It's more than just a referral: Development of an evidence-informed exercise and depression toolkit

Glowacki, Krista; Arbour-Nicitopoulos, Kelly; Burrows, Meghan; Chesick, Leslie; Heinemann, Lyn; Irving, Sarah; Lam, Raymond W.; Macridis, Soultana; Michalak, Erin; Scott, Aidan; Taylor, Adrian; Faulkner, Guy

Published in:
Mental Health and Physical Activity

DOI:
10.1016/j.mhpa.2019.100297

Publication date:
2019

Mental Health and Physical Activity 17 (2019) 100297

Contents lists available at ScienceDirect

Mental Health and Physical Activity

journal homepage: www.elsevier.com/locate/menpa

It's more than just a referral: Development of an evidence-informed exercise and depression toolkit

Krista Glowacki[a,*], Kelly Arbour-Nicitopoulos[b], Meghan Burrows[c], Leslie Chesick[d], Lyn Heinemann[e], Sarah Irving[e], Raymond W. Lam[f], Soultana Macridis[g], Erin Michalak[h], Aidan Scott[i], Adrian Taylor[j], Guy Faulkner[a]

[a] School of Kinesiology, University of British Columbia, Lower Mall Research Station, 2259 Lower Mall Vancouver, BC, V6T 1Z4, Canada
[b] University of Toronto, Faculty of Kinesiology and Physical Education, 55 Harbord Street, Toronto, ON, Canada, M5S 2W6
[c] North Shore Division of Family Practice, 220 - 145, Chadwick Court, North Vancouver, BC, Canada, V7M 3K1
[d] University of British Columbia, Student Counselling Services, 2259, Lower Mall #358, Vancouver, BC, Canada
[e] Canadian Mental Health Association, Vancouver-Fraser Branch, 110-2425, Quebec St, Vancouver, BC, Canada, V5T 4L6
[f] Department of Psychiatry, University of British Columbia, Mood Disorders Centre, Djavad Mowafaghian Centre for Brain Health, 2255, Wesbrook Mall, Vancouver, BC, Canada, V6T 2A1
[g] Centre for Active Living, University of Alberta, Faculty of Kinesiology, Sport and Recreation, 2-131 University Hall, 8840-114 St NW, Edmonton, Alberta, Canada, T6G 2H9
[h] Mood Disorders Centre, Department of Psychiatry, Faculty of Medicine, University of British Columbia, 420-5950 University Boulevard, Vancouver, BC, Canada, V6T 1Z3
[i] BC Children's Hospital, 4555 Heather Street, Vancouver, BC, Canada, V5Z 0A7
[j] Plymouth University Peninsula Schools of Medicine & Dentistry, N6 ITTC Building, Plymouth Science Park, Derriford, Plymouth, United Kingdom, PL6 8BU, UK

ARTICLE INFO

Keywords:
Exercise
Depression
Toolkit
Evidence-based
Knowledge translation
Behaviour change

ABSTRACT

Objective: The aim of this article is to describe this systematic and phased process in developing the evidence-based 'Exercise and Depression Toolkit' for health care providers working with adults with depression.

Methods: The Appraisal of Guidelines, Research and Evaluation (AGREE) II tool was consulted throughout the developmental phased process, and used to guide toolkit content and dissemination strategies. The four phases included a review of relevant literature, formative interviews, an expert panel meeting, and finally toolkit development. A Theoretical Domains Framework (TDF) analysis was also used to determine behaviour change techniques (BCT) to be included in the toolkit. Various stakeholders were involved throughout the process including health care providers, adults who have lived experience with depression, researchers, and exercise professionals who have experience working with adults with depression.

Results: Recommendations from the consultation process included that the toolkit be 'depression tailored' including specific barriers that adults with depression face to engaging in physical activity (PA) and strategies they can use. The toolkit should promote collaboration and a person-centered approach. Different parts of the toolkit should be created for the intended audience of health care providers and adults with depression. BCTs were included to target the 'Emotion' and 'Social Influences' domains of the TDF.

Conclusions: These recommendations have resulted in the development of the 'Exercise and Depression Toolkit'. This toolkit is a resource for health care providers, adults with depression, and exercise professionals to help exercise become an accessible treatment option for the many Canadians living with depression.

1. Background

Depression affects over 300 million people worldwide and its prevalence has increased significantly since 2005 (WHO, 2019). It is one of the leading causes of disability in Canada and globally (MHCC, 2013; WHO, 2019), and Canada's national burden has been estimated to be more than that of lung, prostate, breast and colorectal cancers combined (Ratnasingham, Cairney, Rehm, Manson, & Kurdyak, 2012). Depression can be debilitating with symptoms such as hopelessness, despair, and thoughts of death greatly impacting individuals, families and communities and placing significant burden on economies and health care systems. There is an urgent need to develop innovative and

* Corresponding author.
E-mail addresses: krista.glowacki@ubc.ca (K. Glowacki), guy.faulkner@ubc.ca (G. Faulkner).

https://doi.org/10.1016/j.mhpa.2019.100297
Received 27 June 2019; Received in revised form 8 August 2019; Accepted 29 August 2019
Available online 30 August 2019

acceptable treatment options that are accessible to individuals with depression.

Systematic reviews have consistently shown structured exercise programs to significantly reduce depressive symptoms for individuals with depression (e.g., Cooney et al., 2013; Joseffson et al., 2014; Krogh, Hjorthøj, Speyer, Gluud, & Nordentoft, 2017; Schuch et al., 2016a). The most recent meta-analysis of 11 randomized controlled trials examined the antidepressant effects of exercise among adults (18–65 years) recruited through mental health services with a referral or clinical diagnosis of major depression (Morres et al., 2019). Analyses demonstrated a large significant overall antidepressant effect ($g = -0.79$). In light of such evidence, depression is the first and only mental health disorder in which exercise is recommended as an evidence-based treatment in clinical guidelines.

Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that results in energy expenditure (Casperson, Powell, Christenson, 1985). Exercise is a subset of PA and is defined as PA that is planned, structured, repetitive and done for the purposes of improving or maintaining physical fitness (Casperson et al., 1985). The National Institute of Clinical Care and Excellence in the United Kingdom recommends exercise as a treatment for subthreshold and mild-moderate depression (National Collaborating Centre for Mental Health UK, 2009). The American Psychiatric Association acknowledges that exercise can be used as a monotherapy for mild depression in the acute phase after a diagnosis with monitoring of mood by a health professional (APA, 2010). More recently, the Canadian Network for Mood and Anxiety Treatments (CANMAT) revised its treatment guidelines and now recommends exercise as a primary intervention for mild-moderate Major Depressive Disorder (MDD), and as an adjunctive treatment for moderate-severe MDD (Ravindran et al., 2016). Throughout this manuscript, the use of the term depression refers to MDD. CANMAT recommends a 'dose' of exercise based on the best available evidence acknowledging that personal fitness and current and past activity levels also be considered. This 'dose' is 2–3 times a week for a duration of 30 minutes at a moderate intensity for a minimum of 9 weeks. Supervised exercise is recommended for adherence, and either cardiovascular or resistance training can be used (Ravindran et al., 2016). The CANMAT guideline is of significance as this is the first time that exercise has been recommended as a monotherapy for depression in Canada.

1.1. Physical Activity Guidelines, treatment guidelines and clinical populations

In Canada, little structure exists for mental health professionals to explore exercise as a treatment option for adults with depression. Clinical treatment guidelines such as the CANMAT guidelines were developed to help health care providers implement evidence-based research into their clinical practice (Ravindran et al., 2016). However, releasing guidelines or providing education about guidelines are not sufficient to elicit behaviour change (Pederson et al., 2017). Guidelines help to understand 'what' to do, but not 'how' to do it (implementation). It is likely that most mental health care professionals in Canada have not received any training in exercise or PA promotion, similarly, many exercise professionals may not have been exposed to mental health training (Faulkner, 2016). Accordingly, there is a need to develop resources to support health care professionals in implementing the CANMAT guidelines and to consider exercise as an antidepressant treatment option with clients. While further consideration is needed in how best to support adults with depression to start and maintain exercise as an intervention for their depression, we have assumed that the starting point is initial treatment planning with a clinician.

Work has been done to facilitate the implementation of guidelines for other clinical populations. The seminal international Physical Activity Guidelines (PAGs) for adults with chronic spinal cord injuries were released in 2011 (Martin Ginis et al., 2011). After release of these PAGs, a working group used a systematic process to develop an evidence-informed spinal cord injury specific resource to supplement the guidelines and support behaviour change, the 'SCI Get Fit Toolkit' (Arbour-Nicitopoulos at al., 2013; SCI Action Canada, 2013). The process described by Arbour-Nicitopoulos et al. (2013) served as a template in developing a similar resource to be used by clinicians for implementing the CANMAT guidelines.

The aim of this article is to describe this systematic and phased process used to develop the evidence-based 'Exercise and Depression Toolkit' for health care providers working with adults with depression. The four phases included: a review of relevant literature, formative interviews, an expert panel meeting, and final toolkit development. Various stakeholders were involved throughout the process including health care providers, adults who have lived experience with depression, researchers, and exercise professionals. The next sections will further describe each of these four phases in detail.

2. Methods and results

2.1. Overview

The Agree II instrument is a tool used to develop quality evidence-based guidelines, ensuring methodological rigour and transparency (Brouwers et al., 2010; AGREE II, 2017). It has also been used for resource development and health promotion (Arbour-Nicitopoulos et al., 2013; Latimer-Cheung et al., 2013). The AGREE II was consulted throughout the developmental process and used to guide toolkit content and dissemination strategies. Similar to past use of the AGREE II for resource development, modifications were made to items for health promotion and resource development rather than guideline development. The project leads (KG & GF) consulted the third author (KAN) on use of the AGREE II and for appraisal of the included items. KAN was the AGREE II expert for this project given her leadership on the development and pilot-testing of the SCI Get Fit Toolkit. Table 1 outlines all AGREE II items and modifications, as well as application to the Exercise and Depression Toolkit (referred to throughout this paper as the 'toolkit'). Fig. 1 provides a summary of the events and timeline leading to the development of the toolkit.

2.2. Toolkit development process

2.2.1. ***Phase one:*** *review of the literature*

Before development of the toolkit, the evidence-base reviewed by KG and GF included the CANMAT guidelines (Lam et al., 2016; Ravindran et al., 2016) and recent meta-analyses on exercise for clinical depression (e.g., Krogh et al., 2017; Schuch et al., 2016a; 2016b). Two scoping reviews were also conducted to provide a framework for comprehensively understanding barriers and facilitators to clinician and client participation in PA and exercise promotion, respectively (Glowacki, Duncan, Gainforth & Faulkner, 2017; Glowacki, Weatherson, & Faulkner, 2019). A behavioural analysis driven by theory was used in both reviews using the Theoretical Domains Framework (TDF; Cane, O'Connor, & Michie, 2012). The TDF is part of a larger meta-framework, known as the Behaviour Change Wheel, which helps intervention developers select behaviour change techniques (BCTs) (Cane, Richardson, Johnston, Ladha, & Michie, 2015; Michie et al., 2013; Michie & Atkins, 2014). Behaviour change techniques are the active ingredients within an intervention (what can be observed and replicated) designed to change behaviour (Michie & Atkins, 2014). Thus, conducting a TDF analysis was done to theoretically inform the content of the toolkit.

The first review included thirteen studies that reported on barriers and facilitators to PA and exercise participation among individuals with depression using quantitative, qualitative or mixed methods (Glowacki et al., 2017). To meet inclusion criteria, articles were also required to be peer reviewed, English language, include sample populations of adults

Table 1
Modifications to AGREE II items and application to the toolkit.

AGREE II Item	Modified AGREE II Item	Application to the Toolkit
Domain 1- Scope and purpose: objectives, practical questions and target population.		
1) The overall objective(s) of the guideline is (are) specifically described.	The overall objective of the toolkit is specifically described.	To support health care professionals in collaborating with clients to explore exercise as a treatment option for adults with mild-moderate depression.
2) The health question covered by the guideline is specifically described.	The practical questions covered by the toolkit are specifically described.	What type of resource(s) will support health care professionals to discuss exercise as a treatment for mild-moderate depression with clients? What type of resource will motivate adults with depression to consider exercise as a treatment option?
3) The population to whom the guideline is meant to apply is specifically described.	The population to whom the toolkit is targeted towards is specifically described.	Adults diagnosed with mild-moderate depression aged 18–65 in Canada not meeting the recommended 150 min per week of moderate-vigorous PA per week.
Domain 2- Stakeholder Involvement: consideration of the views of the target group(s) and their representation within the recommendations development group.		
4) The guideline development group includes individuals from all relevant professional groups.	The expert panel includes individuals from all relevant professional groups.	Experts in depression, physical activity, knowledge translation; representatives from mental health & physical activity organizations; health care providers; individuals with lived experience with depression; researchers.
5) The views and preferences of the target population have been sought.	Original AGREE II item retained.	Panel included end users of the toolkit and the population the toolkit is targeting. Formative research was done through interviews with adults with depression and health care providers.
6) The target users of the guideline are clearly defined.	The target users of the toolkit are clearly defined.	Health care organizations and providers that work with adults with depression, inclusive of (but not limited to): Family Physicians, Psychiatrists, Counsellors, Mental health workers, Occupational Therapists, Recreation Therapists, Nurses, Social workers.
Domain 3- Rigour of development: methods and criteria used to inform the recommendations, the review process, and plans for updating.		
7) Systematic methods were used to search for evidence.	Original AGREE II item retained.	Research evidence purposely selected including CANMAT Guidelines (Ravindran et al., 2016) and scoping reviews on barriers and facilitators for AWD and HCP (Glowacki et al., 2017; 2019).
8) The criteria for selecting the evidence are clearly described.	Original AGREE II item retained.	Criteria are described in the methods section of this paper and in scoping reviews (Glowacki et al., 2017; 2019) and CANMAT guidelines (Ravindran et al., 2016).
9) The strengths and limitations of the body of evidence are clearly described.	Original AGREE II item retained.	Key strengths include use of a theory-driven analysis to determine BCTs (Cane et al., 2015; Glowacki et al., 2019, 2017) and the rigorous process to attain the highest level of evidence (one) to support exercise for MDD (Ranvindran et al., 2016). Key limitations include varying methods of diagnosis of depression (Glowacki et al., 2017), no separation of terms PA or exercise (Glowacki et al., 2017; 2019), and lack of long-term data to support exercise for MDD (Ravindran et al., 2016). Further details provided in the methods section and in the discussion of the scoping reviews (Glowacki et al., 2017; 2019) and CANMAT guidelines (Ravindran et al., 2016).
10) The methods for formulating the recommendations are clearly described.	Original AGREE II item retained.	A multistep process used in previous PA toolkit development work in adults with SCI was applied (Arbour-Nicitopoulos et al., 2013): 1. Review of evidence by panel participants before the meeting; 2. Summary of key points from the evidence-base; 3. Structured working groups/breakout sessions; and 4. Review of final content and recommendations by panel survey and feedback.
11) The health benefits, side effects and risks have been considered in formulating the recommendations.	The practical implications have been considered in developing the toolkit.	The toolkit increases awareness and knowledge of the CANMAT guidelines, common barriers and strategies to help individuals with depression engage in exercise & PA are identified; an advocacy tool for improving access to exercise as a treatment for depression; a link to an exercise screening tool is provided; varying programming and exercise referral schemes across Canada and demand may increase; extra training on the toolkit may be needed.
12) There is an explicit link between the recommendations and the supporting evidence.	Original AGREE II item retained.	Refer to Table 4 for explicit link to each recommendation and supporting evidence base.
13) The guideline has been externally reviewed by experts before its publication.	The toolkit has been externally reviewed by experts before its publication.	Toolkit content and format recommendations were reviewed and revised by panel experts and CANMAT board members.
14) A procedure for updating the guideline is provided.	A procedure for updating the toolkit is provided.	The online toolkit will be updated according to resources available.
Domain 4- Clarity of presentation: transparency of the recommendations and dissemination options		
15) The recommendations are specific and unambiguous.	Original AGREE II item retained.	Recommendations are considered clear based on feedback from the expert panel (see Table 5).
16) The different options for management of the condition or health issue are clearly presented.	Original AGREE II item retained.	Different options for management are considered clear based on feedback from expert panel (see Table 5), and CHOICE-D (Parikh et al., 2018) document is referenced for further details.
17) Key recommendations are easily identifiable.	Original AGREE II item retained.	Recommendations are considered easily identifiable based on feedback from the expert panel (see Table 5).
Domain 5- Applicability: dissemination-related barriers and facilitators and the expected resource implications		

(*continued on next page*)

Table 1 (*continued*)

AGREE II Item	Modified AGREE II Item	Application to the Toolkit
18) The guideline describes facilitators and barriers to its application.	Facilitators and barriers to dissemination of the toolkit were discussed.	Facilitators and barriers are outlined in the Discussion. Key facilitators include: identifying champions in different sectors, partnering with organizations with a large following (e.g. CANMAT and Centre for Active Living), and creation of social media packages to give to champions and organizations. Key barriers include: extra training on the toolkit may be needed, and may be multiple parts to the toolkit that will need to be packaged together.
19) The guideline provides advice and/or tools on how the recommendations can be put into practice.	The recommendations provide advice and/or tools on how the toolkit can be put into practice.	Ensuring HCP can readily distinguish the credibility of the information; instructions on use of the toolkit in practice included in the 'INTRO' document; additional supplementary materials as handouts for clients.
20) The potential resource implications of applying the recommendations have been considered.	The potential resource implications of disseminating the toolkit have been considered.	Website management and hosting; personnel available to update website and track downloads; and greater demand for resources, programs and staff.
21) The guideline presents monitoring and/or auditing criteria.	Strategies for monitoring and/or auditing the uptake of the toolkit have been considered.	Monitoring of online downloads of the toolkit (number of downloads and reach) and planned formal feedback on its use in practice through ongoing evaluation.
Domain 6- Editorial independence: independency of the recommendations from the views of the funding body and competing interests of the expert panel		
22) The views of the funding body have not influenced the content of the guideline.	The views of the funding body have not influenced the content of the toolkit.	Representatives from funding agencies did not participate in the development process of the toolkit.
23) Competing interests of guideline development group members have been recorded and addressed.	Competing interests of the toolkit development group have been recorded and addressed.	One panel member reported potential conflicts of interest which have been recorded and addressed. Details are outlined in Potential Conflicts of Interest.

Abbreviations: AWD = Adult with Depression, HCP = Health Care Provider, MDD = Major Depressive Disorder, PA = Physical Activity, SCI = Spinal Cord Injury, CHOICE-D is a document outlining treatment options for clients and families with lived experience of depression, CANMAT = Canadian Network for Mood and Anxiety Treatments.

aged 18–65 with the majority (> 50%) diagnosed with depression, or a mood disorder. Articles were excluded if they did not specify the number of participants and their diagnosis, or if they did not report any empirical data.

This review identified common barriers to engaging in PA inclusive of low mood, lack of energy, fatigue, and lack of motivation (Glowacki et al., 2017). The top facilitators identified included others' attitude and emotional support, and ongoing support for engagement in physical activity. The barriers identified were reflective of the Emotion domain of the TDF. Specific behaviour change techniques recommended to target behaviour change within the emotion domain include: 'Reduce negative emotions', 'Information about emotional consequences', 'Self-assessment of affective consequences', and 'Emotional social support' (Cane et al., 2015) and these are reflected in the toolkit (see phase four for further details).

The second scoping review included studies that reported on the barriers and facilitators that health care providers experience when promoting PA to individuals with a mental illness (inclusive of but not limited to depression) using quantitative, qualitative or mixed methods (Glowacki et al., 2019). To meet inclusion criteria, articles were also required to be peer reviewed, English language, and have sample populations of any health care providers that worked with individuals with a mental illness. Articles were excluded if they did not specify the client population diagnosis that the health care providers worked with, or did not report any empirical data.

Important barriers identified by health care providers in this second review were the barriers faced by clients related to their mental illness (e.g. low mood), a lack of training on how to promote PA, and lack of resources. This review highlighted two key TDF domains that should be targeted to assist health care providers' promotion of PA to individuals with depression: 'Beliefs about the Consequences', and 'Environmental Context and Resources'. The domain of 'Optimism/Pessimism' was also considered important. An example of a recommended BCT that can be used for intervention within these domains is educating providers with information on the health consequences (to their client) of promoting PA, and on the clinical guidelines supporting this evidence (Cane et al., 2015). The theoretical analysis and recommended BCTs from each study were reviewed and discussed by the panel in phase three to formulate recommendations on how to incorporate them into the toolkit (see phase four below).

Key strengths of the two scoping reviews include the use of a theory-driven analysis to determine BCTs (Glowacki et al., 2017; 2019; Cane et al., 2015). Furthermore, a key strength of the CANMAT guidelines includes the rigorous process used to reach a consensus on the highest level of evidence (level one: meta-analysis with narrow confidence intervals and/or two or more RCTs with adequate sample size, preferably placebo controlled plus clinical support) to support exercise as a treatment for MDD (Ravindran et al., 2016).

Key limitations of the scoping reviews include the exclusion of grey literature or articles in a language other than English (Glowacki et al., 2017; 2019), varying methods of diagnosis of depression (Glowacki et al., 2017), and the terms PA and exercise often being used interchangeably (Glowacki et al., 2017; 2019), even though CANMAT guidelines specify exercise as a treatment recommendation. Key limitations of the CANMAT guidelines are more reflective of the state of the exercise and depression evidence base. For example, there remains a lack of long-term data on the benefits of exercise for MDD, and less evidence regarding effectiveness in clinical practice (Ravindran et al., 2016).

2.2.2. ***Phase two:*** *formative research*

This phase of the project was approved by the University of British Columbia Institutional Ethics Review Board. Semi-structured interviews were conducted with the toolkit's target population of Canadian adults with a self-reported diagnosis of depression from a health care provider (n = 13). Diagnosis was not confirmed by chart review or speaking to a health professional. However, participants were screened and asked whether they had been diagnosed with depression, by whom (which health care provider), and in what practice setting (e.g. family physician in primary care). Interviews were also conducted with potential end users of the toolkit, a variety of Canadian health care providers who have experience working with adults with depression (n = 14). Interviews identified needs, content and format preferences for the toolkit. See Table 2 for demographic characteristics of the participants.

Overall, participants (adults with depression and health care providers) reported the CANMAT guidelines to be acceptable. They identified that they had previous knowledge that exercise was beneficial for depression, but that they had not necessarily known it was recommended as a primary treatment. Some clarification was desired on the definition of exercise, and how much exercise was recommended as

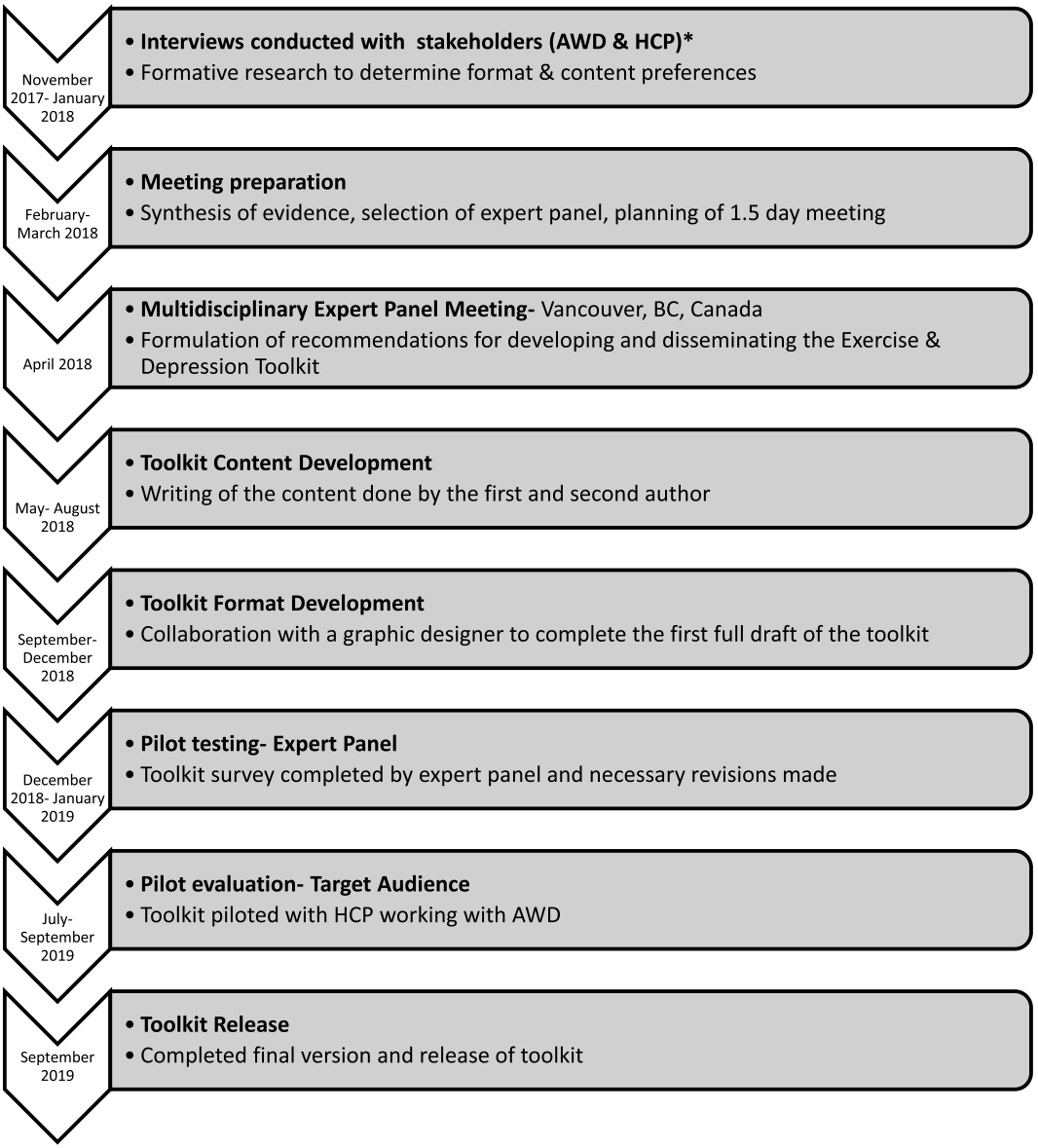

Fig. 1. Timeline of the development of the Exercise and Depression Toolkit.
* AWD = Adults with depression.
HCP = Health Care Providers.

a treatment. Participants felt it was important to know the "FITT" principles, which is the frequency, intensity, time, and type of exercise, to aim for if exercise was going to be used or recommended as a treatment for depression. Participants also wanted the toolkit to include self-monitoring resources such as a mood and activity diary, and for it to highlight health and other benefits of engaging in PA. Participants requested the content of the toolkit be 'depression tailored', including a section on the specific barriers that adults with depression face in engaging in PA, strategies for overcoming barriers, and stories or experiences from individuals with depression about their beneficial participation in PA. Lastly, people wanted a resource that could be used collaboratively by a health care provider and an individual with depression in considering exercise as a treatment for depression. All health care providers (n = 14) and the majority of individuals with depression (n = 7) wanted to be able to access the resource online. The second most desired format was paper (n = 5 individuals with depression; n = 9 health care providers). Considering these preferences, the panel agreed that the toolkit will be available online as a downloadable PDF to either be used online or printed and used as a paper copy as desired.

2.2.3. ***Phase three:*** *expert panel meeting*

A multidisciplinary panel of twelve experts comprised of PA and mental health researchers, health care providers, adults with lived experience with depression, and exercise professionals that have experience working with adults with depression appraised the evidence from phases one and two to generate content, format and dissemination recommendations for the toolkit. See Table 3 for the full list of panel members, affiliations, and roles.

2.3. Scope and purpose of the toolkit

Prior to the expert panel meeting, the first author provided the panel with an executive summary of the results from the two scoping reviews and the interviews that were part of phases one and two. This was done one month in advance of the meeting to provide the panel adequate time to review and consider in relation to the entire toolkit project. At the beginning of the meeting, a summary of the project's

Table 2
Demographic characteristics.

	AWD[a] (n = 13)	HCP[a] (n = 14)
Gender, % (n)		
% Female	69.2 (9)	78.6 (11)
Age		
M (SD)	51.6 (10.79)	36.2 (12.95)
Range	32–64	25–70
Ethnicity, % (n)		
Caucasian	46.2 (6)	100 (14)
Asian	38.5 (5)	
Other	15.4 (2) (Métis, Spanish)	
Education, % (n)		
Some secondary school	7.7 (1)	
Completed secondary school	15.3 (2)	
Completed College	30.8 (4)	
Completed University	38.5 (5)	42.9 (6)
Completed Graduate School	7.7 (1)	57.1 (8)
Employment, % (n)		
Full-time	15.3 (2)	71.4 (10)
Part-time	7.7 (1)	7.1 (1)
Self-employed	7.7 (1)	7.1 (1)
At home w/children	7.7 (1)	
Not currently employed	30.8 (4)	
Other	30. 8 (4)	14.4 (2)[b]
MVPA[a], % (n)		
< 150 min/week	30.8 (4)	21.4 (3)
≥ 150 min/week	69.2 (9)	78.6 (11)
Years Working with AWD, % (n)		
0–5	N/A	28.6 (4)
5–10	N/A	42.9 (6)
10–20	N/A	14.2 (2)
20 +	N/A	14.2 (2)
Diagnose Depression, % (n)		
Yes	N/A	35.7 (5)
HCP Designation, % (n)		
Recreational Therapist	N/A	7.1 (1)
Nurse	N/A	7.1 (1)
Nurse Practitioner	N/A	7.1 (1)
Family Physician[b]	N/A	14.3 (2)
Occupational Therapist	N/A	14.3 (2)
Social Worker	N/A	14.3 (2)
Mental Health Worker	N/A	14.3 (2)
Case Manager	N/A	7.1 (1)
Psychiatrist[b]	N/A	14.4 (2)

[a] AWD = Adult with Depression, HCP = Health Care Provider, MVPA = Moderate-Vigorous Physical Activity.
[b] Two participants were medical residents at the time of interview and reported working full-time and being a student full-time.

objectives and overview of the evidence (e.g. CANMAT guidelines) was presented to the panel by the first and second authors (KG and GF). The first and second authors (KG and GF) defined the target population (adults with depression), and end users (health care providers) of the toolkit based on the findings from phase one and two. These decisions were also reviewed and agreed upon by the expert panel at the beginning of the meeting. Below are the objective, the target population, and the end users of the toolkit.

- Objective: To support health care professionals in collaborating with clients to explore exercise as a treatment option for adults (aged 18–65) with mild-moderate depression.
- Target Population: Adults diagnosed with mild-moderate depression aged 18–65 in Canada not meeting the recommended 150 min per week of moderate-vigorous PA per week.
- End Users: Health care providers who work with adults with depression, inclusive of (but not limited to): Family Physicians, Psychiatrists, Counsellors, Mental health Workers, Occupational Therapists, Recreation Therapists, Nurses, and Social workers. Community, Primary Care, Inpatient, and Outpatient settings.

Panel members split into two working groups and participated in five, 45–60 min breakout sessions. Topics of these sessions included: Review of draft content and structure of the toolkit; Facilitate decision-making around exercise as a treatment option; Addressing barriers; Look and feel of the toolkit; Dissemination. Content and format recommendations were then developed by the panel as an entire group using the evidence reviewed before the meeting (see Table 4). A debriefing meeting was held at the end of the first day between the project leads and one expert panel member (KAN) to summarize these recommendations. On the second day, a facilitated discussion (lead by the project leads KG and GF) was held with the entire group to review and revise recommendations.

2.3.1. ***Phase four:*** *toolkit development*

The toolkit content was written by the first author (KG) in collaboration with the second author (GF) based on the panel meeting recommendations and the desired content identified from the formative interviews with adults with depression and health care providers in phase two. It was decided by KG and GF that there would be three parts to the toolkit (see supplementary file for the first part). The first part is the 'Introduction' document created for the target audience (end user) of health care providers. This document explains the process used for toolkit development, relevant literature, and gives instructions and recommendations on how to use the toolkit. Creation of this document was guided by the second scoping review (Glowacki et al., 2019) and the salient barriers to promoting physical activity identified by health care providers. This document is to address any pessimism regarding clients' motivation to exercise, and build the self-efficacy of health care providers to discuss and recommend exercise by informing them of the evidence-base used to create the toolkit, and the inclusion of tools and behaviour change techniques to help clients overcome barriers to PA and exercise. An example of a recommended BCT for health care providers included in this document is ‘Persuasion to boost self-efficacy’.

The second part of the toolkit is the 'Collaboration' document for a clinician and client to use together (pg. 1–4). An important part of developing this content was the ordering of these pages. KG and GF determined the ordering based on an anticipated collaborative treatment decision-making process. The first author (KG) works as a mental health occupational therapist and used clinical reasoning as guidance for the ordering of this section's content. This begins with a discussion of ‘Why exercise?’ in comparison to other treatment options and why it may be a good fit for an individual (pg.1). This page also includes the desired content of highlighting various benefits of exercise. This then leads to a discussion about someone's personal experiences with exercise or PA in the past, and the incorporation of behavioural activation and the mood cycles in and out of depression (pg. 2 ‘How are exercise and depression related?’). These mood cycles are to be used as an educational tool and are the recommended BCT of ‘information about emotional consequences’ (Cane et al., 2015) and are central to the toolkit. The conversation continues to a discussion about if exercise will be used as a treatment, how much exercise is recommended based on the CANMAT guidelines (pg. 3 ‘CANMAT Guidelines at a glance’). This page has the desired content of what the guidelines are, specifying the frequency, intensity, time and type of exercise to aim for if using exercise as a treatment. The conversation then leads to the discussion of common barriers or concerns that individuals with depression may face when engaging in PA on page 4 ‘Moving More’. Possible actions (behaviour change techniques) to address or overcome these concerns are also included. The content of this page is guided by the first scoping review and TDF analysis (Glowacki et al., 2017). The page has an endpoint, in which a collaborative decision is made to either refer to an exercise program, engage in further PA counselling to help increase general PA (either with the current health care provider or referral to another), or to think about exercise further and discuss at a later date.

The third part of the toolkit is the 'Action Materials’ section, which is targeted to adults with depression. These materials are client handouts that can be given to an individual with depression by a health care

Table 3
Expert panel for the toolkit recommendations development group.

Name	Affiliation and Institution	Expertise
Krista Glowacki (*Project co-lead)*	OT, PhD Candidate, School of Kinesiology, University of British Columbia (UBC)	Mental health, physical activity behaviour change, knowledge translation
Dr. Guy Faulkner *(Project co-lead)*	CIHR-PHAC Chair in Applied Public Health, School of Kinesiology, UBC	Mental health, physical activity behaviour change, knowledge translation
Dr. Kelly Arbour-Nicitopoulos	Assistant Professor, Faculty of Kinesiology and Physical Education, University of Toronto	Mental health, physical activity behaviour change, knowledge translation, resource development
Meghan Burrows	PTS, RTS, Kinect Facilitator	Mental health, exercise and physical activity programming
Leslie Chesick	Counsellor, Counselling Services, UBC	Mental health, physical activity
Lyn Heinemann	OT, Director, Recovery and Innovation, Canadian Mental Health Association	Mental health, community resources and programming
Sarah Irving	SW, Canadian Mental Health Association	Mental health, community resources and programming
Dr. Raymond Lam	Professor and BC leadership Chair in Depression Research, Associate Head for Research, Department of Psychiatry, UBC, Mood Disorders Centre, Cjavad Mowafaghian Centre for Brain Health; Executive Chair, CANMAT	Mental health, psychiatry
Dr. Soultana Macridis	Research Associate and Knowledge Translation Specialist, Centre for Active Living	Physical activity behaviour change, knowledge translation, resource development
Dr. Erin Michalak	Professor, CREST.BD Founder and Director, Patient Engagement Methods Lead, BC SUPPORT Unit, Mood Disorders Centre, Department of Psychiatry, UBC	Mental health, knowledge translation, resource development
Aidan Scott	Patient Engagement & Research Volunteer, International mental health advocate, TEDx speaker, Youth Engagement Specialist, & Founder of Speakbox: social enterprise	Mental health, community resources and programming, client advocacy
Dr. Adrian Taylor	Professor of Health Services Research, Associate Dean for Research, Plymouth University Peninsula Schools of Medicine & Dentistry, UK.	Mental health, physical activity behaviour change

provider at their discretion, and then be used independently or in collaboration with their health care provider. These handouts are linked to page 4 'Moving More' of the collaborative pages and are the actions that can be taken which are recommended behaviour change techniques from the first scoping review and TDF analysis (Glowacki et al., 2017). For example, Handout #1, is a Mood and Activity Diary, which is the recommended BCT of 'Self-assessment of affective consequences' (Cane et al., 2015). This part of the toolkit also includes the desired content of self-monitoring resources, and stories about positive personal experiences that adults with depression have had with exercise.

After content was developed, the toolkit itself was then created in collaboration with a graphic designer. Through online survey, members of the expert panel were consulted to ensure that content and format recommendations were appropriately addressed (as per discussions that occurred during the panel meeting). Table 5 provides a summary of the panel's feedback. Consistency was indicated between the panel recommendations and the general content and presentation of the toolkit. Responses were favourable on all items ($M = 6.42$ on a 7-point scale). Some suggestions by the panel were to provide information about other treatment options, to change the wording of "side-effects of exercise may include…" to something more positive on page 1, and that some actions and concerns are more immediate versus long-term on page 4 'Moving More'. To address these suggestions, reference to the CHOICE-D document (Parikh et al., 2018) was added for more details of other treatment options. CHOICE-D is a summary of the CANMAT guidelines and treatment options for clients and families with lived experience of depression. The wording on page 1 was changed to "benefits of exercise may include…", and the actions on page 4 were ordered from those that can be taken immediately to longer-term. The final version of the 'Introduction' document is presented as a supplementary file. The complete toolkit is available to download at www.exerciseanddepression.ca.

Panel members were also asked questions based on Rogers' Diffusion of Innovations Theory, a theory that explains the process by which people or groups adopt or reject a new idea, behaviour or object (innovation) (Rogers, 2003). Questions were asked how the toolkit related to the five attributes of innovation adoption: relative advantage, compatibility, complexity, trialability, and observability. Table 6 provides a summary of the panel's feedback regarding innovation attributes. Overall, panel members felt the toolkit would facilitate conversations between clinicians and clients about exercise as a treatment for depression (relative advantage), and the toolkit was easy to understand (complexity). With regards to compatibility, panel members were asked if use of the toolkit will be consistent with most clinician's usual practice. Panel members identified that many clinicians may not be currently promoting PA or discussing and recommending exercise. However, the toolkit was viewed as something new and different, with the potential to help many health care providers to do so. An innovation adoption process is not straight forward. The panel viewed the toolkit as having relative advantage and low complexity, which is promising for adoption by the target audience. Further work may be needed to understand the perceived attributes of the innovation, and other factors that may influence adoption by health care providers specifically.

3. Discussion

Our working group developed the first evidence-informed resource to support health care professionals in collaborating with clients to explore exercise as a treatment option for mild-moderate depression and supplement CANMAT guidelines (Ravindran et al., 2016). This was done following an internationally accepted and rigorous consultation process (AGREE II, 2017), successfully used previously in another clinical population (Arbour-Nicitopoulos et al., 2013).

Our working group faced some challenges in the process of developing the toolkit. Access to exercise referral schemes for depression is fragmented in Canada. Systematic reviews suggest that effects and adherence are better when exercise is supervised and structured (Stubbs et al., 2016). Accordingly, the CANMAT guidelines refer to structured and supervised exercise (Ravindran et al., 2016). However, such programs may not always be available. This impacted decisions that were made by the panel regarding content of the toolkit (a greater focus on exercise than habitual or lifestyle PA) and on the end point of the toolkit and the decision making process, particularly if there was no option for an exercise referral. While exercise referral may not always be possible, the working group considers PA promotion as something clinicians should be engaging in with their clients with depression. However, it is acknowledged that increases in PA may not be sufficient for an antidepressant effect but will provide other important health benefits. It is important that health care providers, along with individuals with depression considering exercise as a treatment,

Table 4
Summary of the link between the Exercise and Depression Toolkit recommendations and supporting evidence.

Toolkit Pages	Topic	Recommendation	Supporting Evidence
Exercise and Depression Introduction Document	Toolkit Development Process, Using the Toolkit, and Action Materials	Title page is important as its the first thing seen, need to get attention and highlight how this resource will help the clinician and address any pessimism they may have before using it. Promote collaboration and a person-centered approach between HCP & AWD. Create different parts of the toolkit for the intended audience of health care providers, adults with depression, or both to use together. Ensure risks are considered before engagement in an exercise program and physician clearance may be needed. Include all collaborators of the toolkit and their logos. Ensure it is stated that this toolkit is a guide, and it is not meant to be overly prescriptive.	(Cane et al., 2015; Cane et al., 2012; Glowacki et al., 2019; MHCC, 2016)
Pg. 1 Why exercise?	Primary treatment options and facts	Identify all primary treatment options for mild-moderate depression including anti-depressant medication, exercise and psychological treatment. Enhance credibility of exercise as a treatment by stating facts about its effectiveness compared to other treatments.	(Ravindran et al., 2016; Lam et al., 2016; Parikh et al., 2018)
	Benefits of Exercise	Benefits should convey physical, psychological, and psychosocial health benefits of engaging in regular physical activity as well as benefits other treatments don't have (e.g. socialization)	(Canadian PA Guidelines, from CSEP; Rosenbaum, Tiedemann, Sherrington, Curtis, & Ward, 2014; Stanton, Happell, & Reaburn, 2014; Deslandes et al., 2009)
	Potential Mechanisms	Describe potential mechanisms to explain the benefit of exercise in depression including biological factors (e.g., increased neurotransmitters, endorphins, brain-derived neurotrophic factor; reduction in cortisol levels), and psychological factors (e.g., increased self-efficacy)	(Cooney et al., 2013; Phillips, 2017; Schuch et al., 2016a)
Pg. 2 How are exercise and depression related?	Mood Cycles	Use the behaviour change technique of 'Information about emotional consequences' and incorporate behavioural activation through visual diagrams side-by-side of positive and negative mood cycles. Describe that inactivity and with-drawl can lead to depression, and depression can lead to inactivity which becomes a difficult cycle to get out of. However, changing one thing in this cycle (such as increasing PA) can break the cycle and lead to a positive cycle out of feelings of depression.	(Chalder et al., 2012; Martell, Dimidjian, & Herman-Dunn, 2010; Parikh et al., 2016)
Pg. 3 CANMAT Guidelines at a glance	CANMAT Recommendations, Evidence, and evidence- based dose	State the CANMAT recommendations: exercise is recommended as a monotherapy for mild-moderate MDD, and in combination with other treatments. State the recommended evidence based 'dose' of exercise to aim for if using as a treatment: 2–3 times per week, moderate intensity, 30 min duration, and supervised if possible but that it should be individualized based on current activity levels.	(Krogh et al., 2017; Ravindran et al., 2016; Schuch et al., 2016a)
	Glossary of terms	Define and differentiate the terms PA (for general health benefits) and exercise (for the treatment of depression).	(Caspersen, Powell, & Christenson, 1985; Ravindran et al., 2016).
Page 4. Moving More & Action Materials (Handout #1–5)	Common Concerns, Actions	Evidence-based barriers (top related to emotion): lack of motivation, low mood, lack of energy, fatigue, lack of confidence in ability to exercise, lack of social support, time, money. Evidence-based facilitators: others' support or attitude, and ongoing support for the exercise itself	(Cane et al., 2012; Glowacki et al., 2017)
	Actions, Handouts #1–5 (Mood and Activity Diary, SMART Goal setting, Weekly Schedule, Individuals with Lived Experience, Positive Statements)	Recommended behaviour change techniques include: reduce negative emotions, Information about emotional consequences, Self-assessment of affective consequences, Social comparison, Social support (general, practical, and emotional), Information about others' approval, Restructuring the social environment, Commitment, Behavioural contact, Goal setting (outcome and behaviour, Action planning. Include handouts and resources that clients can use independently: action plan, mood diary, concrete examples of structured & supervised exercise, example of a week schedule to get recommended 'dose'. Provide ways for individuals to work towards the evidence based 'dose'.	(Cane et al., 2012; Cane et al., 2015; Glowacki et al., 2017; Michie et al., 2013)

(*continued on next page*)

Table 4 (*continued*)

Toolkit Pages	Topic	Recommendation	Supporting Evidence
	Layout, Images & Colours	-Combination of text & images -Simple messages by using concise & point form wording -Quick facts pull-out -Bright colours and colour code pages to differentiate collaborative pages, pages for the HCP, and resources for AWD - Leave blank spots or boxes to write with prompt to clinician to engage in a conversation and to fill in with the client -Incorporate white space -Simple, clean graphics -Images of real people not necessary -5-10 pages in length	(Foulon, Lemay, Ainsworth, & Ginis, 2012; Arbour-Nicitopolous et al., 2012)

Abbreviations.
CANMAT = Canadian Network for Mood and Anxiety Treatment HCP = Health Care Provider, MDD = Major Depressive Disorder, PA = Physical Activity, AWD = Adult with Depression.

understand the difference between PA and exercise.

We also acknowledge that a toolkit by itself is likely insufficient in supporting behaviour change, particularly in terms of helping individuals start and maintain exercise as a treatment for mild-moderate depression. With successful and informed dissemination, this toolkit will help health care providers integrate evidence-based guidelines related to exercise and depression into their practice and will be a starting point to facilitate the decision-making process and consideration of exercise as a treatment for mild-moderate depression. For exercise to become an accessible and feasible treatment alternative integrated regularly in health service delivery, significant work is still needed. Mental health care providers will need some training on exercise and PA (Glowacki et al., 2019), and exercise professionals will need training on working with clients with depression (Faulkner & Biddle, 2001). Continued advocacy to key stakeholders such as government health authorities, decision makers, and community organizations is necessary for larger policy and organizational-level changes to support an exercise referral infrastructure for depression in Canada.

However, we believe the toolkit will serve different purposes for different stakeholders. For health care providers, the toolkit provides an evidence-based resource that can be used in practice to guide and facilitate conversations in considering exercise as a treatment for depression. It can also be used as a tool to facilitate PA promotion. For adults with depression, the toolkit is intended to increase awareness and knowledge of recommendations around exercise as a treatment for depression, and to provide behavioural strategies to overcome barriers for increasing PA and engaging in exercise. For exercise professionals, the toolkit can be used as an advocacy tool for integration of exercise programs and professionals into mental health care.

3.1. Dissemination barriers and facilitators

Now that the toolkit has been developed, attention has turned to disseminating the toolkit to clinicians nationally. Barriers to disseminating the toolkit need to be considered. The toolkit involves multiple components, so it will need to be marketed in one package. Extra training on the use of the toolkit may be needed for health care providers. Lastly, the targeted end users of the toolkit include a wide variety of different professions, and so dissemination may need to be tailored to each.

Facilitators that may help dissemination of the toolkit are to engage champions in different sectors including stakeholders involved in this development process, as well as work with our community partners to promote the toolkit (e.g., CANMAT, Centre for Active Living, and Canadian Mental Health Association). The creation of a social media package to send to partners will help them to disseminate through their own platforms and organizations. A tiered approach to national dissemination could start with the province of British Columbia where it was created and then move to other provinces. Housing of the toolkit will be done in one online location (www.exerciseanddepression.ca), so stakeholders promoting and disseminating the toolkit can use one website link with endorsement. This will also help to evaluate and track reach of the toolkit.

3.2. Strengths and limitations

A strength of this work is the thorough systematic process used to develop the toolkit through consultation of the Agree II instrument throughout the process to ensure quality, methodological rigour and transparency on how the toolkit was developed. This includes ensuring all six domains (and 23 items within the domains) were adequately addressed: scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence. Table 1 explicitly outlines how all items and domains were addressed. Some examples of rigour of development (domain 3) include reviewing relevant literature and the two scoping reviews conducted (item 7 and 8), the multi-step phased process (item 10), and the consideration of practical implications for use of the toolkit by health care providers (item 11). Our group did not calculate a quality score by appraisers of each item. In replacement of this, a survey was sent back to panel members with their recommendations and the first draft of the toolkit to ensure that these were adequately met. Stakeholder involvement was an integral part of the process, and our group aimed for diversity of perspectives and expertise of the expert panel. This includes experts in depression, PA, knowledge translation, representatives from mental health and PA organizations, health care providers, individuals with lived experience with depression and researchers. Stakeholders including adults with depression and health care providers were consulted through the entire process reflecting an integrated knowledge translation approach for effective health promotion (Arbour-Nicitopoulos et al., 2013; Olsson, Skovdahl, & Engström, 2016).

3.3. Future directions

Panel members will work with community partners and organizations to disseminate the toolkit across the province of British Columbia, and across Canada. The project leads are planning to evaluate the use of the toolkit in practice. In particular, they plan to evaluate the acceptability of the intervention, perceived attributes of the innovation, and how this may influence dissemination and adoption. Evaluation will also be conducted on the uptake of the resource and its reach to the target audience once it is nationally disseminated and available online.

Table 5
Toolkit ratings obtained from expert panel (n = 9*).

Item	Mean (s.d.)	Range	Area(s) of concern	Response to Feedback
Objectives 1. The toolkit is appropriate for use by the intended audience of health care providers working with adults with depression.	6.89 (0.33)	6–7	Some people may experience low mood and symptoms and not have a clinical diagnosis of depression but could benefit from exercise	Wording changed to incorporate "low mood"
2.Does the toolkit: a. Use concise language? b. Promote collaboration and a person-centered approach between health care providers and individuals with depression? c. Capture the tone/feel of: hopeful + active + journey?	6.56 (0.53) 6.56 (0.53) 6.44 (0.73)	6–7 6–7 5–7	Some are long-term vs. Short-term actions and concerns	Re-ordered actions to progress from more immediate to longer-term actions
3. Discussions at the panel meeting identified the need to tackle clinician's possible pessimism about individuals with depression engaging in an exercise program. Does the 'INTRO' section do this adequately?	5.89 (0.60)	5–7	Perhaps lengthy with only a minor hook -Further details may be necessary for the 'supplementary materials' section -Distinction between PA & exercise not clear	-Title page changed to include CANMAT guidelines & collaborator logos -Further detailed instructions included on each page of the 'supplementary materials' section -Included definitions on page 3 of the intro document 'Using the Toolkit'
Pg. 1 Why Exercise? 4. Does the toolkit present exercise as one treatment option in comparison to other standard treatment options? *n = 8	6.13 (1.36)	3–7	No details or direct comparison provided of other treatments (e.g. side effects) of psychotherapy and medication	-Reference included of CHOICE-D Document to explore details of other treatments -Additional instruction included on page 3 of the intro document 'Using the Toolkit'
5. Does the toolkit describe a variety of benefits of exercise? (e.g. physical health, psychosocial)	6.44 (0.53)	6–7	The benefits were presented using wording "side-effects may include" which may have a negative connotation and be misleading	-Wording changed to "Benefits"
Pg. 2 How are exercise and depression related? 6. Does the toolkit provide visuals and diagrams that are easy to follow?	6.56 (0.53)	6–7		
7. The positive and negative mood cycles in the toolkit are helpful for engaging someone in conversation related to exercise as a treatment for depression.	6.56 (0.53)	6–7		
Pg. 3 Guidelines at a Glance. 8. Does the toolkit clearly state the amount, type, and intensity of exercise of the CANMAT guidelines?	6.33 (1.00)	4–7	Exercise can also be used in conjunction with other treatments and not just stand-alone. The CANMAT guidelines should be page 1 as it is compelling	- Additional recommendation included: Exercise can also be used in combination with other treatments (page 3 & INTRO document) -Wording changed on the title page to include CANMAT guidelines so it is the first thing seen
9. Does the toolkit avoid being overly prescriptive?	6.11 (0.60)	5–7		
Pg. 4 Moving More. 10.Does the toolkit highlight: a. Commonly identified barriers/concerns? b. Strategies or actions to take to overcome barriers?	6.44 (0.53) 6.33 (0.50)	6–7 6–7		
Images 11. In the panel meeting, a consensus was reached that images of real people may not be necessary. The current icons and figures in the toolkit are: a. Appropriate for health care providers and adults with depression? b. Adequate as visuals to enhance the narrative of the document?	6.56 (0.53) 6.44 (0.53)	6–7 6–7		

Consistency was indicated between the panel recommendations and the general content and presentation of the toolkit. Responses were favourable on all items regarding questions about content and format recommendations. (M = 6.42 on a 7-point scale).

Table 6
Toolkit ratings obtained from expert panel Diffusion of Innovation Theory (n = 9[a]).

Item	Mean (s.d.)	Range	Comments
12. The toolkit will facilitate clinician-client discussions about exercise, and exercise as a treatment for depression.	6.56 (0.53)	6–7	
13. Use of the toolkit will be consistent with most clinician's usual practice.	4.78 (1.30)	3–7	This is something new and that is positive: it is easy to use but different. Many clinicians will not currently be promoting PA and this toolkit will help them to do so. Will be beneficial for clinicians and clients
14. The toolkit is easy to understand.	6.67 (0.50)	6–7	
15. Clinicians could observe whether using the toolkit in their practice was beneficial for their clients. (n = 7)[b]	6.00 (1.00)	4–7	Could measure function and attendance (harder to measure social benefits)
16. The use of the toolkit could be adapted to suit the needs of clinicians. (n = 8)[b]	5.50 (1.31)	4–7	

[a] The project leads were panel members and did not fill out the survey, and 1 panel member was on parental leave at the time of the survey resulting in 9 expert panel members completing the survey.
[b] Responses to items were removed and considered a non-response if reported they did not understand the question.

Additional funding will be sought for further dissemination and knowledge translation activities such as a development of educational sessions and educational training videos about using the toolkit and recommendations on its use.

4. Conclusion

Developing the Exercise and Depression Toolkit is the first step in bridging the gap between treatment guidelines for depression and the consideration of exercise as a treatment option in practice. Development followed an internationally accepted and rigorous consultation process by use of the AGREE II instrument (2017). Future evaluation is planned on the use of the toolkit in practice, and to monitor its uptake and reach once disseminated. In tandem with other advocacy and research initiatives, it is anticipated that the toolkit will help health care providers integrate evidence-based guidelines into their practice related to exercise and depression. It is also anticipated that this will be a starting point in helping exercise become an accessible treatment option that is integrated into health service delivery to improve the lives of the many Canadians living with depression.

Potential conflicts of interest

Raymond W. Lam has received honoraria for ad hoc speaking or advising/consulting, or received research funds, from: Akili, Allergan, Asia-Pacific Economic Cooperation, BC Leading Edge Foundation, Canadian Institutes of Health Research, Canadian Network for Mood and Anxiety Treatments, Canadian Psychiatric Association, CME Institute, Hansoh, Healthy Minds Canada, Janssen, Lundbeck, Lundbeck Institute, Medscape, Mind.Me, MITACS, Movember Foundation, Ontario Brain Institute, Otsuka, Pfizer, St. Jude Medical, University Health Network Foundation, and VGH-UBCH Foundation.

Source of funding

This study was supported by a Canadian Institutes of Health Research (CIHR) Foundation grant (CIHR FDN-154289) awarded to Guy Faulkner. Guy Faulkner is also supported by a CIHR-Public Health Agency of Canada (PHAC) Chair in Applied Health Research.

Acknowledgements

Thank you to all of our participants who contributed their invaluable time and knowledge to inform the development of the Exercise and Depression Toolkit.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.mhpa.2019.100297.

References

American Psychiatric Association. (2010). *Practice Guideline for the Treatment of Patients With Major Depressive Disorder* (Third Edition). https://psychiatryonline.org/pb/assets/raw/sitewide/practice_guidelines/guidelines/mdd.pdf.

Arbour-Nicitopoulos, K. P., Ginis, K. M., Latimer-Cheung, A. E., Bourne, C., Campbell, D., Cappe, S., ... Smith, K. (2013). Development of an evidence-informed leisure time physical activity resource for adults with spinal cord injury: The SCI Get fit toolkit. *Spinal Cord, 51*(6), 491.

Brouwers, M. C., Kho, M. E., Browman, G. P., Burgers, J. S., Cluzeau, F., Feder, G., ... Littlejohns, P. (2010). Agree II: Advancing guideline development, reporting and evaluation in health care. *Canadian Medical Association Journal, 182*(18), E839–E842.

Cane, J., O'Connor, D., & Michie, S. (2012). Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science, 7*(1), 37.

Cane, J., Richardson, M., Johnston, M., Ladha, R., & Michie, S. (2015). From lists of behaviour change techniques (BCTs) to structured hierarchies: Comparison of two methods of developing a hierarchy of BCTs. *British Journal of Health Psychology, 20*, 130–150.

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports, 100*(2), 126.

Chalder, M., Wiles, N. J., Campbell, J., Hollinghurst, S. P., Haase, A. M., Taylor, A. H., ... Winder, R. (2012). Facilitated physical activity as a treatment for depressed adults: Randomised controlled trial. *British Medical Journal, 344*, e2758.

Cooney, G. M., Dwan, K., Greig, C. A., Lawlor, D. A., Rimer, J., Waugh, F. R., ... Mead, G. E. (2013). Exercise for depression. *Cochrane Database of Systematic Reviews, 2013*(9), 1–156. https://doi.org/10.1002/14651858.CD004366.pub6.

Deslandes, A., Moraes, H., Ferreira, C., Veiga, H., Silveira, H., Mouta, R., ... Laks, J. (2009). Exercise and mental health: Many reasons to move. *Neuropsychobiology, 59*(4), 191–198.

Faulkner, G. (2016). Sweat is the best antidepressant: But where do we go from here? *WellSpring, 27*(3), 1–4.

Faulkner, G., & Biddle, S. (2001). Exercise and mental health: It's just not psychology!. *Journal of Sports Sciences, 19*(6), 433–444.

Foulon, B. L., Lemay, V., Ainsworth, V., & Ginis, K. A. M. (2012). Enhancing physical activity guidelines: A needs survey of adults with spinal cord injury and health care professionals. *Adapted Physical Activity Quarterly, 29*(4), 329–345.

Ginis, K. M., Hicks, A. L., Latimer, A. E., Warburton, D. E. R., Bourne, C., Ditor, D. S., ... Pomerleau, P. (2011). The development of evidence-informed physical activity guidelines for adults with spinal cord injury. *Spinal Cord, 49*(11), 1088.

Glowacki, K., Duncan, M., Gainforth, H., & Faulkner, G. (2017). Barriers and facilitators to physical activity and exercise among adults with depression: A scoping review. *Mental Health and Physical Activity, 13*, 108–119.

Glowacki, K., Weatherson, K., & Faulkner, G. (2019). Barriers and facilitators to health care providers' promotion of physical activity for individuals with mental illness: A scoping review. *Mental Health and Physical Activity, 16*, 152–168.

Josefsson, T., Lindwall, M., & Archer, T. (2014). Physical exercise intervention in depressive disorders: Meta-analysis and systematic review. *Scandinavian Journal of Medicine & Science in Sports, 24*, 259–272.

Krogh, J., Hjorthøj, C., Speyer, H., Gluud, C., & Nordentoft, M. (2017). Exercise for patients with major depression: A systematic review with meta-analysis and trial sequential analysis. *British Medical Journal open, 7*(9), e014820.

Lam, R. W., McIntosh, D., Wang, J., Enns, M. W., Kolivakis, T., Michalak, E. E., ... Milev, R. V. (2016). Canadian Network for mood and anxiety treatments (CANMAT) 2016 clinical guidelines for the management of adults with major depressive disorder: Section 1. Disease burden and principles of care. *Canadian Journal of Psychiatry, 61*(9), 510–523.

Latimer-Cheung, A. E., Rhodes, R. E., Kho, M. E., Tomasone, J. R., Gainforth, H. L., Kowalski, K., & Duggan, M. (2013). Evidence-informed recommendations for constructing and disseminating messages supplementing the new Canadian Physical

Activity Guidelines. *BMC Public Health, 13*(1), 419.
Martell, C. R., Dimidjian, S., & Herman-Dunn, R. (2010). *Behavioral activation for depression: A clinician's guide.* New York (NY): Guilford.
Mental Health Commission of Canada (2013). Making the case for investing in mental health. https://www.mentalhealthcommission.ca/sites/default/files/2016-06/Investing_in_Mental_Health_FINAL_Version_ENG.pdf.
Mental Health Commission of Canada (2016). Guidelines for recovery-oriented practice. https://www.mentalhealthcommission.ca/English.
Michie, S., Atkins, L., & West, R. (2014). *The behaviour change wheel: A guide to designing interventions.* Great Britain, UK: Silverback Publishing.
Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., et al. (2013). The behaviour change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behavior change interventions. *Annals of Behavioural Medicine, 46*(1), 81–95.
Morres, I. D., Hatzigeorgiadis, A., Stathi, A., Comoutos, N., Arpin-Cribbie, C., Krommidas, C., et al. (2019). Aerobic exercise for adult patients with major depressive disorder in mental health services: A systematic review and meta-analysis. *Depression and Anxiety, 36*(1).
Next Steps Consortium (2017). The AGREE II instrument [electronic version]. http://www.agreetrust.org.39-53.
Olsson, A., Skovdahl, K., & Engström, M. (2016). Using diffusion of innovation theory to describe perceptions of a passive positioning alarm among persons with mild dementia: A repeated interview study. *BMC Geriatrics, 16*(1), 3.
Parikh, S. V., Kcomt, A., Fonseka, T. M., & Pong, J. T. (Eds.). (2018). *THE CHOICE–D PATIENT AND FAMILY GUIDE TO DEPRESSION TREATMENT*. Toronto, Mood: Disorders Association of Ontario.
Parikh, S. V., Quilty, L. C., Ravitz, P., Rosenbluth, M., Pavlova, B., Grigoriadis, S., ... Milev, R. V. (2016). Canadian Network for mood and anxiety treatments (CANMAT) 2016 clinical guidelines for the management of adults with major depressive disorder: Section 2. Psychological treatments. *Canadian Journal of Psychiatry, 61*(9), 524–539.
Phillips, C. (2017). *Brain-derived neurotrophic factor, depression, and physical activity: Making the neuroplastic connection.* (Neural plasticity).
Ratnasingham, S., Cairney, J., Rehm, J., Manson, H., & Kurdyak, P. (2012). *Opening eyes, opening Minds: The Ontario burden of mental illness and addictions report. An ICES/PHO report*Toronto: Institute for Clinical Evaluative Sciences and Public Health Ontario.
Ravindran, A. V., Balneaves, L. G., Faulkner, G., Ortiz, A., McIntosh, D., Morehouse, R. L., ... MacQueen, G. M. (2016). Canadian Network for mood and anxiety treatments (CANMAT) 2016 clinical guidelines for the management of adults with major depressive disorder: Section 5. Complementary and alternative medicine treatments. *Canadian Journal of Psychiatry, 61*(9), 576–587.
Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.
Rosenbaum, S., Tiedemann, A., Sherrington, C., Curtis, J., & Ward, P. B. (2014). Physical activity interventions for people with mental illness: A systematic review and meta-analysis. *Journal of Clinical Psychiatry, 75*, 964–974.
Schuch, F. B., Vancampfort, D., Richards, J., Rosenbaum, S., Ward, P. B., & Stubbs, B. (2016a). Exercise as a treatment for depression: A meta-analysis adjusting for publication bias. *Journal of Psychiatric Research, 77*, 42–51.
Schuch, F. B., Vancampfort, D., Rosenbaum, S., Richards, J., Ward, P. B., & Stubbs, B. (2016b). Exercise improves physical and psychological quality of life in people with depression: A meta-analysis including the evaluation of control group response. *Psychiatry Research, 241*, 47–54.
Spinal Cord Injury (SCI) Action Canada (2013). SCI Get Fit Toolkit. Retrieved from http://sciactioncanada.ca/guidelines/docs/sci-get-fit-toolkit-brochure-r.pdf.
Stanton, R., Happell, B., & Reaburn, P. (2014). The mental health benefits of regular physical activity, and its role in preventing future depressive illness. *Nursing: Research and Reviews, 4*, 45–53.
Stubbs, B., Vancampfort, D., Rosenbaum, S., Ward, P. B., Richards, J., Soundy, A., ... Schuch, F. B. (2016). Dropout from exercise randomized controlled trials among people with depression: A meta-analysis and meta regression. *Journal of Affective Disorders, 190*, 457–466.
World Health Organization (2019). Mental disorders: Depression. https://www.who.int/mental_health/management/depression/en/.