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ARAM V. CHOBANIAN & EDWARD AVEDISIAN SCHOOL OF MEDICINE

Thesis

HEALTHCARE PROFESSIONAL STUDENT INTEGRATION INTO INPATIENT SMOKING CESSATION PROGRAMS

by

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HEALTHCARE PROFESSIONAL STUDENT INTEGRATION INTO INPATIENT SMOKING CESSATION PROGRAMS

RACHEL MAY

ABSTRACT

Smoking cessation counseling is an important aspect of preventative care in the United States, as smoking has numerous detrimental effects on health. Many hospital systems, such as Boston Medical Center, have begun to integrate programs in the inpatient setting to help with helping admitted patients to quit smoking. This thesis examines the current state of smoking cessation in the United States, especially with focus on the inpatient setting, as well as explores the current smoking cessation education in healthcare professional programs and related student interventions. This thesis reviewed numerous inpatient smoking cessation programs and identified areas for improvement, including the volume of patients counseled, and identified students as an untapped potential resource for helping to increase the number of patients that can be counseled.

A study proposed will integrate Boston University Physician Assistant students into Boston Medical Center's inpatient smoking cessation programs, and investigate whether hands-on experience with counseling patients leads to improved confidence and knowledge for students. The intervention will consist of interactive lectures about smoking cessation and available pharmacotherapy, followed by small group discussions, and finally opportunities to counsel patients in the inpatient setting. Study variables and

measures will include comparison of pre- and post-test scores, as well as self-reported confidence scores before and after the intervention. This study will provide important information for educators about whether hands-on experience in smoking cessation counseling can better prepare healthcare professional students for clinical practice. Additionally, future studies are needed to further build on this framework and explore if students can help to expand volumes of patients counseled in the inpatient setting.

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LIST OF ABBREVIATIONS

5A's .... Ask, Advise, Assess, Assist, Arrange Follow-Up

5R's .... Relevance, Risk, Reward, Roadblocks, Repetition

BMC .... Boston Medical Center

BPA .... Best Practice Alert

BU .... Boston University

EMR .... Electronic Medical Record

IVR ....Interactive-Voice-Response

MGH .... Massachusetts General Hospital

MUSC .... Medical University of South Carolina

NRT .... Nicotine Replacement Therapy

PA .... Physician Assistant

TDTS .... Tobacco Dependence Treatment Service

TTC .... Tobacco Treatment Consult

TTS .... Tobacco Treatment Service

USPSTF .... United States Preventive Services Task Force

CHAPTER ONE

Background

Smoking is a major contributor to morbidity and mortality from numerous chronic diseases. Tobacco dependence is a challenging topic for both patients and providers, as the addictive effects of nicotine are difficult to overcome and it can take more than 30 quit attempts for some patients to successfully quit.[1] As a result, many hospitals have created programs to target patients admitted to the hospital for smoking cessation counseling.

While the number of inpatient smoking cessation programs has been increasing in recent years, there is still considerable variability in their delivery strategies. In addition, many institutions are yet to even adopt these systems. While such programs have proven to be effective at improving rates of smoking cessation, the overall smoking abstinence rates are still on average below 50%.[2]

In 2016, Boston Medical Center created the inpatient tobacco treatment consult service to help provide recommendations for inpatient nicotine replacement therapy and smoking cessation counseling to currently smoking patients admitted to the hospital. As a safety net hospital, BMC services a high percentage of low-income, uninsured/Medicaid, and non-English speaking patients, which differs from many other hospital systems where a significant amount of research on smoking cessation has been completed.[3]

While Boston Medical Center's inpatient smoking cessation program has undergone many adaptations and changes over the years, there is still room for improvement, particularly when it comes to the number of patients able to be seen.

Although patients seen by the Tobacco Treatment Consult service were more likely to quit smoking than those who aren't seen, only 14.9% of patients were able to successfully quit, measured by 7 day smoking abstinence at 6 months.[4] Additionally, while the intervention is proven to be effective, the program's limited resources do not allow all patients referred to the service to be seen. In a study that looked at how many hospitalized patients who smoke were seen by the BMC Tobacco Treatment Consult service over a 6 month period (July 2017 to December 2017), of 1,185 hospitalized patients who smoke at BMC, only 42.6% were able to be seen (505/1185).[4]

One avenue that has recently begun to be investigated to overcome resource restraints for inpatient smoking cessation counseling is incorporating health professional students as counselors for patients. Currently, smoking cessation education within medical student education is minimal, and often does not leave students feeling confident in their ability to successfully counsel patients to quit smoking.[5] By first involving healthcare professionals in smoking cessation as students, there is an opportunity for a two-fold effect: increasing confidence in smoking cessation counseling and perceived importance of counseling for healthcare professionals, as well as improving patient outcomes by increased volume of counseling.

Statement of the Problem

Smoking cessation education is an important, but largely overlooked, portion of healthcare professional student education and the integration of students in counseling

admitted patients who are currently smoking has not been researched in a large, urban safety net hospital in the United States such as Boston Medical Center.

Hypothesis

Utilization of healthcare professional students in an inpatient smoking cessation program at a large, urban safety net hospital will increase knowledge and confidence for students in counseling patients on smoking cessation and prescribing nicotine replacement therapy (NRT) compared to before the intervention.

Objectives and Specific Aims

- Improved student knowledge on smoking cessation counseling and NRT prescription
- Improved student confidence to utilize smoking cessation skills in clinical practice

CHAPTER TWO

Burden of Tobacco and Epidemiology

Today, smoking is a major preventable cause of various chronic diseases such as cardiovascular disease, stroke, cancer, diabetes, and COPD, responsible for 1 in 5 deaths in the United States.[6] However, the Surgeon General's first report tying smoking to health concerns only came out in 1964. Each year since that time, stronger evidence has emerged regarding the health risks that smoking poses. As a result of increased education regarding these risks, as well as many campaigns and interventions, rates of smoking in the United States have drastically decreased from 42% in 1965 to 11.5% in 2021.[7,8]

While smoking prevalence has decreased overall, certain groups have fallen behind and seen a slower rate of decline.[7] Smoking affects the general population in an inequitable fashion with disproportionately higher rates among those with lower levels of education, lower income, members of the LGBTQ+ community, military veterans, those covered by Medicaid and the uninsured, those with disabilities, and those with symptoms of severe psychological distress or mental health challenges, including depression.[9,10] Additionally, certain ethnic groups, such as American Indians and Alaskan Natives, have a higher proportion of individuals who smoke compared to other racial and ethnic groups.[7,11,12] Black adults who smoke have higher rates of hospitalizations and cancer compared to non-Hispanic white adults, despite starting to smoke at a later age.[13] Tobacco related health disparities are a result of individual, interpersonal, cultural, and societal factors, which lead to inequitable smoking rates and, therefore, smoking-related consequences.[7]

Nicotine Dependence

As the active ingredient in cigarettes, nicotine is highly physically and psychologically addictive.[14] Nicotine releases dopamine, stimulating the reward center in the brain, which leads to a feeling of brief euphoria and, therefore, its addictive effects.[15] Another factor in nicotine's addictiveness is its pharmacokinetics, which allow its effects to be felt within seconds of smoking but also cause it to last only a very short time.[15] This creates a cycle where individuals who smoke are constantly needing to continue smoking to achieve the desired effects. Psychological behavior patterns are another strong component of nicotine addiction. People who smoke often have "triggers" for their behavior, whether that be people, places, activities, or feelings that they associate with smoking.[14] Similar to other drugs, with chronic use of nicotine, individuals who smoke begin to lose these desired effects due to neuronal changes, which alter the sensitivity to dopamine and, instead, begin using in order to prevent withdrawal symptoms.[14] Withdrawal symptoms can include irritability, restlessness, anxiety, insomnia, difficulty concentrating, depression, increased appetite, and fatigue.[14] These symptoms can begin as early as a few hours after stopping use of cigarettes and can continue for several weeks.[14,15]

Benefits of Quitting

Contrary to popular belief, quitting smoking at any age is beneficial to health outcomes, even if the person has been smoking for many years.[16] However, smoking cessation provides the greatest decrease in risk when initiated earlier.[16] Quitting smoking

prior to age of 40 decreases the risk of death due to smoking-related disease by 90% and, after 15 years, the risk of coronary heart disease is almost the same as someone who never smoked.[17] While smoking is most commonly thought to be associated with lung and throat cancer, quitting smoking can reduce the risk of several other cancers including AML, bladder, cervix, colon, kidney, liver, pancreas, and stomach.[16] Life expectancy for individuals who smoke that quit by age 35 was shown to be between 6.9-8.5 years longer for men and 6.1-7.7 for women compared to their counterparts who continued to smoke.[18] Although the benefit was much larger for those who quit earlier, even those who quit after age 65 still gained 1.4-2.0 (men) and 2.7-3.7 years (women).[18]

While many of the more significant long term effects of quitting smoking take decades to obtain, some beneficial effects of quitting smoking can occur soon after quitting smoking, including decreased shortness of breath, improved sense of smell and taste, decrease in premature wrinkling, tooth loss, and gum disease.[17] After just a few months of smoking, patients can see improvement to respiratory symptoms such as cough and sputum production and, after a few years, their risk for cardiovascular disease and several cancers can be cut in half.[16]

Treatment Options for Smoking Cessation

Recommendations from the American Thoracic Society for smoking cessation include beginning initial therapy with a combination of varenicline and nicotine replacement therapy (NRT).[19] Varenicline is believed to help people stop smoking by partially stimulating alpha-4 beta-2 nicotinic acetylcholine receptors to reduce

withdrawal symptoms and cravings while also blocking nicotine from binding to these receptors and triggering dopamine release, thereby making smoking less rewarding.[19,20] However, new data suggests that nicotine replacement therapy in combination with varenicline may not be more beneficial than varenicline alone.[21] NRT is typically used as a combination therapy of both a long-acting nicotine patch to prevent withdrawal symptoms and a short-acting nicotine gum or lozenge to help with breakthrough cravings.[22] Another first line treatment option is bupropion, which is less effective than varenicline or NRT, but may represent a good choice for patients concerned about post-cessation weight gain or who have concomitant depression.[22,23] Current standard of care includes intensive smoking cessation counseling accompanied by combination NRT or varenicline, which is more effective than counseling alone.[24] The current recommendation is to counsel patients on smoking cessation and offer options for pharmacotherapy, regardless of their present motivation or readiness to quit.[19] Recommendations state for pharmacotherapy to be continued for at least 3 months with varenicline and bupropion able to be continued up to one year if the patient is at risk for relapse.[22]

Current State of Smoking Cessation Assistance

According to the United States Preventive Services Task Force (USPSTF), it is recommended that clinicians ask all adults about tobacco use, recommend them to stop using tobacco, and utilize counseling and pharmacotherapy to assist in cessation attempts.[25] In 2015, a survey found that 68% of people who smoke have a desire to quit smoking.[2] It was noted that 55.4% of people who smoke had made a quit attempt in the

prior year, however only 7.4% reported successfully quitting.[26] Smoking cessation is a challenging topic for healthcare professionals to address with patients and is often avoided due to barriers such as limited time and resources, other concomitant substance use cessation counseling, priority of immediate health threats, and perception that smoking cessation is not a priority to patients.[27] Often, individuals who smoke are not counseled on cessation with only 30% of those visiting a primary care provider annually reporting they had received counseling and medication for smoking cessation.[28] Another study corroborated this, stating only 31.2% of people who smoke reported receiving evidence-based cessation assistance such as counseling or pharmacotherapy.[26]

Historically, the majority of quit attempts were made unassisted, however unassisted attempts are much less likely to be successful.[29] A major barrier to patients receiving assistance is the knowledge gap clinicians have about the efficacy of treatment for tobacco dependence. A 2021 study through Boston Medical Center showed that 62.3% of all residents surveyed were unfamiliar with treatment guidelines for tobacco cessation and only 13.7% felt comfortable administering tobacco dependence pharmacotherapy.[5] Thus, it is clear that there is room for improvement by healthcare professionals to continue to advocate for their patients to quit smoking, as well as provide support and guidance in the form of connection to resources and prescription for pharmacotherapy.

Inpatient Smoking Cessation Counseling

Hospital-based interventions for smoking cessation are particularly important for capturing underserved groups who may not otherwise access a healthcare provider.[4]

Hospitalization provides a smoke-free environment conducive for patients to trial smoking cessation. Additionally, if a patient is hospitalized for a smoking-related condition, their motivation to quit smoking may be positively impacted. In a 2021 study through Boston Medical Center, a survey found patients' willingness to quit smoking increased by 66.7% during hospitalization.[5]

In 2012, the Joint Commission recommended that all hospitalized patients who currently smoke be screened for tobacco use, provided smoking cessation counseling and medication, and be followed up with in the outpatient setting for further counseling and prescriptions.[30] However, despite many studies showing evidence that such programs are effective in encouraging smoking cessation, not all hospitals have implemented these recommendations.[30]

Inpatient smoking cessation programs vary across hospital systems. Many of these teams run as a consult service staffed by a combination of physicians, nurse practitioners, clinical psychologists, pharmacists, nurses, and tobacco treatment specialists. At their most basic level, these teams provide smoking cessation counseling to patients, give recommendations for inpatient nicotine replacement therapy to prevent withdrawals, and if the patient is ready to quit, can also provide recommendations for outpatient pharmacotherapy for smoking cessation. At some institutions, programs rely on interactive-voice-response (IVR) technology to coordinate telephone calls with patients post-discharge.

The exclusion criteria is often a limitation of many inpatient smoking cessation studies. Due to the nature of telephone counseling, patients are unable to be enrolled if

they do not have access to a phone, which can limit the diversity of participants by income and resources. Additionally, many studies exclude patients experiencing homelessness, those with low English proficiency, those not wishing to make a quit attempt, and psychiatric patients. If these patients are included in studies, it also is sometimes difficult to obtain follow-up information which leads to high percentages of drop-outs.

Post-Discharge

Smoking is best viewed as a disease with remission and relapse.[29] In the first 12 months following a quit attempt, more than 50% of individuals will relapse into smoking again.[31] After hospitalization, one study found that 25% of patients relapsed to smoking within one day.[32] Therefore, one of the most critical aspects of inpatient smoking cessation programs is the continuity of care to the outpatient setting, as it has been shown numerous times that such interventions are most effective with continued treatment and support after discharge from the hospital.[4,24] The preferred method for how to follow-up and how often has been a common topic in the literature, however, no consensus has been reached to this point.

More recently, hospital systems have piloted interventions utilizing technology assistance, such as phone calls, IVR calls, and text messaging, to connect with patients post-discharge. A 2022 study out of Boston Medical Center looked at patient perceptions of a text messaging system to encourage smoking cessation, specifically in a population with opioid use disorder.[33] Overall, reception was good, patients rated messages about the

benefits of quitting smoking highest (gain-framed messages), rather than messages about the risks of continued smoking (loss-framed messages).[33] Another study at Penn State Medical Center had a limited pilot study for text messaging which had reasonable participation where 56% of participants responded to 4 out of 5 outcome questions, suggesting that text messaging interventions could help to increase patient participation in post-discharge care. [34]

Another resource to connect with patients after discharge is state supported smoking cessation quitlines, such as 1-800-QUIT-NOW. The Massachusetts quitline features both phone and online components, such as educational materials, access to online community forums, and online chat features. Services are free and some individuals may also qualify for up to 8 weeks of free nicotine replacement therapy sent directly to their home.

Quitlines may be a reasonable alternative to more expensive IVR interventions, especially in resource-deficient settings. In 2022, a study at MGH, University of Pittsburgh Medical Center and Vanderbilt University Medical Center compared the effectiveness of Transitional Tobacco Care Management (IVR counseling) to the use of quitlines. This study found no significant difference between the biochemically verified abstinence rates of the two groups, despite more of the IVR group reporting receiving more counseling and NRT, as well as having higher rates of self-reported continuous abstinence from smoking.[29] It is unclear if the lack of difference is because of the interventions being equivalent or due to the length of time (3 months) the study followed patients for.

Another study explored whether warm handoffs at the bedside had an influence on whether patients enrolled in the quitline program compared to a fax referral. A total of 99.6% of warm handoff patients enrolled as compared to only 59.6% of fax referral patients.[36] This method also proved to be cheaper per patient as well ($5.77/patient vs. $9.41, $p<0.001$).[36] However, warm handoffs did not lead to increased abstinence from smoking as compared with a traditional fax referral.[36]

Several studies have shown the efficacy of quitline interventions amongst outpatients who smoke, but few studies have looked at post-discharge inpatients.[37] One study used a multilingual quitline for Cantonese, Mandarin, Korean, and Vietnamese speaking patients, and found a 16.4% abstinence rate at 6 months compared to a self-help only group which had a 8.0% abstinence rate (intention-to-treat). Therefore, quitlines likely represent an alternative to in-person or live telephone call counseling through the healthcare system. The fact that this study was done with non-English speakers also suggests that quitlines can be useful resources for this patient population.

BMC Inpatient Tobacco Treatment

Boston Medical Center (BMC) is the largest safety net hospital in New England with 73% of the patient population being low-income.[38] A large proportion of the population is covered by Medicaid or MassHealth insurance.[4] Due to these two factors, many patients at BMC do not have a primary care provider and do not regularly seek medical care outside of the hospital setting. BMC's population also has a high rate of people who currently smoke compared to the national average (BMC smoking rate: 25%;

national rate: 11.5%).[39] Many patients are non-English speaking and, although BMC is well-connected with interpreter services, it poses a challenge for providers in terms of both time constraints and building rapport with patients.

In 2016, Boston Medical Center began an "opt out" inpatient smoking cessation counseling program. In the hospital, when a patient with a listed history of smoking is admitted, their provider receives a best practice alert (BPA) with an order set for a referral to a tobacco treatment consult (TTC) service.[4] Upon receipt of the referral, this team, consisting of 2 FTE nurse practitioners, 1 FTE respiratory therapist, and 1 FTE community health worker, visit the patient and counsel them about smoking cessation and their options for NRT. Bedside counseling typically lasts for 15-20 minutes. As a consult service, the TTC service then reports to the primary team with recommendations for NRT, as well as linkage to outpatient treatment for post-discharge follow-up.

The program has been found to be effective in increasing receipt of NRT both inpatient and as a prescription at discharge, as well as self-reported 7-day smoking abstinence at 6 months.[4] Compared to a control group of patients unable to be seen by TTC due to resource and timing issues, abstinence was 14.9% compared to 10% ($p<0.01$).[4] Safety net hospitals have unique challenges to overcome when it comes to smoking cessation counseling, whether due to patient population characteristics, or limited resources. Due to the nature of the population served at BMC, a large challenge of the program is being able to connect with patients for ongoing counseling once they have been discharged from the hospital. In the above mentioned study, only 50% of the participants were able to be reached for follow-up, either due to homelessness, non-

working telephone numbers, or other limiting factors.[4] Another challenge faced by the TTC program is limited resources to be able to see all patients referred to the service. Of the 1,185 hospitalized patients who smoke at BMC over the study duration, only 505 were able to be seen (42.6%).[4] On average, there were around 550 patients who currently smoke admitted needing consultation each month, which was difficult to manage given limitations in staffing.[5] Leadership previously expressed concerns about the cost of hiring an additional full time staff member for the team, which further complicates this issue.[5]

Finally, a limitation of implementation is that clinicians must accept the TTC order set in order for a referral to the Tobacco Treatment Consult service to be generated and, in one study that looked at feasibility, only 62.1% of clinicians at BMC did so.[40] Cited barriers to the inconsistent adoption were BPA fatigue, time constraints, competing priorities, and poor communication with the TTC service.[40] Acceptance also differed based on service with cardiology (82.2%), cardiovascular surgery (78.4%) specialties including ICU, renal, hematology-oncology, and infectious disease (75.3%), and medicine (68%) completing the order more than half the time, while neurology (46.5%), surgery (30.7%), and OB/GYN (8%) services were less likely to complete the order.[40]

The BMC Tobacco Treatment Center is an outpatient service which provides both group and individual counseling and a referral to this outpatient service is offered to patients upon discharge. Connecting patients to this service post-discharge has been a challenge with one study showing that, despite 96.8% (1000/1033) patients accepting inpatient counseling, only 24.6% (254/1033) accepted referral to the BMC outpatient

tobacco treatment program and only 13.8% that accepted a referral attended their appointment.[5]

Additionally, while the program has been successful at ensuring patients receive the appropriate nicotine replacement therapy in the hospital, ensuring that the prescription is maintained post-discharge has been a significant challenge. While 82.5% of patients consulted by TTC received inpatient nicotine replacement therapy as recommended, only 48.8% of patients received NRT on discharge from the hospital.[5] The provider's rationale for this often related to feeling uncomfortable prescribing medications such as varenicline without knowing if they would be followed by a primary care provider to monitor for side effects.[27] Additionally, many patients at BMC have comorbid substance use disorder and many providers expressed hesitation about encouraging quitting smoking at the same time as opioids, despite strong evidence supporting success with concurrent cessation.[27]

Other Inpatient Tobacco Treatment Programs

MUSC

Another hospital system that has adopted a similar program is the Medical University of South Carolina (MUSC), which began their Tobacco Dependence Treatment Service (TDTS) in 2014. Similar to BMC, MUSC is also a safety-net hospital. The MUSC TDTS operates via an "opt-out" protocol, utilizing their electronic medical record (EMR) to identify patients who currently smoke cigarettes. Referrals to the TDTS occur without any input from providers, unlike the BPA pop-up in the BMC EMR. All patients who currently smoke are included in the program, regardless of their motivation

to quit. Patients are seen by a tobacco treatment specialist at the bedside for around 15 minutes and then recommendations are given for treatment. Following discharge from the hospital, eligible patients are enrolled to receive phone calls via an automated interactive-voice-response (IVR) system at 3, 14, and 30 days post-discharge, and given access to the South Carolina Quitline.[41]

The TDTS program paired with IVR follow-up calls was shown to increase smoking abstinence rates and use of smoking cessation medications 30 days post-discharge (by 90% and 200% respectively), as well as decrease healthcare costs by $2190-$2920 per patient 1 year post-discharge.[30,41] Despite the inclusion of all individuals who smoke regardless of their willingness to make a quit attempt, acceptance of services among patients was high - 80% of those approached in the hospital accepted the consult and less than 1% of patients asked to be removed from the IVR system post-discharge.[41] These numbers are consistent with the idea that opt-out smoking cessation counseling provides benefit to all people who smoke, not just those who feel ready to make a quit attempt.

Similar to BMC's program, a shortcoming of the MUSC program is the ability to service all patients who smoke. Between February 2014 and May 2015, of the 5,843 individuals who smoke referred to the program, a full-time counselor was only able to see 1,918 (32.8%).[41] Additionally, being able to reach patients post-discharge to follow-up was a challenge, as well, with only 42.8% of the 5,400 patients enrolled in the IVR system being reached at least once in the 30 days after leaving the hospital.[41]

Other Safety Net Hospital Studies

A study performed through Bellevue Hospital Center and the VA New York Harbor Healthcare system, two safety net hospitals in New York, measured the differences between comprehensive telephone counseling with staff and referral to quitlines for inpatients. The quitline group received one 15-20 minute intake call followed by one follow-up call, while the intervention group received seven phone call counseling sessions lasting 10-20 minutes.[42] Overall, the study population was diverse and representative of a safety net hospital, 60% of patients reported a history of substance abuse, 25% were homeless or in unstable housing, and 50% had a psychiatric diagnosis other than substance abuse.[42] Many of the participants in either group did not receive any phone calls. Being prescribed NRT at discharge was associated with receiving at least one call. At 6 months post-discharge, 20.5% of the quitline group self-reported 30 day abstinence from smoking compared to 25.8% of the intervention group.[42] A limitation of the study was the use of self-reported smoking status compared to biochemically validated. The study attempted to gain biochemically validated data for as many participants as possible and only 51% of individuals reporting to be self-reported quitters had cotinine levels lower than the 10 ng/mL cutoff.[42] The quitline approach was much lower in cost - around $17.84 per patient compared to $72.62 per patient ($1,015 per quit) in the intensive counseling arm.[42] Overall, while the intensive counseling arm had higher rates of quitting, the quitline approach also yielded positive results, which showcases the feasibility of implementation at a safety net hospital similar to Boston Medical Center.

Massachusetts General Hospital

Massachusetts General Hospital has a Tobacco Treatment Service (TTS), which operates via an automatic referral system of patients identified as currently smoking.[43] After a patient is identified and referred, a team of nurses and social workers visits the patient at the bedside to provide cognitive-behavioral therapy, smoking cessation counseling, and pharmacotherapy for nicotine replacement therapy. On average, the bedside counseling sessions lasted for 25 minutes.

In 2011, Regan et al. used the MGH TTS to study whether an IVR system alone would be sufficient for post-discharge follow-up as compared to IVR plus post-discharge counseling.[43] Patients were randomized to either receive 4 IVR calls in the first month post-discharge including the offer for a callback for post-discharge counseling, or a single IVR call at 2 weeks post-discharge. Approximately ⅓ of patients who were offered post-discharge counseling accepted and received approximately 10 minutes of counseling via callback. There was no significant difference in smoking cessation rates between the two groups at either 2 weeks or 12 weeks. However, a limitation to the study was the short duration of the post-discharge counseling.

In 2014, Rigotti et al. published the first Helping HAND trial, which looked at post-discharge interventions compared to standard care in 397 hospitalized patients who smoked at MGH.[44] The control group received inpatient bedside counseling with a prescription for post-discharge pharmacotherapy, while the intervention group received follow-up IVR phone calls at 2, 14, 30, 60, and 90 days, as well as free smoking cessation medication in addition to the same in-hospital intervention as the control group.[44] The

IVR system was also able to complete medication refills and triage to a live counselor for additional support. Mean counseling time at the bedside was 25 minutes. At the end of the trial, 7 day tobacco abstinence (biochemically confirmed) increased from 15% in the control group to 26% in the intervention group.[44] The intervention group was also more likely to use smoking cessation pharmacotherapy one month post-discharge (83% vs. 63%).[44] This study expanded on the Regan et al. study in 2011 by lengthening the duration of IVR phone calls to 3 months, as well as adding free NRT medication. It is not possible to separate the effects of free medication and the IVR intervention, which could be a reasonable future study. Additionally, the study only looked at patients who were willing to quit. Overall, 6,237 individuals who smoke were screened for inclusion criteria but only 397 were eventually included due to lack of willingness to quit smoking, refusal of discharge medication, substance abuse, impaired mental status, communication barrier, inadequate telephone access, or declining enrollment.[44] Overall, while this study showed great potential for IVR phone call follow-up, it occurred in a very limited population and further research is needed to evaluate the effectiveness for all people who smoke.

Student Led Initiatives

Several studies have explored the feasibility of medical students' ability to deliver efficacious smoking cessation counseling, particularly in underserved settings. One such study, conducted in India, compared 84 students providing services to 688 inpatients to a control group.[45] Medical students received 5 hours of training consisting of a 3 hour didactic session followed by 2 hours of group roleplaying, and a short exam with a minimum pass rate to be able to counsel patients.[45,46] Students had an initial face-to-face

counseling encounter of 15-20 minutes (recommended) while patients were hospitalized. Students were able to give recommendations for NRT but had to request the primary team to prescribe them. Students were, thereafter, required to schedule 3 follow-up phone calls with the patients they saw within two months post-discharge. Meanwhile, the control group received standard smoking cessation advice by the primary physician. The group receiving counseling from medical students had a 54.8% 7-day smoking abstinence rate at 6 months, compared to 42% in the control group.[45] Although not taking place in the United States, this study showed initial promise for student-led counseling.

The training manual for students participating in this study was adapted from a preexisting guide by the WHO for quitline tobacco cessation counselors.[47] Topics covered included general information about smoking and its consequences on health, addiction, stages of change, NRT pharmacotherapy, 5As (Ask, Advise, Assess, Assist, Arrange Follow-Up) as a counseling strategy, motivational interviewing, sample discussions, and practice scenarios.[45] Each student received a workbook to help to document important information collected during each encounter, such as current 7-day smoking status and NRT usage (Appendix 1).

Another similar student-led initiative consisted of a student-run smoking cessation clinic in a medically underserved area (Salvation Army Good Samaritan Health Clinic in Rochester, Minnesota).[48] Over the course of 4 years, 282 individuals who smoke received 1,652 weekly individual counseling sessions and were also offered up to 12 weeks of free pharmacotherapy in the form of NRT, bupropion, and/or varenicline. The clinic was run on an apprenticeship model where second year volunteer medical students trained first

year volunteer medical students to counsel patients via interview modeling, shadowing, and direct observation with feedback. Of the 282 patients seen at the student-run clinic in the study, 94 (33.3%) reported smoking abstinence for at least 7 days and 39 (13.8%) reported smoking abstinence for at least 4 weeks.

An additional study, based out of the Royal College of Surgeons in Ireland looked at 61 Graduate Entry Medical (GEM) students providing smoking cessation counseling to patients admitted to the hospital.[49] Prior to counseling patients, students received a one-day training based on the Brief Intervention for Smoking Cessation (BISC) training, provided by Health Services Executive (HSE), the publicly funded healthcare system of Ireland.[49] BISC focuses on a modified version the 5As approach. Follow-up included a 1-week post-discharge phone call that was approximately 10 minutes long. This group was compared to a "usual care" group, consisting of inpatients receiving treatment that typically occurs as part of a normal stay without any additional intervention. The measured outcome was change in motivation to quit, which was assessed via a self-reported motivation to quit using a 7-point scale. Other metrics included proportion of patients receiving an NRT prescription at discharge, self-reported 7-day smoking abstinence, proportion of patients reporting use of prescribed or OTC cessation pharmacotherapy, and patient reported effectiveness of the intervention. Patients were then followed-up at 3 and 6 month post-discharge via telephone call. Student fidelity to the intervention was measured at 39-57%. Although the study did not find statistically significant results for any of the outcome measures, there were limited effects seen in the intervention group as compared to the usual care group. There was overall positive

qualitative feedback from the students involved including regarding their self-efficacy to deliver smoking cessation counseling in the future. One limitation with the study was that there was a statistically significant difference in prescription of NRT, favoring the usual care group.

Smoking Cessation Education

Smoking cessation education in medical training programs is integral to preparing future providers to feel confident in their ability to counsel patients effectively. Even amongst residents at BMC, 62.3% were unfamiliar with tobacco treatment guidelines and 70.1% reported they had received less than 4 hours of tobacco treatment education.[5] Receiving tobacco dependence training increases the likelihood, not only that a healthcare professional will perform an intervention, but also that the intervention will increase the success of a patient's attempt to quit.[50] One Cochrane meta-analysis of 14 studies of training healthcare professionals in smoking cessation counseling showed statistically and clinically significant effects on asking patients to set a quit date, counseling of individuals who smoke, offer of follow-up appointments, and provision of self-help material.[51] One shortcoming of the evidence was that training did not increase the likelihood of individuals prescribing nicotine replacement therapy. [51] Given that evidence-based tobacco dependence treatment is effective, a major barrier to treatment for patients is adequately trained clinicians.[52]

Simulation-based trainings have repeatedly been shown to improve learning compared to purely didactic methods. One study involving 5th year medical students in Australia compared traditional didactic lecture and 3 intervention groups involving some

form of roleplaying and feedback (creating a simulated doctor-patient conversation via audio recording, creating a simulated doctor-patient conversation via video recording, and simulating a doctor-patient conversation with other students in person).[53] As an assessment, at the end of the intervention all students participated in a 10-minute simulated patient encounter.[53] All 3 intervention groups performed better than the control group of didactic lectures alone, which showed no improvement from prior to the intervention.[53] Specifically, the peer feedback group improved in multiple categories, which suggests that it could be the most effective strategy for teaching smoking cessation counseling skills.

An additional component of education, which has particular practical relevance is bedside teaching. Bedside teaching can offer the opportunity both for students to observe how a clinician approaches motivational interviewing in reality, as well as to give the student an opportunity to practice themselves and receive real-time feedback.[52] Real-life experience and observation can bolster students' knowledge about the skillset of counseling patients and provide stylistic examples of how different providers approach different scenarios.

At Boston University's Physician Assistant Program, students have one 2 hour session specifically on tobacco dependence treatment and smoking cessation counseling, in addition to 2 hours of general motivational interviewing training.[54] This proves to be common among physician assistant training programs with a national survey of 132 programs showing a median of 150 minutes of tobacco education.[55] Only 46% of programs responded that they included some form of role-playing exercises for students

to practice smoking cessation counseling strategies.[55] This is despite several studies demonstrating that incorporation of active learning techniques improve students' skills for and confidence with smoking cessation counseling.[53,56]

An ideal tobacco dependence and smoking cessation education program should include a wide variety of topics including general information about tobacco dependence, counseling skills, assessment, treatment planning including an understanding of pharmacotherapy, and relapse prevention for a wide variety of populations.[52] Evidence finds that even a single session with duration of training for 40 minutes - 2 hours can be effective in increasing likelihood that an individual will provide smoking cessation counseling to patients and that their patients will successfully quit smoking.[51]

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CHAPTER THREE

Study Design

This study will examine a smoking cessation counseling education program for physician assistant students. The study will be a quasi-experimental design, as it will be a nonrandomized, pre-post intervention study. It will have a convergent parallel mixed methods component.

Study population and sampling

Boston University's Physician Assistant Program will provide the student population for this study. Boston University's program, on average, consists of 20 Master's level students completing a 30 month curriculum. Eligible students will be first year physician assistant students enrolled in the PS774 Preventive Medicine course. Given the fixed size of the class, the sample size will be set at 20 students. Given this, for a Cohen's d of 0.65 (representing a large effect), the power for the study will be 0.787.

Intervention

The intervention will center around Boston University's physician assistant program and its PS774 Preventative Medicine course, as well as Boston Medical Center's Tobacco Treatment Consult Service. This intervention will seek to incorporate smoking cessation education and hands-on counseling as part of a multi-day experience.

Student Training

Students will participate in a short half-day training to introduce them to the basics of smoking cessation counseling, including epidemiology of smoking, pathophysiology of nicotine addiction, treatment options, including pharmacotherapy, for smoking cessation, and the basic tenets of counseling and motivational interviewing (Appendix 7). The training will also include several example cases for students to work through in small groups.

Prior to undergoing the training, students will complete an online, brief pre-test to gauge their knowledge of smoking cessation counseling, as well as an entry survey about their confidence with counseling patients and its importance (Appendix 2). Students will be encouraged not to study for this pre-test and that performance on the test will not contribute towards their overall term grade. The pre-test will be administered via lockdown browser and students asked not to use outside resources or work collaboratively on the pre-test.

Inpatient Encounters

After the conclusion of the formal half-day training, student participants will have the opportunity to shadow one of the TTC team members at Boston Medical Center, which has a currently running inpatient smoking cessation program, to observe the typical flow of inpatient smoking cessation counseling. There will be two sessions of 10 students. Students will be randomly assigned to see admitted patients in pairs.

Identified patients will be offered a 10-15 minute counseling session on smoking cessation by the students, regardless of their readiness to quit. Refusal to participate will not otherwise impact their care. No patient HIPAA-protected data will be collected and patients will not be considered part of the study. Following counseling, patients will report back to their supervising counselor to discuss how the patient encounter went and will be encouraged to come up with recommendations, if any, for pharmacotherapy to offer. Students will then return to see the patient with their preceptor to discuss the recommendations and educate patients on how to use their chosen form of pharmacotherapy as well as about the side effects of the medication. Opportunities for presenting to a provider from the patient's primary team for the purpose of placing orders will be offered, if applicable.

Following the conclusion of the intervention, students will be asked again to complete a post-test with the same questions from the pre-test. This will be again administered with a lockdown browser with students encouraged not to use outside resources or work collaboratively.

Study variables and measures

Student scores on the pre-test and post-test will be measured, along with self-reported confidence scores before and after the intervention via a survey. Finally, student opinion / attitude on various topics related to smoking will be collected via a survey. There will also be a qualitative survey of student participants. (Appendix 3)

Recruitment

Subjects will be recruited from the Boston University Physician Assistant Program class list for the PS774 Preventive Medicine course. Students will sign an informed consent prior to beginning the smoking cessation portion of the curriculum.

Data collection

Students participating in the intervention will complete an online pre-test prior to the first day of the educational program. Scores will be collected via the online system. At the conclusion of the educational program, students will complete an online post-test. Scores will again be collected via the online system. Surveys will be emailed to students to be collected via an online system, such as SurveyMonkey. No patient HIPAA-protected data will be collected throughout the clinical sessions.

Data analysis

Data from student exams will be analyzed via paired t-test to compare performance before and after the intervention (mean of differences). Data from the student surveys will be analyzed without a statistical test to determine the portion of students who improve confidence in certain categories. Finally, qualitative data collected via student surveys will be analyzed via thematic analysis.

Timeline and resources

Timeline

Approximately 1 month before the scheduled first training session, materials will be made available to the PA program to allow for distribution to students. The online pre-test will be made available 3 days prior to the beginning of the training session for students to complete up until the morning of the session. This study itself will take place over the course of one week. The training session will take place in the morning, while the clinical session will take place in the afternoon. Additional clinical sessions may be added on following days if needed to distribute students appropriately dependent on number of supervising counselors participating. The post-test will open for students after the conclusion of the final clinical session and will remain open for 3 days. Similarly, the qualitative survey for students will also open following the conclusion of the final clinical session and will remain open for 1 week. Data analysis will take place over 1 week following the collection of the qualitative surveys.

Resources

- 2 smoking cessation counselors (either nurse practitioners or social workers) to conduct training and to oversee students in the inpatient setting
- Classroom for lecture / small group portion of educational program with audiovisual capabilities, which is also handicap accessible

Institutional Review Board

IRB approval will be filed for under exempt status. Based on the Human Research Protection Program Policies of Boston Medical Center and Boston University Medical Center, this study would qualify to apply for exempt status according to Section 10.2.4.2.1.2 Common Rule Exempt Category (1) "research conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content".

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CHAPTER FOUR

Discussion

This study aims to be an initial step in the integration of physician assistant students, and other health professional students, into inpatient smoking cessation programs. The goal of this study is to provide an easily implementable training framework for future interventions, as well as show that patient interactions in the clinical setting are beneficial to student learning for more abstract skills, like smoking cessation counseling. For this reason, the study was designed to be generalizable to many types of healthcare professional programs, at a low cost, with low barriers to implementation. Although this specific study counsels patients in the inpatient setting specifically identified through an inpatient smoking cessation consult service, this study could easily be implemented into any inpatient setting without such a program, as long as there is a way to identify currently smoking patients for counseling.

As with many pilot studies, this study has limitations. It plans to enroll a small sample of students from a single program, which makes it difficult to truly understand how the results may apply to large groups of students across the country. Additionally, the fixed, small sample size limits the effect size which can be identified. For the given sample size, in order to adequately power the study, only a very large effect size will be able to be detected as significant, which could lead the intervention to seem less effective than it actually is. Another limitation revolves around the measurement variables and data analysis portion of the study. Given that the study results rely in part on self-reported, opinion-based questions, this is less reliable than objective measures. However, these

limitations also make the study easier to implement at low cost without need for large program size, making it accessible to more students.

Smoking cessation counseling is a complex topic which, preferably, students should have multiple days of lecture and patient experiences to help solidify concepts. However, medical curriculum already has a great challenge in covering an extensive number of topics and, therefore, even important topics such as smoking cessation counseling often are only allotted a single day. So, while the short duration of the educational program is another limitation of the study, this is in-line with many other educational interventions.

Summary

Despite smoking being a major contributor to morbidity and mortality from numerous chronic diseases and there being a known benefit to quitting for patients' health, rates of smoking cessation counseling by providers are consistently low.[57] One possible contributing factor to these low rates of counseling is that education in healthcare professional student curriculum is lacking. By integrating live smoking cessation counseling with real patients into the curriculum, alongside interactive didactic content, students may feel more confident in counseling as providers in the future, as well as feel more invested in the importance of counseling.

In order to help increase smoking cessation rates, many hospitals, such as Boston Medical Center, have created inpatient programs to target patients admitted to the hospital for smoking cessation counseling. One major limitation of such programs is that

limited resources often do not allow all patients referred to the service to be seen. Given the fact that these interventions are proven to be effective, the focus should be to bring this intervention to more individuals. In one study, of 1,185 hospitalized patients who smoke at BMC, only 505 were able to be seen (42.6%).[4] Integrating students into the inpatient smoking cessation program could not only impact student learning and perceived importance, but also provide a new avenue for resources to help counsel more individuals who smoke in the inpatient setting.

Clinical and/or public health significance

Smoking is a significant cause of mortality and morbidity in the United States. Smoking cessation education is often overlooked in medical curriculum, leaving medical professionals feeling unequipped to counsel patients effectively on quitting smoking. By constructing an intervention to involve students in counseling patients on smoking cessation, this not only bolsters the students' education and confidence in counseling, but could additionally help the patients they are counseling as well. Given that students typically have a greater amount of time they can devote to patient care, they represent a great reservoir of potential for making an impact on patients.

Additionally, this study has benefits beyond even just smoking cessation. Motivational interviewing is a skill used throughout all fields of medicine for various reasons, whether for smoking or other substance use, weight loss, or medication compliance. Getting real-life practice using motivational interviewing is a skill for healthcare professionals that can be transferable and applicable to a number of other situations. Beginning this practice early in a student's career also highlights the

importance of this skill, and of preventative counseling in general, which could lead to a greater focus on preventative medicine in future generations of providers.

Future studies should use this foundation to further examine how health professional students can be utilized within inpatient smoking cessation programs. The study described in this thesis provides an educational foundation for students to learn the basics of smoking cessation counseling, and prepare them to enter into counseling real patients. Ideally, additional studies will examine students' effect on patient outcomes after counseling. If student-led counseling interventions are found to have a similar level of effectiveness as clinician counseling, this would allow for an expanded pool of potential counselors for patients.

Finally, if the variables measured in this study (test scores, confidence levels) are found to be significantly changed by the intervention, there also should be a suggestion that this form of training be implemented into more healthcare professional training programs.

APPENDIX

Appendix 1. MS-CHAT Student Workbook Example

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PATIENT 1: NAME: **ID:**

Age:	**Sex:**
Address:	**Ph No:**
Diagnosis:	

Visits	Hospital	FU1	FU2	FU3	FU4	FU5
Date						
Stage (PC-Pre contemplation, C-Contemplation, Pr-Preparatory, A-Action, R-Relapse, M-Maintenance)						
Current smoking status in the last 7 days? Quit (Y/N)						
QUIT						
Type of NRT used if any						
Any other tobacco products (including chewed) used? – type and frequency?						
NOT QUIT						
When did the patient last smoke?						
Enter the number of cigarettes and/or Bidis the patient smokes in a day						
ALL PATIENTS						

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NOTES - Write down important points of each discussion and methods discussed. (eg: quitting for son, will try managing peer pressure)						

IF NOT REACHABLE:

ATTEMPT NO.	DATE TRIED	REASON NOT REACHABLE

Appendix 2. Pre / Post Test [45,47,58]

1. What is the physically addictive ingredient in tobacco products?
A. Smoke
B. Tar
C. Nicotine
D. Formaldehyde
E.

2. Quitting smoking will not slow the progression of chronic obstructive pulmonary disease COPD.
A. True
B. False.

3. Those who quit smoking can significantly reduce their chances of having a stroke or heart attack, especially a fatal heart attack.
A. True
B. False.

4. Use of cessation medication has an additive effect on quit outcomes when combined with behavioral counseling.
A. True
B. False.

5. Which statement about nicotine patches is TRUE?
A. Higher doses of nicotine (those exceeding 21 mg) are known to cause heart attacks.
B. Patches can be used alone or in combination with other tobacco medicines.
C. Patches completely eliminate withdrawal symptoms.
D. Only healthy people can use nicotine patches.

6. Which tobacco cessation medicine is not advised for people who have seizures?
A. Bupropion
B. Inhaler
C. Varenicline
D. Lozenge.

7. Which medication below is NOT considered first-line medication?
A. Clonidine
B. Nicotine Patch
C. Bupropion SR
D. Varenicline.

8. Twenty-four hour formulation patches are available in which three different strengths:
A. 24 mg, 16 mg, 8 mg

B. 20 mg, 10 mg, 5 mg
C. 21 mg, 14 mg, 7 mg.

9. Dosages of NRT are determined by two commonly accepted mechanisms:
A. Cpd (cigarettes per day) + ttfu (first-time use after waking)
B. Years of using tobacco + cpd
C. Cpd + ttfu + cigarette's nicotine content
D. Years of using tobacco + ttfu.

10. What is a typical call structure?
A. Introduction, Assessment, Setting the agenda, Action, Closing.
B. Introduction, Signposting, Setting a quit date, Closing.
C. Introduction, Setting a quit date, Setting the agenda, Quit medicines, Closing.

11. Evidence-based treatment for tobacco cessation includes:
A. Counseling, pharmacotherapy, combinations of pharmacotherapy
B. Counseling, hypnotherapy
C. Counseling, laser therapy, e-cigarette.

12. STAR is an acronym for evidence-based strategies for quitting tobacco. What does STAR stand for?
A. Set a quit date, Talk to a quitline counselor, Allow people to help, Roll with resistance.
B. Set a quit date, Tell friends and family, Anticipate challenges, Remove tobacco products.
C. Stop smoking, Try new things, Action planning, Roll with resistance.
D. Stop smoking, Take time, Anticipate challenges, Relapse prevention.

13. One typical cigarette has 1–1.5 mg nicotine
- **TRUE**
- FALSE

14. One pack of cigarettes typically has 50 cigarettes
- TRUE
- **FALSE**

15. If a person smokes 2 packs of cigarettes a day, according to the Mayo Clinic, it is OK to use two 21 mg nicotine patches at the same time
- **TRUE**
- FALSE

16. Bupropion SR (Zyban®) should NOT be used in people with liver diseases or prone to seizures
- **TRUE**

- FALSE

17. For Bupropion SR (Zyban®) use, a person is still smoking in days 1–7; 150 mg Bupropion is taken once a day in days 1–3; and twice a day (8 h apart) in days 4–7. The person stops smoking in day

- **TRUE**
- FALSE

18. Pack-years is the number of packs of cigarettes smoked per day time the number of years a person smoked

- **TRUE**
- FALSE

19. Evidence-based information supports the Safety of e-cigarettes

- TRUE
- **FALSE**

20. An individual with tobacco use disorder's ambivalence toward smoking is addressed in motivational interviewing.

- **TRUE**
- FALSE

Appendix 3. Pre-Post Survey [45,58]

1. How do you perceive smoking?
    - Acceptable anywhere
    - Acceptable if with other people who smoke but not at home
    - Not acceptable anywhere

2. How do you feel about the statement- 'Medical professionals should refrain from smoking to be a role model for others.'
    - Strongly disagree
    - Somewhat disagree
    - Neutral
    - Somewhat agree
    - Strongly agree

3. How effective do you think is physician advice in motivating patients to quit smoking?
    - Not effective
    - Somewhat effective
    - Effective
    - Very effective
    - Extremely effective

4. How feasible do you think it would be for medical professional to counsel patients about smoking cessation in their every day practice?
    - Very difficult
    - Slightly difficult
    - Neutral
    - Somewhat doable
    - Easily doable

Rate your confidence in completing the following objectives:

1. Asking about a person's tobacco use
    - Very low confidence
    - Low confidence
    - Neutral confidence
    - High confidence
    - Very high confidence

2. Advising patients who use tobacco to quit
    - Very low confidence
    - Low confidence
    - Neutral confidence
    - High confidence

- Very high confidence

3. Providing tobacco cessation assessment
    - Very low confidence
    - Low confidence
    - Neutral confidence
    - High confidence
    - Very high confidence

4. Assisting a patient to quit tobacco use
    - Very low confidence
    - Low confidence
    - Neutral confidence
    - High confidence
    - Very high confidence

5. Telling patients the appropriate manner of NRT use
    - Very low confidence
    - Low confidence
    - Neutral confidence
    - High confidence
    - Very high confidence

6. Prescribing combination therapy
    - Very low confidence
    - Low confidence
    - Neutral confidence
    - High confidence
    - Very high confidence

Appendix 4. Example Cases for Student Training [47]

General Motivational Interviewing Practice

Exercise 1:
Objective - general motivational interviewing

With your partner, one person identifies a behavior they would like to change in their life. The other partner will use motivational interviewing techniques to elicit and explore intrinsic motivation to change. Take turns so each partner has a chance to participate in both roles. Afterwards, reflect on what was difficult vs. what went well as the interviewer, as well as how you felt as the "patient" during the experience.

Smoking Cessation Specific Practice

Case 1:
Objective - dosing NRT

Kate is a 55-year-old married female who has smoked one pack per day for the past 40 years. She has tried to quit several times. The only medication she ever tried was nicotine patches. Kate is interested in trying the patch again. During a previous quit she used a 14 mg patch. She said "it helped" but she was never able to remain abstinent for more than two days because the cravings were so strong. Kate reported concern that the patches may have made her irritable and anxious. Kate smokes her first cigarette immediately after waking up. Please recommend a quit medication plan for Kate to use over the next 12 weeks.

Answer: 21mg patch x 4 weeks, 14mg patch x 2 weeks, 7mg x 2 weeks, 4mg lozenge, also should discuss nicotine withdrawal symptoms

Case 2:
Objective - motivational interviewing practice

Trish has been smoking two packs per day over the past 30 years. She indicates that she is an "addict" and that cigarettes are what get her through stressful times of the day. She says she wants to quit but is reluctant to engage in planning for a quit attempt. She doesn't think there's much hope for her to quit and stay quit. She is concerned about the amount of money she spends on cigarettes.

Answer: use the 5Rs (relevance, risk, reward, roadblocks, repetition)

Case 3:
Objective - relapse

Roger is a 40 year old man who has recently begun smoking again. He states he began smoking one pack per day at age 20, and was able to quit smoking when he was 35. However, in the past year he began smoking again, at first just with one cigarette but now is smoking half a pack a day.

Answer: determine reasons for relapse, discuss what was successful with last successful quit attempt (what strategies did he use), discuss challenges to overcome with this quit attempt, coping skills

Appendix 5. Motivational Interviewing Template

5.1.2 Six steps for conducting an MI session

Below is another example of six steps for conducting an MI session:

Steps	Examples
1. Set the agenda	Clarify the agenda around a target behaviour about which there is ambivalence. Try a series of special questions to help sort things out.
2. Ask what they like about using tobacco	Use statements: • "This is often an engaging surprise. However, it will work only if you are genuinely interested." Ask questions: • "What are some of the good things about your smoking/use of tobacco?" • "People usually use tobacco because there is something that has benefited them in some way. How has tobacco use benefited you?" • "What do you like about the effects of using tobacco?" Summarize the positives.
3. Ask what they don't like about using tobacco	Ask questions: • "Can you tell me about the down side?" • "What are some aspects you are not so happy about?" • "What are some of the things you would not miss?" Summarize the negatives.
4. Explore life goals and values	These goals will be the pivotal point against which cost and benefits are weighed. Ask questions: • "What sorts of things are important to you?" • "What sort of person would you like to be?" • "If things worked out in the best possible way for you, what would you be doing a year from now?" Use affirmations to support positive goals and values.
5. Ask for a decision	Restate their dilemma or ambivalence then ask for a decision. • "You were saying that you were trying to decide whether to continue using tobacco or quit." • "After this discussion, are you more clear about what you would like to do?" • "So have you made a decision?"
6. Goal setting – use SMART goals (specific, meaningful, assessable, realistic, timely)	Ask questions • "What will be your next step?" • "What will you do in the next one or two days?" • "Have you ever done any of these things before to achieve this?" • "Who will be helping and supporting you?" • "On a scale of 1 to 10, what are the chances that you will take your next step?" (If the answer is under 7, the goal may need to be more achievable.) If there is no decision, empathize with the difficulty of ambivalence and ask: • "Is there something else which would help you make a decision?" • "Do you have a plan to manage not making a decision?" • "Are you interested in reducing some of the problems while you are making a decision?" If the decision is to continue the behaviour, go back to explore the ambivalence.

Strategy	Example
Ask evocative/open-ended questions	When a change talk theme emerges, ask for more details: • In what ways? • How do you see this happening?
Ask for elaboration	What have you changed in the past that you can relate to this issue?
Ask for examples	When a change talk theme emerges, ask for specific examples. • When was the last time that happened? • Describe a specific example of when this happens. • What else?
Looking back	Ask about a time before the current concern emerged: • How have things been better in the past? • What past events can you recall when things were different?
Looking forward	Ask them about their hopes for the future if they make this change: • How would you like things to be different?
Query extremes	Ask about the best and worst case scenarios to elicit additional information: • What are the worst things that might happen if you don't make this change? • What are the best things that might happen if you do make this change?
Use change rulers	Ask open questions about where the caller sees themselves on a scale of 1–10: • On a scale where 1 is not at all important and 10 is extremely important, how important (need) is it to you to change_____? • What might happen that could move you from _____ to a _____ [higher number]? • How much do you want (desire) to quit? • How confident are you that you could quit and stay quit (ability)? • How committed are you to_____? (commitment)
Explore goals and values	Ask about the person's guiding values: • What do you want in life? • What values are most important to you? (Using a values card sort can be helpful here). • How does this behaviour fit into your value system?
Come alongside	Explicitly side with the negative (status quo) side of ambivalence: • Perhaps _________ is so important to you that you won't give it up, no matter what the cost. • It may not be the main area that you need to focus on in our work together.

Appendix 6. Videos for Student Training

https://www.youtube.com/watch?v=s3qhWL75JQ0 - Clinical Motivational Interviewing for Smoking Cessation: Smoking and Diabetes (American Indian Cancer Foundation)

https://www.youtube.com/watch?v=URiKA7CKtfc - The Effective Physician: Motivational Interviewing Demonstration (University of Florida Department of Psychiatry)

https://www.youtube.com/watch?v=80XyNE89eCs - The Ineffective Physician: Non Motivational Approach (University of Florida Department of Psychiatry)

Appendix 7. Agenda for Student Training

Agenda for 3 hour student training:

1. Introduction (20 minutes)

- In groups, brainstorming about benefits of quitting / risks of smoking (5 minutes)
- Brief review of epidemiology, nicotine dependence, importance of smoking cessation counseling, different settings ie. inpatient vs. outpatient (15 minutes)
    - 5As
    - Counseling all patients regardless of motivation
    - Pathophysiology of nicotine dependence

2. Motivational Interviewing (50 minutes)

- Brief review of motivational interviewing, provide students with reference guide (see Appendix 5) (25 minutes)
    - 5Rs
    - Importance of patient's own intrinsic motivation
- Watch motivational interviewing examples (see Appendix 6) (15 minutes)
- Practice general motivational interviewing techniques with partner (see Appendix 4, Exercise 1) (10 minutes)

(10 minute break)

3. Treatment Options for Smoking Cessation (45 minutes)

- In groups, brainstorming about what is currently available to assist patients with tobacco dependence (5 minutes)

- Brief review of pharmacotherapy options for smoking cessation, dosing, assessing nicotine dependence levels, side effects (30 minutes)
  - Nicotine levels in cigarettes vs. replacement
  - Combination NRT
  - Varenicline
  - Bupropion
  - Discussion re: no e-cigarette use
  - Time to first use, packs per day
  - Common concerns from patients / side effects

(10 minute break)

4. Integrated Practice (45 minutes)

- Discussion of smoking cessation patient cases in small groups (Appendix 4, Cases 1-3) (~7 minutes per case)
- Discussion / reflection as a class (~7 minutes per case)

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