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Effectiveness of a brief intervention based on the '5A' model for smoking cessation at the primary care level in Santiago, Chile

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SUMMARY

Chilean women have the highest smoking rates in Latin America. Prevalence in this population is about 40%. There are no national programs for smoking cessation at the primary care level. This study explores the feasibility and effectiveness of a brief counseling intervention targeted to women smokers of childbearing age who seek primary care in Santiago, Chile. A quasi-experimental design was used to compare the effect of an intervention based on the '5A' model developed by the National Cancer Institute in the United States and the standard care provided in two control clinics. Women smokers seeking care at the three primary care clinics were contacted during a 2 months period and offer to participate in the study. Sampling was stratified according to the age groups to ensure comparability between cohorts. Quotas were calculated for each age group. Participants were asked about their willingness to quit, self-efficacy, smoking behavior, addiction level as well as support received for smoking cessation. After 18 months of intervention all women were re-evaluated. A total of 773 women were recruited for the study; 76% of them completed the trial. Women smokers are characterized by a large percentage of light smokers with a low self-efficacy for quitting and with very low information on where and how to get assistance to quit. At study end, 15.2% of women reported quitting smoking at least for 1 month in the intervention clinic versus 7.8% in one of the control clinics ($p < 0.05$) and 14.6% in the second control clinic ($p = NS$). Over 70% of women in the intervention clinic were asked, assessed and received advice for quitting in comparison with <15% in the control clinics ($p < 0.01$). To conclude, a primary care intervention based on the '5A' model for smoking cessation is feasible and can have a significant effect in reducing smoking prevalence in this population.

Key words: chile; tobacco use; primary care; brief intervention

INTRODUCTION

In the past 30 years, there has been a tremendous increase in international smoking rates (Shafey *et al*., 2003). Although the westernized nations are increasingly establishing policies to restrict smoking and programs to enhance smoking cessation, this is not the case in developing and emerging countries where smoking rates are high and smoking cessation is low (European Commission, 2003). The situation in Latin America has been of special concern. Prevalence among women and adolescents has continued to rise (Global Youth Tobacco Survey Collaborating Group, 2003; American Cancer Society, 2006) and there has been a systematic campaign from the tobacco-industry to reduce smoking

regulations in these countries (Barnoya and Glantz, 2002; Ramsay, 2002).

The population of Chile has high smoking rates, 43% nationally (National Commission for Drug Abuse, 2002). Incidence rates have been significantly increasing during the last decades among women (World Health Organization, 2000). According to a recent worldwide survey, Chilean women have the highest smoking rates in Latin America and rank among the highest in the world (American Cancer Society, 2006). Smoking prevalence among women was 40.4% in 2004, with rates particularly high among women of childbearing age (ages 15 through 44), and in those living in urban areas of low socioeconomic status (Ferreccio *et al*., 2004; National Commission for Drug Abuse, 2004).

Chilean smoking prevalence is expected to increase in the following years. In the recent Global Youth Tobacco Survey conducted by the World Health Organization and the US Center for Disease Control, Chile ranked as the country with the highest prevalence of smoking from a sample of 42 countries around the world (Global Youth Tobacco Survey Collaborating Group, 2003). Smoking prevalence among teenaged girls living in Santiago is around 44%, significantly higher than the 31% prevalence observed in teenaged boys.

The consequences of these high rates can be observed in the health profile of the Chilean female population. About 60% of the causes of deaths in this population are associated with smoking (i.e. cardiovascular diseases, cancer and respiratory diseases). Seven out of 10 of the main specific causes of deaths in women are associated with smoking (Ministerio de Salud Chile, 2001).

Chilean policies for restricting smoking are still very limited. A new legislation has been recently approved following the Panamerican Health Organization framework for tobacco control (Panamerican Health Organization, 1999). However, there have been concerns about the lack of strong restrictions, particularly those related to second hand smoke in public places. The current Chilean legislation does not consider the implementation of primary care programs to help smokers quit. Chile's strong primary care network represents a great opportunity to develop such programs, especially among women who seek primary care about three times more often than men. In addition, women in Chile have a strong influence in health behaviors and self-care of family members (Lange *et al*., 2006).

In this study, we compare the effect of a brief counseling intervention delivered by primary care providers to help women smokers quit in one clinic in La Pintana, Santiago, with standard care provided in two different primary care clinics in Santiago. The study also provides information on the knowledge, attitudes and behaviors of 760 women smokers seeking care at three primary care clinics in Santiago. This is the first controlled trial that studies the effectiveness of a brief primary care intervention for smoking cessation in Chile.

METHODS

Setting

This project took place in three public primary care clinics. The clinics were located in an urban area in the Southeast of Santiago, Chile. Two clinics El Roble (Clinic A) and Santiago Nuevo Extremo (Clinic B) are located in La Pintana, an area with a population of very low socioeconomic status. Each of these clinics serves a population of ~36 000 individuals and they are very similar in the amount of human resources available and programs delivered. The third clinic, Villaseca (Clinic C) is located in Puente Alto. It serves a population of middle-to-low socioeconomic status. At the time of the study, this clinic served fewer people than the ones in La Pintana (about 33 000) and had a higher ratio of physicians (1/4800 in La Pintana versus 1/3600 in P. Alto) and nurses (1/6000 in La Pintana versus 1/4100 in P. Alto) per population served.

The length of medical visits were shorter in the intervention and control clinics in La Pintana (12 min per visit) in comparison with the control clinic in Puente Alto (15 min). The clinic in Puente Alto had implemented an electronic chart system and a cardiovascular prevention program at the time of the study. No specific cardiovascular programs or electronic chart systems were implemented in La Pintana. The three clinics receive public funding from the Ministry of Health. They are administered by local municipalities.

Sample

The sample consisted of women aged 15 through 45. A cohort of smokers was selected from

women who came to the clinic for a physician visit or a nurse or midwife consultation. Sampling was stratified according to the age groups found in the intervention clinic in the past 12 months to ensure comparability between cohorts in each of the three clinics. Quotas were calculated for each age group (i.e. ages 15–24, 25–34, 35–45). As each quota block was filled, women were no longer recruited for that block.

Procedures

To recruit the sample, women in the waiting room were approached by the trained interviewers. They were asked their age, smoking status and willingness to participate in a project about healthy behavior and disease prevention. If the woman was an age-eligible smoker who agreed to participate in the project, she was asked to read and sign an informed consent agreement. Following this, she completed an in-person interview. All procedures and consent forms were reviewed and approved by the Institutional Review Boards at the Universidad Católica in Santiago, Chile and the Fred Hutchinson Cancer Research Center in Seattle, WA.

Questionnaire

The questionnaire was developed and reviewed by the local health care boards at the clinics and adjustments were made based on their suggestions. The questionnaire contained 59 items grouped into seven sections: visits to the clinic; tobacco use and cessation attempts; knowledge about tobacco; smoking information available from professionals at the clinic; views about smoking policies; medical issues; and sociodemographic questions.

Women also were asked how difficult they would find it to quit smoking and responded on a four-point scale (very or somewhat difficult, somewhat or very easy). Nicotine addiction was assessed by using the four items Fagerstrom nicotine addiction scale (Fagerstrom and Schneider, 1989; Heatherton *et al.*,1991). Missing values on any variable led to exclusion of that observation. Only 15 observations were excluded.

Stage of change was assessed using the criteria established by Prochaska and DiClemente (Prochaska *et al.*,1992; Prochaska, 1996). Pre-contemplators are those who said they did not want to quit smoking in the next 6 months. Contemplators planned to quit in the next 6 months, but not in the next 30 days. Those in preparation stage planned to quit in the next 30 days and had made at least one 24-h quit attempt in the past 12 months.

Women were asked if they had ever been advised to quit by their doctor, nurse and/or midwife. They were also asked if their health care provider ever engaged them in conversation about their smoking in order to assist them in quitting or if they ever received information about how to quit from the clinic. They were asked if they knew of any information about cessation that was available in their community and if they knew of any smoking cessation program they could have access to.

Intervention

The intervention was implemented during 18 months in one of the clinics in La Pintana (Clinic A). The two other clinics (Clinic B in La Pintana; Clinic C in Puente Alto) were control clinics.

The smoking cessation intervention was based in the '5 A' model developed by the Agency for Health Care Policy and Research in the United States (1996) (Agency for Health Care Policy and Research, 1996).

According to the '5 A' model, health care providers should follow a 5-step process that includes: (1) asking every patient for tobacco use, (2) advising smokers to quit, (3) assessing smokers' willingness to make a quit attempt, (4) assisting smokers with treatment and referrals and (5) arranging follow-up contacts.

The application of the '5 A' model at the intervention clinic was developed considering the perspectives of local health teams. A qualitative approach was used to explore limitations, barriers and opportunities for applying a brief intervention strategy for smoking cessation at the intervention clinic (Puschel *et al.*, 2006). Following the recommendations of the local health teams, a multistep approach was developed for applying the '5 A' model. All women (including the intervention cohort) who sought care at the clinic were asked their smoking status. Brief advice was given by the nurse practitioner for smoking women of childbearing age when checking their vital signs. Then, the stage of change for smoking cessation was assessed and registered.

Based on the information about willingness to quit, health care providers (physicians, registered

nurses and midwives) provided information, assisted and arranged follow-up contacts for smokers willing to quit. Health care providers and ancillary staff at the clinic received a training program consisting of four training sessions of 3 h per session. No pharmacological treatment was provided for smokers given that this is not available at the primary care system in Chile.

In the control clinics, standard care was provided for women smokers participating in the study. In the control clinic at La Pintana, no specific smoking cessation programs were available at the time of the study. In Puente Alto, a new cardiovascular program was implemented during the time of the intervention. Providers at this control clinic were told to advise patients to quit smoking in those women with cardiovascular risk factors who seek medical care.

Statistical analysis

For the statistical analysis, for each clinic we report the frequency of demographic characteristics, smoking characteristics, the frequency of visits and discussions with medical personnel, and whether or not smoking was discussed during these visits, patients' knowledge about smoking and attitudes toward restrictive smoking policies. For these variables, we compare patients' responses on final surveys to those on baseline surveys. Significance tests are based on paired *t*-test for variables with continuous responses, McNemar's test for variables with binary responses and marginal homogeneous test for variables with ordinal responses. Resulting *p*-values of 0.05 or less are considered statistically significant.

We also conducted pairwise comparisons between the clinic which received treatment (Clinic A) and the clinics which received no treatment (Clinic B or C). That is, we compared the final survey responses between patients in Clinics A and B, and between patients in Clinics A and C separately. We applied linear regression model to continuous and ordinal responses, and logistic regression model to binary responses, adjusting differences in baseline proportions. The effect of the intervention was also assessed by comparing final survey responses in Clinic A with those in Clinics B and C, combined, adjusting for difference in baseline proportions. Nonlinear mixed model regression as used for this purpose. Potential confounders were tested one at a time in a model that contained the predictor variable of interest. Only confounders that substantially changed the associations were included in the final model. The potential confounders we examined were: socioeconomic/education status, depression at baseline, stages of change at baseline and self-efficacy.

RESULTS

As seen in Table 1, study participants were generally aged 25 and older, had completed 5 or fewer years of education and earned 250 000 pesos ($ 500 USD equivalent) or less per month. Overall, about two-thirds of participants worked as homemakers and the majority were married. A small percentage (about 5%) of women was currently pregnant and 14% were currently being treated for depression.

When we examined demographic characteristics across our intervention (Clinic A) and control (Clinics B and C) clinics, we found that women in Clinic C had the highest levels of education and income. Ethnicity distribution varied by clinic, with a smaller percentage of women in the intervention clinic (17%) reporting being mixed, compared with the control clinics (38 and 33% in Clinics B and C, respectively).

In accordance with eligibility criteria, all study participants smoked at enrollment. A significant proportion of women in our intervention clinic quit smoking during the intervention period; over 15% had quit for the past 7 days and 11% had quit for the past 3 months or longer (Table 2). These proportions were significantly higher than the proportions who quit in the first control clinic (Clinic B), but not in the second control clinic (Clinic C). In these clinics, the 7-day quit rate was 7.8 and 16.2%, respectively. In general, participants smoked few cigarettes; at baseline, 55, 50 and 45% in Clinics A, B and C, respectively, smoked fewer than five cigarettes per day. Across all clinics, there were no significant changes between baseline and final data in the number of cigarettes smoked each day or in the number of times participants attempted to quit smoking. Among Clinic A and Clinic C women, levels of addiction to nicotine were unchanged between baseline and final time points; addiction level dropped at final surveying for Clinic B

Table 1: Socio demographic characteristics of the sample by clinic ($n = 773$)[a]

	Clinic A ($n = 258$)(%)	Clinic B ($n = 259$)(%)	Clinic C ($n = 256$)(%)	Total ($n = 773$)(%)
Age				
15–24	105 (40.7)	102 (40.6)	102 (39.7)	309 (40.3)
25–34	73 (28.3)	74 (29.5)	75 (29.2)	222 (29.0)
35+	80 (31.0)	75 (29.9)	80 (31.1)	235 (30.7)
Education				
Incomplete basic education (7 years or fewer)	90 (34.9)	116 (44.8)	45 (17.6)	251 (32.5)
Complete basic education (8 years)	76 (29.5)	75 (29.0)	59 (23.0)	210 (27.2)
Incomplete high education (9–11 years)	67 (26.0)	50 (19.3)	94 (36.7)	211 (27.3)
High school completed or technical school (12 years or more)	25 (9.7)	18 (6.9)	58 (22.7)	101 (13.1)
Income (per month)				
<100 000 pesos	98 (38.3)	107 (41.3)	68 (26.6)	273 (35.4)
100 000–250 000	136 (53.1)	130 (50.2)	141 (55.1)	407 (52.8)
More than 250 000	22 (8.6)	22 (8.5)	47 (18.4)	91 (11.8)
Ethnicity				
White	93 (36.0)	103 (39.8)	103 (40.2)	299 (38.7)
Mixed	45 (17.4)	100 (38.6)	82 (32.0)	227 (29.4)
Other	15 (5.8)	12 (4.6)	9 (3.5)	36 (4.7)
Don't know	106 (40.7)	44 (17.0)	62 (24.2)	211 (27.3)
Occupation				
Homemaker	179 (69.4)	177 (68.3)	148 (57.8)	504 (65.2)
Student	21 (8.1)	23 (8.9)	38 (14.8)	82 (10.6)
Maid	9 (3.5)	8 (3.1)	10 (3.9)	27 (3.5)
Retail (door-to-door)	14 (5.4)	17 (6.6)	6 (2.3)	37 (4.8)
Other	35 (13.6)	34 (13.1)	54 (21.1)	123 (15.9)
Marital status				
Single	83 (32.2)	91 (35.1)	96 (37.5)	270 (34.9)
Married/living with partner	150 (58.1)	144 (55.6)	145 (56.6)	439 (56.8)
Widowed/separated/divorced	25 (9.7)	24 (9.3)	15 (5.9)	64 (8.3)
Pregnant	15 (5.9)	17 (6.7)	6 (2.4)	38 (5.0)
Currently being treated for depression	46 (17.9)	29 (11.2)	35 (13.7)	110 (14.2)

[a]Percentages are based on non-missing value.

women ($p < 0.01$). When we examined the proportion of individuals who were in the pre-contemplative, contemplative and preparation stages of change, we observed no significant differences between baseline and final survey responses across clinic sites.

Clinics were similar in baseline percentages of women who lived with a smoker in their household; at final surveying, 13% fewer Clinic A women ($p < 0.001$) when compared with 3 and 2% fewer Clinic B and Clinic C women, respectively, lived in a household with a smoker. Beliefs about how difficult it would be to quit smoking were similar at baseline and final time points among Clinic A and Clinic C women. Among Clinic B women, however, a significant shift was observed toward believing that it would be relatively or very difficult to quit.

There were no differences between intervention and control clinics (combined) in the likelihood of having seen a doctor, nurse or midwife or having been told by one of these health professionals to quit smoking (Table 3). Similarly, no differences were noted in the likelihood of having discussed smoking cessation with one's doctor, nurse or midwife. In contrast, individuals in the intervention clinic were more likely than those in the control clinics to have ever received information from the clinic about smoking cessation and to know how to obtain assistance to stop smoking (p value $= 0.01$ and 0.04, respectively, for comparisons between Clinic A versus Clinic B and Clinic C, combined).

When we examined changes in smoking knowledge between intervention and control clinics and at baseline and final surveying, we found few significant differences (Table 4). No significant differences were noted in beliefs about whether smoking produces health effects in smokers, whether it produces health effects

Table 2: Smoking characteristics of the sample by clinic[a]

	Clinic A: EL ROBLE ($n = 204$)					Clinic B: SNE ($n = 193$)					Clinic C: V. SECA ($n = 198$)				
	Baseline		Final		p-value*	Baseline		Final		p-value*	Baseline		Final		p-value*
	n	%	n	%		n	%	n	%		n	%	n	%	
Quit smoke															
Past 7 days[b]	0	0	31	15.2	<0.01	0	0	15	7.8	<0.01	0	0	32	16.2	<0.01
Past 30 days[b]			31	15.2				15	7.8				29	14.6	
Past 3 months			22	10.8				13	6.7				27	13.6	
Cigarettes per day[c]															
<5	111	54.7	112	54.9	0.89	86	44.6	96	49.7	0.51	87	43.9	89	44.9	0.20
5–9	46	22.7	44	21.6		50	25.9	37	19.2		56	28.3	47	23.7	
10–19	33	16.3	37	18.1		36	18.7	42	21.8		47	23.7	40	20.2	
20 +	13	6.4	11	5.4		21	10.9	18	9.3		8	4	22	11.1	
X (S.D.)	6.0	6.3	5.5	5.8		7.2	6.6	6.8	7.2		6.3	4.7	7.0	7.2	
Quit attempts X (S.D.)															
24 h	3.9	9.1	4.8	9.8	0.23	3.4	5.8	3.9	5.5	0. 44	4.8	6.4	5.1	10.2	0.24
72 h[c]	2.4	7.7	2.0	4.8	0.78	2.1	5.6	2.3	4.7	0. 83	2.4	4.8	3.1	6.5	0.01
Addiction[b]															
X (S.D.)	0.3	0.3	0.3	0.3	0.35	0.3	0.3	0.2	0.3	<0.01	0.3	0.3	0.2	0.3	0.22
Stage of change															
Pre-contemplation	90	44.6	85	48	0.78	97	50.5	94	52.5	0. 37	70	36.3	75	44.9	0.17
Contemplation	41	20.3	28	15.8		29	15.1	41	22.9		38	19.7	29	17.4	
Preparation	71	35.1	64	36.2		66	34.4	44	24.6		85	44	63	37.7	
Lives with smokers in household [b,c]	164	80.8	138	68	<0.01	162	83.9	156	80.8	0.35	160	80.8	157	79.3	0.69
Difficulty of quitting[b]															
Very easy	26	12.7	16	9	0.66	29	15	18	10.1	<0.01	20	10.1	29	17.3	0.55
Relatively easy	52	25.5	47	26.6		42	21.8	22	12.3		59	29.8	31	18.5	
Relative difficult	54	26.5	53	29.9		39	20.2	36	20.1		70	35.4	38	22.6	
Very difficult	72	35.3	61	34.5		83	43	103	57.5		49	24.7	70	41.7	

[a]Percentages are based on non-missing values; [b]Significant difference (p-value $< = 0.05$) between clinic A and clinic B; [c]Significant difference (p-value$< = 0.05$) between clinic A and clinic C; [d]Significant difference (p-value$< = 0.05$) between clinic A and clinics B, C combined.
*p-values for comparing responses at final survey with responses at baseline survey by clinic.

Table 3: Health care provider messages to stop smoking by clinic[a]

	Clinic A ($n = 204$)					Clinic B ($n = 193$)					Clinic C ($n = 198$)				
	Baseline		Final		p-value*	Baseline		Final		p-value*	Baseline		Final		p-value*
	n	%	n	%		n	%	n	%		n	%	n	%	
Visited medical doctor	125	61.3	110	53.9	0.11	110	57	111	57.5	1	134	67.7	110	55.6	0.01
Told by medical doctor to quit[b,c]	72	58.5	70	63.6	0.71	50	45	51	45.9	0.70	49	36.8	34	30.9	0.24
Discussed smoking with doctor	26	21.1	18	16.4	0.40	14	12.7	21	18.9	0.61	11	8.3	16	14.5	0.63
Visited nurse	34	16.7	29	14.2	0.57	27	14	30	15.5	0.74	44	22.2	42	21.2	0.90
Told by nurse to quit	16	47.1	13	44.8	1	13	46.4	12	40	0.22	13	29.5	20	47.6	0.68
Discussed smoking with nurse	4	12.1	5	17.2	1	4	14.3	8	26.7	1	3	6.8	11	26.2	1
Visited midwife	130	63.7	117	57.4	0.18	132	68.4	106	54.9	0.01	145	73.2	118	59.6	<0.01
Told by midwife to quit[c]	51	39.5	57	48.7	0.10	66	49.6	44	41.5	0.19	34	23.6	31	26.3	0.30
Discussed smoking with midwife[b]	19	14.7	9	7.7	0.33	18	13.5	20	18.9	0.50	7	4.9	13	11.0	0.08
Received smoking cessation information from clinic[b,c,d]	8	3.9	153	75	< 0.01	12	6.2	11	5.7	1.0	28	14.1	27	13.6	1.0
Know how to get assistance to quit smoking[b,c,d]	43	21.1	144	70.9	< 0.01	20	10.4	12	6.2	0.15	93	47.0	42	21.3	< 0.01

[a]Percentages are based on non-missing values; [b]Significant difference (p-value $< = 0.05$) between clinic A and clinic B; [c]Significant difference (p-value$< = 0.05$) between clinic A and clinic C; [d]Significant difference (p-value$< = 0.05$) between clinic A and clinics B, C combined.
*p-values for comparing responses at final survey with responses at baseline survey by clinic.

in non-smokers nor whether women are more protected than men from the health effects of smoking.

Attitudes about smoking are presented in Table 5. In the three sites there was a positive attitude towards restricting access to cigarettes for children. However, only about 40% of women agreed on limiting cigarette advertisement to adult hours.

DISCUSSION

Our trial shows a reduction of about 15% in the prevalence of smokers after the implementation of the program in the intervention clinic. The magnitude of this effect is similar to that observed in several trials including a meta-analysis of 43 studies (Fiore *et al*., 2000). Our results are comparable with the ones published in the few studies available in Latin America conducted in smoking cessation clinics. Chatkin *et al.* (Chatkin *et al.*, 2004) reported a 14.5% of abstinence rate after a 12-month intervention based on brief counseling in a smoking cessation clinic in Porto Alegre, Brazil. In a randomized clinical trial conducted in Rio de Janeiro, an intervention program using a cognitive–behavioral approach achieved a 20% smoking cessation rate after 12 months (Otero *et al*., 2006). Finally, in a controlled trial conducted in Cuba, Conde *et al.* (Conde *et al.*, 1997) reported a 28.7% smoking cessation rate after 6 months of intervention in a group of 150 smokers who participated in an eight session program.

The effect found in our intervention clinic was significantly higher than that observed in one of the control clinics (Clinic B) but similar to the effect observed in the other control clinic (Clinic C). The lack of difference in smoking cessation rates between the intervention clinic and one of the control clinics (Clinic C) could be explained by several factors. First, both cohorts were significantly different at baseline in terms of socioeconomic status and education level, stages of change for smoking cessation and treatment for depression (Table 1). All these factors have been associated with the likelihood of quitting smoking (Osler and Prescott, 1998). However, after conducting single and multiple adjustments for these variables, there were still not significant differences between groups (data not shown).

Second, there were important differences in the delivery of services between the intervention and the control clinic in Puente Alto. It is possible that the organizational differences observed in Clinic C as well as a more direct

Table 4: Knowledge about smoking by clinic[a]

	Clinic A ($n = 204$)					Clinic B ($n = 193$)					Clinic C ($n = 198$)				
	Baseline		Final		p-value*	Baseline		Final		p-value*	Baseline		Final		p-value*
	n	%	n	%		n	%	n	%		n	%	n	%	
Smoking is addictive[b]	183	89.7	177	87.2	0.51	155	80.3	173	89.6	0.01	180	90.9	188	94.9	0.14
Smoking produces health effects in smokers	201	98.5	201	99	1.0	188	97.9	190	98.4	1.0	196	99	196	99	1.0
Smoking produces health effects in non-smokers	200	98	197	97	0.75	182	94.3	187	96.9	0.33	192	97	193	97.5	1.0
Women are more protected than men from the health effects of smoking[b,c,d,e]	158	77.5	151	74.4	0.54	131	67.9	124	64.2	0.50	171	86.4	176	88.9	0.52

[a]Percentages are based on non-missing values; [b]Significant difference (p-value$< = 0.05$) between clinic A and clinic C; [c]Significant difference (p-value $< = 0.05$) between clinic A and clinic B; [d]percent who disagreed or strongly disagreed; [e]Significant difference (p-value$< = 0.05$) between clinic A and clinics B, C combined.
*p-values for comparing responses at final survey with responses at baseline survey by clinic.

intervention approach could be related to the similar outcomes observed between this clinic and our intervention clinic. The transtheoretical behavior model which underlies the '5 A' strategy has been criticized by its lack of consistency to predict smoking behavior (West, 2005). Our study shows that a systematic approach based on the '5 A' strategy could produce similar benefits than a systematic approach based on an organizational strategy that stimulates preventive interventions for the delivery of care. Both approaches seems significantly better than the standard care deliver at a primary care clinic in Santiago.

One of the organizational factors that has been most related to the impact of smoking cessation intervention in primary care has been length of medical visits. In a meta-analysis that included 43 studies, the authors found a significant dose–response effect on abstinence rate according to the length of contact between the smoker and the provider (Fiore *et al*., 2000). Small differences (i.e. <3 min versus >3 min, versus >10 min) of counseling were associated with significant differences in the estimated relative risk for quitting (OR 1.3, 1.6, 2.3, respectively). About 3 min has been the extra time estimated for delivering brief counseling

Table 5: Attitudes toward restrictive smoking policies by clinic[a]

	Clinic A ($n = 204$)					Clinic B ($n = 193$)					Clinic C ($n = 198$)				
	Baseline		Final		p-value*	Baseline		Final		p-value*	Baseline		Final		p-value*
	n	%	n	%		n	%	n	%		n	%	n	%	
Cigarette advertisement limited to adult hours	88	43.1	75	37.1	0.24	84	43.5	65	33.7	0.05	71	35.9	88	44.4	0.07
No sales to minors	191	93.6	191	94.6	0.81	180	93.3	188	97.4	0.08	176	88.9	191	96.5	0.01
No sales in parks or schools	188	92.2	187	92.6	1.0	183	94.8	185	95.9	0.80	171	86.4	188	94.9	<0.01
Warning should be clearer[b,c,d]	174	85.3	140	69.3	<0.01	167	86.5	154	79.8	0.10	160	81.2	171	86.4	0.23
Restaurants should have smoking and non-smoking areas[b]	200	98.0	184	91.1	0.06	189	97.9	138	71.5	<0.01	194	98.0	178	89.9	<0.01

[a]Percentages are based on non-missing values; [b]Significant difference (p-value $< = 0.05$) between clinic A and clinic B; [c]Significant difference (p-value$< = 0.05$) between clinic A and clinic C; [d]Significant difference (p-value$< = 0.05$) between clinic A and clinics B, C combined.
*p-values for comparing responses at final survey with responses at baseline survey by clinic.

on smoking cessation (Yarnall *et al*., 2003; Katz *et al*., 2004). In our study, length of visit was longer in the control clinic in Puente Alto (Clinic C) versus the intervention clinic (15 versus 12 min). Time has been considered one of the main barriers by primary care physicians to deliver smoking cessation counseling (Blumenthal, 2007).

Finally, it might be possible that the 'doses' of the intervention delivered were insufficient to achieve a higher smoking cessation rate. About 70% of smokers at the intervention clinic were *asked* about their smoking status, received *advice* and were *assessed* about their willingness to quit. This percentage was significantly higher than the one found at the control clinics (i.e. about 15%). However, only about 20% of smokers were involved in a 'motivational discussion' about quitting at the intervention clinic. (Table 2). 'Motivational discussion' was the main strategy of our intervention for *assisting* and *arranging follow-up contacts*. Both components of the '5A' model are essential to improve quitting rates and have been found to be very hard to achieve by health care providers. In a recent trial conducted in nine health care organizations across the United States, the researchers found that only 49% of smokers were given *assistance* to quit and 9% got a *follow-up visit* (Quinn *et al*., 2005).

The lack of compliance in achieving motivational discussions to smokers among health care providers at the intervention clinic might be related to negative attitudes against smoking cessation. *Fatalism, ambivalence* and *invisibility* were the main attitudes found among the primary health care professionals of the three participating clinics in a qualitative investigation conducted before the intervention started (Puschel *et al*., 2006). Similar barriers have been found in other Latin American countries for implementing smoking cessation interventions (Tapia-Conyer *et al*., 1997; Sanchez and Lisanti, 2003). Future interventions should consider these important factors when applying the '5A' model at the primary care system in Chile.

Our baseline and post-intervention results showed a good level of information and supportive attitudes towards smoking restrictive policies among women smokers. This contrasts with the high level of exposure to second hand smoke in the population in Chile. We observed a significant reduction in the percentage of households with a smoker in the intervention clinic (13%) compared with the control clinics (3 and 2%). This is an important finding that might be related with a reduction in the smoking exposure levels of household member participants at the intervention clinic.

Limitations

The sample of this study was selected from a clinical population of women who attended three primary care clinics in Santiago. Therefore it does not represent women of childbearing age at the community level. However, from a primary care perspective this is the appropriate group of interest which would benefit the most from brief counseling interventions models such as the NCI 5 As protocol (U.S. Department ofHealth and Human Services, 1994; U.S. Preventive Services Task Force, 2003). Understanding beliefs, attitudes and practices in this group of women is very useful in designing successful interventions at the primary care level.

Another limitation of our study is that it considered a short-term period of only 1–3 months of smoking assessment. Significant differences were still found for smoking cessation during the past 3 months between the intervention clinic compared with control Clinic B and lack of differences were observed compared with control Clinic C. We have no information of whether these differences remain after a longer period of time.

The quasi-experimental design of our study could affect the internal validity of our results given that the samples selected would have significant differences not possible to consider in our final analysis. In fact, the cohort of one of our control clinics (Clinic C) was significantly different in some important variables such as socioeconomic status and stages of change. We did a post-intervention adjustment for these variables and the results did not change significantly. Another limitation of our design is related to the differences in the organization of care delivered in each clinic. These differences might have affected the comparability of the interventions (standard care) between the control sites and the intervention clinic. However, our quasi-experimental design increases the external validity of our results given that it tested the feasibility of implementing a systematic intervention in the entire clinic rather than in a subgroup of women randomly selected within the clinic.

A cluster randomized trial of several clinics is clearly the ideal design that should be implemented in the future.

CONCLUSIONS

This study shows that a brief smoking cessation intervention based on a primary care setting in a low socioeconomic population in Santiago could have a significant reduction in the smoking prevalence of women smokers of childbearing age. Most women affiliated to the intervention clinic were asked, assessed and received advice for quitting. They signficantly improved their knowledge on how to get assistance for quitting. The percentage of women that engaged in a motivational discussion about how to quit was relatively low in the intervention and control clinics. Smoking behaviors of women smokers seeking care at three primary care clinics in Santiago is characterized by a large percentage of light smokers, with a low self-efficacy for quitting and with very low information on where and how to get assistance to quit. About a third of these women are willing to make an attempt at quitting in the short term.

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