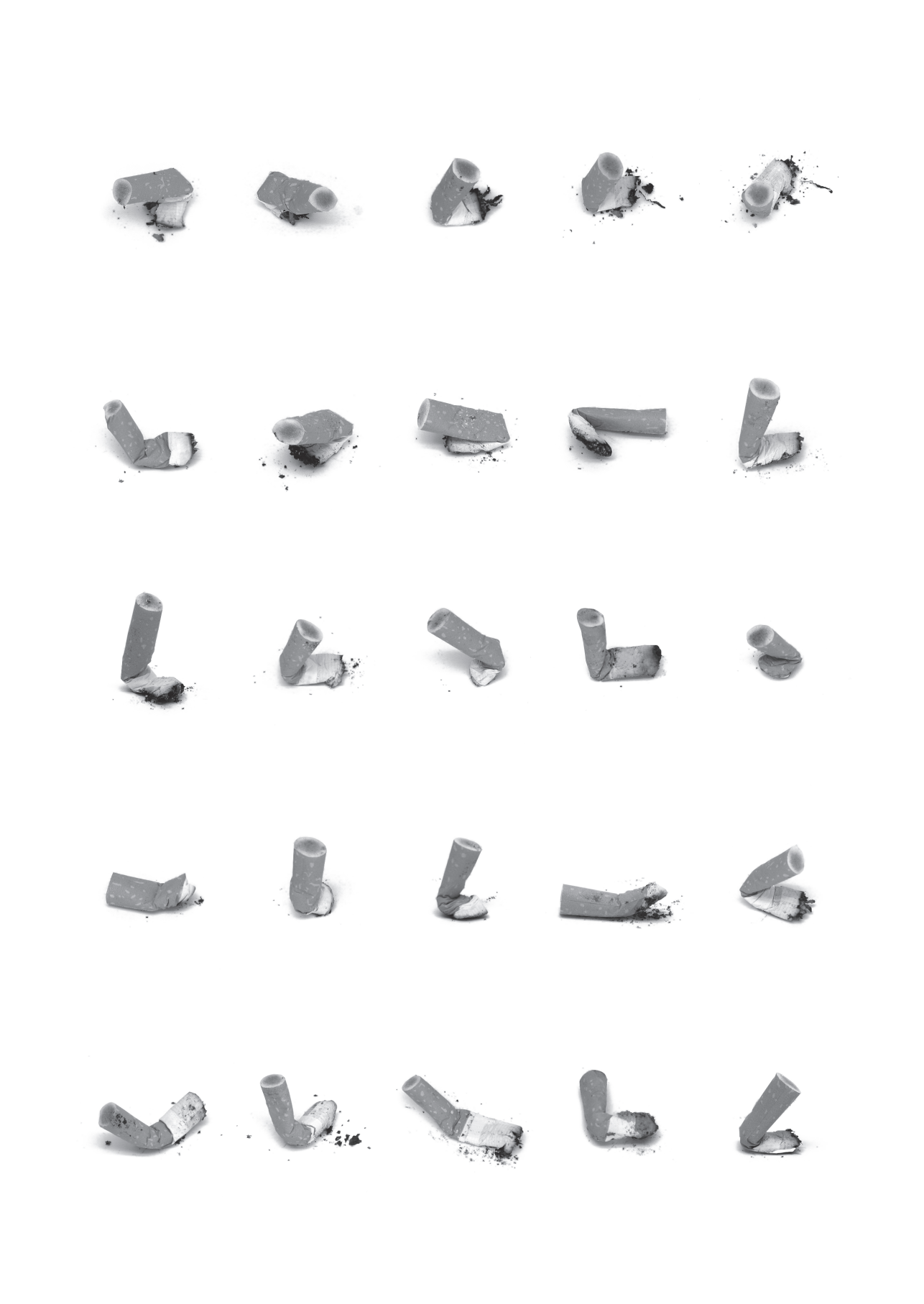

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Sequence-analysis of video-recorded practitioner-patient communication about smoking in general practice: Do smokers express negative statements about quitting?

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ABSTRACT

Objective

To provide insight into the professional-patient interaction during unsolicited dialogues about smoking; to examine the extent to which smokers express negative statements about quitting and the extent to which these statements influence general practitioners' (GPs') and practice nurses' (PNs') (dis)continuation of guideline-recommended smoking cessation care.

Methods

Fifty-two video-consultations were observed (GP-consultations: 2007-2008; PN-consultations: 2010-2011). Dialogues were transcribed verbatim and professionals' and patients' speech units were coded and analysed using sequential analyses (n=1424 speech units).

Results

GPs focused on asking about smoking (GPs: 42.4% versus PNs: 26.2%, p=0.011) and advising to quit (GPs: 15.3% versus PNs: 3.5%, p<0.001) whereas PNs focused on assisting with quitting (GPs: 25.4% versus PNs: 55.2%, p<0.001). Overall, patients expressed more negative statements about quitting than positive statements (negative: 25.3% versus positive: 11.9%, p<0.001), especially when PNs assessed their willingness to quit (OR 3.61, 95% CI 1.44-9.01) or assisted with quitting (OR 2.23, 95% CI 1.43-3.48).

Practice implications

An alternative approach to smoking cessation care is proposed in which GPs' tasks are limited to asking, advising, and arranging follow-up, such as referrals to the PN. This approach seems the least likely to evoke negative statements of patients about quitting during dialogues with GPs and is compatible to tasks and skills of PNs who could subsequently assist smokers with quitting.

INTRODUCTION

Evidence-based guidelines for smoking cessation care recommend general practitioners (GPs) and practice nurses (PNs) to routinely *ask* patients about smoking, *advise* smokers to quit, *assess* their motivation to quit, *assist* them with quitting, and *arrange* follow-up support.[1;2] A full implementation of these '5 A's' significantly improves smoking abstinence rates[3-5] and is cost-effective.[6]

Nevertheless, GPs and PNs (see Appendix 1 for description of PNs' role in Dutch general practice) report various barriers to the implementation of these guidelines during routine consultation.[7-12] Although patients state they are willing to discuss their smoking behaviour during a practitioner-initiated dialogue[13], GPs and PNs report that smokers regularly express negative statements regarding quitting during unsolicited dialogues about smoking, such as a lack of motivation or discipline to quit.[7-12] These negative statements about quitting impede a structural implementation of guideline-recommend smoking cessation care.[7-12] GPs report a limited range of skills for dealing with these negative statements[8] and as a consequence, tend to avoid these negative statements in order to preserve a good doctor-patient relationship.[14;15] This is one of the reported reasons for the evidence-practice gap regarding the provision of guideline-recommended smoking cessation care in Dutch general practice. Results show that, for example, 79% of all smokers and 40% of smokers who discuss smoking with their GP do not receive a quit-smoking advice.[16] Therefore, we aim to provide more insight into the interaction between primary care professionals and smokers during unsolicited dialogues about smoking. These insights may result in recommendations for primary care professionals in how to deal with smokers' negative statements regarding quitting and help them to fully implement guideline-recommended smoking cessation care.

Until now, only a few studies have examined the interaction between primary care professionals and smokers. These studies focused on the way patients react when GPs link their health issues to their smoking[17] or when they are counselled to quit smoking based on their readiness to quit.[18] To our knowledge, no studies have examined the responses of smokers when professionals apply a guideline for smoking cessation care. Moreover, the impact of these responses on professionals' continuation of guideline adherence is unknown. More insight into this interaction may contribute to strategies that can benefit the implementation of smoking cessation counseling in general practice.

Therefore, we assess the extent to which: i) professionals use the 5 A's for smoking cessation care, ii) smoking patients express negative or positive statements about quitting when professionals use these 5 A's, and iii) professionals continue or discontinue their use of the 5 A's after patients express a positive or negative

statement about quitting. Based on literature, we hypothesize that an unsolicited conversation about smoking will elicit patients' negative statements about quitting. Furthermore, we hypothesize that patients' negative statements about quitting will hamper the continuation of guideline adherence, while patients' positive statements about quitting will facilitate it. Since knowledge and skills regarding lifestyle counseling are highlighted in the 'competence profile' of PNs[19], we hypothesize that patients' negative statements about quitting are less likely to hamper guideline adherence in dialogues with PNs compared to dialogues with GPs.

METHODS

Study setting, participants and design

We conducted a cross-sectional study in which we observed video-recordings of random real-life routine consultations in general practice. Such video-taped consultations are regularly used to observe lifestyle counseling[20-25], provide a complete record of what actually happens during consultations, and can be viewed repeatedly.[26] Videos were collected (nationwide) and archived by the Netherlands Institute for Health Services Research (NIVEL). Consultations with GPs and PNs were recorded during 2007-2008 and during 2010-2011, respectively. A detailed overview of the data collection is reported elsewhere.[27;28]

All video-recordings in which smoking was discussed were selected for the present study (n=211). We excluded video-recordings of consultations with non-smokers (n=63), ex-smokers (n=70), consultations in which the patient specifically requested smoking cessation assistance (n=13) and in which patients addressed smoking on their own initiative (n=13). This resulted in a set of 52 videos of 33 primary care professionals (17 GPs and 16 PNs). All PNs were trained in motivational interviewing during the study.[28] This was not the case for GPs and it is unclear whether the participating GPs were trained in motivational interviewing prior to the study. All GPs, PNs and patients were unaware of the fact that the recordings and analyses would focus on smoking cessation care. This study was conducted according to Dutch privacy legislation in which approval of the medical ethics committee was not required.[29]

Procedure and measurements

After the patients gave their informed consent consultations were recorded. Two researchers observed the video-recordings. Subsequently, the dialogues between professionals and patients about smoking were transcribed verbatim (MV and EP). A coding scheme was developed for every speech unit of patients and profes-

sionals. A speech unit is defined as '*the smallest distinguishable speech segment to which a classification may be assigned*'.[30] The length of a speech unit can vary from a single word to a lengthy sentence.

Professionals' speech units

We coded speech units of professionals which were related to the core components of the guideline for smoking cessation care ('5 A's'). These included: 1) *Ask* (about the patient's smoking status, the number of cigarettes, or smoking history), 2) *Advise* (to quit smoking or to smoke less), 3) *Assess* (the smoker's motivation to quit), 4) *Assist* (with quitting, which include discussing advantages of (quitting) smoking, risks of smoking, barriers to quitting, support options, pharmacological support, or a quit plan), and 5) *Arrange* (follow-up quit-smoking support, including referring the smoker to behavioural quit support, arrange a telephone follow-up, or ask permission to discuss smoking next time). Appendix 2 provides an overview of the coding scheme illustrated by examples of speech units of primary care professionals and patients.

Patients' speech units

We coded both negative and positive statement about smoking cessation expressed by patients. A negative statement included: 1) barriers to quit, 2) disadvantages of quitting, 3) advantages of smoking, and 4) reasons to relapse. Patients' positive statement included: 1) motivators to quit, 2) advantages of quitting, 3) disadvantages of smoking, and 4) reasons to smoke less or continue abstinence (see Appendix 2 for coding scheme).

Other speech units

The speech units of professionals which we did not code as related to the 5A's and speech units of patient which we did not code as a negative or positive statement about quitting, were coded as follows: 1) other (non-)smoke-related questions/answers, e.g. "I smoke 10 cigarettes per day", 2) other (non-)smoke-related information, e.g. "These complaints might results from your smoking", 3) other (non-)smoke-related confirmations, e.g. "Yes, I agree", 3) other (non-) smoke-related speech units, e.g. "Thank you". In contrast to '5A-related' speech units, 'other smoke-related' speech units of professionals included general statements about smoking and its risks and were unrelated to quitting or the patient's motivation to quit (see Appendix 2 for coding scheme).

Inter-rater agreement

Two researchers (MV and MC) independently coded five randomly selected dialogues (in total 153 speech units) which resulted in a moderate inter-rater agreement (kappa 0.66). During this pretest of our coding scheme, we encountered two coding difficulties. Firstly, some disagreements occurred regarding differentiating between speech units of professionals related to '*Assisting* a quit attempt' and to 'providing smoke-related information'. These disagreements were resolved via a third person (NC) and we decided to code a speech unit as '*Assisting* a quit attempt' solely when it was related to the patients' motivation to quit, such as an exploration of barriers and motivators to quit, e.g. "*Can you tell me a bit more about the reasons why you want to quit?*". When professionals only made general statements about smoking unrelated to quitting or the patient's motivation to quit, we coded the speech unit as 'other, smoke-related: the provision of smoke-related information', e.g. "*Your smoking has an impact on your vocal cords*".

Secondly, the pretest of our coding scheme showed that the number of coding categories for patients' negative and positive statements about smoking cessation was too limited (it originally included only the coding categories 'barriers to quit' and 'motivators to quit'). After consulting a third person (NC), we therefore decided to extend these coding categories, including '(dis)advantages of quitting', '(dis)advantages of smoking', 'reasons to relapse', and 'reasons to smoke less or continue abstinence'.

The remaining transcripts were coded by one researcher (MV) (see Appendix 2 for coding scheme).

Statistical analyses

Firstly, we calculated the total number of speech units of both professionals and patients and the number of speech units per dialogue. Differences between GP- and PN-dialogues were analyzed with a chi-square test.

Secondly, we performed a number of sequential analyses which can be defined as '*a set of techniques used to identify temporal patterns embedded within sequences of coded behaviours or stimulus events*'.[31-33] The main aim of sequential analysis is to determine if a particular sequence of behaviours or events occurs to a greater or lesser extent than can be expected by chance alone.[31;32] This type of analysis can be regarded as a suitable method for exploring interaction patterns between healthcare professionals and patients.[31]

We prepared our data for these analyses by forming a chain of codes representing the speech units of professionals and patients (a total of 1424 speech units). Then, we examined the three speech units (three lags) following each 5A-related speech unit for negative and positive statements of smokers about

quitting. The existing literature gives only few indications for the optimal number of lags.[30;31] Yet, because we focused on the immediate responses of patients on the provision of smoking cessation care, we limited our analyses to three lags. Lag 0 represented the 5A-related speech unit of a professional during the dialogue, lag 1 represented the speech unit of the patient immediately following the professional's 5A-related speech unit at lag 0, lag 2 represented the second speech unit of the patient following the professional's 5A-related speech unit at lag 0, and lag 3 represented the third speech unit of the patient following the professional's 5A-related speech unit at lag 0.

Next, we calculated transitional probabilities, i.e. the likelihood that a patient expressed one or more negative and positive statements regarding quitting within the three lags following a 5 A-related speech unit of the professional (see Appendix 3). The transitional probabilities were uncorrected for the potential effects of clustering effects of speech units within dialogues. Therefore, we used generalized estimating equations to take into account the multilevel structure of the data. This resulted in corrected odds ratio's (ORs), i.e. the likelihood that a negative or positive statement of the smoker about quitting was preceded by a 5A-related speech unit of the professional compared to any other preceding category of speech units of professionals.

The same method was used to compute the likelihood that a negative or positive statement about quitting of the patient was followed within 3 lags by one or more 5 A-related, other-smoke-related or non-smoke-related speech units of the professional.

RESULTS

Sample characteristics

Table 1 shows the characteristics of the duration of the consultations and dialogues about smoking, and characteristics of the patients, GPs and PNs who enrolled in the study. In total, we coded 1424 speech units (mean 27.4 speech units per smoking dialogue, range 4-118) of which 727 were of professionals (51.1%, mean 14.0 speech units per smoking dialogue, range 2-55) and 697 of patients (48.9%, mean 13.4 speech units per smoking dialogue, range 1-63).

Speech units

Professionals' smoking cessation care

Overall, half of the speech units of professionals were related to the 5 A's for smoking cessation care (Table 2). Chi-square tests showed that PNs expressed

Table 1. Characteristics of video-recorded consultations between patients, GPs and PNs

		Dialogues with	
Consultation characteristics	**Total (n=52)**	**GPs (n=20)**	**PNs (n=32)**
Total duration (min), M (SD)	22:41 (12:05)	12:29 (4:21)	29:04 (10:56)
Duration of smoking dialogue (min), M (SD)	2:57 (2:53)	1:28 (1:04)	3:53 (3:17)
		Dialogues with	
Patient characteristics	**Total (n=52)**	**GPs (n=20)**	**PNs (n=32)**
Age in years, M (SD)	53.5 (14.8)	46.1 (15.7)	57.7 (12.6)
Gender, female	23 (44.2%)	9 (45.0%)	14 (43.8%)
Educational level			
Low	11 (21.2%)	3 (15.0%)	8 (25.0%)
Middle	29 (55.8%)	8 (40.0%)	21 (65.6%)
High	3 (5.8%)	2 (10.0%)	1 (3.1%)
Reason for consultation			
Respiratory	16 (30.8%)	8 (40.0%)	8 (25.0%)
Cardiovascular	14 (26.9%)	6 (30.0%)	8 (25.0%)
Diabetes mellitus	9 (17.3%)	0 (0.0%)	9 (28.1%)
Multiple smoke-related	10 (19.2%)	3 (15.0%)	7 (21.9%)
Other smoke-related	1 (1.9%)	1 (5.0%)	0 (0.0%)
Non-smoke-related	2 (3.8%)	2 (10.0%)	0 (0.0%)
Professional characteristics	**Total (n=33)**	**GPs (n=17)**	**PNs (n=16)**
Age in years, M (SD)	46.4 (7.1)	49.9 (6.1)	42.4 (6.2)
Gender, female	22 (66.7%)	6 (35.3%)	16 (100.0%)

GP=general practitioner, PN=practice nurse, M=mean, SD=standard deviation

significantly more speech units related to these 5 A's than GPs (GPs: 37.8% versus PNs: 55.2%; p <.001). Within this category, GPs significantly more often *asked* about smoking and *advised* to quit compared to PNs. PNs significantly more often *assisted* with quitting compared to GPs.

The remaining speech units of professionals were coded as 'other smoke-related' speech units (31.4%) and 'other non-smoke-related' speech units (17.2%). Although no significant differences were found in these coding categories between GPs and PNS overall, we found a significant difference in one of the subcategories of 'other smoke-related' speech units: GPs significantly more often provided general smoke-related information compared to PNs (GPs: 37.0% versus PNs: 12.6%, p<0.001, data not shown).

Patients' statements about smoking cessation

Overall, patients expressed significantly more often negative than positive statements about quitting during an unsolicited dialogue about smoking (negative: 25.3% versus positive: 11.9%; p<.001). We found no significant differences between the number of negative statements during dialogues with PNs compared to dialogues with GPs (Table 2).

A relative high number of patient's speech units were coded as 'other smoke-related' (49.2%). This category comprised numerous simple answers to and confirmations of the provision of smoke-related questions and information of the professional, e.g. "*Yes, I smoke*" or "*Yes, I agree*").

Sequential analysis

Table 3 shows the transitional probabilities that smokers expressed negative or positive statements about quitting following the 5 A's speech units of professionals. Overall, patients were more likely to express a negative than a positive statement, irrespective of the preceding 5A. The probability that smokers expressed a negative statement about quitting was lowest when professionals *asked* about smoking (11%) or *arranged* a follow-up (15%), and highest when professionals *assessed* the smoker's motivation to quit (55%) or provided *assistance* with quitting (38%).

When adjusting for clustering effects, patients were overall significantly more likely to express a negative statement about quitting when professionals preceded with a speech unit related to *assessing* the patient's motivation to quit (OR 3.61, 95% CI 1.44-9.01) or *assisted* with quitting (OR 2.23, 95% CI 1.43-3.48), compared to any other preceding speech unit of professionals. When professionals preceded with a speech unit related to providing *assistance* with quitting, patients were also significantly more likely to express a positive statement about quitting (OR 2.76, 95% CI 1.56-4.89), compared to any other preceding speech unit of professionals. Table 4 shows the results of comparable analyses, separated for GP and PN dialogues. We found the above-mentioned effects only in PN dialogues. Due to data sparseness, it was not possible to compute all corrected odds ratio's in GP and PN dialogues (Table 4).

Figure 1 illustrates the transitional probabilities that GPs and PNs expressed a 5A-related, other smoke-related, or non-smoke-related speech unit following patients' negative and positive statements about quitting. Although we observed that GPs were less likely to continue with using the 5 A's following patients' negative statements compared to preceding positive statements (negative: 19% versus positive: 47%), analyses could not confirm this statistically (OR 0.68, 95% CI 0.17-2.75).

Table 2. Total number of coded speech units of patients and professionals and the difference between GPs and PNs

	Total coded speech units (n=1424)				GPs' coded speech units (n=287)				PNs' coded speech units (n=1137)				
Professionals	**Number/ Total**	**Mean**	**Range**	**%**	**Number/ Total**	**Mean**	**Range**	**%**	**Number/ Total**	**Mean**	**Range**	**%**	***p*** [a]
Total	727/1424	14.0	2 - 55	51.1%	156/287	14.4	2 - 15	54.4%	571/1137	35.5	2 - 55	50.2%	0.210
Other SR	228/727	4.4	0 - 22	31.4%	54/156	2.7	0 - 9	34.6%	174/571	5.4	0 - 22	30.5%	0.323
Other NSR	125/727	2.4	0 - 16	17.2%	43/156	2.2	0 - 7	27.6%	82/571	2.6	0 - 16	14.4%	<0.001
5A's	374/727	7.2	1 - 33	51.4%	59/156	3.0	1 - 9	37.8%	315/571	9.8	1 - 33	55.2%	<0.001
Ask	107/374	2.1	0 - 6	28.6%	25/59	1.3	0 - 3	42.4%	82/315	2.6	1 - 6	26.0%	0.011
Advise	20/374	0.4	0 - 6	5.4%	9/59	0.5	0 - 3	15.3%	11/315	0.3	0 - 6	3.5%	<0.001
Assess	43/374	0.8	0 - 4	11.5%	8/59	0.4	0 - 2	13.6%	35/315	1.1	0 - 4	11.1%	0.588
Assist	189/374	3.6	0 - 22	50.5%	15/59	0.8	0 - 7	25.4%	174/315	5.4	0 - 22	55.2%	<0.001
Arrange	15/374	0.3	0 - 4	4.0%	2/59	0.1	0 - 1	0.03%	13/315	0.4	0 - 4	4.1%	0.791
Patients	**Number/ Total**	**Mean**	**Range**	**%**	**Number/ Total**	**Mean**	**Range**	**%**	**Number/ Total**	**Mean**	**Range**	**%**	***p***
Total	697/1424	13.4	1 - 63	48.9%	131/287	6.6	1 - 16	45.6%	566/1137	17.7	1-63	49.8%	0.210
Other SR	343/697	6.6	1 - 32	49.2%	63/131	3.2	1 - 7	48.1%	280/566	8.8	1-32	49.5%	0.776
Other NSR	95/697	1.8	0 - 15	13.6%	29/131	1.5	0 - 5	22.1%	66/566	2.1	0-15	11.7%	0.002
Negative statements	176/697	3.4	0 - 13	25.3%	25/131	1.3	0 - 7	19.1%	151/566	4.7	0-13	26.7%	0.071
Positive statements	83/697	1.6	0 - 8	11.9%	14/131	0.7	0 - 4	10.7%	69/566	2.2	0-8	12.2%	0.632

GPs=general practitioner, PNs=practice nurse, SR=smoke-related, NSR=non-smoke-related

[a] Differences in the proportion of coded speech units between GP and PN dialogues were calculated with χ^2 tests

Table 3. Transitional probabilities of patients' speech units following speech units of primary care professionals (GPs and PNs combined) related to the five A's for smoking cessation care [a,b]

	Patients' speech units (lag 1-3)							
	Negative statement about quitting		**Positive statement about quitting**		**Other smoke-related speech unit**		**Non-smoke-related speech unit**	
Professionals' 5-A speech unit (lag 0)	Probability	OR (95% CI)	Probability	OR (95% CI)	Probability	OR (95% CI)	Probability	OR (95% CI)
All 5 A's	0.31 (149/476)	1.88 (1.30-2.72)**	0.09 (41/476)	1.78 (1.07-2.97)*	0.53 (250/476)	3.01 (2.00-4.54)**	0.08 (36/476)	0.42 (0.29-0.59)**
Ask	0.11 (16/142)	1.06 (0.61-1.84)	0.01 (2/142)	0.66 (0.26-1.64)	0.83 (118/142)	11.30 (3.68-34.65)**	0.04 (6/142)	0.24 (1.13-1.45)**
Advise	0.27 (3/11)	0.86 (0.19-3.94)	0.10 (1/11)	-	0.36 (4/11)	1.17 (0.34-3.98)	0.27 (3/11)	0.68 (0.24-2.27)
Assess	0.55 (35/63)	3.61 (1.44-9.01)*	0.13 (8/63)	2.87 (0.89-9.27)	0.27 (17/63)	1.98 (0.58-6.57)	0.05 (3/63)	0.43 (0.13-1.39)
Assist	0.38 (93/247)	2.23 (1.43-3.48)**	0.12 (30/247)	2.76 (1.56-4.89)**	0.41 (102/247)	1.64 (1.00-2.68)*	0.09 (22/247)	0.70 (0.45-1.07)
Arrange	0.15 (2/13)	-[c]	0.00 (0/13)	-	0.69 (9/13)	1.08 (0.26-4.44)	0.15 (2/13)	0.78 (0.20-3.06)
Other SR	0.30 (89/293)	2.44 (1.62-3.66)**	0.12 (35/293)	3.46 (2.01-5.93)**	0.48 (140/293)	1.55 (1.02-2.37)*	0.11 (32/293)	0.81 (0.56-1.17)

[a] Transitional probabilities represent the probabilities of speech chains that begin with the event indicated as '*professionals' 5-A speech unit*' and end with the specific coded patients' speech unit within the following three speech lags (the ratio of the specific patients' speech unit and the total number of coded speech units of patients in brackets),

[b] Generalised estimating equations (GEE) corrected for the hierarchical structure of the data

[c] Analyses not possible due to data sparseness

*p<0.05, **p<0.001

Table 4. Transitional probabilities of patients' speech units following speech units of GPs and PNs separately related to the five A's for smoking cessation care [a,b]

	Patients' speech units (lag 1-3)							
	Negative statement about quitting		**Positive statement about quitting**		**Other smoke-related speech unit**		**Other non-smoke-related speech unit**	
GPs' 5-A speech units (lag 0)	Probability	OR (95% CI)	Probability	OR (95% CI)	Probability	OR (95% CI)	Probability	OR (95% CI)
All 5A's	0.23 (17/75)	1.71 (0.71-4.12)	0.12 (9/75)	0.79 (0.18-3.54)	0.56 (42/75)	7.01 (2.50-19.67)**	0.09 (7/75)	0.24 (0.11-0.54)**
Ask	0.08 (3/38)	1.65 (0.58-4.75)	0.03 (1/38)	0.84 (0.13-5.32)	0.79 (30/38)	8.79 (1.97-39.34)*	0.11 (4/38)*	0.29 (0.11-0.78)*
Advise	0.50 (3/6)	2.32 (0.20-26.66)	0.17 (1/6)	-	0.33 (2/6)	-	0.00 (0/6)	-
Assess	0.63 (5/8)	- [c]	0.25 (2/8)	-	0.00 (0/8)	1.88 (0.08-42.27)	0.13 (1/8)	0.48 (0.02-9.59)
Assist	0.27 (6/22)	1.59 (0.33-7.06)	0.23 (5/22)	-	0.41 (9/22)	3.36 (0.61-18.45)	0.10 (2/22)	0.29 (0.06-1.42)
Arrange	0.00 (0/1)	-	0.00 (0/1)	-	10.00 (1/1)	-	0.00 (0/1)	-
Other SR	0.19 (12/59)	1.96 (0.87-4.44)	0.07 (4/59)	2.81 (0.84-9.37)	0.55 (34/59)	1.81 (0.88-3.73)	0.19 (9/59)	0.71 (0.36-1.38)
PNs' 5-A speech units (lag 0)	Probability	OR (95% CI)	Probability	OR (95% CI)	Probability	OR (95% CI)	Probability	OR (95% CI)
All 5 A's	0.33 (132/401)	1.91 (1.28-2.85)*	0.08 (32/401)	2.02 (1.16-3.54)*	0.52 (208/401)	2.59 (1.57-4.26)**	0.07 (29/401)	0.46 (0.30-0.69)**
Ask	0.13 (13/104)	1.01 (0.54-1.89)	0.01 (1/104)	0.65 (0.23-1.81)	0.85 (88/104)	17.06 (8.29-35.11)**	0.02 (2/104)	1.15 (0.05-0.43)**
Advise	0.00 (0/5)	0.51 (0.06-4.00)	0.00 (0/5)	-	0.40 (2/5)	0.69 (0.18-2.60)	0.60 (3/5)	1.13 (0.31-4.14)
Assess	0.55 (30/55)	4.37 (1.69-11.30)*	0.11 (6/55)	2.24 (0.60-8.36)	0.31 (17/55)	2.24 (0.46-10.87)	0.04 (2/55)	0.36 (0.08-1.67)
Assist	0.39 (87/225)	2.20 (1.3803.51)**	0.11 (25/225)	3.17 (0.74-5.76)**	0.41 (93/225)	1.50 (0.85-2.66)	0.09 (20/225)	0.77 (0.47-1.26)
Arrange	0.17 (2/12)	-	0.00 (0/12)	-	0.67 (8/12)	0.99 (0.19-5.14)	0.17 (2/12)	0.81 (0.17-3.95)
Other SR	0.33 (77/234)	2.75 (1.75-4.32)**	0.13 (31/234)	3.93 (2.17-7.15)**	0.45 (106/234)	1.57 (0.89-2.76)	0.09 (20/234)	0.82 (0.51-1.32)

GPs = general practitioners, PNs = practice nurses

[a] Transitional probabilities represent the probabilities of speech chains that begin with the event indicated as 'professionals' 5-A speech unit' and end with the specific coded patients' speech unit within the following three speech lags (the ratio of the specific patients' speech unit and the total number of coded speech units of patients in brackets)

[b] Generalised estimating equations (GEE) corrected for the hierarchical structure of the data

[c] Analyses not possible due to data sparseness

*p<0.05, **p<0.001

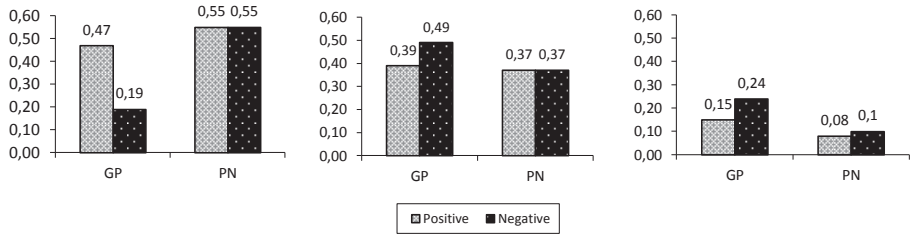

Figure 1. Transitional probabilities of GPs' and PNs' 5 A-related speech units (I), other smoke-related speech units (II), and non-smoke-related speech units (III) following patients' positive and negative statements about quitting smoking

DISCUSSION

Main findings

The present study aimed to provide insight into the professional-patient interaction during unsolicited dialogues about smoking. Firstly, we assessed the extent to which primary care professionals use the 5A's for smoking cessation care during unsolicited dialogues about smoking. We found that GPs mainly focused on *asking* their patients about smoking and PNs on *assisting* patients with a quit attempt. Overall, little attention was paid to *advising* smokers to quit, to *assessing* their motivation to quit, and to *arranging* follow-up. Secondly, we examined the extent to which smokers expressed positive and negative statements about quitting during these dialogues. Overall, we found that patients more frequently expressed negative statements compared to positive statements about quitting. These negative statements mainly consisted of quit-smoking barriers and were most likely expressed when PNs *assessed* the patients' willingness to quit or when PNs *assisted* patients with a quit attempt. Finally, we explored the degree to which primary care professionals (dis)continued the 5 A's following patients' positive or negative statements about quitting. Although we observed that GPs were less likely to continue using the 5 A's following patients' negative statements about quitting, analyses could not statistically confirm this finding.

Interpretation of the findings

In line with previous studies and assumptions underlying current guidelines, we found that GPs and PNs focus on different smoking cessation counseling activities.[1;20;21;34;35] GPs tend to focus on identifying smokers and informing about risks, whereas stop-smoking support is more often provided by PNs. Although these differences might be explained by the different time-periods in which the consultations were recorded (GPs: 2007-2008, PNs: 2010-2011), it is more likely

that these differences can be explained by other factors, such as differences in patient population, characteristics of the professionals (e.g. training, skills, practice protocols), and consultation characteristics (e.g. time available).

Both GPs and PNs lacked focus on *arranging* a follow-up for quit-smoking support. This is in line with recent findings showing that GPs in the Netherlands experience a lack of overview of smoking cessation programs in their neighborhood.[12] In addition, smokers may lack motivation to quit, which seems a logical reason for not arranging follow-up care. However, even if smokers are not motivated to quit, guidelines recommend primary care professionals to ask the patient's permission to discuss their smoking behaviour in a next consultation. Therefore, when GPs and PNs in our study would have followed these current guidelines, the rate of arranging follow-up should have been much higher than observed.

Although not statistically confirmed, we observed that GPs were less likely to proceed with a 5A-related speech unit following a negative statement of patients about quitting. We did not observe this in PN-patient dialogues. A possible explanation for this is that all PNs in the present study were trained in motivational interviewing, and that GPs might lack such skills or have insufficient time to apply them.[36;37] This might also explain why patients were more likely to respond both negatively *and* positively towards quitting during dialogues with PNs: exploring and resolving patients' ambivalence towards behaviour change is an essential part of motivational interviewing.[38] Another explanation might be that GPs and PNs encounter different types of patients. For example, patients who visit the GP might be more likely to perceive their complaints as not directly related to their smoking behaviour, resulting in less motivation to quit or discuss smoking. On the other hand, PNs provide care for patients with diabetes mellitus, asthma, or COPD, including routinely providing information, advice and counseling on lifestyle. These patients might be more inclined to relate their health complaints to their smoking behaviour, which results in a higher motivation to quit or discuss smoking.

Study strengths and limitations

Video-based observations provide an objective method to capture all modalities of the interaction between professionals and patients.[26] In addition, sequence analysis exceeds a simple description of frequencies of spoken communication and provides further insight into practitioner-patient interactional processes. To our knowledge, this is the first study using sequence analysis to provide insight into the way smoking cessation care evokes positive and negative responses of

patients thereby providing further insight into practitioner-patient interactional processes.

However, several limitations of our study have to be acknowledged. First, to guarantee the anonymity of the patients, the camera was positioned so that patients were only visible from behind or were not visible at all. Therefore, we were unable to observe non-verbal behaviour, which may also play a role when assessing patients' responses towards smoking cessation. Yet, a recent study showed that communication ratings using only audio or video data are highly correlated.[39] Second, due to the small samples it was not always possible to take into account that the possible cluster effects within the data . Third, using video-based observations may limit the external validity of the findings, unless the sample is representative for the overall population.[26] Although we were unable to compare our sample of PNs with the average Dutch population of PNs, the GPs in our study were representative for the average Dutch population of GPs with regard to gender and practice type.[36] Moreover, none of the GPs and PNs were aware that the observations would focus on dialogues about smoking.

Practice implications

Our study findings support alternative approaches to smoking cessation care in healthcare settings where a successful implementation of the 5 A's is lacking. These alternative approaches include the 'Ask-Advise-Arrange' (A-A-R) or 'Ask-Advise-Connect' (A-A-C) approaches.[40;41] These approaches instruct healthcare professionals to routinely *ask* patient about smoking, *advise* smokers to quit, and to *refer* (A-A-R) or proactively *connect* (A-A-C) smokers to a quit line or face-to-face quit-smoking support. As shown by Vidrine et al., significantly more smokers enrolled in quit-smoking treatment following the A-A-C approach (11.4%) compared to the A-A-R approach (0.6%) which is also likely to result in more smokers who successfully quit.[41]

Since we found that smokers are least likely to express negative statements about quitting when being *asked* about smoking, *advised* to quit and *arranged* with follow-up support, we recommend GPs to focus on implementing these alternative approaches. This might reduce the amount of impeding implementation barriers, such as the amount of time involved in discussing barriers to quitting. These approaches are also compatible with the lifestyle counseling tasks and skills of PNs. PNs could play an important role in motivating smokers to quit and provide behavioural counseling.

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Appendix 1. Role of practice nurses (PNs) in general practice in the Netherlands

The standard general practice in the Netherlands comprises about 2,350 patients and an average consultation lasts about 10 minutes[42]; this results in considerable time pressure and workload for general practitioners (GPs). Therefore, in 1999 practice nurses (PN) were introduced in Dutch general practice to reduce the workload of GPs and to improve the quality of care for chronically ill patients.[43] Nowadays, PNs are involved in multiple primary prevention activities (e.g. hypertension care) and secondary prevention activities (e.g. routine care for elderly patients and/or patients with diabetes mellitus, asthma, or COPD). PNs work under the supervision of GPs, manage their consultations independently, and base their clinical practice on guidelines developed by the Dutch College of General Practitioners (NHG) and on healthcare standards which specifically focus on the treatment of chronically ill patients. The collaboration between GPs and PNs provides a good basis for identifying smokers, for motivating them to quit, and to deliver effective quit-smoking support.

Appendix 2. Coding scheme for speech units

Theme	Category	Subcategory	Example
Professionals			
5 A's	• Ask	Smoking status	"Do you smoke?"
		Number of cigarettes	"How many cigarettes do you smoke?"
		Smoking history	"At what age did you start smoking?"
	• Advise	To quit	"The best prevention for not only your airways but also your coronary problems, is to quit smoking"
		To smoke less	["The best thing to do is quit smoking"] "but at least cut down on your smoking"
	• Assess	Motivation to quit	"Do you still not feel like quitting?"
	• Assist	Discuss previous quit attempt	"You quit smoking for almost a year, did you think of cigarettes every day in that period?"
		Discuss quit plan	"First, I want you to go home and think about it, 'do I *want* to quit smoking, am I *able* to quit smoking'?"
		Offer/discuss pharmacotherapy	"Nowadays, we have medication that decreases the craving for cigarettes"
		Discuss advantages of smoking	"Well, you get some kind of peace from it.. especially during hard times, then you desire your cigarettes.."
		Discuss risks of smoking	"..when you continue your smoking, it's far more likely that you will move from stage 2 to 3, and maybe to stage 4"
		Discuss advantages of quitting	"When you say 'I considered quitting', what would be the reasons for this? What would be the positive side of this?"
		Discuss barriers to quitting	"Maybe it is more like a habit, is that right?"
		Discuss support options	"We talked about it before, I also provide consultations for smoking cessation, so if you think you would like to quit smoking, then we could do that together…"
	• Arrange	Ask permission to discuss smoking next time	"Do you mind if we discuss your smoking again next time?"
		Plan (telephone) follow-up	"Yes, we'll discuss that next time, do you come back then?"

Theme	Category	Subcategory	Example
Patients			
Negative statement about smoking cessation	• Barriers to quit • Reasons for relapse • Advantages smoking • Disadvantages quitting	Habit	"Meanwhile, it has become a habit after all those years"
		Lack of motivation/ discipline	"I quit smoking for a year, but I started again.. I think it depends on your overall lifestyle, maybe a little unhealthy.. I would like to improve that…but that will require some discipline of course…"
		Denial of consequences	"Maybe when you're smoking a package each day, then I should think 'yes, maybe you should cut down a little on your smoking…"
		Social environment	"Someday I have to quit, but my wife is a smoker as well.."
		Stress	"..but on the other hand, it helps to reduce my stress"
		(Fear of) weight gain	"Yes, I would like to quit smoking, but I'm worried about my weight, to gain weight again…"
		Previous quit attempt failed	" I already tried it 7 or 8 times…"
		Not the right time	"When I quit I'm not very pleasant, and we bought a new house, the transfer will be on the 4th"
		Addiction	"That's the addiction to nicotine of course, it's the same as with alcohol"
		Smoking is tasteful/ enjoyable	"It's stupid, but I really like it, especially in the weekends after breakfast…"
		Satisfied smoker	"I'm okay with being a smoker"
		Lack of distraction/ daytime activities	"I sit at home for 3 weeks… and then you'll start smoking again"
		Lack of self-confidence	"I want to quit, but I really don't know how"
		Related to pharmacotherapy (e.g. costs)	"I once did a treatment, I had to continue smoking for 10 days and after the pill it would be all over… but it did not work…"
		No complaints of smoking	["What would be reasons for quitting smoking?"] "Well, I feel fine actually"
		Long-time smoker	["Do you think about quitting or not?"] "Well, what do you want? I'm 70.. I only have a few years left so…"
		Smoking cessation is not profitable	"When I don't smoke I still have those complaints"
		Stigma	"Nowadays, if you have a sore knee they will ask you if you're smoking… as if you sprain your ankle because of smoking.. well, that makes me furious"

Theme	Category	Subcategory	Example
		Smoking is the only thing left	"I'll never give up smoking, it's the only thing I still have"
		Withdrawal symptoms	"In the morning I have to smoke a cigarette again, to feel fine again…"
		Psychological complaints	"I quit smoking, but now I go to a psychologist again for depression and I started smoking again.."
		Smoker identity	"I don't see myself refraining from smoking actually…'
Positive statements about smoking cessation	• Motivators to quit	Health concerns	"The main reason I would say is 'it's not good for your health', that would be the reason to quit"
		Social environment	"I will read that [leaflet], then we can look at it together at home, maybe he'll also say 'when you quit, I will quit'
		Health of children	"My daughter is pregnant, so nobody smokes anymore. I think I should quit, yes.."
		Fear for disease/illness	"But I'm actually not really afraid of getting lung cancer, but more of getting something here …[larynx]"
		Quit-smoking advice of health professional	"Yes, you're absolutely right… but, yes well… then I shall do that"
		Smoke-free legislation	"Once I was in prison for 18 months… that was hard, 24 hours inside and not allowed to smoke…I then quitted smoking"
		Costs	"I've already thought about it for a while because, well cigarettes are expensive"
		Smoke smell/taste	"…and they [cigarettes] don't taste very special anymore"
		Sufficient distraction/ daytime activities	"When I'm busy, then it's easy. For example, tomorrow my grandchild will visit me, then it's going perfect"
		Sufficient motivation/ discipline	"I definitely want to quit smoking"
		Positive consequences of quitting	"I often have good results if I refrain from smoking for a while, I feel mentally better than"

Theme	Category	Subcategory	Example
Professionals and patients			
Other speech units	• Other, smoke-related	Question	"So, coffee and smoking are two risk factors?" [patient]
		Answer	"I smoke one packet a day" [patient]
		Provision information	"People who smoke… this has its effect on the vocal cords" [professional]
		Confirmation	["You are a smoker, that's not good"] "No, that's right" [patient]
		Other	[I don't think you are a good example for your kids this way] "Well, I shall talk about it with my wife" [patient]
	• Other, non-smoke-related	Question	"Do you have a fever?" [professional]
		Answer	"This side is much more painful" [patient; during physical examination]
		Provision information	"With regard to your cholesterol, according to this table, you are still within the normal risk boundaries" [professional]
		Confirmation	[I can give you something to inhale] "Yes" [patient]
		Other	"Thank you, see you next time" [patient]

Appendix 3. Simplified example of transitional probabilities

		Lag 1-3			Total
		A	**B**	**C**	
Lag 0	**A**	0.00 (0/7)	0.43 (3/7)	0.57 (4/7)	1.00 (7/7)
	B	0.40 (2/5)	0.00 (0/5)	0.60 (3/5)	1.00 (5/5)
	C	0.63 (5/8)	0.25 (2/8)	0.12 (1/8)	1.00 (8/8)