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Impact of Continuing Education on Clinicians' Self- Reported Knowledge of Tobacco Dependence and Tobacco Control Interventions

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Abstract

Purpose: To assess a tobacco cessation continuing education (CE) program for Indiana dental and medical providers. Methods: A 26-item immediate post-CE survey and a 19-item 3-month follow-up survey assessed changes in participants' self-reported knowledge of tobacco dependence and tobacco control interventions. De-identified data were analyzed using descriptive statistics, Spearman correlation coefficients, and Mantel- Haenszel chi-square tests.

Results: Participants totaled 252 across 6 programs statewide. Immediate post-CE course survey response was 98.4% (N=248): dental assistants (2%), dental hygienists (83%), dentists (8.5%), and other healthcare professionals (6.45%). Participants reported less knowledge before than immediately after CE ($p<.0001$) and 3 months after ($p<.0001$). Reported knowledge at 3 months was less than after CE ($p<.002$). Participants reported on their intention to apply program communication strategies (99%), implement brief tobacco interventions (85%), and refer patients to local cessation resources (95%), Indiana Quitline (96%). Follow-up survey response rate was 54% (N=136). Participants reported active engagement in tobacco interventions (48%, 78), applying CE communication strategies (85%, 109), and implementing brief interventions (71%, 90). Participants reported referring few patients to local or state quitline counselors. Conclusion:Tobacco dependence CE may enhance health care practitioners' knowledge and willingness to integrate tobacco interventions in their healthcare settings but it does not ensure a change in clinical tobacco control interventions.

Introduction

The principal cause of preventable disease and death in the United States is the use of tobacco.One in two smokers dies of tobacco-related diseases. [1] Tobacco use contributes to an extensive list of serious diseases, including cardiovascular and cerebrovascular diseases, cancers, emphysema, and bronchitis.Second-hand smoke is reported as a contributive factor in many pediatric illnesses such as asthma and others. The oral effects of tobacco use are also well documented and manifest as a wide variety of benign and serious conditions from dental stains to periodontal disease to oral and pharyngeal cancers; this renders tobacco use an important oral health concern. [1- 4] Moreover, tobacco use is responsible for nearly $170 billion per year in direct medical costs in adults and in excess of $156 billion per year in lost productivity due to exposure to environmental tobacco smoke and premature death [1,5]. It has been reported that fewer than 5% of tobacco users remain abstinent one year following a successful quit effort when attempted without assistance [6]. Healthcare personnel who give the advice to quit tobacco and offer pharmacotherapy can double or triple a client's success rate to stop and 'stay quit' compared to a tobacco user trying to quit by themselves [7]. Primary care clinicians such as medical and dental care providers have been encouraged by their respective professional organizations to implement proven tobacco cessation strategies within their practices. A national survey of health care providers during 2003–2004 found that 94.9% of primary care physicians, 70.6% of dentists, and 77.5% of dental hygienists reported that they regularly advised their patients to stop smoking [8]. As 50% of tobacco users have been reported to visit an oral health professional regularly [9], the oral health care provider is in a particularly unique position to provide tobacco cessation strategies to patients seen in their practices on a regular and on-going basis.

An analysis conducted by Danesh et. al. revealed that only 50% of current tobacco users reported having received advice to quit.Of those who did report being counseled, only 1 in 10 reported having heard the message from oral health care personnel [10]. Danesh et. al. [10] recognized a need for improvement from all health professions, but especially in dentistry, and suggested continuing education programs as one way to improve compliance with the U.S. Public Health Service (USPHS) Clinical Practice Guideline, Treating Tobacco Use and Dependence: 2008 Update. The USPHS Clinical Practice Guideline [7] provides clinicians with recommendations for helping tobacco users quit. The recommendations involve proven strategies such as behavioral counseling including the use of tobacco quitlines. Pharmacotherapy such as nicotine replacement therapy, varenicline, and bupropion are also recommended. Enhanced quit rate effectiveness has been shown with combinations of pharmacotherapy. The addition of counseling to the use of medications is even more effective in increasing quit rates [7].

It has been shown that training health care professionals to provide smoking cessation counseling favorably impacts professional performance [11]. Furthermore, patients expect oral health care providers to ask them about using tobacco [12]. Dolan and colleagues found that14% of dentists and 23% of dental hygienists surveyed reported having completed formal tobacco cessation training [13]. More recent studies have found that 22-64% of oral healthcare practitioners have undergone training to help their patients quit tobacco [14, 15]. Compared to those without training, oral health care providers with tobacco cessation training provide more tobacco use cessation services and advise more patients to stop using tobacco [13-16].

Oral healthcare providers typically have not been highly engaged in tobacco cessation counseling due to a number of perceived barriers [17]. The most commonly cited barriers include lack of time, lack of financial reimbursement, patient resistance/negativity, and a lack of confidence. Other reported barriers include inadequate knowledge of referral services available; focus on other healthcare needs; staff resistance to implement changes; inadequate training; and a lack of available educational materials [15, 18, 19].

Gordon et. al. made the observation that no national standards exist for tobacco cessation curriculum in U.S. dental and allied dental schools. Furthermore, the Commission on Dental Accreditation does not consider tobacco cessation as a separate clinical competency [18]. Thus, for oral health professionals to systematically assist their patients to quit tobacco, changes must be made to the ways treatment of tobacco dependence is viewed and valued in practice. Until that time, the dental profession may continue to fall short of the USPHS Clinical Practice Guideline and the policies of oral health professions' organizations [18-21]. Nonetheless, oral healthcare environments continue to be an important, yet underused area for treating tobacco use and dependence, so much so that Healthy People 2020 has made a goal of improving the rates of tobacco screening and cessation counseling in dental care settings [22, 23].

Likewise, despite Guideline [7] recommendations, although most physicians routinely ask patients if they smoke and advise smokers to quit, less actually assist the patient

throughout the quitting process [24, 25]. The barriers often cited for not providing cessation interventions by medical colleagues are similar to those expressed by oral healthcare providers: a lack of both perceived efficacy and adequate training in tobacco control interventions [26-28].

Continued improvement in the efforts of health professionals to support the sustained delivery of tobacco cessation messages is warranted.Despite the availability of evidence-based tools like the Guideline [7], nationally-recognized, clinician education programs, such as Rx For Change [29], and state toolkits [30, 31], as well as referral sources such as telephone quitlines [7, 32] and cell phone applications [33] which have all been shown to be efficacious in helping patients quit tobacco, clinicians do not routinely provide tobacco interventions [34]. More needs to be done to educate clinicians on available resources, decrease the barriers, and enhance their self-efficacy in providing tobacco interventions.

This study aimed to 1) address several noted barriers to providing tobacco control interventions by offering a day-long, in-person, comprehensive continuing education (CE) course to healthcare professionals on tobacco use and dependence, 2) assess the effectiveness of the CE course at enhancing attendees' knowledge of tobacco's addictive nature and associated health effects; biomedical and behavioral tobacco interventions; local and statewide tobacco cessation referral resources; and the components and protocols for establishing a team-based approach for tobacco control interventions in practice, and 3) obtain information on the extent to which program participants' changed their tobacco intervention behaviors and access to community and statewide tobacco cessation resources following the program.

Methods

Continuing Education (CE) Course Content

The CE course entitled, "Tobacco Cessation in Clinical Practice-A Team Approach", was based on the USPHS Clinical Practice Guideline and developed by the authors who are educators with expertise in tobacco dependence education and treatment. The course sought to enhance Indiana healthcare practitioners' understanding of tobacco dependence and treatment and encourage them to provide tobacco control interventions. It was composed of a series of interactive lectures with skills-based practice in communication techniques, case studies in behavioral and biomedical interventions, and a question and answer session with the course instructors and local community partners of the Indiana State Department of Health (ISDH) Tobacco Prevention & Cessation office. CE content included the following: the 5 A's (Ask, Advise, Assess, Assist, Arrange), and Ask, Advise & Refer interventions that could be implemented in a time efficient manner; demonstration of motivational interviewing techniques for communicating with tobacco users to minimize resistance and motivate cessation efforts; where to obtain no/low cost patient education materials; introduction to and presentation by their local representative from the state Department of Health tobacco prevention and cessation office; reimbursement strategies for clinical tobacco interventions; and presentation of a team-based approach for implementing tobacco interventions in a healthcare setting. The course agenda from the program brochure is shown in Table 1.

The course was offered free of charge and provided 7 hours of continuing education credit towards Indiana licensure for physicians, physician assistants, nurses, respiratory therapists, dentists, dental hygienists, and dental assistants.

CE Course Locations

Investigators presented the course at the following six locations across the state of Indiana, USA: Goshen, Lafayette, Madison, Richmond, Tell City, and Vincennes.These locations were chosen because they were communities where the program had not been previously presented.Also taken into consideration were the tobacco use rates at these sites; most were higher than the state average as reported by the Indiana State Department of Health (Table 2).

Program informational brochures that included the agenda (Table 1) and registration information were mailed to all licensed oral health care providers and hospitals in a 50-mile radius of the chosen sites.

CE Course Assessment Methods

A 26-item immediate post-CE survey and a 19-item, 3-month follow-up survey was developed by investigators to capture the participants' self-reported knowledge before, immediately after, and 3 months after the course, as well as planned changes in their tobacco control interventions as a result of the course, and tobacco intervention activities at 3 months following the course.

To establish content validity, each survey was piloted with 6 Indiana University School of Dentistry faculty; surveys were modified based upon pilot data. The 26-item immediate post-CE survey contained an item for each of the 9 tobacco dependence and treatment knowledge areas for which participants were asked to rate their knowledge on each of the survey item topics before versus after the course. The survey also contained 9 items regarding current biomedical

8:00 a.m. – 8:30 am	Registration	
8:30 am – 8:35 am	Introduction and Objectives	Lorinda L. Coan, LDH, MS
8:35 am – 9:35 am	Nicotine Dependence 101	Dr. Arden Christen
9:35 am - 9:45 am	Break	
9:45 am – 10:15 am	Oral health and Tobacco	Dr. Arden Christen, L. Coan, LDH, MS
10:15 am – 11: 15 am	Systemic Health and Tobacco	Dr. Stephen Jay
11:15 am – 11:30 am	Molecular Biology of Tobacco	Dr. Jack Windsor
11:30 am – 12:15 pm	Pharmacotherapy and Cessation Aids	Dr. Laura Romito
12:15 pm – 1:15 pm	Lunch	
1:15 pm – 2:45 pm	Behavioral Interventions	Lorinda L. Coan, LDH, MS
2:45 pm – 3:00 pm	Break	
3:00 pm– 3:45 pm	The Office Model for Implementing a Tobacco Cessation Program	Lorinda L. Coan, LDH, MS
3:45 pm – 4:15 pm	Community Partners and Resources	Department of Health County Representatives
4:15 pm – 4:30 pm	Course Wrap Up Lorinda	L. Coan, LDH, MS
4:30 pm	Adjournment	

Table 1. Agenda for the Continuing Education Course, "Tobacco Cessation in Clinical Practice-A Team Approach"

CE Location	County	Smoking Rate (2011)
Goshen	Elkhart	21%
Lafayette	Tippecanoe	17%
Madison	Jefferson	28%
Richmond	Wayne	28%
Tell City	Perry	26%
Vincennes	Knox	31%
Indiana (overall)		25.6%

Table 2: Tobacco Use Rates by Location of Continuing Education Course

tobacco interventions and provision of patient resources, perceived barriers, and intention to implement tobacco control interventions with patients as a result of attending the program; one demographic item; and 7 items evaluating the program content and instructors. The format of survey items included multiple-choice with an option for write-in responses, 4-point scaled responses (great amount-moderate amount-slight amount-none) and 5-point-scaled responses (strongly agree-agree-undecided-disagree-strongly disagree).

The 3-month follow-up survey contained 9 knowledge items corresponding to those from the immediate post-CE survey, as well 9 items regarding participants' self-reported tobacco control interventions and perceived barriers since attending the CE course, and one demographic item. Approval for the project was obtained by the Indiana University Purdue University Indianapolis (IUPUI) Institutional Review Board (#1208009443).

A total of 252 people attended the six CE programs. During each course, the study was explained to attendees and they were offered the opportunity to participate by agreeing to provide their contact information and complete the immediate and 3-month follow-up surveys. At the conclusion of each course, participants were asked to complete the immediate post-CE survey.

Three months after the date of the course, the follow-up survey was mailed or delivered electronically to those who had previously consented to participate and had completed the immediate post-CE survey. A contact information form, attached to the immediate survey was used to mail 3-month follow-up surveys and survey completion reminders to non-responders. All attendees (N=252) were mailed a 19-item 3-month follow-up survey, cover letter, study information sheet, and self-addressed, stamped envelope. Following the initial mailing, two subsequent mailings were sent to non-responders.

The survey was confidential; however, to track completion, both the contact information form and the surveys were coded with the same numerical identifier. De-identified survey data were reviewed, coded and entered into an electronic database for analyses. Data analyses included descriptive statistic and comparisons of the same questions between times were made using Cochran-Mantel-Haenszel chi-square tests for repeated ordered categorical data. Associations of Immediate-Q13 with 3 month-Q14 and Immediate-Q14 with 3 month-Q15 were made using Mantel-Haenszel chi-square tests and Spearman correlation coefficients.

Results

The response rate for the immediate post-CE survey was 98.4% (N=248). Course participants who responded to the post-CE survey included: dental assistants (2%); dental hygienists (83%), dentists (8.5%), and other healthcare professionals (6.45%). The response rate for the 3-month survey was 54% (N=136).

Knowledge

Table 3 summarizes the data for the knowledge items on both the immediate post-CE survey and the 3-month follow-up survey. Between time comparisons for all data showed less knowledge before than immediately after ($p<.0001$ for all items) and 3 months after the CE course ($p<.0001$, for all items); immediately after showed more knowledge than 3 months after the CE course for all survey questions (Q1:$p=.0019$;Q2-Q5:$p<.0001$; Q6:$p=.0002$; Q7:$p=.0007$; Q9:$p=.0005$) except question #8 ($p=0.06$).

Tobacco Control Interventions

Table 4 describes the participants' self-reported intention to implement tobacco control interventions immediately after the CE course, and three months later. Immediately after the CE course, 99% of participants (N=247) strongly agreed/agreed that the course improved their ability to use effective communication strategies with tobacco using clients; however, at 3 months post-CE, 85% (N=130) reported applying learned communication strategies. Similarly, immediately after the course 85% strongly agreed/agreed that they would implement the brief interventions from the course; at 3 months, however, 71% reported actually doing so. Immediately following the course, approximately 95% of responding participants indicated that they planned to refer interested patients to local tobacco cessation resources and the Indiana Tobacco Quitline. However, at 3 months 120 of 130 (93%) participants reported referring 5 or fewer patients to local resources (Table 5) and 114 of 133 (88%) referred 5 or fewer people to the Quitline (Table 6). There were no significant associations between participating clinicians' plans to refer to local tobacco cessation resources ($r=.16$) and the Indiana Tobacco Quitline ($r=.02$) and the number of patients referred at 3 months as reported by participants.

Resources Provided

Results for tobacco cessation resources provided to patients are shown in Table 7.

	Question	Total N	Great (1)	Moderate (2)	Slight (3)	None (4)	Mean (SD)
Before	Q1: Knowledge of oral effects of tobacco	248	46 (19%)	165 (67%)	37 (15%)	0 (0%)	2.0 (0.6)
	Q2: Clear understanding nicotine addiction	248	23 (9%)	126 (51%)	98 (40%)	1 (0%)	2.3 (0.6)
	Q3: Knowledge of pharm of NRT, bupropion and varenicline	247	7 (3%)	49 (20%)	158 (64%)	33 (13%)	2.9 (0.7)
	Q4: Knowledge of NRT, bupropion, varenicline dosing requirements	248	6 (2%)	27 (11%)	86 (35%)	129 (52%)	3.4 (0.8)
	Q5: Knowledge of adverse effects of NRT, Bupropion, varenicline	246	7 (3%)	30 (12%)	116 (47%)	93 (38%)	3.2 (0.8)
	Q6: Knowledge of communication techniques for tobacco cessation	247	10 (4%)	85 (34%)	135 (55%)	17 (7%)	2.6 (0.7)
	Q7: Knowledge of selection of community and state resources	247	9 (4%)	35 (14%)	143 (58%)	60 (24%)	3.0 (0.7)
	Q8: Clear understanding ISDH local community resources services	246	5 (2%)	25 (10%)	126 (51%)	90 (37%)	3.2 (0.7)
	Q9: Clear understanding of Quitline service	246	12 (5%)	26 (11%)	101 (41%)	107 (43%)	3.2 (0.8)
Immediate	Q1: Knowledge of oral effects of tobacco	247	211 (85%)	35 (14%)	1 (0%)	0 (0%)	1.1 (0.4)
	Q2: Clear understanding nicotine addiction	248	203 (82%)	44 (18%)	1 (0%)	0 (0%)	1.2 (0.4)
	Q3: Knowledge of pharm of NRT, bupropion and varenicline	247	149 (60%)	91 (37%)	7 (3%)	0 (0%)	1.4 (0.5)
	Q4: Knowledge of NRT, bupropion, varenicline dosing requirements	247	129 (52%)	106 (43%)	12 (5%)	0 (0%)	1.5 (0.6)
	Q5: Knowledge of adverse effects of NRT, Bupropion, varenicline	247	135 (55%)	103 (42%)	9 (4%)	0 (0%)	1.5 (0.6)
	Q6: Knowledge of communication techniques for tobacco cessation	246	183 (74%)	60 (24%)	3 (1%)	0 (0%)	1.3 (0.5)
	Q7: Knowledge of selection of community and state resources	247	148 (60%)	91 (37%)	8 (3%)	0 (0%)	1.4 (0.6)

	Q8: Clear understanding ISDH local community resources services	244	120 (49%)	105 (43%)	18 (7%)	1 (0%)	1.6 (0.6)
	Q9: Clear understanding of Quitline service	245	170 (69%)	67 (27%)	8 (3%)	0 (0%)	1.3 (0.5)
3 month	Q1: Knowledge of oral effects of tobacco	136	90 (66%)	44 (32%)	2 (1%)	0 (0%)	1.4 (0.5)
	Q2: Clear understanding nicotine addiction	135	75 (56%)	58 (43%)	2 (1%)	0 (0%)	1.5 (0.5)
	Q3: Knowledge of pharm of NRT, bupropion and varenicline	136	21 (15%)	83 (61%)	32 (24%)	0 (0%)	2.1 (0.6)
	Q4: Knowledge of NRT, bupropion, varenicline dosing requirements	136	17 (13%)	60 (44%)	49 (36%)	10 (7%)	2.4 (0.8)
	Q5: Knowledge of adverse effects of NRT, Bupropion, varenicline	136	18 (13%)	73 (54%)	40 (29%)	5 (4%)	2.2 (0.7)
	Q6: Knowledge of communication techniques for tobacco cessation	136	71 (52%)	55 (40%)	10 (7%)	0 (0%)	1.6 (0.6)
	Q7: Knowledge of selection of community and state resources	136	56 (41%)	60 (44%)	20 (15%)	0 (0%)	1.7 (0.7)
	Q8: Clear understanding ISDH local community resources services	135	56 (41%)	56 (41%)	20 (15%)	3 (2%)	1.8 (0.8)
	Q9: Clear understanding of Quitline service	134	76 (57%)	42 (31%)	14 (10%)	2 (1%)	1.6 (0.7)

Table 3: Clinicians' Self-Reported Tobacco Dependence and Treatment Knowledge Before, Immediately After, and 3 Months After the Tobacco CE Program

Time	Question	Total N	Strongly Agree (1)	Agree (2)	Undecided (3)	Disagree (4)	Strongly Disagree (5)	Mean (SD)
Immediate	Q10: will improve ability to play active role in team plan	247	92 (37%)	142 (57%)	12 (5%)	0 (0%)	1 (0%)	1.7 (0.6)
	Q11: will improve ability to use communication strategies	247	115 (47%)	128 (52%)	3 (1%)	0 (0%)	1 (0%)	1.6 (0.6)
	Q12: will implement the brief tobacco intervention strategies	246	69 (28%)	139 (57%)	36 (15%)	2 (1%)	0 (0%)	1.9 (0.7)
	Q13: will refer interested patients to local resources	246	102 (41%)	132 (54%)	10 (4%)	2 (1%)	0 (0%)	1.6 (0.6)
	Q14: will refer interested patients to the Indiana Quitline	244	129 (53%)	104 (43%)	9 (4%)	1 (0%)	1 (0%)	1.5 (0.6)

3 month	Q10: currently play active role in team based tobacco cessation	130	10 (8%)	68 (52%)	22 (17%)	22 (17%)	8 (6%)	2.6 (1.1)
	Q11: applying the communication strategies learned in the course	129	23 (18%)	86 (67%)	13 (10%)	4 (3%)	3 (2%)	2.1 (0.8)
	Q12: implemented brief tobacco intervention strategies	128	15 (12%)	75 (59%)	18 (14%)	15 (12%)	5 (4%)	2.4 (1.0)

Table 4: Clinicians' Self-Reported Intention to Implement Tobacco Intervention Behaviors and Actual Implementation 3 Months Post-CE

Time	Question	Total N	0	1-5	6-10	11-15	16 or more
3 month	Q14: #pts referred to local counselors since CE program	130	62 (48%)	58 (45%)	8 (6%)	0 (0%)	2 (2%)
3 month	Q15: # pts referred to Indiana Quitline since CE program	133	50 (38%)	64 (48%)	12 (9%)	3 (2%)	4 (3%)

Table 5: Clinicians' Self-Reported Referrals to Local Cessation Resources and Indiana Tobacco Quitline 3 Months Post-CE

3 month										
Referral	Immediate	Total N	0	1-5	6-10	11-15	16 or more	Mean (SD)	p-value	Correlation
Local	Strongly Agree (1)	58	32 (55%)	22 (38%)	4 (7%)	0 (0%)	0 (0%)	1.5 (0.6)	0.0700	0.16
	Agree (2)	65	28 (43%)	31 (48%)	4 (6%)	0 (0%)	2 (3%)	1.7 (0.8)		
	Undecided (3)	3	0 (0%)	3 (100%)	0 (0%)	0 (0%)	0 (0%)	2.0 (0.0)		
	Disagree (4)	1	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	2.0 (.)		
Quitline	Strongly Agree (1)	77	30 (39%)	36 (47%)	7 (9%)	1 (1%)	3 (4%)	1.8 (0.9)	0.7427	0.02
	Agree (2)	49	16 (33%)	26 (53%)	4 (8%)	2 (4%)	1 (2%)	1.9 (0.9)		
	Undecided (3)	4	2 (50%)	1 (25%)	1 (25%)	0 (0%)	0 (0%)	1.8 (1.0)		
	Strongly Disagree (5)	1	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1.0 (.)		

Table 6: Numbers of Patients Referred to Local Cessation Resources and Indiana Tobacco Quitline Reported by Clinicians' 3 Months Post-CE

Time	Immediate		3 Month		p-value
Survey Question	Total N	Yes	Total N	Yes	
Q15: Tobacco cessation resources are currently provided	241	85 (35%)	NA	NA	
Q16: Resources-Literature display in reception area	245	47 (19%)	133	32 (24%)	
Q16: Resources-Literature display in treatment area	245	50 (20%)	133	44 (33%)	p=0.0173
Q16: Resources-Video in treatment area	245	4 (2%)	133	4 (3%)	
Q16: Resources-Distributed directly to patient	245	53 (22%)	132	66 (50%)	p<.0001
Q16: Resources-Practice website	245	4 (2%)	133	4 (3%)	
Q16: Resources-Other	245	11 (4%)	133	13 (10%)	
Q17: Barrier-Lack of time to distribute resources	240	29 (12%)	133	27 (20%)	
Q17: Barrier-Lack of time to discuss resources	240	48 (20%)	132	16 (12%)	
Q17: Barrier-Patient acceptance	240	30 (13%)	132	39 (30%)	p=0.0004
Q17: Barrier-Lack of referral agencies in area	240	19 (8%)	132	49 (37%)	
Q17: Barrier-Locating and obtaining resources	240	49 (20%)	132	9 (7%)	p=0.0003
Q17: Barrier-Space for resource materials	240	23 (10%)	132	10 (8%)	
Q17: Barrier-Cost of resource materials	240	28 (12%)	132	17 (13%)	
Q17: Barrier-Other	240	30 (13%)	132	11 (8%)	
Q18: Prescribe/Recommend NRT gum	245	51 (21%)	132	17 (13%)	p=0.0082
Q18: Prescribe/Recommend NRT lozenge	245	20 (8%)	132	30 (23%)	p=0.0009
Q18: Prescribe/Recommend NRT patch	245	45 (18%)	132	55 (42%)	p=0.0431
Q18: Prescribe/Recommend NRT inhaler	245	7 (3%)	132	30 (23%)	
Q18: Prescribe/Recommend NRT nasal spray	245	5 (2%)	132	46 (35%)	
Q18: Prescribe/Recommend NRT bupropion	245	13 (5%)	132	9 (7%)	
Q18: Prescribe/Recommend NRT varenicline	245	30 (12%)	132	4 (3%)	p=0.0330
Q18: Prescribe/Recommend no pharmacotherapy	245	135 (55%)	132	16 (12%)	

Table 7: Clinician's Self-Reported Tobacco Cessation Resources and Perceived Barriers Before and 3 Months Post-CE

Immediate to 3 months comparisons showed increases for providing any resources (p<.0001), literature display in the treatment area (p=0.0173), distribution directly to patient (p<.0001), patient acceptance as a barrier (p=0.0004), and prescription or recommendation of NRT gum (p=0.0082), lozenge (p=0.0009), and patch (p=0.0431).

Comparisons between times using all data showed decreases from immediate to 3 months for locating and obtaining resources as a barrier (p=0.0003) and prescription/ recommendation of NRT, varenicline (p=0.0330).

Program Evaluation

The CE course was well-received. Of the responding participants (N=238), approximately 75% "strongly agreed" that the instructors demonstrated expertise and presented high-quality scientific content based on the best available evidence, presented appropriately for the target audience and related to attendees current scope of practice, and presented information in an organized and clear manner.

Of responding participants (N=235), 52% strongly agreed, and 47% agreed that the scope of the program was appropriate for their needs. Concerning whether the course held their interest, of 241 participants, 25% strongly agreed and 64% agreed that it did and 54% strongly agreed while 44% agreed that it was a worthwhile investment of their time. Of the participants answering the question concerning course resource materials (N=240), 69% strongly agreed and 39% agreed that the program provided helpful and supporting materials and tools for enhancing their ability to provide tobacco interventions.

Discussion

Previous research has indicated that compared to medical providers, oral healthcare professionals are less likely to assist patients in tobacco cessation efforts but that training may improve the likelihood that they would do so. [13-16, 25] Thus, the overall goal of the comprehensive CE course, “Tobacco Cessation in Clinical Practice - a Team Approach” was to enhance clinicians' engagement, particularly oral health care providers, in tobacco control interventions in their practices. The course aimed to accomplish this goal by enhancing participants' knowledge of 9 key topic areas in tobacco dependence and treatment, demonstrating and practicing communication techniques through interactive skills training, providing potential solutions to common barriers, and describing the team-based approach to tobacco control interventions and its associated benefits for the clinician and the patient.

Participants rated the course highly; they perceived that it provided valuable information and enhanced their ability to provide tobacco control interventions in their practices. Furthermore, the results of the self-reported knowledge assessment indicated that attendees believed that the course did improve their understanding of tobacco use and dependence as well as biomedical and behavioral tobacco interventions. However, participants’ self-reported knowledge at three months following the program decreased, although not to pre-program levels. This is consistent with the literature indicating that some degree of knowledge decay is to be expected over time following instruction. [35, 36] Nonetheless, the program did improve clinicians’ self-reported knowledge and positive attitudes concerning tobacco control interventions in practice settings. Sheffer [37] found similar changes in perceived knowledge and attitudes following only a 1-hour tobacco training session for healthcare providers with the dental clinicians showing the greatest improvement. Likewise, Walsh and colleagues [16] noted that compared to those without training, dental providers who had engaged in a day-long tobacco training workshop were more likely to apply Guideline [7] recommendations and have favorable perceptions of tobacco cessation counseling.

Regarding changes in clinicians’ tobacco control interventions, despite the perception that the course enhanced their ability to refer receptive tobacco users to local and statewide resources, at three months following the program, clinicians reported referring very few patients for tobacco cessation counseling. This may have been due to a number of factors, for example, clinicians may have encountered few tobacco users who interested in accepting the referral. Nonetheless, Ebbert et al [38] showed that if oral healthcare providers are aware of and comfortable with tobacco quitline services, such referrals by dental practices is an effective strategy to address tobacco use and dependence.

Study outcomes suggest that participants increased the display and dissemination of tobacco education and cessation materials, as well as the recommendation of nicotine replacement therapy (NRT) to patients, particularly the over-the-counter medications. This would suggest that the course influenced some of the practitioners’ tobacco control intervention behaviors by improving their awareness, procurement, and utilization of patient education resource materials as well as enhancing their confidence in discussing tobacco cessation pharmacotherapy.

Research indicates that knowledge transfer is complex and may be best viewed as an ongoing process rather

than a single event [39]. Thus, while motivation and training increase the likelihood of initial adoption of an innovation and its early use, other factors, such as ongoing access to information and support for the innovation, are beneficial to promote continued adoption [40]. In addition, while training workshops have shown some impact on practice [41], clinical practice behavior is minimally influenced through training alone; clinical training combined with ongoing coaching or "booster sessions" can enhance and sustain practice change [42]. Clinical education that focuses on enhancing providers' intrinsic motivation for change and identifies and overcomes perceived barriers, provides skill training with directed practice, and engages practitioners in ongoing support for change (e.g., networking, ongoing coaching, communities of practice) can more effectively promote adherence to evidence-based models and tools [43, 44]. Therefore, the course may have a greater impact on clinician behaviors if follow-up sessions or ongoing support were offered. However, the course sought to address this issue to some degree by introducing participants to local ISDH cessation counselors and resources such as the Indiana Quitline Preferred Provider program which offers support and partners with the clinicians in their community to help tobacco users' quit. It was anticipated that gaining awareness of these resources and meeting their local representatives would encourage providers to network and become comfortable with using them as a referral source for their patients.

The self-reported nature of data is a limitation of the current study.Research has indicated that clinicians are inclined to overstate their engagement in tobacco interventions [45], therefore, our immediate and 3-month post-program results should be interpreted cautiously. Secondly, although the current study found increases in clinicians' self-reported tobacco-related knowledge and tobacco control interventions, there is no evidence that clinician tobacco interventions changed in the long term as a result of the participating in the course. Additionally, it cannot be assumed that any such changes had an impact on their patient quit rates. The practitioners who chose to attend the course may have had a particular interest in tobacco dependence and treatment interventions and so were more motivated to learn and adopt such interventions in their practices.It is also possible that participants who responded to the 3-month follow-up survey may have been among the most interested and most likely to integrate knowledge, skills, and abilities obtained in the program into clinical practice. Despite these limitations, however, study outcomes indicated that overall, the course was beneficial in that it improved clinicians' perception of their knowledge about tobacco use and dependence, and may have facilitated an increase in their tobacco control interventions.

Conclusion

Continuing education on tobacco use, dependence and treatment is beneficial, at least in the short-term, in enhancing health care practitioners' knowledge and willingness to integrate tobacco control interventions in their healthcare settings. However, this does not ensure that they will substantially change their practice behaviors by utilizing the learned concepts and tobacco interventions with patients.

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