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Primary healthcare provider experience of knowledge brokering interventions for mood management

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ABSTRACT

Background: Knowledge brokering is a knowledge translation strategy used in healthcare settings to facilitate the implementation of evidence into practice. How healthcare providers perceive and respond to various knowledge translation approaches is not well understood. This qualitative study used the Theoretical Domains Framework to examine healthcare providers' experiences with receiving one of two knowledge translation strategies: a remote knowledge broker (rKB); or monthly emails, for encouraging delivery of mood management interventions to patients enrolled in a smoking cessation program.

Methods: Semi-structured interviews were conducted with 21 healthcare providers recruited from primary care teams. We used stratified purposeful sampling to recruit participants who were allocated to receive either the rKB, or a monthly email-based knowledge translation strategy as part of a cluster randomized controlled trial. Interviews were structured around domains of the Theoretical Domains Framework (TDF) to explore determinants influencing practice change. Data were coded into relevant domains.


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Results: Both knowledge translation strategies were considered helpful prompts to remind participants to deliver mood interventions to patients presenting depressive symptoms. Neither strategy appeared to have influenced the health care providers on the domains we probed. The domains pertaining to knowledge and professional identity were perceived as facilitators to implementation, while domains related to beliefs about consequences, emotion, and environmental context acted as barriers and/or facilitators to healthcare providers implementing mood management interventions.

Conclusion: Both strategies served as reminders and reinforced providers' knowledge regarding the connection between smoking and depressed mood. The TDF can help researchers better understand the influence of specific knowledge translation strategies on healthcare provider behavior change, as well as potential barriers and facilitators to implementation of evidence-informed interventions. Environmental context should be considered to address challenges and facilitate the movement of knowledge into clinical practice.

Abbreviations

CAMH:	Centre for Addiction and Mental Health
HCP:	Healthcare providers
ICP:	Integrated care pathway
KT:	Knowledge translation
PHQ-9:	Patient Health Questionnaire-9
TDF:	Theoretical domains framework

Introduction

Healthcare interventions should incorporate the latest scientific evidence to improve patient and population health outcomes (Bowen & Graham, 2013). However, research has shown that engaging primary healthcare providers (HCPs) to implement evidence-based interventions as part of best practice can be a complex and challenging process (Bowen & Graham, 2013; Grimshaw & Eccles, 2004; Grol & Grimshaw, 2003). Traditional 'passive' knowledge translation (KT) strategies, which focus on the dissemination of information through journal articles, clinical guidelines, and didactic instruction, are shown to have only a modest effect on promoting clinical practice change (Grimshaw & Eccles, 2004; Grol & Grimshaw, 2003). This low impact may stem from barriers faced by the HCP, including lack of time and capacity to assess scientific evidence, and limited access to information in a format that is relevant to the provider's particular needs (Dagenais et al., 2015; Hoens et al., 2013; Kajermo et al., 2010). The professional differences found between researchers and clinicians can also result in a failure to recognize the complexities present within both settings. This can lead to discrepancies in their interpretation and communication of new evidence (Choi et al., 2005; Dagenais et al., 2015; Urquhart et al., 2011).

As a means to bridge the gap between evidence and practice, an increasingly popular KT strategy within healthcare settings is a Knowledge Broker (Canadian Health Services Research Foundation, 1999; Lomas, 2007). A knowledge broker fosters clinical practice

change and aids in capacity building by acting as the ‘linkage agent’ between investigators and end-users; facilitating, through interpersonal communication, the exchange and management of information (Canadian Health Services Research Foundation, 1999; Canadian Health Services Research Foundation, 2003; Ward et al., 2009). Another KT strategy, although a passive intervention for modest behavior change, educational materials emailed to providers may serve as an effective reminder (Campbell et al., 2019; Cheung et al., 2012; Grol & Grimshaw, 2003). Although there is no one effective strategy, a range and or multifaceted interventions could lead to provider behavior change (Grimshaw et al., 2002; Johnson & May, 2015). Currently, there is limited research on the factors related to how HCPs experience different KT strategies (Slaughter et al., 2018). To close this gap, and to understand the factors that affected the implementation of an intervention the current study explores HCPs experiences with two implementation strategies for delivering a mood management intervention in an existing smoking cessation program in primary care settings (1) the receipt of generalized monthly emails focused on tobacco and depression treatment or (2) the remote knowledge broker (rKB) offering tailored support via phone and email.

Theoretical frameworks serve as a shared language to describe contexts, specific problems, and interventions in a generalizable manner, providing guidance for adapting implementation strategies. One such framework, the Theoretical Domains Framework (TDF), was specifically designed to identify factors influencing professional behavior change (Cane et al., 2012). An increasing number of interview studies have employed the TDF to identify factors influencing the adoption of new programs (Cassidy et al., 2018; Lawton et al., 2016; McSherry et al., 2012; Smith et al., 2021), and do so by incorporating the domains of the framework into the interview schedule and/or utilizing the framework to structure the analytical process (Lawton et al., 2016; McSherry et al., 2012). In the current study, our interview guide and analytical process were guided by the TDF and 12 key determinants which include knowledge, skills, beliefs about consequences, beliefs about capabilities, social influences, emotion, motivation/goals, professional role/identity, memory and decision processes, environmental context and resources and action planning (Cane et al., 2012; Michie et al., 2005).

This current study is a sub-study of a cluster randomized trial conducted in 2017 with funding from the Canadian Institutes of Health Research. We conducted this cluster randomized trial to examine the effectiveness of generalized, exclusively email-based prompts, versus a personalized rKB for delivering evidence-based mood management interventions via phone and email within an existing smoking cessation program (the STOP program) in primary care settings. Both the full protocol and the primary outcomes of the trial have been published (Minian et al., 2018; Minian, Ahad, et al., 2021). Following the Expert Recommendations for Implementing Change (ERIC), the rKB was conceptualized as an implementation strategy that would encourage the adoption of the mood management intervention by facilitating interactive problem-solving and support and providing ongoing consultation (Powell et al., 2015). Monthly emails were conceptualized as an implementation strategy that would encourage the adoption of the mood management intervention by distributing educational materials (Powell et al., 2015).

In this 2017 randomized trial, 123 primary care teams were randomly allocated in a 1:1 ratio to either a control arm (monthly emails $n = 61$) or an intervention arm (remote

knowledge brokers $n = 62$). All HCPs were granted access to a computerized integrated care pathway (ICP) within the STOP program's online portal to help screen patients, in English, for past diagnosis and/or current diagnosis of depression, using the Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al., 2001). If a patient screened positive for previous diagnosis and/or current depressive symptoms, HCPs would receive an automated prompt encouraging the delivery of a brief intervention and a self-help mood management resource (the 'mood management intervention'). The complete results of the study have been published (Minian, Ahad, et al., 2021). Briefly, between February 2018 and January 2019, 7175 patients were screened for depression and 2765 (39%) reported current/past depression. Among those who reported current/past depression, 983 patients (36%) were offered a self-help mood management resource. 782 (80%) of the patients who were offered a resource, accepted it.

The mood management intervention was chosen as there is a need to help people with depression quit smoking; compared to the general population, individuals with depression are almost twice as likely to smoke (Hall & Prochaska, 2009) and there is strong evidence supporting the incorporation on a mood management element into smoking cessation programs as it enhances long-term quit rates for individuals with a history of depression, as well as those currently experiencing depression (Minian et al., 2018).

The aim of the current qualitative sub-study was to understand how HCPs experienced the rKB or the generalized monthly emails, and the incorporation of the mood management intervention into the existing smoking cessation program.

Methods

Study design and setting

This current study employed qualitative methodology, applying framework analysis (Gale et al., 2013) to data collected from semi-structured interviews with HCPs who participated in the STOP mood management trial. The Consolidated Criteria for Reporting Qualitative Research guided this article (Tong et al., 2007).

Recruitment

Participants for this qualitative sub-study were lead STOP program implementers from four performance strata. We used stratified purposeful sampling to recruit lead program implementers who were allocated to receive either the rKB, or monthly email-based knowledge translation strategy as part of a cluster randomized controlled trial. HCPs were eligible for recruitment if they participated in the mood management trial and if they enrolled at least seven patients that reported current/history of depression. In order to achieve representation from across primary care team sites, lead team HCPs were grouped into four strata. Performance was measured by examining the proportion of times a HCP enrolled a patient who was eligible for a mood management intervention, and proceeded to offer a self-help mood management resource. High performance was based on a 0.7 cutoff; meaning that HCPs offered the self-help resource to at least 70%

of eligible patients. Low performance was based on a 0.1 cutoff; meaning that HCPs offered the resource to less than 10% of eligible patients.

A Research Coordinator generated an initial list of five eligible HCPs for recruitment into each stratum. A total of five call attempts were made to recruit each HCP, and calls took place on different days and at different times of the day to increase the chances of successful contact. 47 HCPs were invited to participate in this study, 21 agreed to participate and completed an interview, yielding a response rate of 45%. Two students were responsible for recruitment between June to September 2019. Prior to participating in the interview, all HCPs were required to review and sign an informed consent form via email. Five HCPs were recruited and interviewed from all strata, except intervention \times high performance, where six HCPs agreed to be interviewed.

Interview procedure

Following recruitment, interviews were conducted by telephone between 27 June 2019 and 2 October 2019. The interviewer was blinded to the HCP's performance but was aware of whether HCPs were allocated to the control vs intervention arm to help guide interview questions. Each interview lasted approximately 30 minutes. The interviews explored HCPs' experiences with the KT strategies and delivering the mood management intervention as part of the STOP program, including facilitators and barriers. The interview questions were structured around 12 domains of the TDF (supplementary file 1). All interviews were audio recorded and transcribed verbatim.

Data analysis

NVivo 12 (QSR International) was used for data management and analysis. Interview data were analyzed using Framework analysis (Gale et al., 2013). Two researchers (AS and NM) read through the transcripts in order to get familiar with the data before coding. Codes were then discussed between the two researchers, and amendments were made where appropriate until full agreement was reached. In the first stage, participants' perception about the interventions, the rKB, and monthly emails, were coded and categorized using inductive thematic analysis (Braun & Clarke, 2019). In the second stage, perceptions about incorporating a mood management intervention into a smoking cessation program were coded using inductive thematic analysis and then mapped deductively to the established domains and theoretical constructs of the TDF, a validated framework comprising domains and theoretical constructs of behavior change in health providers (Cane et al., 2012; Lynch et al., 2017). One author assessed and examined the data coded in relation to the TDF. Tables were produced to highlight key thematic content. Factors affecting intervention implementation were assigned to a relevant TDF.

Statistical analysis

This study was approved by the Centre for Addiction and Mental Health's (CAMH Research Committee (REB #: 065-2016) and was part of the registered trial dated April 27, 2017 (ClinicalTrials.gov # NCT03130998).

Results

Of the 21 HCPs interviewed, 11 were assigned to receive calls and or emails from the rKB KT strategy and 10 were assigned to receive the generalized monthly email KT strategy to motivate providers' implementation of the mood management intervention. Participants' baseline characteristics are shown in [Table 1](#). The first section describes HCPs perception of which KT strategy would be more effective for motivating HCPs to provide resources on mood management to eligible patients. A key finding was that both KT strategies served as helpful reminders but did not influence providers' behavior/clinical practice change. In the second section, across five domains of the TDF, barriers or facilitators to providers incorporating the mood management intervention into the smoking cessation program were identified.

Perceptions of the rKB and generalized emails

Most (10/11) of the HCPs assigned to the rKB reported that they had received a call from the rKB at least two times; one HCP did not recall receiving any calls from the rKB. Of those who received at least one call, most (6/10) found the frequency of the calls appropriate, two HCPs expressed that the calls were too frequent and they did not have the time to answer calls during the workday. One HCP said they would prefer receiving emails over phone calls.

She tried calling multiple times and I'm just so busy I didn't always have time to call her back. ... when I did speak to her, she was lovely and really helpful. (P16, remote knowledge broker (rKB))

Of the 10 HCPs assigned to receive generalized monthly email communications, 5 mentioned they did not read most of the emails they received. Three HCPs said they had received the emails but had saved them to review later.

HCPs perceived the emails and the support from the rKB to be helpful reminders, or nudges, to provide a brief mood management intervention to their patients, rather than as methods of acquiring knowledge. The majority of the HCPs (10/11) in the rKB group shared that the phone calls acted as reminders. The calls also increased their awareness of all the available resources and prompted them to offer resources to their patients. Similarly, HCPs (5/10) who received emails also perceived them as reminders:

Table 1 . Participant characteristics.

Professional Role	Knowledge Translation Strategy	
	Remote Knowledge Broker	Monthly Emails
Pharmacist	4	0
Nurse	4	6*
Social Worker	1	0
Respiratory therapists	0	2
Kinesiologist	0	1
Health Promoter	0	1
Health Educator	1	0
Program coordinator	1	0
Total	11	10

*Two of the nurses in the email group also held health promoter roles and one of the nurses held a health educator role.

They [the emails] remind me of the significance of the mood and the process for the patient ... it just verifies that this is important and this is how my role is evolving in caring for tobacco risk. (P2, email)

Actually since [remote knowledge broker] called me a couple times it made me more aware and to remind myself to ask and explain to patient's how this can help them. Especially if they're not able to go and get mental health um support in our community without having to wait months. But at least they have something ... resource too look through ... it gives options of coping mechanism ... (P11, rKB)

HCPs from both groups believed that the emails and the rKB served as a reinforcement for what they already knew and increased their awareness about the connection between smoking and depression.

I think [remote knowledge broker] kind of reiterated and reinforced things that we already knew. (P13, rKB)

I think it just reinforced to me what I already knew. ... I always knew that they kind of go hand in hand and I think the monthly emails certainly, yeah I think they reinforced it in a positive way. (P8, email)

HCPs perception was that neither the emails nor rKB influenced (positive or negative) the TDF domains explored such as HCPs' knowledge, skills, social/professional role and identity, beliefs about capabilities, beliefs about consequences, motivation and goals, social influences, and behavioral regulation. Both KT strategies served as helpful reminders, not determinants of professional behavior:

I guess a reminder but I don't really think it advanced my understanding that there was a very strong link between smoking and mental health issues or concerns. (P1, rKB)

Perceptions on incorporating the mood management intervention into a smoking cessation program

This section is organized based on TDF domains. We found that the following five theoretical domains were relevant to incorporating a mood management intervention into a smoking cessation program: knowledge, social/professional role and identity, beliefs about consequences, emotions, and environmental context and resources.

Under the 'knowledge' domain (defined as 'an awareness of the existence of something' (Cane et al., 2012)) we explored HCPs' awareness of the connection between smoking and depression. Most HCPs mentioned that they were aware of the connection of mood disorders and smoking prior to the mood management intervention launching (8/11 in the rKB group and 9/10 in the email group). Their knowledge came from both training and practical experience.

I've been doing smoking cessation counseling now for about 22 years. So I had done a lot of training ... then started coming on board whenever CAMH started offering any sorts of training, webinars ... I feel quite knowledgeable in the connection with depression, mental illness ... As well as the possible effects of quitting smoking on mental health and exacerbating ... depression in some cases ... (P6, rKB)

Three HCPs mentioned that while they had knowledge about the importance of addressing mood in a smoking cessation program prior to the launch of the mood management intervention, they were unsure of how to actually address it.

Before the launch of the mood management, I would've said I had a hunch that that definitely made it more difficult for people to quit smoking, having had the depression diagnosis. But I probably was a little bit nervous to tackle it 'cause I didn't feel, like I had that much psychology background. So, I definitely knew it, it affected our success, but not really sure what to do about it. (P12, email)

HCPs reported that their knowledge on how to address mood in the context of smoking cessation improved because of the mood management intervention rather than by the KT strategy (rKB or emails) they received.

But I would say definitely it has, my knowledge has expanded in this area thanks to the STOP study in general and then definitely with this mood management intervention as well. (P15, email)

Under the social and professional identity domain, we explored how HCPs' professional identities aligned with the mood management intervention. As shown in [Table 1](#), HCPs from a variety of professional roles were involved in the mood management intervention. For the most part, HCPs' professional identity was a facilitator to implementing the mood management intervention. The majority of the HCPs, regardless of their profession, reported that the mood management intervention aligned well with their professional identities and that they were prepared to address mood (10/11 in the rKB group and 9/10 in the email group).

Oh I would say it (the mood management intervention) for sure aligns with it ... it is really being patient centered which is certainly in alignment with my values as a nurse. (Nurse, P16, rKB group)

Two HCPs, a pharmacist (rKB) and a nurse (email), shared that addressing mood management was out of their scope of practice. Therefore, they preferred to refer their patients to other professionals.

I'm comfortable ... talking to patients about depression, and things like that. It's just there's just always in the back of my mind I'm thinking, I'm a nurse, not a social worker. (Nurse, P8, email)

I am a pharmacist, we are trained in the pharmacotherapy of mood management, but our training with regards to behavioural changes, and ... non-pharmacological. ... methods of dealing with mood is rather limited because it's not something we're consistently taught in school, and in our practice either. (Pharmacist, P19, rKB)

Belief about consequences (defined as the 'acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation' (Cane et al., 2012)) also played an important role in integrating mood management into smoking cessation treatment. Most HCPs, regardless of the KT group they were assigned to, believed that by screening for mood disorders they could provide better care to their patients, as it allowed them to gain a better understanding of their patients' overall state of mental health and to take appropriate actions, such as providing referrals and resources.

I think it definitely is a very important thing to do. I would say that over 50% of the people that come to see us do have some kind of mental health issues so it can't be taken in isolation to try and quit smoking ... I find there's usually repercussions especially in the areas of dealing with stress. So, stress management's really important. ... So, I definitely think it's

extremely important and it has to be considered when you're helping people quit smoking. (P6, rKB)

A few HCPs ($n = 4$) also shared their belief that patients who have received the mood management intervention displayed increased confidence in their ability to quit smoking

The improvement in confidence in the ability to quit ... It's just amazing when you give them tools and address certain aspect that they weren't aware of. You're creating a higher level of self-awareness ... the level of awareness really, really has changed a lot of people's lives and moving forward they can apply ... their quitting smoking to other aspects of their life and ... make things a lot easier for them ... their confidence is a lot higher. (P18, rKB)

Patient's receptivity to discussing their mood as part of smoking cessation was a concern brought up by five HCPs. They feared that asking mood-related questions could cause patients to feel uncomfortable and could negatively affect their patient-provider relationship.

I think it's an important thing to talk about for sure but ... people's eyes kind of gloss over after a while ... we've had some comments about ... why are you asking me these questions because I'm only here to address my smoking issues. ... some of them get quite defensive ... (P13, rKB)

HCPs' emotions ('a complex reaction pattern, involving experiential, behavioral, and physiological elements, by which the individual attempts to deal with a personally significant matter or event' (Cane et al., 2012)) influenced whether, or how, they delivered mood management interventions as part of smoking cessation treatment. Overall, most HCPs had positive emotions about asking questions related to mood (7/11 in the rKB group and 6/10 in the email group). HCPs expressed that supporting patients with their mood helped them become more empathetic, and made them feel confident and reassured, knowing that they are able to offer resources to their patients.

We are human and everybody has stressors makes me more empathetic and willing to help or if I can refer to somebody else if they need emergent intervention it's supported me ... I'm definitely more comfortable knowing that I've sent them home with something they can further look into or review. (P11, rKB)

However, some HCPs (5/21) expressed discomfort about potentially upsetting patients who may struggle to answer mood-related questions, and a lack of knowledge of where to refer patients who may need extra support with their mood management.

I guess sometimes just my comfort level ... sometimes I worry ... about my knowledge level and I don't want to say the wrong thing ... (P14, email)

Two HCPs mentioned that when the mood management intervention was introduced they feared that asking questions about depression and suicide could cause patients to feel triggered or distressed; however after receiving educational training as part of the mood management intervention, including a two-part webinar series hosted by the STOP Program, and electronic resources, their attitudes changed.

... So, once we got over our fear that we weren't going to induce a suicidal ideation I think everybody became that much more interested in feeling that this was where we needed to go

for people we needed to be able to support them, we needed to be able to talk to them about it. (P2, email)

The last domain that we interpreted as playing a role implementing the mood management intervention was ‘environmental context and resources.’ Resources mentioned as barriers and facilitators to providing the mood management intervention included: education and training, tools and handouts, computerized ICP, PHQ-9 screening tool, time constraints, referral network, and wait times.

Six HCPs (2/11 in the rKB group and 4/10 in the email group) mentioned that having formal education on mood management, including continuing medical education (CME) training such as courses and educational series with the STOP program, facilitated their ability to provide mood management to their patients.

I did the Core Course with the STOP program ... I also did a certificate online ... CAMH ... has a lot of available ongoing educational pieces ... which is very important. So, CME's, when we go to conferences and they are including a lot more discussions and breakout sessions on mental health in primary care and how to deal with it ... so that's good, we're seeing a lot more of that because there's such a need for it. (P11, rKB)

Seven HCPs also found that the tools and handouts provided as part of the mood management intervention facilitated the provision of the intervention. In addition, without prompting, two HCPs reported using the self-help resource outside of the STOP program. Three HCPs shared that many patients brought back the self-help resource in follow-up appointments to discuss further.

Like it facilitated conversation and dialogues and acknowledgement and teaching moments ... The tools are (also) used outside the STOP program, which is fantastic too (P1, rKB)

Seven HCPs also mentioned the computerized ICP was an enabler for the mood management intervention, as the alerts it provided were a good reminder of the resources available.

Well it's [the ICP] been a positive impact. In that good reminder to actually use the resource, I think was probably the biggest piece that came out of that ... prompting me to remind the client that we have the resources available ... that they could have handouts and then a referral to another organization if they want counselling services ... those have been really helpful. (P20, rKB)

HCPs found the PHQ-9 screening tool helpful in assessing their patients and facilitating an open conversation about their mood (4/11 in the rKB group and 2/10 in the email group). HCPs in both groups also liked the automatic scoring of the PHQ-9 screening tool items within the STOP portal, which allowed them to understand the severity of their patient's depressive symptoms (3/11 in the rKB group and 2/10 in the email group).

... the PHQ-9 automatic tally ... is helpful, most definitely ... the red attention box that a person is reporting signs of major depression with mild severity or whatever degree they have is helpful, as a talking point, teaching point. And ... there's a number of people that are already aware and being treated for that but it's great thing to remind them especially with regards to quitting smoking and what to expect and how to prepare them for what may occur as they reduce their or abstain totally from nicotine ... cigarettes. Yeah I like the warning box more than anything, that's good. (P1, rKB)

Contextual barriers mentioned by HCPs included time constraints, particularly with respect to conducting the mood management intervention during the patient's first session where they are already screened for multiple health issues and behavioral risk factors related to smoking. A lack of places to refer patients with severe mood disorders, and/or specialists having long waitlists were also mentioned as barriers.

Five HCPs explained that they did not have enough time to conduct a mood management intervention during the patient's initial clinic visit (3/11 in the rKB group and 2/10 in the email group).

It's difficult to do a lot of interventions in that time you have because you're already covering so many other things with the smoking, the alcohol, you know, the mood and the time frame isn't there. (P13, rKB)

To refer somebody for counselling you're looking at ... 4–9 months wait. We have very low psychiatry services here ... you're waiting sometimes a couple months even to get a consult done ... resources that are in our team and in the community itself is lacking. (P13, rKB)

Discussion

This study set out to use the TDF to understand how HCPs working in a primary care setting experienced either the rKB, or the generalized monthly emails, and the incorporation of mood management interventions within their existing smoking cessation programming. The KT strategies were designed as two distinct implementation strategies: the rKB was intended to provide 'ongoing consultation' and monthly emails were to 'distribute educational materials.' Our findings show that both KT strategies served as 'reminders' to HCPs to provide the mood management intervention to their patients. This finding is in contrast to other studies where knowledge brokers were found to help increase knowledge and skills (Anthierens et al., 2017; Cameron et al., 2011; Willems et al., 2016) and emails could help with being familiar with the latest evidence (Piening et al., 2013; Tanna et al., 2011). This contrast could be due to HCPs reporting limited time to read the emails, or speak with the rKB, thus diluting the potential effectiveness of these strategies.

HCPs reported several barriers and facilitators to implementing mood management interventions within smoking cessation treatment. Knowledge and professional identity were key facilitators, as several HCPs believed that the mood management intervention fit well with their professional identity, regardless of their profession, and felt it was their professional duty to deliver the intervention. This finding aligns with other studies describing the important role professional identity plays in implementation (Alexander et al., 2014; Shrubsole, 2021; Tavender et al., 2014). HCPs also mentioned that prior to the implementation of the mood management intervention within the STOP program, they were aware of the connection between smoking and depression. This knowledge facilitated their ability to deliver the intervention to support their patients with smoking cessation. This is consistent with findings from other studies that knowledge and familiarity with a mood intervention is a meaningful facilitator in primary care sites (Haga et al., 2012; Lemke et al., 2017; Vest et al., 2020).

Findings linked to TDF domains indicated that HCPs beliefs about consequences, their emotions, and the environmental context acted as both barriers and facilitators

to implementing the mood management intervention. HCPs believed that addressing mood during a smoking cessation intervention would help their patients quit smoking and improve their overall quality of life. This belief was a strong motivator for the implementation of the mood management intervention. However, many HCPs also believed that screening for depression during the initial smoking cessation visit could harm the patient-provider relationship. HCPs also expressed concerns that asking questions about mood, and especially suicide, could trigger patients and initiate suicidal ideation. Their emotions and accompanying beliefs were barriers to the implementation of the mood management intervention. Other studies found that apprehensions about making patients uncomfortable and/or negatively affecting patient relationships could deter HCPs from implementing a program or intervention (Barley et al., 2011; Minian, Noormohamed et al., 2021; Slade et al., 2016; Whittenbury et al., 2022).

Having a supportive organization, available resources, and trusted screening questions were all mentioned as contextual facilitators for HCPs to deliver the mood intervention. Time constraints and long waitlists to refer patients to a mental health specialist were perceived as major barriers to delivering the mood management intervention. These results are similar to previous reports, whereby HCPs who perceived their working environments as supportive, including supportive managers, or receive support from an intermediary organization are more likely to implement evidence-based interventions, than those lacking support (Briffa et al., 2022; Metz et al., 2014; Shrubsole et al., 2019; Whittenbury et al., 2022).

These findings contextualize some of the previously reported quantitative findings of this trial (Minian, Ahad, et al., 2021). The mechanism of action of both KT strategies was the same, in that both acted primarily as reminders for HCPs. It is therefore not surprising that there was no significant difference in the effects of both KT strategies. By mapping the data to the TDF (Cane et al., 2012; Michie et al., 2005), we were able to systematically examine a wide range of domains that have been linked to behavior change and identify those that acted as barriers and facilitators. This allowed us to understand our quantitative findings, which revealed that less than 30% of patients who could benefit from a mood management intervention received one from their HCP (Minian, Ahad, et al., 2021). Beliefs about consequences, emotions, environmental context, and resources all played a role in why HCPs did not deliver the mood management intervention.

Strengths and limitations

A key strength of this study was the use of a well-defined implementation framework, the TDF, to explore influencing factors. Utilizing the TDF provided a wide range of domains for identifying potential barriers and facilitators to implementing mood interventions within primary care teams operating the STOP program. Another strength was the use of stratified purposeful sampling to engage HCPs, which facilitated the collection of information-rich cases and ensured equal representation and variability in performance among our sample of participants.

Along with these strengths, there are a number of limitations. The first study limitation is the response rate: only 45% (21/47) of HCPs invited for an interview agreed to participate. This low response rate could have resulted in selection bias, whereby

HCPs that disliked the mood management intervention or were less engaged in the STOP program may have been less willing to participate in the study. Also, variability in disciplines between HCPs from the rKB and email intervention groups that were interviewed could have resulted in differences in implementing the mood management intervention.

Another limitation was recall bias regarding HCPs experiences with the KT strategies. Time constraints and competing priorities, and staff turnover during the study period may have limited their interactions with either strategy and/or caused them to forget about their interactions altogether.

These findings may not be representative or generalizable as qualitative research does not rely on large and statistically representative samples for its credibility. However, given the importance of contextual factors, namely a well-established smoking cessation program operating within multidisciplinary primary care teams across Ontario, Canada, the findings may be transferable to others of similar contexts. While these primary care settings provide HCPs with the resources and capacity to screen and deliver mood interventions, or refer to other health professionals within their organization, smaller settings with less access to staff and in-house services might not have the same capacity.

Finally, our rKB strategy was limited to the use of telephone calls to communicate with HCPs. However, researchers and program implementers interested in using remote knowledge brokers as a KT strategy are encouraged to use methods of remote communication that promote engagement and flexibility, and have been shown to benefit HCPs with consulting and clinical decision-making such as video chats, text, and multi-media messaging (Ventola, 2014).

Conclusion

This qualitative study revealed that telephone calls from a rKB, and dissemination of educational materials via monthly emails were both perceived as effective strategies for reinforcing knowledge and reminding HCPs to implement evidence-based interventions to their primary care patients. Using the TDF allowed us to characterize behavioral factors that hindered and facilitated the ability for HCPs to implement mood interventions within their smoking cessation programming. Our results can help inform the use of KT strategies for supporting the implementation of evidence-based interventions into clinical practice; however, organizational settings and context must be considered.

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Author contributions

NM and PS conceptualized the study. SA supported the rKB and email intervention and coordinated the interviews. AS and NM analyzed the interviews. NM, AS, SA, and AG

drafted the manuscript. All authors participated in the critical revision of the manuscript, read, and approved the final manuscript.

Disclosure statement

No potential conflict of interest was reported by the author(s).












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Institutional review board statement

- The study was conducted in accordance with the Declaration of Helsinki and was approved by an Institutional Review Board/Ethics committee.
- The study received an exemption from an Institutional Review Board/Ethics committee

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