Dentist versus physician cessation counselling: A secondary analysis of the US Tobacco Use Supplement to the Current Population Survey

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ABSTRACT

INTRODUCTION We investigated associations between counseling by a dentist or physician and quit intentions/attempts using longitudinal data.

METHODS Analyses were performed with longitudinal data from the 2010–2011 Tobacco Use Supplement to the Current Population Survey (TUS-CPS). Participants were followed over a one-year period and provided repeated measurements. Multivariable logistic regression was used to measure associations between cessation counseling and study endpoints. All data were weighted to yield nationally representative estimates.

RESULTS Of smokers who visited a dentist at both baseline and follow-up in TUS-CPS, 51.7% were not counselled on either occasion; only 19.2% were counselled on both occasions. In contrast, 52.6% of smokers who visited a physician at both baseline and follow-up at 1 year were counseled on both occasions and only 17.6% were not counseled on any occasion. Dentist-only advice at baseline was associated with higher odds of intention to quit in the next 30 days (AOR=1.96; 95% CI: 1.04–3.68), but not with a past-year quit attempt. Physician-only advice at baseline was associated with intention to quit in the next 6 months (AOR=1.52; 95% CI: 1.18–1.94), as was advice delivered by both a dentist and physician at baseline (AOR=1.54; 95% CI: 1.05–2.28).

CONCLUSIONS Dental patients are less likely to receive cessation counselling at every visit than medical patients. Intensified efforts are needed to increase counselling within dental settings.

INTRODUCTION

Tobacco smoking is causally linked to many systemic diseases of almost all the organs of the body, and with several oral conditions, including dental caries, periodontal disease, dental staining, cancer, and COVID-19[1-5]. Tobacco use accounts for nearly 480000 deaths in the US and about 6 million deaths worldwide annually[1,6]. One of the Healthy People 2020 objectives (TU-12) is to reduce cigarette smoking prevalence among US adults to ≤12% by 2020[7]. While most smokers want to quit, cigarette smokers may make multiple quit attempts before achieving successful long-term cessation or abstinence[8-10], and smoking cessation counseling by a health professional can help[11-14]. The US Preventive Services Task Force (USPSTF) gave a Grade A recommendation for smoking cessation counseling among all adults and pregnant women[15]. The U.S. Public Health Service (USPHS) Clinical Practice guidelines recommend that healthcare professionals follow the following five steps to help patients quit[16]: 1) Ask about tobacco use status for every patient at every visit; 2)Advise every tobacco user to quit; 3) Assess the willingness to make a cessation attempt; 4) Assist in cessation attempt; and 5) Arrange follow-up care as needed[14]. This 5As model is designed to be a continuum; merely performing the 'Ask' component is necessary but not sufficient for a behavioral change when there are absent efforts to engage further with advice or assistance to quit[16].

Despite the widespread acknowledgement of the role of dental providers in cessation counseling[17,18], it is well documented that while most dental providers ask about their patients' smoking status; only a relatively smaller percentage advice or assist their patients to quit[19-21]. The percentage of dentists regularly engaging in cessation counseling is lower compared to other healthcare providers[19,22]; this is also reflected in the rather low target for general dentists within the Healthy People framework which seeks to increase tobacco cessation counseling in health care settings (TU-10.3: by 2020, 39.3% of general dentists should report that 'they or their dental team usually or always personally counsel patients who use tobacco products on tobacco cessation')[7].

To date, however, there is a paucity of data regarding effectiveness of dentist interventions to help smokers quit. The frequency, consistency, and intensity of cessation counseling delivered within interventional studies may differ quite markedly from that observed in routine clinical care where wide variations may be observed from provider to provider. To fill these gaps in knowledge, this study examined effectiveness of dentist cessation counseling among a nationally representative sample of US smokers, using longitudinal data.

METHODS

Data source

We use data from a nationally representative panel of US smokers who participated in the longitudinal component of the 2010–2011 Tobacco Use Supplement to the Current Population Survey (TUS-CPS)[23], a national survey of the civilian non-institutionalized US adult population. TUS-CPS collects a multistage stratified area probability sample of households and is conducted in person or by proxy. The baseline data collection was in May 2010; the follow-up was in May 2011. Our analytic sample comprised current cigarette smokers who completed both the baseline and the follow-up surveys at 1 year. Our analytical approach was repeated cross-sectional, not longitudinal.

Measures

The measures of interest were each assessed at both baseline and follow-up at 1 year. Separate questions were asked for dentist versus physician cessation counselling. Current cigarette smokers were defined as adults aged ≥18 years who had smoked at least 100 cigarettes in their lifetime and currently smoked either every day or some days.

Patient-reported receipt of assistance interventions from a provider

TUS-CPS ascertained visits to physicians and dentists from 'Yes' responses to the questions: 'In the past 12 months, have you seen a medical doctor?' and 'In the past 12 months, have you seen a dentist?'. Receipt of cessation counseling from a physician or a dentist (assessed separately) was assessed only among those who had visited the relevant provider in the past 12 months, and was defined as a 'Yes' response to 'During the past 12 months, did any [medical doctor/dentist] advise you to stop smoking?'.

Among current smokers who had visited a physician or a dentist in the past 12 months, and were advised to quit smoking, the survey assessed implementation of assistance measures with a stem question, followed by several multiple-choice options. The stem question for physician and dentist patients separately, was: 'In the past 12 months, when a [medical doctor/dentist] advised you to quit smoking, did the [doctor/dentist] also . . .', with multiple choice options: 1) 'Suggest that you call or use a telephone help line or quit line?'; 2) 'Suggest that you use a smoking cessation class, program, or counseling?'; 3) 'Suggest that you set a specific date to stop smoking?'; 4) 'Recommend or Prescribe a nicotine product such as a patch, gum, lozenge, nasal spray or inhaler?'; and 5) 'Prescribe a pill such as Chantix, Varenicline, Zyban, Bupropion, or Wellbutrin?'. Patients were classified to have received any 'assist' intervention if they affirmed receiving ≥1 of the five interventions.

Based on these data, we created three sets of composite variables to assess dose-response in exposure to smoking cessation counseling: 1) Consistency of dentist or physician cessation intervention: neither baseline nor follow-up, baseline only, follow-up only, or both baseline and follow-up; 2) Intensity of dentist or physician cessation intervention: no intervention at all, advice only (minimal intervention), or advice plus assist (intense intervention); and 3) Frequency of exposure to cessation across all providers, both dentists and physicians combined: no provider at all, dentist only, physician only, or both a dentist and physician.

Quit intentions and attempts

Current smokers were asked the following two questions to assess quit intentions: 'Are you planning to quit within the next 30 days?', 'Are you seriously considering quitting smoking within the next 6 months?' Categorical response options were 'Yes' or 'No'. A quit attempt in the past 12 months was defined as either a report by a former smoker that they had quit in the past 12 months, or an affirmative response by a current smoker that 'during the past 12 months, [they] stopped smoking for one day or longer because [they] were trying to quit smoking'. These three indicators: a past-year quit attempt, an intention to quit in the next 30 days, or in the next 6 months, represent different levels within the transtheoretical model of behavioral change. Smokers who express a desire to quit in the somewhat distant future (6 months) may be in the contemplation stage, whereas those committed to quitting urgently (next 30 days) may be in the preparatory phase; a quit attempt signifies action.

Sociodemographic characteristics

These included race/ethnicity (Hispanic, White, Black, other

race), age (≤24, 25–44, 45–64, or ≥65 years), gender (male or female), education level (<12 years, no diploma; 12 years, general educational development certificate; or >12 years), annual household income (<$20000; $20000–$49999; $50000–$99999; or ≥$100000), and marital status (married, widowed, divorced, separated, or single).

Statistical analysis

Percentages with 95% confidence intervals were computed to characterize the study population and receipt of cessation counseling. Differences in prevalence were assessed using the standard χ^2 statistic. Multivariable analyses were performed to examine the effect of consistency, intensity, and frequency of exposure to cessation counseling. To account for both consistency and intensity of cessation counseling exposure from either a dentist or physician, the time and intensity elements were combined; separate analyses examined receipt of either minimal intervention (advice only) or intense intervention (advice plus assist), respectively at: 1) neither baseline nor follow-up, 2) baseline only, 3) follow-up only, or 4) both baseline and follow-up.

The fitted multivariable logistic regression analyses controlled for sex, age, race/ethnicity, annual household income, education level, marital status, and non-cigarette tobacco use at baseline. The denominators for analyses varied depending on the exposure of interest as described below. For analyses examining the impact of dentist counseling on smoking cessation (singly without accounting for physician counseling), the denominator was defined as adults who were current cigarette smokers at baseline (regardless of their smoking status at follow-up) and reported a dental visit either at baseline or at follow-up. A similar definition was employed for physician counseling. For analyses examining the impact of multi-provider counseling on smoking cessation (jointly, accounting for both dentist and physician counseling), the denominator was adults who were current cigarette smokers at baseline (regardless of their smoking status at follow-up) and who reported a visit to a dentist and/or a physician at either baseline or follow-up. All data were weighted to account for the complex survey design.

RESULTS

In terms of sample sizes, there were n=2815 current smokers at baseline, 97.9% of whom provided information at follow-up (n=1181). Overall, 40.97% (n=1181) of smokers visited a dentist at baseline, while 64.88% (n=1874) visited a physician at baseline. Smokers who visited a health provider (physician or dentist) differed systematically from those not reporting a visit in having a higher proportion of females and older persons. Other differences are shown in Table 1. Among all smokers at baseline, 49.3 reported a quit attempt, 24.1% no longer smoked at follow-up, and 8.6% reported sustained quitting (i.e. ≥6 months).

Of current cigarette smokers who reported a dentist visit at both baseline and follow-up (n=560), over half (51.7%) were not counseled on either occasion, 17.0% were counseled only at baseline, 12.1% only at follow-up, and 19.2% reported receipt of counseling on both occasions. In contrast, over half (52.6%) of all smokers who saw a physician at both baseline and follow-up (n=1152) were counseled to quit smoking on both occasions; only 17.6% did not receive counseling on any occasion; 17.4% were counseled at baseline only, and 12.5% in the follow-up population only.

Among the population of smokers at baseline and saw a dentist at either baseline or follow-up, Supplemental file Table 1 shows prevalence of quitting-related outcomes depending on frequency of dentist intervention to quit smoking. With one exception, dentist delivery of advice only (i.e. minimal intervention) was not significantly associated with any study endpoint in adjusted analyses, regardless of timing of the cessation intervention (baseline only, follow-up only, or both baseline and follow-up). The sole significant finding was that dentist delivery of a minimal intervention at follow-up was significantly associated with intention to quit smoking in the next 6 months (AOR=1.62; 95% CI: 1.06–2.49) (Table 2). Smokers who received advice only from a physician at both baseline and follow-up, however, had significantly higher odds than those not receiving such advice at either baseline or follow-up, for all study endpoints, namely: recent quit attempt (AOR=2.23; 95% CI: 1.68–2.96), intention to quit in the next 30 days (AOR=1.72; 95% CI: 1.08–2.71), and intention to quit in the next 6 months (AOR=2.12; 95% CI: 1.61–2.78). Those exposed to such minimal intervention from a physician only at follow-up also had higher odds of making a quit attempt (AOR=1.94; 95% CI: 1.36–2.78) or intending to quit in the next 30 days (AOR=1.75; 95% CI: 1.08–2.82); results were, however, not significant for intention to quit in 6 months.

Within unadjusted analysis, dentist delivery of intense intervention (advice plus assist) was associated with higher prevalence of quit intentions compared to minimal intervention (advice only). For example, 61.2% of smokers who received intense dentist intervention at both baseline and follow-up intended to quit smoking in the next 12 months, compared to 49.9% of those who received minimal dentist intervention at both baseline and follow-up (Supplementary file Table 1). Furthermore, 17.3% of smokers who received intense dentist intervention at both baseline and follow-up intended to quit smoking in the next 30 days, compared to 12.7% of those who received minimal dentist intervention at both baseline and follow-up. Within adjusted analysis, dentist delivery of intense interventions (advice plus assist) was not significantly associated with any study endpoint, regardless of whether the intervention was delivered at baseline only, follow-up only, or both baseline and follow-up (Table 3). However, physician delivery of intense intervention at follow-up, but not at baseline, was positively associated with all study endpoints, namely: past-

Table 1. Characteristics of study population at baseline, TUS-CPS (2010–2011)

Characteristics of all current smokers at baseline			Characteristics by self-reported dental visit at baseline					Characteristics by self-reported physician visit at baseline				
			Visit		No visit		p	Visit		No visit		p
	n	%	n	%	n	%		n	%	n	%	
Overall	2.815	100	1.181	100	1.546	100		1874	100	860	100.0	
Sex												
Male	1.326	54	489	47.1	786	58.2	<0.001	777	47.1	499	65.3	<0.001
Female	1.489	46	692	52.9	760	41.8		1.097	52.9	361	34.7	
Age (years)							0.0152					
18–24	141	14.3	47	11	90	16.9		75	11.9	63	19.5	<0.001
25–44	1.030	37.1	455	39.1	548	35.8		635	34.2	367	42.4	
45–64	1.366	40.4	577	42.5	738	38.4		942	43.4	378	34	
≥65	278	8.2	102	7.5	170	8.8		222	10.6	52	4.2	
Race/ethnicity						0						
White	2.229	73.6	975	79.3	1.185	69.5	<0.001	1.511	76.1	656	68.9	0.0005
Black	261	10.9	84	7.5	172	13.6		179	11.4	77	10.5	
Hispanic	183	10.5	63	8.1	110	11.7		97	8.2	76	14	
Other	142	5.1	59	5.1	79	5.2		87	4.3	51	6.6	
Annual household income (1000 US$)									0			
<20	1.072	38.2	438	36.4	602	39.5	<0.001	715	39.1	329	36.6	0.100
20–49	774	25.9	395	31.9	361	22.1		529	25.8	228	26.6	
50–99	736	28.1	195	19	514	34.3		461	26.5	249	30.8	
≥100	233	7.8	153	12.7	69	4.1		169	8.6	54	6.1	
Education level												
<High school	455	18.2	119	11.3	324	22.8	<0.001	272	16.5	172	21.2	0.0098
High school graduate	1.110	38.3	426	35.3	649	40.6		728	37.3	350	40.3	
Some college	850	30.7	398	35	420	27.3		585	31.8	233	27.7	
College or higher	400	12.9	238	18.4	153	9.4		289	14.4	105	10.8	

Continued

Table 1. Continued

Characteristics of all current smokers at baseline			Characteristics by self-reported dental visit at baseline				p	Characteristics by self-reported physician visit at baseline				p
			Visit		No visit			Visit		No visit		
	n	%	n	%	n	%		n	%	n	%	
Marital status												
Married	1.221	41.7	589	49.5	595	36.1	<0.001	850	44.2	338	36.9	<0.001
Widowed/divorced/ separated	929	28.3	338	25.2	561	30.3		641	30.2	259	24.3	
Single, never married	665	30	254	25.4	390	33.7		383	25.6	263	38.8	
Other tobacco use												
Exclusive cigarette smoker	2.554	88.8	1.098	91	1.434	90.6	0.9485	1.747	91.3	789	89.3	0.4767
Dual user	186	8.5	81	8.5	104	8.8		119	7.9	66	10	
Unknown	75	2.8	2	0.4	8	0.6		8	0.7	5	0.7	
Past year quit attempt		**% (95% CI)**		**% (95% CI)**		**% (95% CI)**			**% (95% CI)**		**% (95% CI)**	
No	1436	50.7 (48.3–53.0)	595	50.4 (46.9–53.9)	801	51.3 (48.1–54.5)	0.7009	943	50 (47.2–52.9)	457	52.5 (48.3–56.7)	0.3411
Yes	1.334	49.3 (47–51.7)	568	49.6 (46.1–53.1)	722	48.7 (45.5–51.9)		900	50 (47.1–52.8)	393	47.5 (43.3–51.7)	
Intend to quit in next 30 days?												
No	1781	88.6 (86.8–90.2)	738	88 (85.0–90.5)	997	89.2 (86.8–91.2)	0.4989	1.199	88.5 (86.3–90.5)	538	89.1 (85.8–91.6)	0.7793
Yes	249	11.4 (9.8–13.2)	108	12.0 (9.5–15.0)	133	10.8 (8.8–13.2)		165	11.5 (9.5–13.8)	77	11.0 (8.4–14.2)	
Intend to quit in next 6 months?												
No	1245	61.2 (58.6–63.8)	500	59.6 (55.6–63.4)	713	62.9 (59.3–66.3)	0.2163	800	58.6 (55.4–61.7)	414	66.8 (62.1–71.2)	0.0044
Yes	840	38.8 (36.2–41.4)	372	40.4 (36.6–44.4)	440	37.1 (33.7–40.7)		599	41.4 (38.3–44.6)	216	33.2 (28.8–37.9)	
Quit for ≥6 months												
No	2587	91.4 (89.8–92.7)	1070	90.1 (87.7–92.1)	1436	92.1 (89.9–93.9)	0.194	1.717	91.1 (89–92.8)	795	91.7 (88.9–93.8)	0.7017
Yes	228	8.6 (7.3–10.2)	111	9.9 (7.9–12.3)	110	7.9 (6.1–10.1)		157	8.9 (7.2–11.0)	65	8.3 (6.2–11.1)	
Currently not smoking												
No	2190	75.9 (73.8–77.9)	907	74.9 (71.6–77.9)	1212	76.7 (73.8–79.4)	0.3937	1.471	76.4 (73.7–78.8)	652	74.9 (71.1–78.4)	0.5235
Yes	625	24.1 (22.1–26.2)	274	25.1 (22.1–28.4)	334	23.3 (20.6–26.2)		403	23.7 (21.2–26.3)	208	25.1 (21.6–28.9)	

TUS-CPS: Tobacco Use Supplement to the Current Population Survey. The denominators in the table above are based on only baseline data in May 2010, and do not account for follow-up information. All percentages are weighted. All sample sizes are unweighted. AOR: adjusted odds ratio.

Table 2. Relationship between delivery of minimal intervention (advice only) by dentist and physicians and cessation-related outcomes among persons who smoked at baseline, TUS-CPS (2010–2011)

Characteristics	Minimal dentist intervention			Minimal physician intervention		
	Past year quit attempt AOR (95% CI)	Intention to quit in the next 30 days AOR (95% CI)	Intention to quit in the next 6 months AOR (95% CI)	Past year quit attempt AOR (95% CI)	Intention to quit in the next 30 days AOR (95% CI)	Intention to quit in the next 6 months AOR (95% CI)
Advice-only intervention						
Not delivered at any time (Ref.)	1	1	1	1	1	1
Baseline only	1.25 (0.86–1.83)	1.18 (0.65–2.11)	1.13 (0.79–1.64)	1.21 (0.84–1.74)	0.94 (0.51–1.73)	1.04 (0.74–1.46)
Follow-up only	1.47 (0.96–2.27)	1.28 (0.74–2.21)	1.62 (1.06–2.49)	1.94 (1.36–2.78)	1.75 (1.08–2.82)	1.26 (0.9–1.77)
Both baseline and follow-up	1.08 (0.64–1.81)	1.14 (0.56–2.31)	1.58 (0.97–2.56)	2.23 (1.68–2.96)	1.72 (1.08–2.71)	2.12 (1.61–2.78)
Sex						
Male						
Female	1.3 (1.03–1.63)	0.99 (0.71–1.40)	1.29 (1.03–1.61)	1.18 (0.93–1.49)	0.94 (0.66–1.32)	1.22 (0.97–1.53)
Age (years)						
18–24 (Ref.)	1	1	1	1	1	1
25–44	0.64 (0.37–1.08)	1.05 (0.47–2.32)	0.95 (0.56–1.61)	0.57 (0.33–0.98)	0.96 (0.43–2.12)	0.88 (0.52–1.49)
45–64	0.58 (0.33–0.99)	0.95 (0.42–2.16)	0.95 (0.56–1.63)	0.47 (0.27–0.82)	0.86 (0.38–1.96)	0.83 (0.49–1.41)
≥65	0.4 (0.21–0.77)	0.8 (0.30–2.17)	0.66 (0.35–1.25)	0.29 (0.15–0.56)	0.66 (0.24–1.86)	0.49 (0.26–0.93)
Race/ethnicity						
White (Ref.)	1	1	1	1	1	1
Black	1.17 (0.80–1.72)	1.19 (0.69–2.05)	1.27 (0.87–1.85)	1.2 (0.82–1.75)	1.21 (0.7–2.09)	1.27 (0.86–1.86)
Hispanic	1.05 (0.65–1.69)	0.63 (0.29–1.36)	1.03 (0.64–1.67)	1.15 (0.7–1.87)	0.67 (0.31–1.45)	1.08 (0.67–1.75)
Other	1.41 (0.84–2.38)	0.84 (0.38–1.84)	1.1 (0.66–1.85)	1.41 (0.84–2.37)	0.81 (0.37–1.77)	1.07 (0.64–1.78)
Annual household income (1000 US$)						
<20 (Ref.)	1	1	1	1	1	1
20–49	0.89 (0.66–1.19)	0.95 (0.63–1.43)	1.24 (0.94–1.64)	0.87 (0.65–1.18)	0.92 (0.61–1.39)	1.25 (0.95–1.65)
50–99	1.06 (0.79–1.42)	1.02 (0.65–1.59)	1.12 (0.83–1.50)	1.03 (0.76–1.38)	0.99 (0.64–1.55)	1.08 (0.8–1.45)
≥100	1.14 (0.72–1.81)	1.08 (0.58–2.00)	0.94 (0.61–1.47)	1.03 (0.64–1.66)	0.92 (0.48–1.74)	0.87 (0.56–1.36)

Continued

Table 2. Continued

Characteristics	Minimal dentist intervention			Minimal physician intervention		
	Past year quit attempt AOR (95% CI)	Intention to quit in the next 30 days AOR (95% CI)	Intention to quit in the next 6 months AOR (95% CI)	Past year quit attempt AOR (95% CI)	Intention to quit in the next 30 days AOR (95% CI)	Intention to quit in the next 6 months AOR (95% CI)
Education level						
<High school (Ref.)	1	1	1	1	1	1
High school graduate	1.05 (0.75–1.48)	0.83 (0.51–1.34)	1.03 (0.73–1.44)	1.03 (0.73–1.45)	0.82 (0.51–1.32)	1.01 (0.72–1.42)
Some college	1.02 (0.7–1.48)	0.75 (0.43–1.31)	1.04 (0.72–1.50)	0.98 (0.67–1.43)	0.73 (0.42–1.27)	1.00 (0.69–1.45)
College or higher	0.93 (0.6–1.44)	0.97 (0.55–1.73)	1.30 (0.85–1.98)	0.88 (0.56–1.37)	0.99 (0.56–1.74)	1.27 (0.83–1.95)
Marital status						
Married (Ref.)	1	1	1	1	1	1
Widowed/divorced/separated	0.89 (0.68–1.16)	0.93 (0.63–1.35)	0.82 (0.63–1.06)	0.90 (0.69–1.18)	0.93 (0.63–1.36)	0.82 (0.63–1.07)
Single, never married	0.68 (0.48–0.96)	0.88 (0.57–1.37)	0.90 (0.65–1.23)	0.69 (0.49–0.98)	0.92 (0.59–1.41)	0.91 (0.66–1.25)

TUS-CPS: Tobacco Use Supplement to the Current Population Survey. AOR: adjusted odds ratio.

Table 3. Relationship between delivery of intense intervention (advice plus assist) by dentist and physicians and cessation-related outcomes, TUS-CPS (2010–2011)

	Intense dentist intervention			Intense physician intervention		
	Past year quit attempt AOR (95% CI)	Intention to quit in the next 30 days AOR (95% CI)	Intention to quit in the next 6 months AOR (95% CI)	Past year quit attempt AOR (95% CI)	Intention to quit in the next 30 days AOR (95% CI)	Intention to quit in the next 6 months AOR (95% CI)
Advice + Assist						
Not delivered at any time (Ref.)	1	1	1	1	1	1
Baseline only	1.7 (0.84–3.42)	2.05 (0.78–5.38)	0.71 (0.33–1.50)	1.1 (0.78–1.54)	1.26 (0.67–2.35)	1.06 (0.75–1.50)
Follow-up only	1.47 (0.71–3.05)	1.87 (0.85–4.09)	2.35 (1.21–4.55)	2.03 (1.44–2.87)	2.55 (1.59–4.09)	1.89 (1.34–2.68)
Both baseline and follow-up	1.04 (0.32–3.41)	1.71 (0.42–6.91)	2.32 (0.67–7.96)	2.11 (1.51–2.93)	1.84 (1.17–2.90)	2.72 (1.95–3.80)
Sex						
Male						
Female	1.29 (1.03–1.62)	0.99 (0.71–1.39)	1.29 (1.03–1.61)	1.22 (0.97–1.54)	0.93 (0.66–1.31)	1.22 (0.98–1.54)

Continued

Table 3. Continued

	Intense dentist intervention			Intense physician intervention		
	Past year quit attempt	Intention to quit in the next 30 days	Intention to quit in the next 6 months	Past year quit attempt	Intention to quit in the next 30 days	Intention to quit in the next 6 months
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Age (years)						
18–24 (Ref.)	1	1	1	1	1	1
25–44	0.65 (0.38–1.11)	1.08 (0.49–2.39)	0.95 (0.56–1.62)	0.57 (0.34–0.97)	0.92 (0.41–2.04)	0.87 (0.51–1.47)
45–64	0.58 (0.34–1.01)	0.98 (0.43–2.23)	0.94 (0.55–1.61)	0.48 (0.28–0.83)	0.82 (0.36–1.86)	0.79 (0.46–1.35)
≥65	0.41 (0.21–0.79)	0.83 (0.3–2.24)	0.65 (0.34–1.23)	0.31 (0.16–0.6)	0.63 (0.23–1.7)	0.51 (0.27–0.96)
Race/ethnicity						
White (Ref.)	1	1	1	1	1	1
Black	1.16 (0.79–1.69)	1.17 (0.68–2.02)	1.24 (0.85–1.81)	1.19 (0.81–1.74)	1.21 (0.7–2.10)	1.27 (0.87–1.87)
Hispanic	1.01 (0.62–1.64)	0.62 (0.29–1.35)	0.99 (0.61–1.61)	1.05 (0.64–1.72)	0.69 (0.32–1.50)	1.05 (0.64–1.71)
Other	1.39 (0.83–2.33)	0.83 (0.38–1.82)	1.09 (0.65–1.83)	1.49 (0.88–2.54)	0.88 (0.4–1.90)	1.15 (0.68–1.95)
Annual household income (1000 US$)						
<20 (Ref.)	1	1	1	1	1	1
20–49	0.89 (0.66–1.19)	0.94 (0.62–1.42)	1.25 (0.95–1.66)	0.89 (0.65–1.21)	0.92 (0.6–1.41)	1.27 (0.96–1.69)
50–99	1.05 (0.78–1.41)	1.01 (0.65–1.57)	1.10 (0.82–1.48)	1.05 (0.78–1.41)	1.01 (0.64–1.59)	1.12 (0.82–1.51)
≥100	1.16 (0.73–1.84)	1.05 (0.57–1.94)	0.97 (0.62–1.52)	1.10 (0.7–1.75)	0.99 (0.53–1.86)	0.9 (0.57–1.42)
Education level						
<High school (Ref.)	1	1	1	1	1	1
High school graduate	1.05 (0.74–1.48)	0.82 (0.51–1.33)	1.03 (0.74–1.44)	1.04 (0.73–1.48)	0.84 (0.52–1.36)	1.03 (0.73–1.46)
Some college	1.02 (0.70–1.47)	0.73 (0.42–1.27)	1.06 (0.73–1.52)	0.98 (0.67–1.43)	0.74 (0.42–1.30)	0.99 (0.68–1.45)
College or higher	0.93 (0.60–1.44)	0.98 (0.55–1.74)	1.36 (0.89–2.06)	0.95 (0.61–1.49)	1.04 (0.58–1.85)	1.36 (0.88–2.10)
Marital status						
Married (Ref.)	1	1	1	1	1	1
Widowed/divorced/separated	0.9 (0.69–1.17)	0.93 (0.64–1.37)	0.81 (0.63–1.06)	0.91 (0.69–1.19)	0.91 (0.62–1.33)	0.84 (0.64–1.09)
Single, never married	0.68 (0.48–0.96)	0.89 (0.57–1.38)	0.88 (0.64–1.21)	0.66 (0.47–0.94)	0.86 (0.55–1.32)	0.87 (0.63–1.19)

TUS-CPS: Tobacco Use Supplement to the Current Population Survey. AOR: adjusted odds ratio.

year quit attempts (AOR=2.03; 95% CI: 1.44–2.87), intention to quit smoking in the next 30 days (AOR=2.55; 95% CI: 1.59–4.09), and in the next 6 months (AOR=1.89; 95% CI: 1.34–2.68). Receipt of intense intervention from a physician at both baseline and follow-up also increased the odds for all study endpoints: past-year quit attempts (AOR=2.11; 95% CI: 1.51–2.93), intention to quit smoking in the next 30 days (AOR=1.84; 95% CI: 1.17–2.90), as well as in the next 6 months (AOR=2.72; 95% CI: 1.95–3.80).

Examination of the independent effects of dentist versus physician cessation counseling (advice with or without assistance) within mutually exclusive categories found that dentist-only any counseling at baseline was associated with higher likelihood of intending to quit in the next 30 days (AOR=1.96; 95% CI: 1.04–3.68); this was the only statistically significant outcome (Supplemental file Table 2). Physician-only any counseling at baseline was significantly associated with intention to quit in the next 6 months (AOR=1.52; 95% CI: 1.18–1.94), as was brief counseling delivered by both a dentist and physician at baseline (AOR=1.54; 95% CI: 1.05–2.28). Physician-only any counseling delivered at any point during the study period (in addition to baseline) increased the likelihood of all study endpoints: past-year quit attempt (AOR=1.83; 95% CI: 1.38–2.42), intention to quit smoking in the next 30 days (AOR=1.59; 95% CI: 1.01–2.50), and intention to quit in the next 6 months (AOR=1.50; 95% CI: 1.14–1.96).

DISCUSSION

Our analyses showed that dental patients were less likely to consistently receive cessation counseling, compared to medical patients. While over half (52.6%) of smokers received cessation counseling from a physician at both baseline and follow-up, among those who reported both visits, the corresponding percentage among dental patients was 19.2% among those reporting a dental visit at both baseline and follow-up. While we cannot tell from the data whether the visit was to the same physician or dentist, these data confirm previous reports showing much lower rates of cessation counseling among dentists than physicians[19,22,24-26].

Smokers who received advice at baseline only from a dentist but not a physician were likely to indicate an intention to quit smoking in the short-term (30 days), no associations with a quit attempt were observed though. Dental practice is highly procedure-oriented (e.g. restorations, extractions); dentists may be counseling their patients against smoking mainly to prevent treatment failure – a very immediate outcome. Helping patients grasp the enormity and lifelong damage caused by smoking can motivate a quit attempt[14,27]. Our findings indicate that the more patients hear providers reinforce these messages at different visits, the higher their likelihood of making a quit attempt. We found that smokers whose most recent cessation counseling was a year ago (i.e. at baseline) did not differ significantly from those who never received cessation counseling at all, whereas those whose most recent cessation counseling (advice plus assist) was at follow-up, had higher odds of making a quit attempt. The repeated nature of dental visits and ongoing relationship between patients and dental professionals builds a foundation of trust and creates avenues to intervene among smokers[28]. Hygiene visits are an ideal time to provide tobacco-related education because of the length of the visit (e.g. 30–60 minutes), the rapport between professional and patient, and the ability to give feedback on oral health status, and potential implications for overall health[29].

Differences existed in those who visited a physician or dentist, by age, sex, race/ethnicity, and other characteristics. The relatively low rates of access to health providers among disadvantaged populations underscore the need to explore cessation counseling delivery in non-traditional settings, including non-healthcare settings[13,30,31]. Faith leaders, guidance counselors, and community gatekeepers, are all trusted sources of information with whom smokers may interact more often than a heath provider[32,33].

Limitations

Among the limitations of our results is the potential for measurement error. There is a possibility that individuals who were asked whether they smoked could misreport this as advice to quit, even if such a question was not followed up with advice or assistance to quit; conversely, the relatively long recall period (past 12 months) could result in individuals forgetting they were counseled to quit smoking, especially if this counseling was overshadowed by a tragic health outcome or a health scare. Furthermore, data only existed for dentists and physicians, and not other types of health providers who also deliver cessation counseling, including nurses, pharmacists, psychologists, or others. We also lack data on frequency of visits to dental or medical providers, or the type of provider (i.e. generalists vs specialist).

CONCLUSIONS

This study demonstrated that dental patients were less likely to consistently receive cessation counseling from a dentist compared to medical patients from a physician. Of smokers who visited a dentist in both surveys, less than 1 in 5 were counseled on both occasions, compared to 1 in 2 of medical patients. Dentist-only advice to quit delivered at the baseline survey was associated with an intention to quit smoking in the next 30 days but was not associated with a quit attempt. Physician-only advice as well as exposure to both dentist and physician advice was associated with quit attempts. Enhanced and sustained efforts are needed to increase cessation counseling within dental settings, with a special focus on enhancing the frequency, intensity, and consistency of those health messages.

REFERENCES

1. Centers for Disease Control and Prevention. The Health

Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General. CDC; 2014. Accessed February 2, 2023. https://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/index.htm
2. Tomar SL, Hecht SS, Jaspers I, Gregory RL, Stepanov I. Oral Health Effects of Combusted and Smokeless Tobacco Products. Adv Dent Res. 2019;30(1):4-10. doi:10.1177/0022034519872480
3. Vardavas CI, Nikitara K. COVID-19 and smoking: A systematic review of the evidence. Tob Induc Dis. 2020;18(March). doi:10.18332/tid/119324
4. Lariscy JT. Smoking-attributable mortality by cause of death in the United States: An indirect approach. SSM - Popul Heal. 2019;7:100349. doi:10.1016/j.ssmph.2019.100349
5. Carter BD, Abnet CC, Feskanich D, et al. Smoking and mortality--beyond established causes. N Engl J Med. 2015;372(7):631-640. doi:10.1056/NEJMsa1407211
6. Centers for Disease Control and Prevention. Smoking & Tobacco Use: Fast Facts and Fact Sheets. CDC; 2021. Accessed February 2, 2023. https://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/index.htm
7. Centers for Disease Control and Prevention. National Center for Health Statistics: Healthy People 2020 Errata Page. CDC; 2021. Accessed February 2, 2023. https://www.cdc.gov/nchs/healthy_people/hp2020/hp2020-errata-page.htm
8. Borland R, Partos TR, Yong H-H, Cummings KM, Hyland A. How much unsuccessful quitting activity is going on among adult smokers? Data from the International Tobacco Control Four Country cohort survey. Addiction. 2012;107(3):673-682. doi:10.1111/j.1360-0443.2011.03685.x
9. Chaiton M, Diemert L, Cohen JE, et al. Estimating the number of quit attempts it takes to quit smoking successfully in a longitudinal cohort of smokers. BMJ Open. 2016;6(6):e011045. doi:10.1136/bmjopen-2016-011045
10. Hughes JR, Peters EN, Naud S. Relapse to smoking after 1 year of abstinence: a meta-analysis. Addict Behav. 2008;33(12):1516-1520. doi:10.1016/j.addbeh.2008.05.012
11. Stead LF, Buitrago D, Preciado N, Sanchez G, Hartmann-Boyce J, Lancaster T. Physician advice for smoking cessation. Cochrane database Syst Rev. 2013;2013(5):CD000165. doi:10.1002/14651858.CD000165.pub4
12. Zulkiply SH, Ramli LF, Fisal ZAM, Tabassum B, Abdul Manaf R. Effectiveness of community health workers involvement in smoking cessation programme: A systematic review. PLoS One. 2020;15(11):e0242691. doi:10.1371/journal.pone.0242691
13. United States Public Health Service Office of the Surgeon General; National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health. Smoking Cessation: A Report of the Surgeon General. Chapter 6, Interventions for Smoking Cessation and Treatments for Nicotine Dependence. US Department of Health and Human Services; 2020. https://www.ncbi.nlm.nih.gov/books/NBK555596/#_NBK555596_pubdet_
14. Omaña-Cepeda C, Jané-Salas E, Estrugo-Devesa A, Chimenos-Küstner E, López-López J. Effectiveness of dentist's intervention in smoking cessation: A review. J Clin Exp Dent. 2016;8(1):e78-83. doi:10.4317/jced.52693
15. The U.S. Preventive Services Task Force. Final Recommendation Statement: Tobacco Smoking Cessation in Adults, Including Pregnant Persons: Interventions. USPSTF; 2021. Accessed February 2, 2023. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/tobacco-use-in-adults-and-pregnant-women-counseling-and-interventions
16. Agency for Healthcare Research and Quality. Treating Tobacco Use and Dependence: 2008 Update. AHRQ; 2013. Accessed February 2, 2023. https://www.ahrq.gov/prevention/guidelines/tobacco/index.html
17. Centers for Disease Control and Prevention. Dental Professionals: Help Your Patients Quit. CDC; 2020. Accessed February 2, 2023. https://www.cdc.gov/oralhealth/publications/features/dental-pros-help-your-patients-quit-tobacco.html
18. Chestnutt IG, Binnie VI. Smoking cessation counselling--a role for the dental profession?. Br Dent J. 1995;179(11):411-415. doi:10.1038/sj.bdj.4808944
19. Agaku IT, Ayo-Yusuf OA, Vardavas CI. A comparison of cessation counseling received by current smokers at US dentist and physician offices during 2010-2011. Am J Public Health. 2014;104(8):67-75. doi:10.2105/AJPH.2014.302049
20. Prakash P, Belek MG, Grimes B, et al. Dentists' attitudes, behaviors, and barriers related to tobacco-use cessation in the dental setting. J Public Health Dent. 2013;73(2):94-102. doi:10.1111/j.1752-7325.2012.00347.x
21. Jannat-Khah DP, McNeely J, Pereyra MR, et al. Dentists' self-perceived role in offering tobacco cessation services: results from a nationally representative survey, United States, 2010-2011. Prev Chronic Dis. 2014;11:E196. doi:10.5888/pcd11.140186
22. Agaku I, Odani S, Gordon J. State-specific changes in receipt of cessation counseling from dentist and physician offices, 2011–2015. Popul Med. 2021;3(May):1-17. doi:10.18332/popmed/136451
23. National Cancer Institute. TUS-CPS Questionnaires and Data Files. NIH; 2021. Accessed February 2, 2023. https://cancercontrol.cancer.gov/brp/tcrb/tus-cps/questionnaires-data
24. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System: 2018 BRFSS Survey Data and Documentation. CDC; 2019. Accessed February 2, 2023. https://www.cdc.gov/brfss/annual_data/annual_2018.html
25. Shelley D, Cantrell J, Faulkner D, Haviland L, Healton C, Messeri P. Physician and dentist tobacco use counseling and adolescent smoking behavior: results from the 2000 National Youth Tobacco Survey. Pediatrics. 2005;115(3):719-725. doi:10.1542/peds.2004-0873
26. Danesh D, Paskett ED, Ferketich AK. Disparities in receipt of advice to quit smoking from health care providers: 2010 National Health Interview Survey. Prev Chronic Dis.

2014;11:E131. doi:10.5888/pcd11.140053
27. Girvalaki C, Filippidis FT, Kyriakos CN, et al. Perceptions, Predictors of and Motivation for Quitting among Smokers from Six European Countries from 2016 to 2018: Findings from EUREST-PLUS ITC Europe Surveys. Int J Environ Res Public Health. 2020;17(17):6263. doi:10.3390/ijerph17176263
28. Vernon LT, Howard AR. Advancing Health Promotion in Dentistry: Articulating an Integrative Approach to Coaching Oral Health Behavior Change in the Dental Setting. Curr oral Heal reports. 2015;2(3):111-122. doi:10.1007/s40496-015-0056-9
29. Gordon JS, Albert DA, Crews KM, Fried J. Tobacco education in dentistry and dental hygiene. Drug Alcohol Rev. 2009;28(5):517-532. doi:10.1111/j.1465-3362.2009.00108.x
30. Soulakova JN, Li J, Crockett LJ. Race/ethnicity and intention to quit cigarette smoking. Prev Med reports. 2017;5:160-165. doi:10.1016/j.pmedr.2016.12.008
31. Mai Y, Soulakova JN. Retrospective reports of former smokers: Receiving doctor's advice to quit smoking and using behavioral interventions for smoking cessation in the United States. Prev Med reports. 2018;11:290-296. doi:10.1016/j.pmedr.2018.07.012
32. Heward-Mills NL, Atuhaire C, Spoors C, Pemunta NV, Priebe G, Cumber SN. The role of faith leaders in influencing health behaviour: a qualitative exploration on the views of Black African Christians in Leeds, United Kingdom. Pan Afr Med J. 2018;30:199. doi:10.11604/pamj.2018.30.199.15656
33. Li X, Zhang L, Li Z, Tang W. Patient Choice and Willingness Toward Gatekeepers as First-Contact Medical Institutions in Chinese Tiered Healthcare Delivery System: A Cross-Sectional Study. Front public Heal. 2021;9:665282. doi:10.3389/fpubh.2021.66528

CONFLICTS OF INTEREST
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