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The HAT TRICK program for improving physical activity, healthy eating and connectedness among overweight, inactive men: Study protocol of a pragmatic feasibility trial

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ABSTRACT

Introduction: Physical activity, healthy eating, and maintaining a healthy weight are associated with reduced risk of cardiovascular disease, type 2 diabetes and cancer, and improved mental health. Despite these benefits, many men do not meet recommended physical activity guidelines and have poor eating behaviors. Many health promotion programs hold little 'manly' appeal and consequently fail to influence men's self-health practices. Research has revealed that consideration of 'place' and 'product' that aligns with men's values and interests can advance health promotion behaviors. HAT TRICK was designed as a 12-week face-to-face, gender-sensitized intervention for overweight and inactive men focusing on physical activity, healthy eating and social connectedness, and delivered in collaboration with a major junior Canadian ice hockey team. The program was implemented and evaluated to assess its feasibility. This article describes the intervention design and study protocol examining feasibility and estimated intervention effectiveness of HAT TRICK.

Methods and Analysis: HAT TRICK participants (N=60) will be men ≥35 years, residing in the Okanagan Region of British Columbia, who accumulate <150mins of moderate to vigorous physical activity a week, with a Body Mass Index >25kg/m^2 and a pant waist size of >38". Each 90-minute weekly session will include targeted health education and theory-guided behavior change techniques, as well as a progressive group physical activity component. Outcome measures will be collected at baseline, 12-weeks, and 9-months and include: anthropometrics physical activity, diet, smoking, alcohol consumption, sleep habits, risk of depression, health-related quality of life, and social connectedness. Program feasibility and acceptability data (e.g., satisfaction, adherence, delivery) will be assessed at 12-weeks.

Ethics and Dissemination: Ethical approval was obtained from the University of British Columbia Okanagan Behavioural Research Ethics Board (#H1600736). Study findings will be disseminated widely through academic meetings, peer reviewed publication, web-based podcasts, social media, plain language summaries and co-delivered community presentations.

Keywords: Men's health; masculinity; physical activity; dietary behaviors; overweight/obese; social connectedness; community partnerships; feasibility trial

Trial Registration: ISRCTN43361357, Registered August 3, 2016

Strengths and Limitations of the Study:

- HAT TRICK is a gender-sensitized program designed to engage 'hard to reach' men with their health by resonating with and appealing to masculine ideals.
- The HAT TRICK program has the potential to be transferred across a number of male populations and settings, thus further increasing its reach to a large proportion of men.
- This study has a robust evaluation plan, utilizing objective and subjective measures of physical activity, and a variety of measures to assess program feasibility.
- Given the exploratory nature of this feasibility study, it is limited in examining causal effect in terms of behavior change.

INTRODUCTION

Engaging in healthy lifestyle behaviors including physical activity (PA) and healthy eating to achieve and maintain a healthy body weight, can reduce the risk for developing chronic diseases such as cardiovascular disease, cancer, type 2 diabetes, depression and premature mortality [1-4]. Despite the benefits associated with these lifestyle behaviors, a large proportion of men do not meet the recommended PA guidelines [3, 5] (i.e., at least 150 minutes of moderate to vigorous intensity PA per week) and have poor eating behaviors [6, 7]. Accordingly, the prevalence of overweight and obesity among men is on the rise and continues to grow at a disproportionate rate to their female counterparts [8]. Complicating matters is the fact that many men have proved reluctant and/or 'hard-to-reach' in healthy lifestyle and weight management programs, making disease and illness prevention initiatives difficult [9, 10].

Traditionally, a central challenge associated with engaging men in taking more active care in their health was a perception that attention to one's health ran counter to masculine ideals of strength, self-reliance and independence [11-14]. Men often associate health promoting practices as feminine, or a sign of weakness, and consequently threatening to their status in masculine hierarchies [12, 15]. Thus, many men refrain from engaging in health promotion behaviors, including attending PA, healthy eating, and weight management programs [16, 17]. However, Pringle et al. [18] suggested that men's apparent detachment from healthy behaviors is an indication that typical approaches to health are unappealing and/or irrelevant to their masculine values and virtues. Previous men-centered PA and healthy eating related research [19-21] has revealed that careful consideration of 'place', along with a tailored approach that aligns with men's values and interests, can indeed support increases in health

promoting behaviors [22-24]. This work supports the notion that there is value in providing men with health promotion opportunities in venues where they participate in and/or watch sport and recreational activities [18, 24, 25].

Recent research has highlighted the potential for professional sports teams/clubs to attract and engage men in healthy lifestyle behaviors [26-28]. Such settings have proved a powerful draw for men due to familiar, comfortable and/or appealing environments which they offer and the socio-cultural connections men often make with particular teams and fellow supporters in terms of loyalty, identity and belonging [24, 26, 29, 30]. Furthermore, professional/elite sport clubs and settings offer a unique opportunity to support men's health because they provide health promoters with a potentially large captive audience of men in an environment that plays to masculine values and virtues [18, 19, 26, 30].

Within this context, the gender-sensitized HAT TRICK program was designed to engage men with their health by resonating with and appealing to masculine ideals. Its delivery model is founded on the strong collaboration with the Kelowna Rockets Hockey Team, a major junior ice hockey team within the Canadian Hockey League (CHL) [31]. Garnering the social-cultural connections that men often cultivate with particular sports teams can be a 'lynchpin' to engaging men in healthful behaviors in that this approach recognizes the interests and preferences of men, while fostering an environment that promotes a sense of identity, camaraderie and healthy living. The over-arching goal of this study is to examine the feasibility and acceptability of HAT TRICK, and estimate changes in PA behavior, diet, other health related behaviors (e.g., smoking, alcohol consumption, sleep), risk of depression, health related-quality

of life (HRQoL) and social connectedness. The specific objective of this article is to describe the intervention design and methodological protocols of HAT TRICK.

METHODS AND ANAYLSIS

Objectives

The specific objectives of this study are to:

1) Determine feasibility and acceptability of HAT TRICK, a health promotion program focused on PA and healthy eating for inactive, overweight men.
2) Estimate effectiveness in terms of changes over time in PA, dietary behaviors, weight, smoking, alcohol consumption, sleep habits, risk for depression, HRQoL and social connectedness.
3) Utilize findings to refine the program and inform the development of a future large scale randomized control trial (RCT).

Study design

This study protocol has been prepared according to Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) [32]. For a completed SPIRIT checklist please see Supplementary File 1.

A quasi-experimental, pre-post test design will be used to evaluate the feasibility and acceptability of a men's health promotion program focused on PA, healthy eating, and social connectedness. Data collection will occur at baseline, 12-weeks, and 9-months follow-up. The study period extends from August 2016 – May 2018. Recruitment will occur in three phases, corresponding with the delivery of three 12-week HAT TRICK sessions: Phase 1 recruitment

period occurred in fall of 2016; phase 2 recruitment period occurred in winter 2017; and, phase 3 recruitment will begin in the summer 2017. Figure 1 provides a flow diagram for the HAT TRICK protocol. Figure 2 provides Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) figure.

Study population, eligibility and recruitment

A total of 60 participants (20 participants x 3 groups) will be recruited for this feasibility trial. This sample size is appropriate for feasibility trials which aim to provide an estimate of the parameters (i.e., identifying/recruiting participants; practicality of delivery, standard deviation of a primary outcome measure to estimate sample size) needed to design and conduct a sufficiently powered RCT [19, 33, 34]. To be eligible for the study, participants must be men over the age of 35 years, reside in the Okanagan Region of British Columbia (BC), Canada, accumulate less than 150 minutes of PA per week, have a body mass index (BMI) of over 25kg/m^2 and a pant waist size of 38" or greater.

A variety of recruitment strategies will be utilized, including: 1) communication avenues via the Kelowna Rockets Hockey Team (e.g., poster advertising at home games, Rockets website, newsletters to season tickets holders, game day intercom announcements, recruitment/information booth at home games); 2) local media, including print newspaper and television and radio broadcasts; 3) email and print communication via local male dominated community organizations (e.g., Okanagan Men's Shed); 4) social media, including Facebook, Castanet, Kijiji, and Kelowna Now (community events website); and 5) Poster advertisements at local community centers, ice hockey arenas, coffee shops, pubs and bars, and large hardware and automotive commercial entities (e.g., Canadian Tire). Prior to groups 2 and 3, word of

mouth may be an additional recruitment strategy. Lastly, a project specific website (www.hattrick.ok.ubc.ca) with additional information about the program, including eligibility criteria and how to sign up, will also be used to recruit participants.

Interested individuals will be encouraged to contact the research team to confirm their eligibility. Those confirmed eligible will be asked to complete a Physical Activity Readiness Questionnaire (PAR-Q+) [35], a medical screening tool which has been recommended for use in exercise related interventions and RCTs [36]. All completed PAR-Q+ will be reviewed by a Certified Exercise Physiologist [37] and individuals who require further medical screening will be informed and invited to gain medical clearance from a general medical practitioner (i.e., family doctor) in order to participate in the study. Individuals will be accepted on a 'first come first serve' basis with additional individuals being placed on a waitlist and contact list for the next available session.

HAT TRICK Intervention

HAT TRICK focuses on three goals including enhancing PA, healthy eating, and social connectedness. The program is tailored for men using evidence-based research [24, 38, 39] and is informed by theoretical underpinnings associated with behavior change [40-42] and masculinities [11, 12, 14]. Gender-related factors influencing men's health behaviors and health promotion were considered throughout the design of the program. All resources were consistent with a masculine look and feel, and provided clear, positive, and direct messaging around PA, healthy eating, and social connectedness [38, 43].

HAT TRICK consists of 12 weekly, 90-minute face-to-face group sessions delivered at the local hockey arena, the home facility to the Kelowna Rockets. Each group session includes a

'locker room' component with an ice hockey related-theme used to frame health-related education and information regarding PA, healthy eating and behavior change techniques (i.e., goal setting, self-monitoring, social support), whilst simultaneously promoting enjoyment and increased social connectedness through an interactive and informal style of learning. For instance, to enhance social connectedness, facilitators will aim to foster a sense of teamwork and comradery among the men through group activities and competition. Men will be encouraged to share contact information and meet outside of the program as well as foster friendly competition by challenging each other meet their physical activity and healthy eating goals. Participants are introduced to a variety of activities and guided through a progressive PA program within the facility. Weekly PA and healthy eating challenges are introduced to supplement the education to encourage men to integrate what they learned to their daily life [44-46]. Table 1 provides a detailed description of the weekly locker room content, PA, and challenges provided to the men.

Table 1. Weekly Outline of HAT TRICK

Locker Room Education	Group PA	Weekly Challenge
Week 1: Pre Game		
• Program introduction • Why HAT TRICK? • The first step • Take stock of current activities	• Introduction to Fitbits • Hockey area facility tour • Intermission ○ Meet and greet with hockey team	On every day this week: • Record how many steps you do • Record everything that you eat and drink
Week 2: Face Off		

• Change a bit
• Break the cycle
• Top 5 tips for success
	• Activities around hockey arena
	  ○ Climb bleachers, walk the loop, seat dips
	• Intermission
	  ○ Fitbit usage and barriers
	  ○ Step recommendations
		On at least **3** days of the week:
		• walk an extra 1,500 steps (from baseline value)
		• Choose water instead of a sugary drink

Week 3: Power Play		
• HAT TRICK to healthy eating:	• Hockey team training gym	On at least **3** days of the week:

carbs, proteins, and fats • Top 6 healthy eating tips • Power food swaps	○ Fundamental activities with Athletic Trainer ○ Circuit-style workout • Intermission ○ Discuss week 2 challenge	• walk an extra 1,500 steps (from baseline value) • Start your morning with a healthy breakfast
Week 4: Tic Tac Toe		
• Size: Then and now • Handy portion guide • Top 7 tips for dining out • Rethink beer o'clock • Top 6 tips for keeping the beer gut in check	• Ball hockey game ○ Two periods of 15 minutes • Intermission: ○ Discuss week 3 challenge	On at least **5** days of the week: • walk an extra 1,500 steps (from baseline value) • Use the handy portion guide to plan a meal
Week 5: Long Change		
• Active living 101 • HAT TRICK to active living • Canada PA Guidelines • Recruit a deep bench	• Hockey team training gym ○ Fundamental activities with Athletic Trainer ○ Circuit-style workout • Intermission ○ Discuss week 4 challenge	On at least **5** days of the week: • walk an extra 1,500 steps (from baseline value) • Choose water instead of a sugary drink
Week 6: Neutral Zone		
• Energy balance • The 80/20 rule • Top 8 keys to weight loss • Drink wisely	• Exercise at a moderate intensity (3 bouts of 15 minutes)- Include short intervals of higher intensity • Intermission: ○ Discuss week 5 challenge	On at least **3** days of the week: • walk an extra 3,000 steps (from baseline value) • Apply the 80/20 rule
Week 7: Penalty Kill		
• SMART goals • Keep your stick on the ice • Top 6 relapse prevention strategies • Top 6 healthy snacking tips • Rewarding yourself	• "Boot camp" style workout • Intermission: ○ Discuss week 6 challenge	On at least **3** days of the week: • walk an extra 3,000 steps (from baseline value) • Choose healthy snacks options
Week 8: Odd Man Rush		
• Principles of strength training • Circuit training • At home workout • Turning up the heat	• Introduction to at-home bodyweight workout • Intermission: ○ Discuss week 7 challenge	On at least **5** days of the week: • walk an extra 3,000 steps (from baseline value) • Start your morning with a healthy breakfast
Week 9: Icing		
• Top 5 tips for "brocery"shopping • Reading the fine print • The many names for sugar and salt • Product buzz words	• Exercise at moderate-vigorous intensity (3 bouts of 15 minutes)-15 minutes will include high intensity training (HIT) • Intermission:	On at least **5** days of the week: • walk an extra 3,000 steps (from baseline value) • Apply the 80/20 rule

	○ Discuss week 8 challenge	
Week 10: Fast Break		
• Making healthy trades • The BBQ king • Meals on the fly	• Sport chosen by men (3 periods of 15 minutes) • Intermission: ○ Discuss week 9 challenge	On at least **5** days of the week: • walk an extra 3,000 steps (from baseline value) • Choose healthy snacks options
Week 11: Set Play		
• Sit less • Top 4 stress management tips • Sleep and health	• Resistance training session • Intermission: ○ Discuss week 10 challenge	On at least **5** days of the week: • walk an extra 3,000 steps (from baseline value) • Use the handy portion guide to plan a meal
Week 12: He shoots, he scores!		
• Highlight reel • Dealing with set-backs • What's the next step?	• Family skate and BBQ ○ Family and friends ○ Man of the Match (awards) • Intermission: ○ Discuss week 11 challenge	Be HAT TRICK healthy. Keep working towards your goals and making small lifestyle changes.

In these initial deliveries, HAT TRICK will be facilitated by research personnel trained in health promotion and behavior change techniques. However, it is anticipated that for future delivery of the program, external facilitators (e.g., community health promotion 'champions', individuals who have previously gone through the program) will be trained to deliver the program. In addition, hockey team personnel and community experts will be invited as guest speakers/presenters for selected sessions. For example, the Rockets Athletic Therapist will be brought in to lead a strength training session and the Rockets nutritionist specialist will be a guest presenter for some of the nutrition education sessions. Community health professionals will also be involved in leading some of the group sessions. For instance, qualified local fitness professionals will lead the men through a circuit training session and martial arts type workouts, and a local Chef may also assist with presenting and discussing healthier food options

when ordering from restaurant menus. Including team 'insiders' and local professionals (i.e., Rockets personnel) provides a variety of content and activities for the men, potentially helping to build community capacity and buy-in, which will be vital to future dissemination and sustainability.

All participants will be provided with the HAT TRICK 'Playbook', a print resource manual that further summarizes the key messages and signposts the resources to draw on over 12-week program. The 'Playbook' is divided into 12 weeks and corresponds with each weekly theme of HAT TRICK, as outlined in Table 1. It contains educational information, expressed in simple terms using hockey-related metaphors, concerning healthy eating (i.e., information about macro-nutrients, portion sizes, etc.) and active living (i.e., barriers and benefits to PA, being active at home, etc.), as well as strategies for weight management and behavior change, such as information concerning social support, self-monitoring, goal setting, and relapse prevention. To assist with self-monitoring, participants will be provided with a Fitbit Charge HR™ and PA and dietary tracking logs which are embedded in the 'Playbook'. During each week of the program, men will be encouraged and challenged to increase their step count (in graduate increments) and non-walking PA, as well as to engage in healthy eating (e.g., increasing fruit and vegetable consumption) and record these activities in their 'Playbook' tracking logs.

Outcome Measures

Quantitative and qualitative data collection methods will be used to assess outcome and feasibility measures. All assessments will take place at the same facility where HAT TRICK will be delivered and occur at baseline (one week prior to the start of the program), at 12-

weeks (completion of the program) and at 9-months follow-up (post-baseline). Participants that are unable to attend the measurement session will be invited to complete measures at an agreed upon time in the Physical Health and Activity Behaviour Lab at the University of British Columbia or at an alternative location such as their home. All measures are described in further detail below. In addition, Table 2 provides a summary of measures and data collection time points.

Table 2. Summary of measures and data collection time points

Measures	Methods for data collection	Data collection time points
Demographics	Age, ethnicity, education, occupation, income, marital status, co-morbidities	0 (Baseline only)
Anthropometrics	Height, weight, blood pressure, heart rate, waist circumference	0, 12-wks and 9-mths
PA levels	Actigraph GT3X™ accelerometer (over a 7 day-period)	0, 12-wks and 9-mths
	Godin's Leisure Time Exercise Questionnaire (GLTEQ)	0, 12-wks and 9-mths
Sedentary behavior	Actigraph GT3X™ accelerometer (over a 7 day-period)	0, 12-wks and 9-mths
	Marshall Sitting Questionnaire (MSQ)	0, 12-wks and 9-mths
Dietary behavior	The Dietary Instrument for Nutrition Education Questionnaire (DINE)	0, 12-wks and 9-mths
Other health behaviors	7 Day Alcohol Recall	0, 12-wks and 9-mths
	Smoking and tobacco use	0, 12-wks and 9-mths
	Sleep habits	0, 12-wks and 9-mths
Psychological and physical well-being	SF-12V2 Health Survey	0, 12-wks and 9-mths

	Male Depression Risk Scale (MDRS-22)	0, 12-wks and 9-mths
	Abbreviated Duke Social Support Index (DSSI-11)	0, 12-wks and 9-mths
Program satisfaction/acceptability	Satisfaction/acceptability questionnaire	12-wks (post intervention only)
	Semi-structured telephone interview with participants	12-wks (post intervention only)

Demographics and anthropometrics

As part of the self-report questionnaire, participants will be asked to report demographic variables including; date of birth, ethnic background, level of education, marital status, chronic disease conditions, main activity, occupation, and household income. Height (cm), weight (kg), waist circumference (cm), blood pressure (mmHg), and heart rate (bpm) will be measured by a research team member, trained to a standard protocol, at all assessment sessions. Weight and height will be measured with the participant standing normally, with feet together and head in the Frankfort plane, using Seca 700 mechanical balance scales and a Seca 220 measuring rod (Seca GmbH, Hamburg). Using the National Institutes of Health protocol [47], waist circumference will be measured on the transverse plane at the top of the iliac crest using a measurement tape. Blood pressure and heart rate will be measured two times at two minutes intervals with a Life Source Digital Deluxe One Step Blood Pressure Monitor. Participants will be asked to sit quietly for five minutes prior to the first measurement. Blood pressure will be measured on the left arm with forearm on a table, palm of the hand facing up. Participants will be asked to rest the arm comfortably at heart level, sitting with their back against the chair, legs uncrossed.

Physical Activity

PA will be assessed objectively using an Actigraph GT3X™ accelerometer (ActiGraph, Pensacola, FL) during all waking hours over seven days. The accelerometers will be initialized to record steps, inclination, and acceleration counts in tri-axial mode, using 60-second epochs [48, 49]. Participants will be instructed to wear the accelerometer above their right hip and in-line with their right knee facing up, and to remove it during sleeping hours or for any activities where water may be involved. The Actigraph GT3X™ is considered the 'gold standard' measure of PA in adults [50] and has shown validity and reliability compared to other commercial devices [51, 52]. Established cutoff points were used to calculate daily minutes of moderate (2,691 – 6,166 counts/min) and vigorous (>6,167 counts/min) physical activity while controlling for the number of days the accelerometer was worn [51]. Moderate-to-vigorous physical activity (MVPA) will be calculated as a sum score of weekly minutes in MVPA. Data will be included in the analyses if there are no extreme counts (>20,000) and if data are available for at least 600 minutes wear time per day on 5 days. Participants with invalid data will be asked to wear the activity monitor for a further 7 days.

PA will also assessed by self-report using a modified version of the Godin Leisure Time Exercise Questionnaire (GLTEQ) [53]. Participants will be asked to indicate the frequency and type of intensity (i.e., light, moderate, vigorous) of their daily PA per week and the duration (minutes) of these sessions [53]. All responses will be converted to minutes and calculated in accordance with the metabolic equivalent (MET) minutes method [54]. A cut-off point of $\geq$ 600 MET minutes will then be used to dichotomize participants as "adequately active for health

benefit" or "inadequately active" [54, 55] .The GLTEQ has shown good validity and reliability across a number of populations and settings [56-58].

Sedentary Behavior

Accelerometers will also be used to objectively assess sedentary behavior using a 30s epoch. Sedentary time will be determined as <100 counts/min, adjusted for non-wear time operationalized as at least 60 minutes of consecutive zeros [49]. In addition, sedentary behaviors will be assessed by self-report using The Marshall Sitting Questionnaire (MSQ) [59]. The MSQ assesses time spent sitting on weekdays and weekend days at work, traveling and at home. Data from the sitting time questionnaire will be used to create an estimate of total weekday and weekend-day sitting times (min/day) by summing the time reported in each domain [59]. This measure has demonstrated reliability and validity in the adult population [59].

Dietary Behaviors

Dietary behaviors will be assessed by the Dietary Instrument for Nutrition Education (DINE) questionnaire [60], a short 19-item questionnaire providing a measure of frequency of intake of different food types (i.e., fruits and vegetables) and macronutrients over the last seven days. Composite scores will be calculated in accordance with the DINE protocol used for total fat intake and total fiber intake , with higher scores indicating greater consumption [60]. This validated instrument [60] is considered to be an acceptable alternative to more detailed diet recall questionnaires and food dairies, and has been chosen for this particular study as it focuses on food types (i.e., fruits and vegetables) associated with chronic disease prevention and management [61, 62].

Other health-related behaviors

Smoking and tobacco use, alcohol consumption, and sleep habits will be assessed via self-report questions [63]. Smoking status will be measured using a single question, wherein participants identify as a regular smoker (daily), occasional smoker (once in a while), ex-smoker, or non-smoker. Occasional and regular smokers will be asked to report their smoking habits and quit attempts using standardized questions [63].

Alcohol intake will be measured using a 7-Day Alcohol Recall [64]. Participants are asked to consider the previous 7 days and report the number of pints of beer/cider, glasses of wine, glasses of fortified wine (e.g., Port), measures of spirits, and any other alcoholic beverages consumed each day.

Participants' sleeping habits will be reported through average hours of sleep on a typical night [65]. Descriptive measures related to speaking with a doctor or health professional about having difficulty sleep and being diagnosed with a sleep disorder will also collected [65].

Risk of Depression

Risk of depression will be assessed using the Male Depression Risk Scale (MDRS-22) [66]. This is a 22-item Likert scale questionnaire ranging from 0 (not at all) to 7 (almost always). Participants are asked to think back over the last month and respond to each item considering how often it applies. The MDRS-22 provides a total score via the summation of all 22 items and six subscale scores that follow six symptom domains including: emotional suppression, drug use, alcohol use, somatic symptoms, risk taking, and anger and aggression. A higher score indicates a greater risk of depression. The MDRS-22 has demonstrated validity and reliability among men [66, 67].

Health-related Quality of Life

HRQoL will be assessed using the Short Form Health Survey (SF-12) [68]. The SF-12 was developed as a shorter alternative to the SF-36 [69], and it includes 12 questions and eight physical and mental health dimension scales including; physical functioning, role-physical, bodily pain, general health, vitality, social function, role-emotional and mental health [68]. Scoring for this survey includes pre-coded numeric values that are assigned to each of the eight scales and then scored from 0 to 100, with a higher score indicating better health [70]. The SF-12 is one of the most widely used HRQoL evaluation tools and has been shown to be valid and reliable in a number of populations [71-74].

Social Support

The Abbreviated Duke Social Support Index (DSSI-11) [75] will be used to assess perceived social support. The DSSI is an 11-item questionnaire comprising of two sub-scales; social interaction (4 items) and social satisfaction (7 items), measured on a 4 point Likert scale. The social interaction subscale asks questions regarding the number of social interactions an individual has had within the past week (e.g., *How many times during the past week did you spend time with someone who does not live with you?* The social satisfaction subscale asks about the subjective quality of these relationships (e.g., *When you are talking with your family or friends, do you feel you are being listened to?* The social interaction scale ranges from 4 to 12 and the social satisfaction subscale ranges from 6 to 18, thus the total score for the DSSI-11 ranges from 10 to 30 (combination of social interactions and social satisfaction scores, with social satisfaction reverse scored before summation) with higher scores indicating a stronger perception of social support [75]. The DSSI-11 has been shown to be valid and reliable in adult

populations and reported to be useful for measuring social support in community-based epidemiological studies [76-79].

Statistical Analysis

Descriptive analyses will be completed and presented as means and standard deviations for continuous variables and as frequencies and proportions for categorical data. Data analysis of outcome variables including estimates of change in PA, sedentary behavior, dietary behaviors, smoking, smoking, alcohol consumption, sleep habits, risk of depression, HRQoL, and social support will be examined using a within subjects, repeated measures ANOVA. The level of significance (α) will be set at 0.05. As the primary outcome is feasibility, it is not appropriate to perform a power calculation. All analyses will be conducted using IBM SPSS statistics 23.

Program Feasibility and Analysis

At 12-weeks (post intervention), all participants will complete a program satisfaction/acceptability questionnaire. Participants will be asked several Likert scale questions as well as open-ended response questions relating to their experience and satisfaction with the program design, content, resources, and logistics concerning program implementation (i.e., day and time of sessions, structure of sessions, facility where program was delivered). To inform future requirement strategies, data will also be collected from website usage patterns (Google Analytics-frequencies, means, etc.) as they relate to key time points during the program (e.g., media releases) as well as using paper-based questions regarding how/where participants heard about the program. Program-related statistics, including participant attendance, number of guest presenters and metrics concerning program inquiries, participant communications and follow-ups, will also be collected.

Semi-structured telephone interviews will be undertaken with a subsample of participants (n=30) to gain further insight concerning satisfaction and acceptability of HAT TRICK, and to understand the challenges/enablers associated with design and implementation of the program, including feasibility parameters such as recruitment, attendance, adherence and acceptability of the program and content. Participants will be purposefully selected from each of the three HATTRICK groups to include men reporting a range of feasibility and program outcomes. These individuals will include those who have completed the program (i.e., completed baseline and 12-week follow-up assessment periods) and have attended at least 50% of the sessions (i.e., 6 of 12 weekly 90 minute sessions). Data collection and analysis will occur simultaneously in three phases as the HATTRICK program is implemented. Interview questions will be refined as data collection progresses to address gaps identified in the analysis as well as expand on and verify emerging themes. Data from the interviews will be audio recorded (with participants' permission) and transcribed verbatim with all identifiable information removed. Data will be analyzed using thematic content analysis [80] to explore participant satisfaction and enjoyment and to identify challenges experienced during program implementation as well as factors that may have facilitated implementation. To enhance rigor, at least two members of the research team will independently code participant responses into relevant subthemes. Once all coding has been completed, subthemes will be discussed among the two research team members to ensure bias is minimized. Any disagreements or concerns that may arise during the analysis will be presented at this time and further discussion will be carried out with the research team until consensus is reached.

Data Management

Data collection, as well as handling and storage of data, will be coordinated within the Physical Health and Activity Behaviour (PHAB) Lab at the University of British Columbia. Demographic, anthropometric and self-reported questionnaire data will be entered electronically by a research team member. Accelerometer data will automatically be uploaded from the accelerometers to an excel data file by two research team members. All paper–based data will be stored in a secure and locked filing cabinet located in the PHAB lab. All electronic data will be stored on a password-protected computer also located in the PHAB lab.

Ethics and Dissemination:

Ethical approval for this trial was obtained from the University of British Columbia Okanagan Behavioural Research Ethics Board (#H1600736). Participants will provide informed consent and medical clearance prior to all baseline assessment. Participants will also be informed that they may withdraw from the study at any time, for any reason, without consequence. All personal data will be coded and handled with confidentiality.

Study findings will be disseminated widely through national and international academic meetings, peer reviewed publication and by web-based activities (e.g., podcasts, research webinars). In addition, these findings will also be disseminated through social media (e.g., facebook, twitter), plain language summaries to participants, summary briefings to local stakeholders and government agencies, and co-delivered (i.e., researcher-participants) community presentations.

DISCUSSION

Engaging men in health promoting behaviors, such as PA and healthy eating can be challenging. Men have often been regarded as 'hard to reach' in terms of health promotion programs with linkages being made to some masculine ideals as contributing to men's estrangement from self-health. This is further supported by the research which has suggested that many men are reticent to attend health promotion education sessions, disinterested in information concerning disease prevention and estranged from professional health care services [81, 82] although more recent research is beginning to challenge such stereotypes. Some researchers suggest these 'traditional' patterns are implicated in Western men's shorter life expectancy compared to women and high morbidity rates associated with chronic disease [83, 84]. Thus, men are a population that would benefit from effective targeted programs to engage them in disease preventing behaviors, including PA and healthy eating. To reach and engage men, innovative approaches that acknowledge and play to specific masculine values and virtues show promise in garnering significant success in advancing the health of men and their families [16, 23, 27].

HAT TRICK was designed to address these specific elements by creating an evidence based program that employed men-friendly strategies to fully engage men's participation, including; aligning with an elite male sports team (i.e., Kelowna Rockets), promoting friendly competition, and delivering the program in a familiar "place" (i.e., hockey arena and surrounding male-friendly community venues) where men ordinarily gather and connect with others (i.e., male facilitators and male only participants) who share similar interests. Appealing to these well-known masculine values and norms including friendly competition, and catering

to methods and modes of delivery that recognizes gender differences have been successful approaches to men-centered PA and healthy eating programs [23, 24, 39].

Another promising aspect of HAT TRICK is its potential to be transferred across a number of male populations and settings, thus further increasing its reach to a large proportion of men. In part, HAT TRICK is based on the successful Football Fan In Training (FFIT) intervention [24, 27], which was designed to engage overweight Scottish men in weight management and healthy living program by capitalizing on men's team loyalty and love of the game of soccer. FFIT was specifically developed within a context that supports masculine ideals, encompassing a look and feel that appeals to many men [19, 29]. HAT TRICK utilized these same principles, but altered the context of delivery by developing the program to fit with the national sports obsession of Canadian men, ice hockey. Specifically, the program's name (HAT TRICK), logo design, resources and content are all influenced by the sport of ice hockey. Although this particular program was designed to appeal to male Canadian ice hockey fans, the unique aspect of this model is that it can be easily modified to appeal to male fans of other sports or activities. For instance, the same model has been recreated to appeal to Rugby fans in the UK. The Rugby Fans in Training (RuFIT) [85] study (and subsequently Premiership Rugby's Move Like a Pro program) aimed to test the FFIT model in the English professional rugby club setting, and to enhance long term weight loss and lifestyle change for men in the UK. In North America, a similar approach could be transferable to other popular sports including gridiron, basketball and baseball, all of which exist within professional leagues that have a strong male fan base.

Although HAT TRICK can be recreated and transferred to suit fans of a variety of sports, we do acknowledge that there is a great diversity of men within Canada (e.g., new immigrant

men, older age men, gay men, men from remote areas) who may have other interests beyond sport. Thus, prior to undertaking refinements and restructuring the program, formative evaluations should be undertaken with these specific male groups in order to gain further knowledge concerning local, regional and global masculine values and norms [21].

In conclusion, given the limited published research for effective and feasible approaches to men's health promotion, but the promise shown by programs such as FFIT, the results of this feasibility study will serve as a valuable platform to guide future work. There also seems to be great opportunity for sustainability and scalability of the HAT TRICK program based on its transferability and the thoughtful deliberate formal evaluation of this intervention.

TRIAL STATUS

Recruitment for this study began in December 2016 and is ongoing until September 2017.

AUTHOR CONTRIBUTIONS

CMC, JLB, JLO, STJ, KH conceived the project and procured the project funding. CMC is leading the coordination of the trial. CMC, JLB, JLO, STJ, KH, contributed to the study design. PS is managing the trial, including data collection, with assistance from KMF and RP. CMC, PS, KMF and RP drafted the manuscript and all authors read, edited and approved the final manuscript.

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COMPETING INTERESTS

All authors state that they have no competing interests to declare.

DATA SHARING

The datasets analyzed during the current trial will be available from the corresponding author on reasonable request.

PROVENCE AND PEER REVIEW

Not commissioned; externally peer reviewed.

REFERENCES

1. Lee CD, Sui X, Hooker SP*, et al.* Combined impact of lifestyle factors on cancer mortality in men. *Ann Epidemiol* 2011;21(10):749-54.
2. Shiroma EJ, Sesso HD, Lee IM. Physical activity and weight gain prevention in older men. *Int J Obes (Lond)* 2012;36(9):1165-9.
3. Kohl HW, 3rd, Craig CL, Lambert EV*, et al.* The pandemic of physical inactivity: global action for public health. *Lancet* 2012;380(9838):294-305.
4. Nunan D, Mahtani KR, Roberts N*, et al.* Physical activity for the prevention and treatment of major chronic disease: an overview of systematic reviews. *Syst Rev* 2013;2:56.
5. WHO. *Global Recommendations on Physical Activity and Health*. Geneva: World Health Organization 2010.
6. Wardle J, Haase AM, Steptoe A*, et al.* Gender differences in food choice: the contribution of health beliefs and dieting. *Ann Behav Med* 2004;27(2):107-16.
7. Baker AH, Wardle J. Sex differences in fruit and vegetable intake in older adults. *Appetite* 2003;40(3):269-75.
8. Belanger-Ducharme F, Tremblay A. Prevalence of obesity in Canada. *Obes Rev* 2005;6(3):183-6.
9. Baker P. Current issues in men's health. *Trends Urol Men's Health* 2012;3:19-21.
10. Sinclair A, Alexander HA. Using outreach to involve the hard-to-reach in a health check: what difference does it make? *BMC Public Health* 2012;126(2):87-95.
11. Courtenay WH. Constructions of masculinity and their influence on men's well-being: a theory of gender and health. *Soc Sci Med* 2000;50(10):1385-401.

12. Courtenay WE. Making health manly: Norms, peers, and men's health. In: Cohen L, Chavez V, Chehimi S, editors. *Prevention is primary; Strategies for community wellbeing*. San Francisco, CA: Jossey-Bass; 2007.

13. Gough B. Try to be healthy, but don't forgot your masculinity: deconstructing men's health discourse in the media. *Soc Sci Med* 2006;63(9):2476-88.

14. Robertson S. *Understanding men and health: Masculinities, identities and well-being*. Buckingham, UK: Open University Press; 2007.

15. Sloan C, Gough B, Conner M. Healthy masculinities? How ostensibly healthy men talk about lifestyle, health and gender. *Psychol Health* 2010;25(7):783-803.

16. Cormie P, Oliffe JL, Wootten AC*, et al.* Improving psychosocial health in men with prostate cancer through an intervention that reinforces masculine values - exercise. *Psychooncology* 2015.

17. Gough B. 'Real men don't diet': an analysis of contemporary newspaper representations of men, food and health. *Soc Sci Med* 2007;64(2):326-37.

18. Pringle A, Zwolinsky S, McKenna J*, et al.* Health improvement for men and hard-to-engage-men delivered in English Premier League football clubs. *Health Educ Res* 2014;29(3):503-20.

19. Gray CM, Hunt K, Mutrie N*, et al.* Football Fans in Training: the development and optimization of an intervention delivered through professional sports clubs to help men lose weight, become more active and adopt healthier eating habits. *BMC Public Health* 2013;13:232.

20. Oliffe JL, Bottorff JL, Sharp P*, et al.* Healthy Eating and Active Living: Rural Based Working Men's Perspectives. *Am J Mens Health* 2015.

21. Caperchione CM, Sharp P, Bottorff JL*, et al.* The POWERPLAY workplace physical activity and nutrition intervention for men: Study protocol and baseline characteristics. *Contemp Clin Trials* 2015;44:42-7.

22. Johnson ST, Stolp S, Seaton C*, et al.* A Men's Workplace Health Intervention: Results of the POWERPLAY Program Pilot Study. *J Occup Environ Med* 2016;58(8):765-9.

23. Caperchione CM, Stolp S, Bottorff JL*, et al.* Changes in Men's Physical Activity and Healthy Eating Knowledge and Behavior as a Result of Program Exposure: Findings From the Workplace POWERPLAY Program. *J Phys Act Health* 2016;13(12):1364-71.

24. Wyke S, Hunt K, Gray CM*, et al.* Football Fans in Training (FFIT): a randomised controlled trial of a gender-sensitised weight loss and healthy living programme for men-end of study report. *Public Health Res* 2015;3(2):1-129.

25. Mason OJ, Holt R. Mental health and physical activity interventions: a review of the qualitative literature. *J Mental Health* 2012;21(3):274-84.

26. Brady AJ, Perry C, Murdoch DL*, et al.* Sustained benefits of a health project for middle-aged football supporters, at Glasgow Celtic and Glasgow Rangers Football Clubs. *Eur Heart J* 2010;31(24):2696-8.

27. Hunt K, Wyke S, Gray CM*, et al.* A gender-sensitised weight loss and healthy living programme for overweight and obese men delivered by Scottish Premier League football clubs (FFIT): a pragmatic randomised controlled trial. *Lancet* 2014;383(9924):1211-21.

28. Gill DP, Blunt W, De Cruz A*, et al.* Hockey Fans in Training (Hockey FIT) pilot study protocol: a gender-sensitized weight loss and healthy lifestyle program for overweight and obese male hockey fans. *BMC Public Health* 2016;16(1):1096.

29. Hunt K, McCann C, Gray CM, *et al.* "You've got to walk before you run": positive evaluations of a walking program as part of a gender-sensitized, weight-management program delivered to men through professional football clubs. *Health Psychol* 2013;32(1):57-65.

30. Bunn C, Wyke S, Gray CM, *et al.* 'Coz football is what we all have': masculinities, practice, performance and effervescence in a gender-sensitised weight-loss and healthy living programme for men. *Sociol Health Illn* 2016;38(5):812-28.

31. Canadian Hockey League. Canadian Hockey League. Scarborough, ON2017 [cited 2017 25 Feb]; Available from: http://chl.ca/.

32. Chan AW, Tetzlaff JM, Gotzsche PC, *et al.* SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. *BMJ* 2013;346:e7586.

33. Arain M, Campbell MJ, Cooper CL, *et al.* What is a pilot or feasibility study? A review of current practice and editorial policy. *BMC Med Res Methodol* 2010;10:67.

34. McLeroy KR, Bibeau D, Steckler A, *et al.* An ecological perspective on health promotion programs. *Health Educ Q* 1988;15(4):351-77.

35. Canadian Society for Exercise Physiology. Physial Activity and Readiness Questionnaire for everyone: PAR-Q+. Ottawa, ON: Canadian Society for Exercise Physiology: CSEP; 2012 [cited Feb 2017 21]; Available from: http://www.csep.ca/cmfiles/publications/parq/parqplussept2011version_all.pdf.

36. Duncan MJ, Rosenkranz RR, Vandelanotte C, *et al.* What is the impact of obtaining medical clearance to participate in a randomised controlled trial examining a physical activity intervention on the socio-demographic and risk factor profiles of included participants? *Trials* 2016;17(1):580.

37. Canadian Society for Exercise Physiology. Canadian Society for Exercise Physiology (CSEP). Ottawa, ON1967 [10 Feb 2017]; Available from: http://www.csep.ca/en/about-csep/about-the-canadian-society-for-exercise-physiology.

38. Bottorff JL, Seaton CL, Johnson ST, *et al.* An Updated Review of Interventions that Include Promotion of Physical Activity for Adult Men. *Sports Med* 2015;45(6):775-800.

39. Caperchione CM, Vandelanotte C, Kolt GS, *et al.* What a man wants: understanding the challenges and motivations to physical activity participation and healthy eating in middle-aged Australian men. *Am J Mens Health* 2012;6(6):453-61.

40. Bandura A. *Social foundation of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall; 1986.

41. Bandura A. Social Cognitive theory of self-regulation. *Organ Behav Hum Decis Process* 1991;50(2):248-87.

42. Deci EL, Ryan RM. *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum; 1985.

43. Taylor PJ, Kolt GS, Vandelanotte C, *et al.* A review of the nature and effectiveness of nutrition interventions in adult males--a guide for intervention strategies. *Int J Behav Nutr Phys Act* 2013;10:13.

44. Verdonk P, Seesing H, de Rijk A. Doing masculinity, not doing health? A qualitative study among Dutch male employees about health beliefs and workplace physical activity. *BMC Public Health* 2010;10:712.

45. George ES, Kolt GS, Duncan MJ, *et al.* A review of the effectiveness of physical activity interventions for adult males. *Sports Med* 2012;42(4):281-300.

46. Morgan PJ, Collins CE, Plotnikoff RC*, et al.* Efficacy of a workplace-based weight loss program for overweight male shift workers: the Workplace POWER (Preventing Obesity Without Eating like a Rabbit) randomized controlled trial. *Prev Med* 2011;52(5):317-25.

47. National Institute of Health. Clinical guidelines on the identification, evaluation, and treatment of overwieght and obesity in adults-the eivdence report. Washington, DC1998. p. 56-94.

48. Freedson PS, Melanson E, Sirard J. Calibration of the Computer Science and Applications, Inc. accelerometer. *Med Sci Sports Exerc* 1998;30(5):777-81.

49. Troiano RP, Berrigan D, Dodd KW*, et al.* Physical activity in the United States measured by accelerometer. *Med Sci Sports Exerc* 2008;40(1):181-8.

50. Kelly LA, McMillan DG, Anderson A*, et al.* Validity of actigraphs uniaxial and triaxial accelerometers for assessment of physical activity in adults in laboratory conditions. *BMC Med Phys* 2013;13(1):5.

51. Sasaki JE, John D, Freedson PS. Validation and comparison of ActiGraph activity monitors. *J Sci Med Sport* 2011;14(5):411-6.

52. Vanhelst J, Mikulovic J, Bui-Xuan G*, et al.* Comparison of two ActiGraph accelerometer generations in the assessment of physical activity in free living conditions. *BMC Res Notes* 2012;5:187.

53. Godin G, Shephard RJ. A simple method to assess exercise behavior in the community. *Can J Appl Sport Sci* 1985;10(3):141-6.

54. Brown WJ, Bauman AE. Comparison of estimates of population levels of physical activity using two measures. *Aust N Z J Public health* 2000;24(5):520-5.

55. Plotnikoff RC, Johnson ST, Loucaides CA*, et al.* Population-based estimates of physical activity for adults with type 2 diabetes: a cautionary tale of potential confounding by weight status. *J Obes* 2011;2011.

56. Godin G, Jobin J, Bouillon J. Assessment of leisure time exercise behavior by self-report: a concurrent validity study. *Can J Public Health* 1986;77(5):359-62.

57. Jacobs DR, Jr., Ainsworth BE, Hartman TJ*, et al.* A simultaneous evaluation of 10 commonly used physical activity questionnaires. *Med Sci Sports Exerc* 1993;25(1):81-91.

58. Hyde AL, Elavsky S, Doerksen SE*, et al.* The stability of automatic evaluations of physical activity and their relations with physical activity. *J Sport Exerc Psychol* 2012;34(6):715-36.

59. Marshall AL, Miller YD, Burton NW*, et al.* Measuring total and domain-specific sitting: a study of reliability and validity. *Med Sci Sports Exerc* 2010;42(6):1094-102.

60. Roe L, Strong C, Whiteside C*, et al.* Dietary intervention in primary care: validity of the DINE method for diet assessment. *Fam Pract* 1994;11(4):375-81.

61. Cole JA, Gillespie P, Smith SM*, et al.* Using postal questionnaires to evaluate physical activity and diet behaviour change: case study exploring implications of valid responder characteristics in interpreting intervention outcomes. *BMC Res Notes* 2014;7:725.

62. John JH, Ziebland S, Yudkin P*, et al.* Effects of fruit and vegetable consumption on plasma antioxidant concentrations and blood pressure: a randomised controlled trial. *Lancet* 2002;359(9322):1969-74.

63. Diemert L, Kueller-Olaman R, Schwartz R*, et al.* Data Standards for Smoke-free Ontario Smoking Cessation Service Providers: Core Indicators and Questions for Intake and Follow-up of Adult Respondents. Toronto, ON: Ontario Tobacco Research Unit; 2013.

64. Emslie C, Lewars H, Batty GD*, et al.* Are there gender differences in levels of heavy, binge and problem drinking? Evidence from three generations in the west of Scotland. *BMC Public Health* 2009;123(1):12-4.

65. Centres for Disease Control and Prevention. Sleep Disorders: National Health and Nutrition Examination Survey 2013. Centres for Disease Control and Prevention,; 2013.

66. Rice SM, Fallon BJ, Aucote HM*, et al.* Development and preliminary validation of the male depression risk scale: furthering the assessment of depression in men. *J Affect Disord* 2013;151(3):950-8.

67. Rice SM, Fallon BJ, Aucote HM*, et al.* Longitudinal sex differences of externalising and internalising depression symptom trajectories: Implications for assessment of depression in men from an online study. *Int J Soc Psychiatry* 2015;61(3):236-40.

68. Ware J, Jr., Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 1996;34(3):220-33.

69. Ware JE, Kosinski M, Keller SD. *SF-36 Physical and Mental Healty Summary Scales: A User's Manual*. Boston, MA: The Health Institute, New England Medical Center 1994.

70. Ware JE, Kosinski M, Keller SD. *SF-12: How to score the SF-12 Physical and Mental Health Summary Scales*. 3rd, editor. Lincoln, RI: Quality Metric Incorporated; 1998.

71. Jenkinson C, Chandola T, Coulter A*, et al.* An assessment of the construct validity of the SF-12 summary scores across ethnic groups. *J Public Health Med* 2001;23(3):187-94.

72. Burdine JN, Felix MR, Abel AL*, et al.* The SF-12 as a population health measure: an exploratory examination of potential for application. *Health Serv Res* 2000;35(4):885-904.

73. Jakobsson U. Using the 12-item Short Form health survey (SF-12) to measure quality of life among older people. *Aging Clin Exp Res* 2007;19(6):457-64.

74. Wee CC, Davis RB, Hamel MB. Comparing the SF-12 and SF-36 health status questionnaires in patients with and without obesity. *Health Qual Life Outcomes* 2008;6:11.

75. Koenig HG, Westlund RE, George LK*, et al.* Abbreviating the Duke Social Support Index for use in chronically ill elderly individuals. *Psychosomatics* 1993;34(1):61-9.

76. Goodger B, Byles J, Higganbotham N*, et al.* Assessment of a short scale to measure social support among older people. *Aust N Z J Public Health* 1999;23(3):260-5.

77. Powers JR, Goodger B, Byles JE. Assessment of the abbreviated Duke Social Support Index in a cohort of Australian women. *Austral J Age* 2004;23(2):71-6.

78. Ebeling-Witte S, Frank ML, Lester D. Shyness, Internet use, and personality. *Cyberpsychol Behav* 2007;10(5):713-6.

79. Pachana NA, Smith N, Watson M*, et al.* Responsiveness of the Duke Social Support sub-scales in older women. *Age Ageing* 2008;37(6):666-72.

80. Braun V, Clarke V. Using thematic anaylsis in psychology. *Qual Res Psychol* 2006;3(2):77-101.

81. Lee C, Owen GR. *The Psychology of Men's Health*. Payne S, Horn S, editors. Philadelphia: Open Uiversity Press; 2002.

82. Deeks A, Lombard C, Michelmore J*, et al.* The effects of gender and age on health related behaviors. *BMC Public Health* 2009;9:213.

83. Pinkhasov RM, Wong J, Kashanian J*, et al.* Are men shortchanged on health? Perspective on health care utilization and health risk behavior in men and women in the United States. *Int J Clin Pract* 2010;64(4):475-87.

84. Salomon JA, Wang H, Freeman MK*, et al.* Healthy life expectancy for 187 countries, 1990-2010: a systematic analysis for the Global Burden Disease Study 2010. *Lancet* 2012;380(9859):2144-62.

85. Gray CM, Brennan G, Maclean A*, et al.* Can professional rugby clubs attract English male rugby supporters to a healthy lifestyle programme: the Rugby Fans in Training (RuFIT). *Eur J Public Health* 2014;24(suppl 2):166.

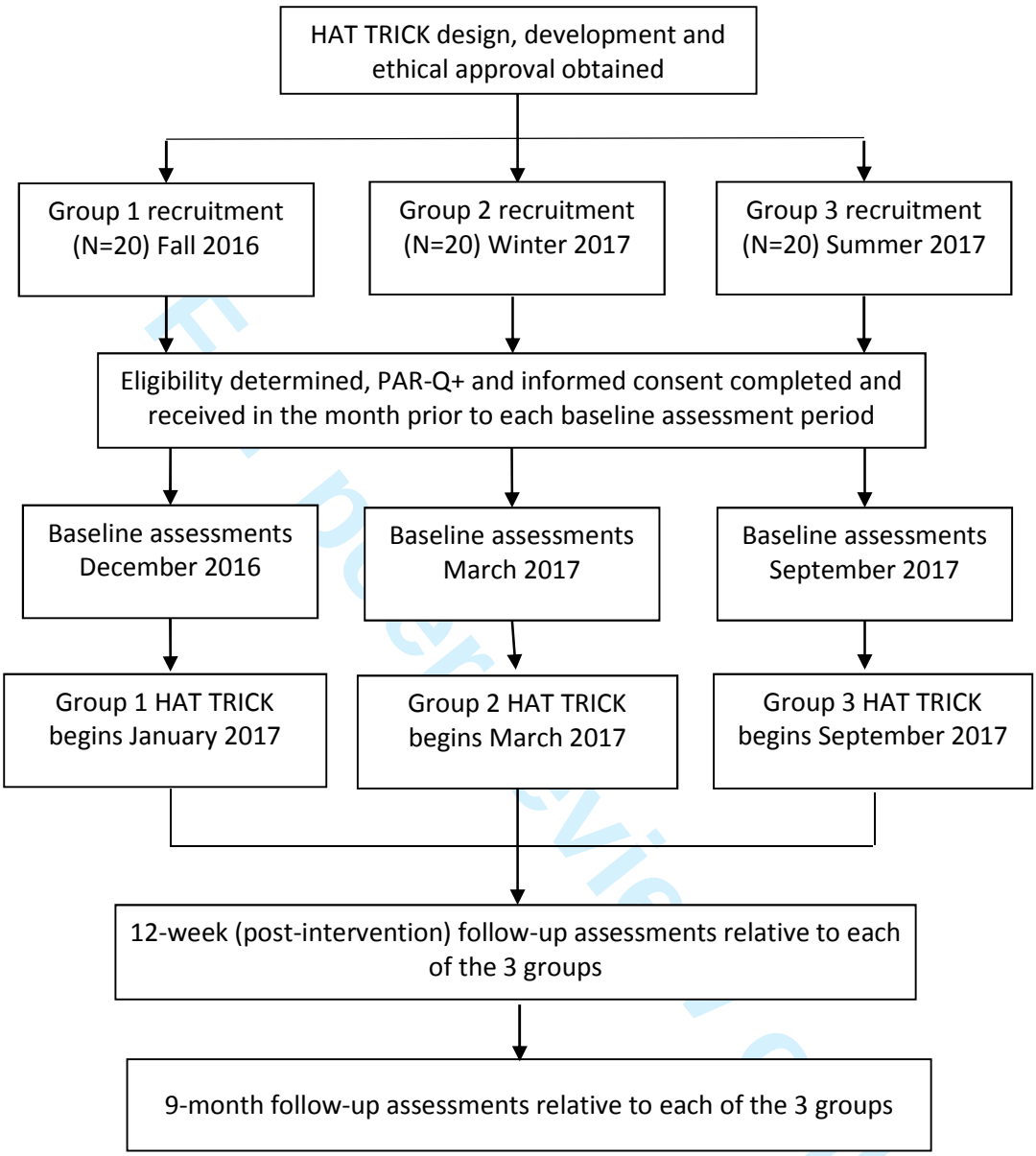

Figure 1. Flow diagram of HAT TRICK protocol

	STUDY PERIOD				
	Enrolment	Allocation			Close-out
TIMEPOINT**	***-8 to 0 weeks***	**0 week**	**1-12 weeks**		**9-month follow-up**
ENROLMENT:					
Eligibility screen	X				
Informed consent	X				
Medical clearance	X				
INTERVENTIONS:					
HAT TRICK Intervention			←	→	
ASSESSMENTS:					
Demographics		X			
Anthropometrics		X		X	X
Physical Activity		X		X	X
Sedentary behavior		X		X	X
Dietary behavior		X		X	X
Smoking		X		X	X
Alcohol consumption		X		X	X
Sleep habits		X		X	X
Risk of depression		X		X	X
HRQoL		X		X	X
Social support		X		X	X
Program Feasibility				X	

Figure 2. Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) figure

SPIRIT 2013 Checklist: Recommended items to address in a clinical trial protocol and related documents*

Section/item	Item No	Description	Addressed on page number
Administrative information			
Title	1	Descriptive title identifying the study design, population, interventions, and, if applicable, trial acronym	1
Trial registration	2a	Trial identifier and registry name. If not yet registered, name of intended registry	4
	2b	All items from the World Health Organization Trial Registration Data Set	n/a
Protocol version	3	Date and version identifier	7-8
Funding	4	Sources and types of financial, material, and other support	25
Roles and responsibilities	5a	Names, affiliations, and roles of protocol contributors	1 & 25
	5b	Name and contact information for the trial sponsor	1
	5c	Role of study sponsor and funders, if any, in study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication, including whether they will have ultimate authority over any of these activities	25
	5d	Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee)	n/a

Introduction			
Background and rationale	6a	Description of research question and justification for undertaking the trial, including summary of relevant studies (published and unpublished) examining benefits and harms for each intervention	_____5-7_____
	6b	Explanation for choice of comparators	____5-7_____
Objectives	7	Specific objectives or hypotheses	_____7_____
Trial design	8	Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group), allocation ratio, and framework (eg, superiority, equivalence, noninferiority, exploratory)	____7-8_____
Methods: Participants, interventions, and outcomes			
Study setting	9	Description of study settings (eg, community clinic, academic hospital) and list of countries where data will be collected. Reference to where list of study sites can be obtained	_____7, Fig 1&2_
Eligibility criteria	10	Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and individuals who will perform the interventions (eg, surgeons, psychotherapists)	_____8-9___
Interventions	11a	Interventions for each group with sufficient detail to allow replication, including how and when they will be administered	__9-13, Table 1
	11b	Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose change in response to harms, participant request, or improving/worsening disease)	__22_____
	11c	Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence (eg, drug tablet return, laboratory tests)	___9-11_____
	11d	Relevant concomitant care and interventions that are permitted or prohibited during the trial	__n/a_____
Outcomes	12	Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg, median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen efficacy and harm outcomes is strongly recommended	__13-19, Table 2
Participant timeline	13	Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for participants. A schematic diagram is highly recommended (see Figure)	_Fig 2, Table 2__

Sample size	14	Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations	__ 8, 20___
Recruitment	15	Strategies for achieving adequate participant enrolment to reach target sample size	__8-9_____
Methods: Assignment of interventions (for controlled trials)			
Allocation:			
Sequence generation	16a	Method of generating the allocation sequence (eg, computer-generated random numbers), and list of any factors for stratification. To reduce predictability of a random sequence, details of any planned restriction (eg, blocking) should be provided in a separate document that is unavailable to those who enrol participants or assign interventions	__n/a_____
Allocation concealment mechanism	16b	Mechanism of implementing the allocation sequence (eg, central telephone; sequentially numbered, opaque, sealed envelopes), describing any steps to conceal the sequence until interventions are assigned	__n/a_____
Implementation	16c	Who will generate the allocation sequence, who will enrol participants, and who will assign participants to interventions	_____n/a_____
Blinding (masking)	17a	Who will be blinded after assignment to interventions (eg, trial participants, care providers, outcome assessors, data analysts), and how	__n/a_____
	17b	If blinded, circumstances under which unblinding is permissible, and procedure for revealing a participant's allocated intervention during the trial	__n/a_____
Methods: Data collection, management, and analysis			
Data collection methods	18a	Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (eg, duplicate measurements, training of assessors) and a description of study instruments (eg, questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol	_13-19, Table 2_
	18b	Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols	____19-20_____

Data management	19	Plans for data entry, coding, security, and storage, including any related processes to promote data quality (eg, double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol	__21_____
Statistical methods	20a	Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol	__20_____
	20b	Methods for any additional analyses (eg, subgroup and adjusted analyses)	__20_____
	20c	Definition of analysis population relating to protocol non-adherence (eg, as randomised analysis), and any statistical methods to handle missing data (eg, multiple imputation)	___20_____
Methods: Monitoring			
Data monitoring	21a	Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the protocol. Alternatively, an explanation of why a DMC is not needed	____21_____
	21b	Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial	__n/a_____
Harms	22	Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct	___n/a_____
Auditing	23	Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor	__n/a_____
Ethics and dissemination			
Research ethics approval	24	Plans for seeking research ethics committee/institutional review board (REC/IRB) approval	__22_____
Protocol amendments	25	Plans for communicating important protocol modifications (eg, changes to eligibility criteria, outcomes, analyses) to relevant parties (eg, investigators, REC/IRBs, trial participants, trial registries, journals, regulators)	__n/a_____

Consent or assent	26a	Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32)	_22_____
	26b	Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable	__n/a_____
Confidentiality	27	How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial	____22_____
Declaration of interests	28	Financial and other competing interests for principal investigators for the overall trial and each study site	___26_____
Access to data	29	Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators	____26_____
Ancillary and post-trial care	30	Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation	_____n/a_____
Dissemination policy	31a	Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (eg, via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions	____22_____
	31b	Authorship eligibility guidelines and any intended use of professional writers	___n/a_____
	31c	Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code	__26_____
Appendices			
Informed consent materials	32	Model consent form and other related documentation given to participants and authorised surrogates	_supplementary file 2
Biological specimens	33	Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable	_____n/a_____

*It is strongly recommended that this checklist be read in conjunction with the SPIRIT 2013 Explanation & Elaboration for important clarification on the items. Amendments to the protocol should be tracked and dated. The SPIRIT checklist is copyrighted by the SPIRIT Group under the Creative Commons "Attribution-NonCommercial-NoDerivs 3.0 Unported" license.

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Consent Form

Title: HAT TRICK: Examining the feasibility of a gender-sensitive intervention focused on physical activity, healthy eating and connectedness in male hockey fans

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Funding
This study is funded by the Canadian Cancer Society Research Institute.

Purpose of the study
The purpose of this research is to evaluate the feasibility of the HAT TRICK Program, a program targeting physical activity, healthy eating and connectedness in men living in Kelowna, BC. The intervention will be delivered in connection with the Kelowna Rockets Hockey team.

Eligibility
You are being invited to voluntarily take part in this study because you are a man over the age of 35 years, residing in the Okanagan Region, who accumulates less than 150 minutes of moderate to vigorous physical activity a week, who has a Body Mass Index (BMI) greater than 25kg/m^2, and a pant size greater than 38".

Study Procedures
As a participant of this research project you will be invited to participate in twelve 90-minute weekly sessions, provide feedback on aspects of the program, and complete three assessment periods (baseline, 12-week, and 9-month follow-up). Weekly sessions will include a physical activity component, nutrition component, and behavior change component. Participants will be encouraged to make gradual changes to their lifestyle with the goal of improving overall health and well-being. Throughout the program, presentations will be given from local health professionals (e.g., nutritionist, fitness trainer), Kelowna Rockets staff and players, as well as other community personalities.

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Assessment sessions will be held at a convenient location. These assessment periods will last up to 1.5 hours. At these assessment periods, you will be asked to complete a brief questionnaires about your; physical activity and dietary behaviours, social relatedness, general health and well-being questions as well as general demographic information (e.g., age, education, marital status). During these times you will also be given an accelerometer and instructions on how to use the accelerometer. Accelerometers are a device for measuring your daily physical activity. It is a small, non-invasive device which is worn around your chest. You will be asked to wear this accelerometer for 7 consecutive days during all waking hours. You will also be asked to return the accelerometers to the research team after these 7 days. Return instructions will be provided to you when you receive your accelerometer.

Following the completion of the program you may also be asked commit an additional 1 hour of your time to participate in a semi-structured telephone interview with a member of the research team. If you are selected, a member of the research team will contact you to arrange a time that is convenient for you to conduct the interview. All telephone interviews will be audio recorded with your consent. During this interview we hope to hear about your thoughts, opinions and perceptions about the HAT TRICK Program and provide general comments about how you think the HAT TRICK Program could be improved.

Potential Risks and Benefits

The HAT TRICK program and data collection procedures involve no foreseeable risks or harm to you. However, you will be asked to work towards meeting the minimum recommended Canadian Physical Activity Guidelines (150minutes per week in bouts of 10 minutes or more) and depending on your initial activity levels, you will be encouraged to safely increase your physical activity levels throughout the project. Becoming physically active and progressively increasing your physical activity may potentially include some risk of injury, such as common muscle soreness or strains associated with being physically active. To limit any concerns you may have regarding these minor injuries, information about reducing this risk of injury, such as education about stretching and starting off slowly and building up your physical activity levels will be provided during the weekly sessions. Although no benefits can be guaranteed, potential benefits that may occur include; improvements in overall physical and mental health as a result of increasing your physical activity levels, improved understandings about the benefits of physical activity and other healthy lifestyle behaviours (i.e., healthy eating, stress management), increased social interaction and support.

Confidentiality

Your confidentially will be respected at all times. Only research team members and research staff will have access to data collected in this study. All documents will only be identified by a code number and kept in a locked filing cabinet and/or secure password protected system. Participants will not be identified by name in any reports or materials associated with this research. Paper copies and electronic audio files will be kept for 7 years in the Physical Health and Activity Behaviour Laboratory at UBC Okanagan. All participants taking part in the sessions will sign the confidentiality agreement at the bottom of this consent form; however, we cannot control what the other participants do with the information discussed. Findings from the study may be shared through conference presentations, articles for publication, and other media outlets. An electronic or print copy of the research report will be available to you on request.

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Contact for information about the study

If you have any questions or would like additional information, please contact Dr. Cristina Caperchione at 250-807-9679.

Contact for concerns about the rights of research participants

If you have any concerns about your treatment or rights as a research participant and/or your experiences while participating in this study you may contact the Research Participant Complaint Line in the UBC Office of Research Services at 1-877-822-8598 or the UBC Okanagan Research Services Office at 250-807-8832. It is also possible to contact the Research Participant Complaint Line by email (RSIL@ors.ubc.ca).

Consent

Your participation is entirely voluntary. You may refuse to participate or withdraw at any time without penalty or consequence. If you choose to participate and then decide to withdraw at a later time, you have the right to request the withdrawal of your information collected during the study. This request will be respected to the extent possible.

By signing this consent form, you are agreeing to participate in all study protocols. By signing this consent form you are acknowledging that you have received a signed copy of the consent form for your records. By signing this consent form, you do not waive any of your legal rights.

Consent

I have read and understood the information on this consent form and voluntarily consent to participate in this study. I have had a chance to ask questions about the study and my involvement in it and have received a copy of the consent form.

_____	_____	_____
Participant's Name (please print)	Participant's Signature	Date

Confidentiality Agreement

I agree to respect the confidentiality of all program participants. This means I will not discuss participants' personal information with anyone outside of this program.

_____	_____	_____
Participant's Name (please print)	Participant's Signature	Date

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Contact for a Follow-up Interview

Upon completion of the program, would you be interested in taking part in a 1-hour semi-structured telephone interview with a member of the research team regarding your thoughts, opinions, and perceptions of the HAT TRICK Program?

☐Yes, I would be interested in taking part in a telephone interview.

☐No, I would not be interested in taking part in a telephone interview.

_____	_____	_____
Participant's Name (please print)	Participant's Signature	Date

_____	_____
Telephone Number	Email Address

Contact for Future Studies

Would you like to be contacted in the future about other studies?

☐Yes, I would like to receive information about future studies on men's health and physical activity.

☐No, I would not like to receive information about future studies.

_____	_____	_____
Participant's Name (please print)	Participant's Signature	Date

BMJ Open

The HAT TRICK program for improving physical activity, healthy eating and connectedness among overweight, inactive men: Study protocol of a pragmatic feasibility trial

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The HAT TRICK program for improving physical activity, healthy eating and connectedness among overweight, inactive men: Study protocol of a pragmatic feasibility trial

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ABSTRACT

Introduction: Physical activity, healthy eating, and maintaining a healthy weight are associated with reduced risk of cardiovascular disease, type 2 diabetes and cancer, and improved mental health. Despite these benefits, many men do not meet recommended physical activity guidelines and have poor eating behaviors. Many health promotion programs hold little appeal to men and consequently fail to influence men's health practices. HAT TRICK was designed as a 12-week face-to-face, gender-sensitized intervention for overweight and inactive men focusing on physical activity, healthy eating and social connectedness, and delivered in collaboration with a major junior Canadian ice hockey team (age range 16-20 years). The program was implemented and evaluated to assess its feasibility. This article describes the intervention design and study protocol of HAT TRICK.

Methods and Analysis: HAT TRICK participants (N=60) were men ≥35 years, residing in the Okanagan Region of British Columbia, who accumulate <150mins of moderate to vigorous physical activity a week, with a Body Mass Index >25kg/m^2 and a pant waist size of >38". Each 90-minute weekly session included targeted health education and theory-guided behavior change techniques, as well as a progressive (i.e., an increase in duration and intensity) group physical activity component. Outcome measures were collected at baseline, 12-weeks, and 9-months and included: objectively measured anthropometrics, blood pressure, heart rate, physical activity and sedentary behavior, as well as, self-reported physical activity, sedentary behavior, diet, smoking, alcohol consumption, sleep habits, risk of depression, health-related quality of life, and social connectedness. Program feasibility data (e.g., recruitment,

satisfaction, adherence, content delivery) was assessed at 12-weeks via interviews and self-report.

Ethics and Dissemination: Ethical approval was obtained from the University of British Columbia Okanagan Behavioural Research Ethics Board (#H1600736). Study findings will be disseminated through academic meetings, peer reviewed publication, web-based podcasts, social media, plain language summaries and co-delivered community presentations.

Keywords: Men's health; masculinity; physical activity; dietary behaviors; overweight/obese; social connectedness.

Trial Registration: ISRCTN43361357, Registered August 3, 2016

Strengths and Limitations of the Study:

- HAT TRICK is a gender-sensitized program designed to engage 'hard to reach' men with their health by resonating with and appealing to masculine ideals.
- The HAT TRICK program has the potential to be transferred across a number of male populations and settings, thus further increasing its reach to a large proportion of men.
- This study has a robust evaluation plan, utilizing objective and subjective measures of physical activity, and a variety of measures to assess program feasibility.
- Given the exploratory nature of this feasibility study, it is limited in examining causal effect in terms of behavior change.

INTRODUCTION

Engaging in healthy lifestyle behaviors including physical activity (PA) and healthy eating to achieve and maintain a healthy body weight, can reduce the risk for developing chronic diseases such as cardiovascular disease, cancer, type 2 diabetes, depression and premature mortality [1-4]. Despite the benefits associated with these lifestyle behaviors, up to 83% of men are not meeting the recommended PA guidelines [3,5,6] (i.e., at least 150 minutes of moderate to vigorous intensity PA per week) and have poor eating behaviors [7,8]. Accordingly, the prevalence of overweight and obesity among men is on the rise and continues to grow at a disproportionate rate to their female counterparts [9]. Complicating matters is the fact that many men have proved reluctant and/or 'hard-to-reach' in healthy lifestyle and weight management programs, making disease and illness prevention initiatives difficult [10-13].

Traditionally, a central challenge associated with engaging men in taking more active care in their health was a perception that attention to one's health ran counter to masculine ideals of strength, self-reliance and independence [14-17]. Men often associate health promoting practices as feminine, or a sign of weakness, and consequently threatening to their status in masculine hierarchies [15,18]. Thus, many men refrain from engaging in health promotion behaviors, including attending PA, healthy eating, and weight management programs [19,20]. However, Pringle et al. [21] suggested that men's apparent detachment from healthy behaviors is an indication that typical approaches to health are unappealing and/or irrelevant to their masculine values and virtues. Previous men-centered PA and healthy eating related research [22-24] has revealed that careful consideration of 'place' (i.e., physical setting), along with a tailored approach that aligns with men's values and interests, can indeed support

increases in health promoting behaviors [25-27]. This work supports the notion that there is value in providing men with health promotion opportunities in venues where they participate in and/or watch sport and recreational activities [21,27,28].

Recent research has highlighted the potential for professional sports teams/clubs to attract and engage men in healthy lifestyle behaviors [29-31]. Such settings have proved a powerful draw for men due to familiar, comfortable and/or appealing environments which they offer and the socio-cultural connections men often make with particular teams and fellow supporters in terms of loyalty, identity and belonging [27,29,32,33]. Furthermore, professional/elite sport clubs and settings offer a unique opportunity to support men's health because they provide health promoters with a potentially large captive audience of men in an environment that plays to masculine values and virtues [21,22,29,33]. For example, the Football Fans in Training (FFIT) intervention targeted overweight Scottish men and reported a significant reduction in weight at 12 months post-intervention (mean weight loss of 4.95kg) [27], as well as significant positive changes in blood pressure, diet, self-reported PA and physical quality of life. This program has since been expanded to include professional soccer clubs across Europe [34] and has been adapted to addition sports (i.e., Rugby) [35].

Within this context, the gender-sensitized HAT TRICK program was designed to engage men with their health by resonating with and appealing to masculine ideals. Its delivery model is founded on the strong collaboration with the Kelowna Rockets Hockey Team, a major junior ice hockey team within the Canadian Hockey League (CHL) [36]. Garnering the social-cultural connections that men often cultivate with particular sports teams can be a 'lynchpin' to engaging men in healthful behaviors in that this approach recognises the interests and

preferences of men, while fostering an environment that promotes a sense of identity, camaraderie and healthy living. This paper describes the intervention design and methodological protocols of HAT TRICK.

METHODS AND ANAYLSIS

Objectives

The specific objectives of the HAT TRICK study were to:

1) Determine feasibility and acceptability of HAT TRICK, a health promotion program focused on PA, healthy eating and connectedness for inactive, overweight men.
2) Estimate effectiveness in terms of changes over time in PA, sedentary behavior, dietary behaviors, weight, smoking, alcohol consumption, sleep habits, risk for depression, health-related quality of life (HRQoL) and social connectedness.
3) Utilise findings to refine the program and inform the development of a future large scale randomised control trial (RCT).

Study design

This study protocol was prepared according to Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) [37]. This study utilised a quasi-experimental, pre-post test design to evaluate the feasibility and acceptability of a men's health promotion program focused on PA, healthy eating, and social connectedness. Data collection occurred at baseline, 12-weeks, and 9-months follow-up. The study period extends from August 2016 – May 2018. Recruitment occurred in three phases, corresponding with the delivery of three 12-week HAT TRICK sessions: Phase 1 recruitment period occurred in November 2016;

phase 2 recruitment period occurred in January 2017; and, phase 3 recruitment will begin in August 2017. Figure 1 provides a flow diagram for the HAT TRICK protocol. Figure 2 provides Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) figure. (Please see Supplementary File 1 for SPIRIT Checklist).

Study population, eligibility and recruitment

A total of 60 participants (20 participants x 3 groups) were recruited for this feasibility trial. This sample size is appropriate for feasibility trials which aim to provide an estimate of the parameters (i.e., identifying/recruiting participants; practicality of delivery, standard deviation of a primary outcome measure to estimate sample size) needed to design and conduct a sufficiently powered RCT [22,38,39]. To be eligible for the study, participants had to be men over the age of 35 years, reside in the Okanagan Region of British Columbia (BC), Canada, accumulate less than 150 minutes of PA per week, have a body mass index (BMI) of over 25kg/m^2 and a pant waist size of 38" or greater. It was not a requirement of the program to be able to skate or play hockey.

A variety of recruitment strategies were utilised, including: 1) communication avenues via the Kelowna Rockets Hockey Team (e.g., poster advertising at home games, Rockets website, newsletters to season tickets holders, game day intercom announcements, recruitment/information booth at home games); 2) local media, including print newspaper and television and radio broadcasts; 3) email and print communication via local male dominated community organizations (e.g., Okanagan Men's Shed); 4) social media, including Facebook, Castanet, Kijiji, and Kelowna Now (community events website); and 5) Poster advertisements at local community centers, ice hockey arenas, coffee shops, pubs and bars, and large hardware

and automotive commercial entities (e.g., Canadian Tire). Prior to groups 2 and 3, word of mouth was an additional recruitment strategy. Lastly, a project specific website (www.hattrick.ok.ubc.ca) with additional information about the program, including eligibility criteria and how to sign up, was also used to recruit participants.

Interested individuals were encouraged to contact the research team to confirm their eligibility. Those confirmed eligible were asked to complete a Physical Activity Readiness Questionnaire (PAR-Q+) [40], a medical screening tool which has been recommended for use in exercise related interventions and RCTs [41]. All completed PAR-Q+ were reviewed by a Certified Exercise Physiologist [42] and individuals who required further medical screening were informed and invited to gain medical clearance from a general medical practitioner (i.e., family doctor) in order to participate in the study. Individuals were accepted on a 'first come first serve' basis with additional individuals being placed on a waitlist and contact list for the next available session.

HAT TRICK Intervention

HAT TRICK is a term synonymous with the achievement of a single hockey player scoring three goals in one hockey game. Although the term has its origins in hockey, it is also used in other sports. For example, a soccer player who scores three goals in one game or a football player who scores three touchdowns in one game may also claim that they achieved a 'hat trick'. Thus, the HAT TRICK program follows this same logic and focuses on three goals including enhancing PA, healthy eating, and social connectedness. The program was tailored for men using evidence-based research concerning men's health behaviours [27,43] and was guided by theoretical underpinnings associated with behavior change, specifically incorporating

components of the Social Cognitive Theory [44,45], Self-Determination Theory [46] and masculinities [14,17]. It was also informed by formative consultations with the men, previously conducted by the research team [23,47]. Gender-related strategies found to be successful in influencing men's health behaviors were integrated into the design of the program including men's preferences for activity based approaches, self-monitoring and friendly competition, while providing space for male comradery to foster group support, normalise practices related to health, and mobilise men in regaining fitness and valued masculine identities and activities [14,17]. All resources were consistent with a masculine look and feel, and provided clear, positive, and direct messaging around PA, healthy eating, and social connectedness [43,48]. For example, consideration was given to the use of colours (e.g., dark tones and stark contrasts), images (e.g., average men performing PA), language (e.g., "power foods"), and tone (e.g., "I don't need to eat like a rabbit or live at the gym to improve my health").

HAT TRICK consists of 12 weekly, 90-minute face-to-face group sessions delivered at the local hockey arena, the home facility to the Kelowna Rockets. Each group session included a 'locker room' component with an ice hockey related-theme used to frame health-related education and information regarding PA, healthy eating and behavior change techniques (i.e., goal setting, self-monitoring, social support), whilst simultaneously promoting enjoyment and increased social connectedness through an interactive and informal style of learning. For instance, to enhance social connectedness, facilitators aimed to foster a sense of teamwork and comradery among the men through group activities and competition. Men were encouraged to share contact information and meet outside of the program as well as foster friendly competition by challenging each other to meet their PA and healthy eating goals. Participants

were introduced to a variety of activities and guided through a progressive (i.e., increase duration and intensity over time) PA program within the facility using the team gym, the concession loop, and spectator stands. Weekly PA and healthy eating challenges were introduced to encourage men to integrate what they learned to their daily life [49-51]. Table 1 provides a detailed description of the weekly locker room content, PA, and challenges provided to the men.

Table 1. Weekly Outline of HAT TRICK

Locker Room Education	Group PA	Weekly Challenge
Week 1: Pre Game		
• Program introduction • Why HAT TRICK? • The first step • Take stock of current activities	• Introduction to Fitbits • Hockey area facility tour • Intermission ○ Meet and greet with hockey team	On every day this week: • Record how many steps you do • Record everything that you eat and drink
Week 2: Face Off		

• Change a bit
• Break the cycle
• Top 5 tips for success
	• Activities around hockey arena
	  ○ Climb bleachers, walk the loop, seat dips
	• Intermission
	  ○ Fitbit usage and barriers
	  ○ Step recommendations
		On at least **3** days of the week:
		• walk an extra 1,500 steps (from baseline value)
		• Choose water instead of a sugary drink

Week 3: Power Play		

• HAT TRICK to healthy eating: carbs, proteins, and fats
• Top 6 healthy eating tips
• Power food swaps
	• Hockey team training gym
	  ○ Fundamental activities with Athletic Trainer
	  ○ Circuit-style workout
	• Intermission
	  ○ Discuss week 2 challenge
		On at least **3** days of the week:
		• walk an extra 1,500 steps (from baseline value)
		• Start your morning with a healthy breakfast

Week 4: Tic Tac Toe		

• Size: Then and now
• Handy portion guide
• Top 7 tips for dining out
• Rethink beer o'clock
• Top 6 tips for keeping the beer gut in check
	• Ball hockey game
	  ○ Two periods of 15 minutes
	• Intermission:
	  ○ Discuss week 3 challenge
		On at least **5** days of the week:
		• walk an extra 1,500 steps (from baseline value)
		• Use the handy portion guide to plan a meal

Week 5: Long Change		
• Active living 101	• Hockey team training gym	On at least **5** days of the week:

• HAT TRICK to active living • Canada PA Guidelines • Recruit a deep bench (i.e., elicit social support)	○ Fundamental activities with Athletic Trainer ○ Circuit-style workout • Intermission ○ Discuss week 4 challenge	• walk an extra 1,500 steps (from baseline value) • Choose water instead of a sugary drink
Week 6: Neutral Zone		
• Energy balance • The 80/20 rule (i.e., 80% healthy eating/20% anything foods) • Top 8 keys to weight loss • Drink wisely (i.e., choose water instead of sugary drinks)	• Exercise at a moderate intensity (3 bouts of 15 minutes)- Include short intervals of higher intensity • Intermission: ○ Discuss week 5 challenge	On at least **3** days of the week: • walk an extra 3,000 steps (from baseline value) • Apply the 80/20 rule
Week 7: Penalty Kill		
• SMART goals • Keep your stick on the ice (i.e. relapse prevention) • Top 6 relapse prevention strategies • Top 6 healthy snacking tips • Rewarding yourself	• "Boot camp" style workout • Intermission: ○ Discuss week 6 challenge	On at least **3** days of the week: • walk an extra 3,000 steps (from baseline value) • Choose healthy snacks options
Week 8: Odd Man Rush		
• Principles of strength training • Circuit training • At home workout • Turning up the heat	• Introduction to at-home bodyweight workout • Intermission: ○ Discuss week 7 challenge	On at least **5** days of the week: • walk an extra 3,000 steps (from baseline value) • Start your morning with a healthy breakfast
Week 9: Icing		
• Top 5 tips for "brocery"shopping (i.e., grocery shopping for guys) • Reading the fine print • The many names for sugar and salt • Product buzz words	• Exercise at moderate-vigorous intensity (3 bouts of 15 minutes)-15 minutes will include more vigorous intensity • Intermission: ○ Discuss week 8 challenge	On at least **5** days of the week: • walk an extra 3,000 steps (from baseline value) • Apply the 80/20 rule
Week 10: Fast Break		
• Making healthy trades • The BBQ king • Meals on the fly	• Sport chosen by men (3 periods of 15 minutes) • Intermission: ○ Discuss week 9 challenge	On at least **5** days of the week: • walk an extra 3,000 steps (from baseline value) • Choose healthy snacks options
Week 11: Set Play		
• Sit less • Top 4 stress management	• Resistance training session • Intermission:	On at least **5** days of the week: • walk an extra 3,000 steps

tips • Sleep and health	○ Discuss week 10 challenge	(from baseline value) • Use the handy portion guide to plan a meal
Week 12: He shoots, he scores!		
• Highlight reel • Dealing with set-backs • What's the next step?	• Family skate and BBQ ○ Family and friends ○ Man of the Match (awards) • Intermission: ○ Discuss week 11 challenge	Be HAT TRICK healthy. Keep working towards your goals and making small lifestyle changes.

In the initial deliveries, HAT TRICK was facilitated by research personnel trained in health promotion and behavior change techniques. However, it is anticipated that for future delivery of the program, external facilitators such as fitness professionals with relevant certifications (e.g., CSEP CPT, BCRPA Personal Trainer) or other accredited local health professionals (e.g., nutrition specialists, physical therapists), as well as individuals who have previously gone through the program, will be trained to deliver the program. In addition, hockey team personnel and community experts were invited as guest speakers/presenters for selected sessions. For example, the Rockets Athletic Therapist was brought in to lead a strength training session and the Rockets nutritionist specialist was a guest presenter for some of the nutrition education sessions. Community health professionals (e.g., fitness trainers, physiotherapist) were also involved in leading some of the group sessions. For instance, qualified local fitness professionals led the men through a circuit training session and martial arts type workouts, and a local Chef assisted with presenting and discussing healthier food options when ordering from restaurant menus. Including team 'insiders' and local professionals (i.e., Rockets personnel) provided a variety of content and activities for the men, potentially helping to build community capacity and buy-in, which is vital to future dissemination and sustainability.

All participants were provided with the HAT TRICK 'Playbook', a print resource manual that further summarised the key messages and signposts the resources to draw on over 12-week program. The 'Playbook' is divided into 12 weeks and corresponds with each weekly theme of HAT TRICK, as outlined in Table 1. It contains educational information, expressed in simple terms using hockey-related metaphors, concerning healthy eating (i.e., information about macro-nutrients, portion sizes, etc.) and active living (i.e., barriers and benefits to PA, being active at home, etc.), as well as strategies for weight management and behavior change, such as information concerning social support, self-monitoring, goal setting, and relapse prevention. To assist with self-monitoring, participants were provided with a Fitbit Charge HR™ and PA and dietary tracking logs which are embedded in the 'Playbook'. During each week of the program, men were encouraged and challenged to increase their step count (in graduate increments) and non-walking PA, as well as to engage in healthy eating (e.g., increasing fruit and vegetable consumption) and record these activities in their 'Playbook' tracking logs.

Outcome Measures

Quantitative and qualitative data collection methods were used to assess outcome and feasibility measures. All assessments took place at the same facility where HAT TRICK was delivered and occurred at baseline (one week prior to the start of the program), at 12-weeks (completion of the program) and will occur again at 9-months follow-up (post-baseline). Participants who were unable to attend the measurement session were invited to complete measures at an agreed upon time in the Physical Health and Activity Behaviour Lab at the University of British Columbia or at an alternative location such as their home. All measures are

described in further detail below. In addition, Table 2 provides a summary of measures and data collection time points.

Table 2. Summary of measures and data collection time points

Measures	Methods for data collection	Data collection time points
Demographics	Age, ethnicity, education, occupation, income, marital status, co-morbidities	0 (Baseline only)
Anthropometrics	Height, weight, waist circumference	0, 12-wks and 9-mths
Physiological Measures	Blood pressure, heart rate	0, 12-wks and 9-mths
PA levels	Actigraph GT3X™ accelerometer (over a 7 day-period)	0, 12-wks and 9-mths
	Godin's Leisure Time Exercise Questionnaire (GLTEQ)	0, 12-wks and 9-mths
Sedentary behavior	Actigraph GT3X™ accelerometer (over a 7 day-period)	0, 12-wks and 9-mths
	Marshall Sitting Questionnaire (MSQ)	0, 12-wks and 9-mths
Dietary behavior	The Dietary Instrument for Nutrition Education Questionnaire (DINE)	0, 12-wks and 9-mths
Other health behaviors	7 Day Alcohol Recall	0, 12-wks and 9-mths
	Smoking and tobacco use	0, 12-wks and 9-mths
	Sleep habits	0, 12-wks and 9-mths
Psychological and physical well-being	SF-12V2 Health Survey	0, 12-wks and 9-mths
	Male Depression Risk Scale (MDRS-22)	0, 12-wks and 9-mths
	Abbreviated Duke Social Support Index (DSSI-11)	0, 12-wks and 9-mths
Program	Satisfaction/acceptability	12-wks (post intervention

satisfaction/acceptability	questionnaire	only)
	Semi-structured telephone interview with participants	12-wks (post intervention only)

Demographics, anthropometrics and physiological measures

As part of the self-report questionnaire, participants were asked to report demographic variables including; date of birth, ethnic background, level of education, marital status, chronic disease conditions, main activity, occupation, and household income. Height (cm), weight (kg), waist circumference (cm), blood pressure (mmHg), and heart rate (bpm) were measured by a research team member, trained to a standard protocol, at all assessment sessions. Weight and height was measured with the participant standing normally, with feet together and head in the Frankfort plane, using Seca 700 mechanical balance scales and a Seca 220 measuring rod (Seca GmbH, Hamburg). Using the National Institutes of Health protocol [52], waist circumference was measured on the transverse plane at the top of the iliac crest using a measurement tape. Blood pressure and heart rate was measured two times at two minutes intervals with a Life Source Digital Deluxe One Step Blood Pressure Monitor. Participants were asked to sit quietly for five minutes prior to the first measurement. Blood pressure was measured on the left arm with forearm on a table, palm of the hand facing up. Participants were asked to rest the arm comfortably at heart level, sitting with their back against the chair, legs uncrossed.

Physical Activity

PA was assessed objectively using an Actigraph GT3X™ accelerometer (ActiGraph, Pensacola, FL) during all waking hours over seven days. The accelerometers were initialized to record steps, inclination, and acceleration counts in tri-axial mode, using 60-second epochs

[53,54]. Participants were instructed to wear the accelerometer above their right hip and in-line with their right knee facing up, and to remove it during sleeping hours or for any activities where water may be involved. The Actigraph GT3X™ is considered the 'gold standard' measure of PA in adults [55] and has shown validity and reliability compared to other commercial devices [56,57]. Established cut-off points were used to calculate daily minutes of moderate (2,691 – 6,166 counts/min) and vigorous (>6,167 counts/min) PA while controlling for the number of days the accelerometer was worn [56]. Moderate-to-vigorous physical activity (MVPA) will be calculated as a sum score of weekly minutes in MVPA. Data will be included in the analyses if there are no extreme counts (>20,000) and if data are available for at least 600 minutes wear time per day on 5 days. Participants with invalid data were asked to wear the activity monitor for a further 7 days.

PA was also assessed by self-report using a modified version of the Godin Leisure Time Exercise Questionnaire (GLTEQ) [58]. Participants were asked to indicate the frequency and type of intensity (i.e., light, moderate, vigorous) of their daily PA per week and the duration (minutes) of these sessions [58]. All responses will be converted to minutes and calculated in accordance with the metabolic equivalent (MET) minutes method [59]. A cut-off point of ≥ 600 MET minutes will then be used to dichotomize participants as "adequately active for health benefit" or "inadequately active" [59,60] .The GLTEQ has shown good validity and reliability across a number of populations and settings [61-63].

Sedentary Behavior

Accelerometers were also be used to objectively assess sedentary behavior using a 30s epoch. Sedentary time will be determined as <100 counts/min, adjusted for non-wear time

operationalized as at least 60 minutes of consecutive zeros [54]. In addition, sedentary behaviors was assessed by self-report using The Marshall Sitting Questionnaire (MSQ) [64]. The MSQ assesses time spent sitting on weekdays and weekend days at work, traveling and at home. Data from the sitting time questionnaire will be used to create an estimate of total weekday and weekend-day sitting times (min/day) by summing the time reported in each domain [64]. This measure has demonstrated reliability and validity in the adult population [64].

Dietary Behaviors

Dietary behaviors were assessed by the Dietary Instrument for Nutrition Education (DINE) questionnaire [65], a short 19-item questionnaire providing a measure of frequency of intake of different food types (i.e., fruits and vegetables) and macronutrients over the last seven days. Composite scores will be calculated in accordance with the DINE protocol used for total fat intake and total fiber intake, with higher scores indicating greater consumption [65]. This validated instrument [65] is considered to be an acceptable alternative to more detailed diet recall questionnaires and food dairies, and was chosen for this particular study as it focuses on food types (i.e., fruits and vegetables) associated with chronic disease prevention and management [66,67].

Other health-related behaviors

Smoking and tobacco use, alcohol consumption, and sleep habits were assessed via self-report questions [68]. Smoking status was measured using a single question, wherein participants identify as a regular smoker (daily), occasional smoker (once in a while), ex-smoker,

or non-smoker. Occasional and regular smokers were asked to report their smoking habits and quit attempts using standardized questions [68].

Alcohol intake was measured using a 7-Day Alcohol Recall [69]. Participants were asked to consider the previous 7 days and report the number of pints of beer/cider, glasses of wine, glasses of fortified wine (e.g., Port), measures of spirits, and any other alcoholic beverages consumed each day.

Participants' sleeping habits were reported through average hours of sleep on a typical night [70]. Descriptive measures related to speaking with a doctor or health professional about having difficulty sleep and being diagnosed with a sleep disorder were also collected [70].

Risk of Depression

Risk of depression was assessed using the Male Depression Risk Scale (MDRS-22) [71]. This is a 22-item Likert scale questionnaire ranging from 0 (not at all) to 7 (almost always). Participants were asked to think back over the last month and respond to each item considering how often it applies. The MDRS-22 provides a total score via the summation of all 22 items and six subscale scores that follow six symptom domains including: emotional suppression, drug use, alcohol use, somatic symptoms, risk taking, and anger and aggression. A higher score indicates a greater risk of depression. The MDRS-22 has demonstrated validity and reliability among men [71,72].

Health-related Quality of Life

HRQoL was assessed using the Short Form Health Survey (SF-12) [73]. The SF-12 was developed as a shorter alternative to the SF-36 [74], and it includes 12 questions and eight physical and mental health dimension scales including; physical functioning, role-physical,

bodily pain, general health, vitality, social function, role-emotional and mental health [73]. Scoring for this survey includes pre-coded numeric values that are assigned to each of the eight scales and then scored from 0 to 100, with a higher score indicating better health [75]. The SF-12 is one of the most widely used HRQoL evaluation tools and has been shown to be valid and reliable in a number of populations [76-79].

Social Support

The Abbreviated Duke Social Support Index (DSSI-11) [80] was used to assess perceived social support. The DSSI is an 11-item questionnaire comprising of two sub-scales; social interaction (4 items) and social satisfaction (7 items), measured on a 4 point Likert scale. The social interaction subscale asks questions regarding the number of social interactions an individual has had within the past week (e.g., *How many times during the past week did you spend time with someone who does not live with you?* The social satisfaction subscale asks about the subjective quality of these relationships (e.g., *When you are talking with your family or friends, do you feel you are being listened to?* The social interaction scale ranges from 4 to 12 and the social satisfaction subscale ranges from 6 to 18, thus the total score for the DSSI-11 ranges from 10 to 30 (combination of social interactions and social satisfaction scores, with social satisfaction reverse scored before summation) with higher scores indicating a stronger perception of social support [80]. The DSSI-11 has been shown to be valid and reliable in adult populations and reported to be useful for measuring social support in community-based epidemiological studies [81-84].

Statistical Analysis

Descriptive analyses will be completed and presented as means and standard deviations for continuous variables and as frequencies and proportions for categorical data. Data analysis of outcome variables including estimates of change in PA, sedentary behavior, dietary behaviors, smoking, smoking, alcohol consumption, sleep habits, risk of depression, HRQoL, and social support will be examined using a within subjects, repeated measures ANOVA. The level of significance (α) will be set at 0.05. As the primary outcome is feasibility, it is not appropriate to perform a power calculation. All analyses will be conducted using IBM SPSS statistics 23.

Program Feasibility and Analysis

At 12-weeks (post intervention), all participants will complete a program satisfaction/acceptability questionnaire. Participants will be asked several Likert scale questions as well as open-ended response questions relating to their experience and satisfaction with the program design, content, resources, and logistics concerning program implementation (i.e., day and time of sessions, structure of sessions, facility where program was delivered). To inform future requirement strategies, data will also be collected from website usage patterns (Google Analytics-frequencies, means, etc.) as they relate to key time points during the program (e.g., media releases) as well as using paper-based questions regarding how/where participants heard about the program. Program-related statistics, including participant attendance, number of guest presenters and metrics concerning program inquiries, participant communications and follow-ups, will also be collected.

Semi-structured telephone interviews will be undertaken with a subsample of participants (n=30) to gain further insight concerning satisfaction and acceptability of HAT TRICK, and to understand the challenges/enablers associated with design and implementation

of the program, including feasibility parameters such as recruitment, attendance, adherence and acceptability of the program and content. Participants will be purposefully selected from each of the three HAT TRICK groups to include men reporting a range of feasibility and program outcomes. These individuals will include those who have completed the program (i.e., completed baseline and 12-week follow-up assessment periods) and have attended at least 50% of the sessions (i.e., 6 of 12 weekly 90 minute sessions). Data collection and analysis will occur simultaneously in three phases as the HAT TRICK program is implemented. Interview questions will be refined as data collection progresses to address gaps identified in the analysis as well as expand on and verify emerging themes. Data from the interviews will be audio recorded (with participants' permission) and transcribed verbatim with all identifiable information removed. Data will be analyzed using thematic content analysis [85] to explore participant satisfaction and enjoyment and to identify challenges experienced during program implementation as well as factors that may have facilitated implementation. To enhance rigor, at least two members of the research team will independently code participant responses into relevant subthemes. Once all coding has been completed, subthemes will be discussed among the two research team members to ensure bias is minimized. Any disagreements or concerns that may arise during the analysis will be presented at this time and further discussion will be carried out with the research team until consensus is reached.

Ethics and Dissemination:

Ethical approval for this trial was obtained from the University of British Columbia Okanagan Behavioural Research Ethics Board (#H1600736). Participants provided informed consent (Please see Supplementary File 2) and medical clearance prior to all baseline

assessments. Participants were also informed that they may withdraw from the study at any time, for any reason, without consequence. All personal data will be coded and handled with confidentiality.

Study findings will be disseminated widely through national and international academic meetings, peer reviewed publication and by web-based activities (e.g., podcasts, research webinars). In addition, these findings will also be disseminated through social media (e.g., facebook, twitter), plain language summaries to participants, summary briefings to local stakeholders and government agencies, and co-delivered (i.e., researcher-participants) community presentations.

DISCUSSION

Engaging men in health promoting behaviors, such as PA and healthy eating can be challenging. Men have often been regarded as 'hard to reach' in terms of health promotion programs with linkages being made to some masculine ideals as contributing to men's estrangement from their health. This is further supported by the research which has suggested that many men are reticent to attend health promotion education sessions, disinterested in information concerning disease prevention and estranged from professional health care services [86,87] although more recent research is beginning to challenge such stereotypes. Some researchers suggest these 'traditional' patterns are implicated in Western men's shorter life expectancy compared to women and high morbidity rates associated with chronic disease [88,89]. Thus, men are a population that would benefit from effective targeted programs to engage them in healthy lifestyle behaviors, including PA and healthy eating. To reach and

engage men, innovative approaches that are aligned with a range of masculinities (e.g., strength, toughness, risk-taking and skill in PA) as well as provide safe male spaces to promote trust and normalize men's efforts to change their health behaviours show promise in garnering significant success in advancing the health of men and their families [12,13,19,26,30].

HAT TRICK was designed to address these specific elements by creating an evidence based program that employed men-friendly strategies to fully engage men's participation, including; aligning with an elite male sports team (i.e., Kelowna Rockets), promoting friendly competition, and delivering the program in a familiar "place" (i.e., hockey arena and surrounding male-friendly community venues) where men ordinarily gather and connect with others (i.e., male facilitators and male only participants) who share similar interests. Appealing to these well-known masculine values and norms including friendly competition, and catering to methods and modes of delivery that recognise gender differences have been successful approaches to men-centered PA and healthy eating programs [12,26,27,47].

Another promising aspect of HAT TRICK is its potential to be transferred across a number of male populations and settings, thus further increasing its reach to a large proportion of men. In part, HAT TRICK is based on the successful Football Fans In Training (FFIT) intervention [27,30], which was designed to engage overweight Scottish men in weight management and healthy living program by capitalizing on men's team loyalty and love of the game of soccer . FFIT was specifically developed within a context that supports masculine ideals, encompassing a look and feel that appeals to many men [22,32]. HAT TRICK utilised these same principles, but altered the context of delivery by developing the program to fit with the national sports obsession of Canadian men, ice hockey. Specifically, the program's name

(HAT TRICK), logo design, resources and content are all influenced by the sport of ice hockey. Although this particular program was designed to appeal to male Canadian ice hockey fans, the unique aspect of this model is that it can be easily modified to appeal to male fans of other sports or activities. For instance, the same model has been recreated to appeal to Rugby fans in the UK. The Rugby Fans in Training (RuFIT) [35] study (and subsequently Premiership Rugby's Move Like a Pro program) aimed to test the FFIT model in the English professional rugby club setting, and to enhance long term weight loss and lifestyle change for men in the UK. In North America, a similar approach could be transferable to other popular sports including gridiron football, basketball and baseball, all of which exist within professional leagues that have a strong male fan base.

Although HAT TRICK can be recreated and transferred to suit fans of a variety of sports, we do acknowledge that there is a great diversity of men within Canada (e.g., new immigrant men, older age men, gay men, men from remote areas) who may have other interests beyond sport. Thus, prior to undertaking refinements and restructuring the program, formative evaluations should be undertaken with these specific male groups in order to gain further knowledge concerning local, regional and global masculine values and norms [24].

In conclusion, given the limited published research for effective and feasible approaches to men's health promotion, but the promise shown by programs such as FFIT, the results of this feasibility study will serve as a valuable platform to guide future work. There also seems to be great opportunity for sustainability and scalability of the HAT TRICK program based on its transferability and the thoughtful deliberate formal evaluation of this intervention.

TRIAL STATUS

The trial was registered on August 3, 2016. Recruitment for this study began in December 2016 and is ongoing until September 2017.

AUTHOR CONTRIBUTIONS

CMC, JLB, JLO, STJ, KH conceived the project and procured the project funding. CMC is leading the coordination of the trial. CMC, JLB, JLO, STJ, KH, contributed to the study design. PS is managing the trial, including data collection, with assistance from KMF and RP. CMC, PS, KMF and RP drafted the manuscript and all authors read, edited and approved the final manuscript.

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COMPETING INTERESTS

All authors state that they have no competing interests to declare.

DATA SHARING

The datasets analyzed during the current trial will be available from the corresponding author on reasonable request.

PROVENCE AND PEER REVIEW

Not commissioned; externally peer reviewed.

FIGURES

Figure 1. Flow diagram of HAT TRICK protocol

Figure 2. Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) figure

SUPPLEMENTRAY FILES

Supplementary File 1. SPIRIT Checklist

Supplementary File 2. Informed consent form

REFERENCES

1. Lee CD, Sui X, Hooker SP, Hebert JR, Blair SN. Combined impact of lifestyle factors on cancer mortality in men. *Ann Epidemiol.* Oct 2011;21(10):749-754.
2. Shiroma EJ, Sesso HD, Lee IM. Physical activity and weight gain prevention in older men. *Int J Obes (Lond).* Sep 2012;36(9):1165-1169.
3. Kohl HW, 3rd, Craig CL, Lambert EV, et al. The pandemic of physical inactivity: global action for public health. *Lancet.* Jul 21 2012;380(9838):294-305.
4. Nunan D, Mahtani KR, Roberts N, Heneghan C. Physical activity for the prevention and treatment of major chronic disease: an overview of systematic reviews. *Syst Rev.* Jul 10 2013;2:56.
5. WHO. *Global Recommendations on Physical Activity and Health.* Geneva: World Health Organization;2010.
6. Colley RC, Garriguet D, Janssen I, Craig CL, Clarke J, Tremblay MS. Physical activity of Canadian children and youth: accelerometer results from the 2007 to 2009 Canadian Health Measures Survey. *Health Rep.* Mar 2011;22(1):15-23.
7. Wardle J, Haase AM, Steptoe A, Nillapun M, Jonwutiwes K, Bellisle F. Gender differences in food choice: the contribution of health beliefs and dieting. *Ann Behav Med.* Apr 2004;27(2):107-116.
8. Baker AH, Wardle J. Sex differences in fruit and vegetable intake in older adults. *Appetite.* Jun 2003;40(3):269-275.
9. Belanger-Ducharme F, Tremblay A. Prevalence of obesity in Canada. *Obes Rev.* Aug 2005;6(3):183-186.

10. Baker P. Current issues in men's health. *Trends Urol Men's Health.* 2012;3:19-21.

11. Sinclair A, Alexander HA. Using outreach to involve the hard-to-reach in a health check: what difference does it make? *BMC Public Health.* Feb 2012;126(2):87-95.

12. Young MD, Morgan PJ, Plotnikoff RC, Callister R, Collins CE. Effectiveness of male-only weight loss and weight loss maintenance interventions: a systematic review with meta-analysis. *Obes Rev.* May 2012;13(5):393-408.

13. Pagoto SL, Schneider KL, Oleski JL, Luciani JM, Bodenlos JS, Whited MC. Male inclusion in randomized controlled trials of lifestyle weight loss interventions. *Obesity (Silver Spring).* Jun 2012;20(6):1234-1239.

14. Courtenay WH. Constructions of masculinity and their influence on men's well-being: a theory of gender and health. *Soc Sci Med.* May 2000;50(10):1385-1401.

15. Courtenay WE. Making health manly: Norms, peers, and men's health. In: Cohen L, Chavez V, Chehimi S, eds. *Prevention is primary; Strategies for community wellbeing*. San Francisco, CA: Jossey-Bass; 2007.

16. Gough B. Try to be healthy, but don't forgot your masculinity: deconstructing men's health discourse in the media. *Soc Sci Med.* Nov 2006;63(9):2476-2488.

17. Robertson S. *Understanding men and health: Masculinities, identities and well-being*. Buckingham, UK: Open University Press; 2007.

18. Sloan C, Gough B, Conner M. Healthy masculinities? How ostensibly healthy men talk about lifestyle, health and gender. *Psychol Health.* Sep 2010;25(7):783-803.

19. Cormie P, Oliffe JL, Wootten AC, Galvao DA, Newton RU, Chambers SK. Improving psychosocial health in men with prostate cancer through an intervention that reinforces masculine values - exercise. *Psychooncology.* Jun 18 2015.

20. Gough B. 'Real men don't diet': an analysis of contemporary newspaper representations of men, food and health. *Soc Sci Med.* Jan 2007;64(2):326-337.

21. Pringle A, Zwolinsky S, McKenna J, Robertson S, Daly-Smith A, White A. Health improvement for men and hard-to-engage-men delivered in English Premier League football clubs. *Health Educ Res.* Jun 2014;29(3):503-520.

22. Gray CM, Hunt K, Mutrie N, et al. Football Fans in Training: the development and optimization of an intervention delivered through professional sports clubs to help men lose weight, become more active and adopt healthier eating habits. *BMC Public Health.* 2013;13:232.

23. Oliffe JL, Bottorff JL, Sharp P, et al. Healthy Eating and Active Living: Rural Based Working Men's Perspectives. *Am J Mens Health.* 2015.

24. Caperchione CM, Sharp P, Bottorff JL, et al. The POWERPLAY workplace physical activity and nutrition intervention for men: Study protocol and baseline characteristics. *Contemp Clin Trials.* Jul 14 2015;44:42-47.

25. Johnson ST, Stolp S, Seaton C, et al. A Men's Workplace Health Intervention: Results of the POWERPLAY Program Pilot Study. *J Occup Environ Med.* Aug 2016;58(8):765-769.

26. Caperchione CM, Stolp S, Bottorff JL, et al. Changes in Men's Physical Activity and Healthy Eating Knowledge and Behavior as a Result of Program Exposure: Findings From the Workplace POWERPLAY Program. *J Phys Act Health.* Dec 2016;13(12):1364-1371.

27. Wyke S, Hunt K, Gray CM, et al. Football Fans in Training (FFIT): a randomised controlled trial of a gender-sensitised weight loss and healthy living programme for men-end of study report. *Public Health Res.* 2015;3(2):1-129.

28. Mason OJ, Holt R. Mental health and physical activity interventions: a review of the qualitative literature. *J Mental Health.* Jun 2012;21(3):274-284.

29. Brady AJ, Perry C, Murdoch DL, McKay G. Sustained benefits of a health project for middle-aged football supporters, at Glasgow Celtic and Glasgow Rangers Football Clubs. *Eur Heart J.* Dec 2010;31(24):2696-2698.

30. Hunt K, Wyke S, Gray CM, et al. A gender-sensitised weight loss and healthy living programme for overweight and obese men delivered by Scottish Premier League football clubs (FFIT): a pragmatic randomised controlled trial. *Lancet.* Apr 5 2014;383(9924):1211-1221.

31. Gill DP, Blunt W, De Cruz A, et al. Hockey Fans in Training (Hockey FIT) pilot study protocol: a gender-sensitized weight loss and healthy lifestyle program for overweight and obese male hockey fans. *BMC Public Health.* Oct 19 2016;16(1):1096.

32. Hunt K, McCann C, Gray CM, Mutrie N, Wyke S. "You've got to walk before you run": positive evaluations of a walking program as part of a gender-sensitized, weight-management program delivered to men through professional football clubs. *Health Psychol.* Jan 2013;32(1):57-65.

33. Bunn C, Wyke S, Gray CM, Maclean A, Hunt K. 'Coz football is what we all have': masculinities, practice, performance and effervescence in a gender-sensitised weight-loss and healthy living programme for men. *Sociol Health Illn.* Jun 2016;38(5):812-828.

34. van Nassau F, van der Ploeg HP, Abrahamsen F, et al. Study protocol of European Fans in Training (EuroFIT): a four-country randomised controlled trial of a lifestyle program for men delivered in elite football clubs. *BMC Public Health.* Jul 19 2016;16:598.

35. Gray CM, Brennan G, Maclean A, Mutrie N, Hunt K, Wyke S. Can professional rugby clubs attract English male rugby supporters to a healthy lifestyle programme: the Rugby Fans in Training (RuFIT). *Eur J Public Health.* 2014;24(suppl 2):166.

36. Canadian Hockey League. Canadian Hockey League. 2017; http://chl.ca/. Accessed 25 Feb, 2017.

37. Chan AW, Tetzlaff JM, Gotzsche PC, et al. SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. *BMJ.* Jan 08 2013;346:e7586.

38. Arain M, Campbell MJ, Cooper CL, Lancaster GA. What is a pilot or feasibility study? A review of current practice and editorial policy. *BMC Med Res Methodol.* 2010;10:67.

39. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Q.* Winter 1988;15(4):351-377.

40. Canadian Society for Exercise Physiology. Physial Activity and Readiness Questionnaire for everyone: PAR-Q+. 2012; http://www.csep.ca/cmfiles/publications/parq/parqplussept2011version_all.pdf. Accessed 21, Feb 2017.

41. Duncan MJ, Rosenkranz RR, Vandelanotte C, et al. What is the impact of obtaining medical clearance to participate in a randomised controlled trial examining a physical activity intervention on the socio-demographic and risk factor profiles of included participants? *Trials.* Dec 07 2016;17(1):580.

42. Canadian Society for Exercise Physiology. Canadian Society for Exercise Physiology (CSEP). 1967; http://www.csep.ca/en/about-csep/about-the-canadian-society-for-exercise-physiology. Accessed 10 Feb 2017.

43. Bottorff JL, Seaton CL, Johnson ST, et al. An Updated Review of Interventions that Include Promotion of Physical Activity for Adult Men. *Sports Med.* Jun 2015;45(6):775-800.

44. Bandura A. *Social foundation of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall; 1986.

45. Bandura A. Social Cognitive theory of self-regulation. *Organ Behav Hum Decis Process.* 1991;50(2):248-287.

46. Deci EL, Ryan RM. *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum; 1985.

47. Caperchione CM, Vandelanotte C, Kolt GS, et al. What a man wants: understanding the challenges and motivations to physical activity participation and healthy eating in middle-aged Australian men. *Am J Mens Health.* Nov 2012;6(6):453-461.

48. Taylor PJ, Kolt GS, Vandelanotte C, et al. A review of the nature and effectiveness of nutrition interventions in adult males--a guide for intervention strategies. *Int J Behav Nutr Phys Act.* Jan 29 2013;10:13.

49. Verdonk P, Seesing H, de Rijk A. Doing masculinity, not doing health? A qualitative study among Dutch male employees about health beliefs and workplace physical activity. *BMC Public Health.* Nov 19 2010;10:712.

50. George ES, Kolt GS, Duncan MJ, et al. A review of the effectiveness of physical activity interventions for adult males. *Sports Med.* Apr 01 2012;42(4):281-300.

51. Morgan PJ, Collins CE, Plotnikoff RC, et al. Efficacy of a workplace-based weight loss program for overweight male shift workers: the Workplace POWER (Preventing Obesity Without Eating like a Rabbit) randomized controlled trial. *Prev Med.* May 2011;52(5):317-325.

52. National Institute of Health. Clinical guidelines on the identification, evaluation, and treatment of overwieght and obesity in adults-the eivdence report. Washington, DC1998:56-94.

53. Freedson PS, Melanson E, Sirard J. Calibration of the Computer Science and Applications, Inc. accelerometer. *Med Sci Sports Exerc.* May 1998;30(5):777-781.

54. Troiano RP, Berrigan D, Dodd KW, Masse LC, Tilert T, McDowell M. Physical activity in the United States measured by accelerometer. *Med Sci Sports Exerc.* Jan 2008;40(1):181-188.

55. Kelly LA, McMillan DG, Anderson A, Fippinger M, Fillerup G, Rider J. Validity of actigraphs uniaxial and triaxial accelerometers for assessment of physical activity in adults in laboratory conditions. *BMC Med Phys.* 2013;13(1):5.

56. Sasaki JE, John D, Freedson PS. Validation and comparison of ActiGraph activity monitors. *J Sci Med Sport.* Sep 2011;14(5):411-416.

57. Vanhelst J, Mikulovic J, Bui-Xuan G, et al. Comparison of two ActiGraph accelerometer generations in the assessment of physical activity in free living conditions. *BMC Res Notes.* Apr 25 2012;5:187.

58. Godin G, Shephard RJ. A simple method to assess exercise behavior in the community. *Can J Appl Sport Sci.* Sep 1985;10(3):141-146.

59. Brown WJ, Bauman AE. Comparison of estimates of population levels of physical activity using two measures. *Aust N Z J Public health.* Oct 2000;24(5):520-525.

60. Plotnikoff RC, Johnson ST, Loucaides CA, Bauman AE, Karunamuni ND, Pickering MA. Population-based estimates of physical activity for adults with type 2 diabetes: a cautionary tale of potential confounding by weight status. *J Obes.* 2011;2011.

61. Godin G, Jobin J, Bouillon J. Assessment of leisure time exercise behavior by self-report: a concurrent validity study. *Can J Public Health.* Sep-Oct 1986;77(5):359-362.

62. Jacobs DR, Jr., Ainsworth BE, Hartman TJ, Leon AS. A simultaneous evaluation of 10 commonly used physical activity questionnaires. *Med Sci Sports Exerc.* Jan 1993;25(1):81-91.

63. Hyde AL, Elavsky S, Doerksen SE, Conroy DE. The stability of automatic evaluations of physical activity and their relations with physical activity. *J Sport Exerc Psychol.* Dec 2012;34(6):715-736.

64. Marshall AL, Miller YD, Burton NW, Brown WJ. Measuring total and domain-specific sitting: a study of reliability and validity. *Med Sci Sports Exerc.* Jun 2010;42(6):1094-1102.

65. Roe L, Strong C, Whiteside C, Neil A, Mant D. Dietary intervention in primary care: validity of the DINE method for diet assessment. *Fam Pract.* Dec 1994;11(4):375-381.

66. Cole JA, Gillespie P, Smith SM, Byrne M, Murphy AW, Cupples ME. Using postal questionnaires to evaluate physical activity and diet behaviour change: case study

exploring implications of valid responder characteristics in interpreting intervention outcomes. *BMC Res Notes.* 2014;7:725.

67. John JH, Ziebland S, Yudkin P, Roe LS, Neil HA. Effects of fruit and vegetable consumption on plasma antioxidant concentrations and blood pressure: a randomised controlled trial. *Lancet.* Jun 08 2002;359(9322):1969-1974.

68. Diemert L, Kueller-Olaman R, Schwartz R, O'Conner S, Babayan A. Data Standards for Smoke-free Ontario Smoking Cessation Service Providers: Core Indicators and Questions for Intake and Follow-up of Adult Respondents. Toronto, ON: Ontario Tobacco Research Unit; 2013.

69. Emslie C, Lewars H, Batty GD, Hunt K. Are there gender differences in levels of heavy, binge and problem drinking? Evidence from three generations in the west of Scotland. *BMC Public Health.* Jan 2009;123(1):12-14.

70. Centres for Disease Control and Prevention. Sleep Disorders: National Health and Nutrition Examination Survey 2013: Centres for Disease Control and Prevention,; 2013.

71. Rice SM, Fallon BJ, Aucote HM, Moller-Leimkuhler AM. Development and preliminary validation of the male depression risk scale: furthering the assessment of depression in men. *J Affect Disord.* Dec 2013;151(3):950-958.

72. Rice SM, Fallon BJ, Aucote HM, Moller-Leimkuhler A, Treeby MS, Amminger GP. Longitudinal sex differences of externalising and internalising depression symptom trajectories: Implications for assessment of depression in men from an online study. *Int J Soc Psychiatry.* May 2015;61(3):236-240.

73. Ware J, Jr., Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care.* Mar 1996;34(3):220-233.

74. Ware JE, Kosinski M, Keller SD. *SF-36 Physical and Mental Healty Summary Scales: A User's Manual.* Boston, MA: The Health Institute, New England Medical Center;1994.

75. Ware JE, Kosinski M, Keller SD. *SF-12: How to score the SF-12 Physical and Mental Health Summary Scales*. Lincoln, RI: Quality Metric Incorporated; 1998.

76. Jenkinson C, Chandola T, Coulter A, Bruster S. An assessment of the construct validity of the SF-12 summary scores across ethnic groups. *J Public Health Med.* Sep 2001;23(3):187-194.

77. Burdine JN, Felix MR, Abel AL, Wiltraut CJ, Musselman YJ. The SF-12 as a population health measure: an exploratory examination of potential for application. *Health Serv Res.* Oct 2000;35(4):885-904.

78. Jakobsson U. Using the 12-item Short Form health survey (SF-12) to measure quality of life among older people. *Aging Clin Exp Res.* Dec 2007;19(6):457-464.

79. Wee CC, Davis RB, Hamel MB. Comparing the SF-12 and SF-36 health status questionnaires in patients with and without obesity. *Health Qual Life Outcomes.* Jan 30 2008;6:11.

80. Koenig HG, Westlund RE, George LK, Hughes DC, Blazer DG, Hybels C. Abbreviating the Duke Social Support Index for use in chronically ill elderly individuals. *Psychosomatics.* Jan-Feb 1993;34(1):61-69.

81. Goodger B, Byles J, Higganbotham N, Mishra G. Assessment of a short scale to measure social support among older people. *Aust N Z J Public Health.* Jun 1999;23(3):260-265.

82. Powers JR, Goodger B, Byles JE. Assessment of the abbreviated Duke Social Support Index in a cohort of Australian women. *Austral J Age.* 2004;23(2):71-76.

83. Ebeling-Witte S, Frank ML, Lester D. Shyness, Internet use, and personality. *Cyberpsychol Behav.* Oct 2007;10(5):713-716.

84. Pachana NA, Smith N, Watson M, McLaughlin D, Dobson A. Responsiveness of the Duke Social Support sub-scales in older women. *Age Ageing.* Nov 2008;37(6):666-672.

85. Braun V, Clarke V. Using thematic anaylsis in psychology. *Qual Res Psychol.* 2006;3(2):77-101.

86. Lee C, Owen GR. *The Psychology of Men's Health*. Philadelphia: Open Uiversity Press; 2002.

87. Deeks A, Lombard C, Michelmore J, Teede H. The effects of gender and age on health related behaviors. *BMC Public Health.* Jun 30 2009;9:213.

88. Pinkhasov RM, Wong J, Kashanian J, et al. Are men shortchanged on health? Perspective on health care utilization and health risk behavior in men and women in the United States. *Int J Clin Pract.* Mar 2010;64(4):475-487.

89. Salomon JA, Wang H, Freeman MK, et al. Healthy life expectancy for 187 countries, 1990-2010: a systematic analysis for the Global Burden Disease Study 2010. *Lancet.* Dec 15 2012;380(9859):2144-2162.

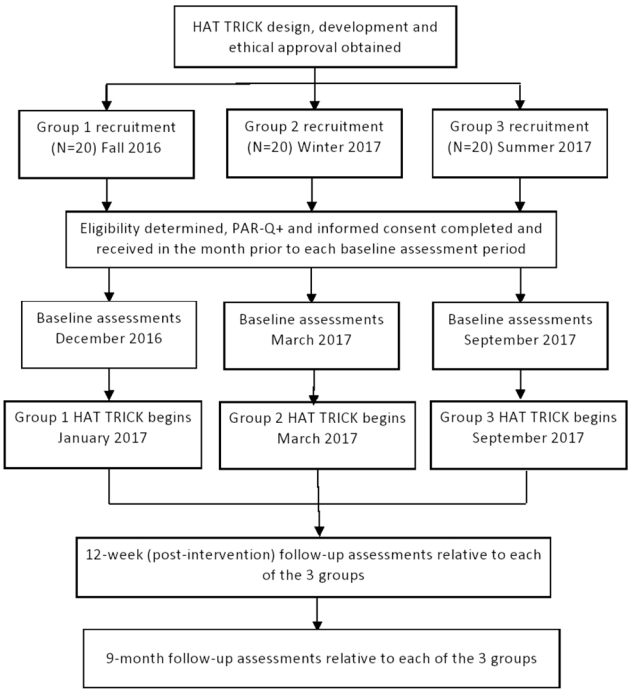

Figure 1. Flow diagram of HAT TRICK protocol

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	STUDY PERIOD				
	Enrolment	Allocation			Close-out
TIMEPOINT**	*-8 to 0 weeks*	0 week	1-12 weeks		9-month follow-up
ENROLMENT:					
Eligibility screen	X				
Informed consent	X				
Medical clearance	X				
INTERVENTIONS:					
HAT TRICK Intervention			←	→	
ASSESSMENTS:					
Demographics		X			
Anthropometrics		X		X	X
Physical Activity		X		X	X
Sedentary behavior		X		X	X
Dietary behavior		X		X	X
Smoking		X		X	X
Alcohol consumption		X		X	X
Sleep habits		X		X	X
Risk of depression		X		X	X
HRQoL		X		X	X
Social support		X		X	X
Program Feasibility				X	

Figure 2. Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) figure

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SPIRIT 2013 Checklist: Recommended items to address in a clinical trial protocol and related documents*

Section/item	Item No	Description	Addressed on page number
Administrative information			
Title	1	Descriptive title identifying the study design, population, interventions, and, if applicable, trial acronym	1
Trial registration	2a	Trial identifier and registry name. If not yet registered, name of intended registry	4
	2b	All items from the World Health Organization Trial Registration Data Set	n/a
Protocol version	3	Date and version identifier	7-8
Funding	4	Sources and types of financial, material, and other support	25
Roles and responsibilities	5a	Names, affiliations, and roles of protocol contributors	1 & 25
	5b	Name and contact information for the trial sponsor	1
	5c	Role of study sponsor and funders, if any, in study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication, including whether they will have ultimate authority over any of these activities	25
	5d	Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee)	n/a

Introduction			
Background and rationale	6a	Description of research question and justification for undertaking the trial, including summary of relevant studies (published and unpublished) examining benefits and harms for each intervention	_____5-7_____
	6b	Explanation for choice of comparators	____5-7_____
Objectives	7	Specific objectives or hypotheses	_____7_____
Trial design	8	Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group), allocation ratio, and framework (eg, superiority, equivalence, noninferiority, exploratory)	____7-8_____
Methods: Participants, interventions, and outcomes			
Study setting	9	Description of study settings (eg, community clinic, academic hospital) and list of countries where data will be collected. Reference to where list of study sites can be obtained	_____7, Fig 1&2_
Eligibility criteria	10	Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and individuals who will perform the interventions (eg, surgeons, psychotherapists)	_____8-9___
Interventions	11a	Interventions for each group with sufficient detail to allow replication, including how and when they will be administered	__9-13, Table 1
	11b	Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose change in response to harms, participant request, or improving/worsening disease)	__22_____
	11c	Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence (eg, drug tablet return, laboratory tests)	___9-11_____
	11d	Relevant concomitant care and interventions that are permitted or prohibited during the trial	__n/a_____
Outcomes	12	Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg, median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen efficacy and harm outcomes is strongly recommended	__13-19, Table 2
Participant timeline	13	Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for participants. A schematic diagram is highly recommended (see Figure)	_Fig 2, Table 2__

Sample size	14	Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations	__ 8, 20___
Recruitment	15	Strategies for achieving adequate participant enrolment to reach target sample size	__8-9_____
Methods: Assignment of interventions (for controlled trials)			
Allocation:			
Sequence generation	16a	Method of generating the allocation sequence (eg, computer-generated random numbers), and list of any factors for stratification. To reduce predictability of a random sequence, details of any planned restriction (eg, blocking) should be provided in a separate document that is unavailable to those who enrol participants or assign interventions	__n/a_____
Allocation concealment mechanism	16b	Mechanism of implementing the allocation sequence (eg, central telephone; sequentially numbered, opaque, sealed envelopes), describing any steps to conceal the sequence until interventions are assigned	__n/a_____
Implementation	16c	Who will generate the allocation sequence, who will enrol participants, and who will assign participants to interventions	_____n/a_____
Blinding (masking)	17a	Who will be blinded after assignment to interventions (eg, trial participants, care providers, outcome assessors, data analysts), and how	__n/a_____
	17b	If blinded, circumstances under which unblinding is permissible, and procedure for revealing a participant's allocated intervention during the trial	__n/a_____
Methods: Data collection, management, and analysis			
Data collection methods	18a	Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (eg, duplicate measurements, training of assessors) and a description of study instruments (eg, questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol	_13-19, Table 2_
	18b	Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols	____19-20_____

Data management	19	Plans for data entry, coding, security, and storage, including any related processes to promote data quality (eg, double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol	__21_____
Statistical methods	20a	Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol	__20_____
	20b	Methods for any additional analyses (eg, subgroup and adjusted analyses)	__20_____
	20c	Definition of analysis population relating to protocol non-adherence (eg, as randomised analysis), and any statistical methods to handle missing data (eg, multiple imputation)	___20_____
Methods: Monitoring			
Data monitoring	21a	Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the protocol. Alternatively, an explanation of why a DMC is not needed	____21_____
	21b	Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial	__n/a_____
Harms	22	Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct	___n/a_____
Auditing	23	Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor	__n/a_____
Ethics and dissemination			
Research ethics approval	24	Plans for seeking research ethics committee/institutional review board (REC/IRB) approval	__22_____
Protocol amendments	25	Plans for communicating important protocol modifications (eg, changes to eligibility criteria, outcomes, analyses) to relevant parties (eg, investigators, REC/IRBs, trial participants, trial registries, journals, regulators)	__n/a_____

Consent or assent	26a	Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32)	_22_____
	26b	Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable	__n/a_____
Confidentiality	27	How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial	____22_____
Declaration of interests	28	Financial and other competing interests for principal investigators for the overall trial and each study site	___26_____
Access to data	29	Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators	____26_____
Ancillary and post-trial care	30	Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation	_____n/a_____
Dissemination policy	31a	Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (eg, via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions	____22_____
	31b	Authorship eligibility guidelines and any intended use of professional writers	___n/a_____
	31c	Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code	__26_____
Appendices			
Informed consent materials	32	Model consent form and other related documentation given to participants and authorised surrogates	_supplementary file 2
Biological specimens	33	Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable	_____n/a_____

*It is strongly recommended that this checklist be read in conjunction with the SPIRIT 2013 Explanation & Elaboration for important clarification on the items. Amendments to the protocol should be tracked and dated. The SPIRIT checklist is copyrighted by the SPIRIT Group under the Creative Commons "Attribution-NonCommercial-NoDerivs 3.0 Unported" license.

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Consent Form

Title: HAT TRICK: Examining the feasibility of a gender-sensitive intervention focused on physical activity, healthy eating and connectedness in male hockey fans

Lead Investigators:
Dr. Cristina Caperchione, School of Health and Exercise Sciences, University of British Columbia, Kelowna 250 807 9679

Co-Investigators:
Dr. Joan Bottorff, Inst. For Healthy Living and Chronic Disease Prevention, University of British Columbia, Kelowna 250 807 8627
Dr. John Oliffe, School of Nursing, University of British Columbia, Vancouver 604 822-7638

Dr. Steven Johnson, Centre for Nursing and Health Studies, Athabasca University, Athabasca 877 848-6903
Dr. Kate Hunt, School of Public Health Sciences Unit, University of Glasgow, Glasgow 0 141 353-7552
Paul Sharp, School of Health and Exercise Sciences, University of British Columbia, Kelowna 250-807-9979

Funding
This study is funded by the Canadian Cancer Society Research Institute.

Purpose of the study
The purpose of this research is to evaluate the feasibility of the HAT TRICK Program, a program targeting physical activity, healthy eating and connectedness in men living in Kelowna, BC. The intervention will be delivered in connection with the Kelowna Rockets Hockey team.

Eligibility
You are being invited to voluntarily take part in this study because you are a man over the age of 35 years, residing in the Okanagan Region, who accumulates less than 150 minutes of moderate to vigorous physical activity a week, who has a Body Mass Index (BMI) greater than 25kg/m^2, and a pant size greater than 38".

Study Procedures
As a participant of this research project you will be invited to participate in twelve 90-minute weekly sessions, provide feedback on aspects of the program, and complete three assessment periods (baseline, 12-week, and 9-month follow-up). Weekly sessions will include a physical activity component, nutrition component, and behavior change component. Participants will be encouraged to make gradual changes to their lifestyle with the goal of improving overall health and well-being. Throughout the program, presentations will be given from local health professionals (e.g., nutritionist, fitness trainer), Kelowna Rockets staff and players, as well as other community personalities.

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Assessment sessions will be held at a convenient location. These assessment periods will last up to 1.5 hours. At these assessment periods, you will be asked to complete a brief questionnaires about your; physical activity and dietary behaviours, social relatedness, general health and well-being questions as well as general demographic information (e.g., age, education, marital status). During these times you will also be given an accelerometer and instructions on how to use the accelerometer. Accelerometers are a device for measuring your daily physical activity. It is a small, non-invasive device which is worn around your chest. You will be asked to wear this accelerometer for 7 consecutive days during all waking hours. You will also be asked to return the accelerometers to the research team after these 7 days. Return instructions will be provided to you when you receive your accelerometer.

Following the completion of the program you may also be asked commit an additional 1 hour of your time to participate in a semi-structured telephone interview with a member of the research team. If you are selected, a member of the research team will contact you to arrange a time that is convenient for you to conduct the interview. All telephone interviews will be audio recorded with your consent. During this interview we hope to hear about your thoughts, opinions and perceptions about the HAT TRICK Program and provide general comments about how you think the HAT TRICK Program could be improved.

Potential Risks and Benefits

The HAT TRICK program and data collection procedures involve no foreseeable risks or harm to you. However, you will be asked to work towards meeting the minimum recommended Canadian Physical Activity Guidelines (150minutes per week in bouts of 10 minutes or more) and depending on your initial activity levels, you will be encouraged to safely increase your physical activity levels throughout the project. Becoming physically active and progressively increasing your physical activity may potentially include some risk of injury, such as common muscle soreness or strains associated with being physically active. To limit any concerns you may have regarding these minor injuries, information about reducing this risk of injury, such as education about stretching and starting off slowly and building up your physical activity levels will be provided during the weekly sessions. Although no benefits can be guaranteed, potential benefits that may occur include; improvements in overall physical and mental health as a result of increasing your physical activity levels, improved understandings about the benefits of physical activity and other healthy lifestyle behaviours (i.e., healthy eating, stress management), increased social interaction and support.

Confidentiality

Your confidentially will be respected at all times. Only research team members and research staff will have access to data collected in this study. All documents will only be identified by a code number and kept in a locked filing cabinet and/or secure password protected system. Participants will not be identified by name in any reports or materials associated with this research. Paper copies and electronic audio files will be kept for 7 years in the Physical Health and Activity Behaviour Laboratory at UBC Okanagan. All participants taking part in the sessions will sign the confidentiality agreement at the bottom of this consent form; however, we cannot control what the other participants do with the information discussed. Findings from the study may be shared through conference presentations, articles for publication, and other media outlets. An electronic or print copy of the research report will be available to you on request.

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Contact for information about the study

If you have any questions or would like additional information, please contact Dr. Cristina Caperchione at 250-807-9679.

Contact for concerns about the rights of research participants

If you have any concerns about your treatment or rights as a research participant and/or your experiences while participating in this study you may contact the Research Participant Complaint Line in the UBC Office of Research Services at 1-877-822-8598 or the UBC Okanagan Research Services Office at 250-807-8832. It is also possible to contact the Research Participant Complaint Line by email (RSIL@ors.ubc.ca).

Consent

Your participation is entirely voluntary. You may refuse to participate or withdraw at any time without penalty or consequence. If you choose to participate and then decide to withdraw at a later time, you have the right to request the withdrawal of your information collected during the study. This request will be respected to the extent possible.

By signing this consent form, you are agreeing to participate in all study protocols. By signing this consent form you are acknowledging that you have received a signed copy of the consent form for your records. By signing this consent form, you do not waive any of your legal rights.

Consent

I have read and understood the information on this consent form and voluntarily consent to participate in this study. I have had a chance to ask questions about the study and my involvement in it and have received a copy of the consent form.

_____	_____	_____
Participant's Name (please print)	Participant's Signature	Date

Confidentiality Agreement

I agree to respect the confidentiality of all program participants. This means I will not discuss participants' personal information with anyone outside of this program.

_____	_____	_____
Participant's Name (please print)	Participant's Signature	Date

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Contact for a Follow-up Interview

Upon completion of the program, would you be interested in taking part in a 1-hour semi-structured telephone interview with a member of the research team regarding your thoughts, opinions, and perceptions of the HAT TRICK Program?

☐Yes, I would be interested in taking part in a telephone interview.

☐No, I would not be interested in taking part in a telephone interview.

_____ _____ _____
Participant's Name (please print) Participant's Signature Date

_____ _____
Telephone Number Email Address

Contact for Future Studies

Would you like to be contacted in the future about other studies?

☐Yes, I would like to receive information about future studies on men's health and physical activity.

☐No, I would not like to receive information about future studies.

_____ _____ _____
Participant's Name (please print) Participant's Signature Date