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Preferred Features of E-Mental Health Programs for Prevention of Major Depression in Male Workers: Results from a Canadian National Survey

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Abstract

The purpose of this study was to estimate and compare the proportions of preferred design features and likely use of e-mental health programs and understand potential barriers to the use of e-mental health programs in working men who were at high risk of a major depressive episode. A cross-sectional survey in 10 provinces in Canada was conducted between March and December 2015 (n = 511). Of the 17 different features assessed, the top three features that were most likely to be used by high-risk men were: "information about improving sleep hygiene" (61.3%), "practice and exercise to help reduce symptoms of stress and depression" (59.5%) and "having access to quality information and resources about work stress issues" (57.8%). E-mental health programs may be a promising strategy for prevention of depression in working men. Development of e-mental health programs should consider men's preferences and perceived barriers to enhance the acceptability of this approach.

Keywords:

Mental Health Services; Program Development; Depressive Disorder, Major

Introduction

Major depression is a prevalent mental disorder. In Canada, the annual prevalence of major depressive disorder was 3.9% based on the DSM-IV criteria [1]; in the United States, the 12-month prevalence was 6.6% [2]. Major depression is also disabling and significantly affects workers' health and productivity. Depression alone accounts for 2.5% of the global burden of disease and is among the largest single causes of disability worldwide (8.2% of all years lived with disability globally) [3]. US workers with depression cost an estimated US $44.01 billion per year in lost productivity [4]. Epidemiological studies have consistently found that women are more likely to have major depression than men. However, men are not immune to depression. Canadian national data showed that annually, 2.8% of adult men have a major depressive disorder [1]. One of the severe consequences of having a major depressive episode (MDE) is suicide. Canadian national data showed that 75%-80% of all suicides were male [5, 6].

Given the considerable impact on health, productivity and lives, there is a pressing need for innovation in the prevention of major depression in male workers. However, this is a challenging endeavor. In the workplace, risk factors for having MDE differ for men and women [7-9]. For instance, job strain, family to work conflict and job insecurity appear to be more prominent MDE risk factors in men than in women [7, 8]. Compounding men's risk, men are less likely than women to seek help and to disclose depressive symptoms and often delay seeking help until symptoms become severe. Men tend to be socialized to be emotionally stoic and exemplify traditional masculine characteristics such as independence, self-reliance, and dominance [10]. Men are concerned over the perceived negative judgments from family, friends, and co-workers if they access treatment for depression. These gender-specific experiences together with a limited knowledge base about effective interventions call for innovative solutions tailored for men. One of the burgeoning solutions that have attracted considerable interests is e-mental health.

E-mental health is "the use of information and communication technologies to support and improve mental health, including the use of online resources, social media and smartphone applications" [11]. E-mental health self-help services enable users to learn more about their mental health conditions and empower users to strengthen their self-management and improve their health. The majority of e-mental health treatment programs were developed based on the models of cognitive behavioral therapy (CBT) or interpersonal therapy (IPT) that demonstrate evidence of effectiveness for depression and anxiety [12]. A review by Christensen and Petrie showed that by 2013 there had been 62 web-based mental health interventions and 11 mobile applications [13]. Lal and Adair found 91 peer-reviewed publications on the application of e-mental health interventions between 2000 and 2010. Thus far, randomized controlled trials of e-mental health interventions on depression have been conducted with samples of individuals who have clinical depression or are above a threshold of a depression rating scale [14]. Consistent with public health mandates to reduce the burden of depression, it is important that e-mental health not only addresses needs of those with depression or who are above a depression rating threshold, but also advances capacity for secondary prevention [15], i.e., identifying high-risk individuals and intervening to prevent early symptoms from progressing into an MDE. Additionally, existing e-mental health programs have not been designed and evaluated using a gender lens. Given the gender norms, the extent to which e-mental health programs are accepted by men is unknown. The effectiveness of the program and its acceptability to users constitute the foundation for scalable and sustainable program implementation. Therefore, as part of the BroMatters study (www.bromatters.ca), we conducted a cross-sectional survey in working men, some of whom were at high risk of MDE, to understand their preference of design features of e-mental health programs.

The objectives of this analysis were, amongst male workers who were at variable risk levels of MDE, to 1) estimate and compare the proportions of Internet use for medical information, preferred design features and likely use of e-mental health programs, 2) examine factors associated with the likely use of e-mental health programs, and 3) understand potential barriers to the use of e-mental health programs in working men who were at high risk of MDE.

Methods

A cross-sectional survey was conducted between March and December 2015. The target population of the survey included Canadian working men who: 1) were aged 18+, 2) did not have an MDE in the past 12 months, 3) were at high risk of MDE at the time of interview (a low-risk sample was also obtained for comparison), 4) were working at the time of the survey, and 5) have no language barriers to either English or French. Because of the vast geographic area of Canada, participants were recruited using random digit dialing method by Bureau of Professional Interviewers (BIP) located in Montreal Canada. The BIP has the access to household telephone numbers across the country and to a validated cell phone number database, and its interviewers can conduct interviews in both English and French. The study was approved by the Conjoint Health Research Ethics Review Board of University of Calgary.

Once a household was reached, the household contact was asked to retrieve, or provide contact information (e.g. a first name) of the household residents who are men and are currently working. If there was more than one potentially eligible individual in the same household, one was randomly selected. Once the prospective participant was fully informed about the objectives and procedures of the study, oral consent was obtained to proceed with the interview. Participants were first administered a risk calculator for MDE to estimate their probability of having MDE in the future. The definition of high-risk is described below. The number of high risk participants in each age group was proportional to the age distribution of Canadian male working population in 2014, provided by Statistics Canada.

From March to December 2015, 49,500 calls were made. A majority of the calls (47,648, 96.2%) were not valid (not in service, fax/modem, answering machine, language barriers, ineligibility, duplications, refusal before eligibility was assessed). Among 1852 eligible participants, 596 (32.1%) refused to participate after verifying eligibility; 842 provided completed data (45.4%); the remaining included incomplete interviews and scheduled call-backs not in the study period (22.5%). After removing one duplication, 841 participants were included in the analysis, including 511 men who were at high risk of having major depression and 330 who were at low risk of having major depression.

Measurements

A multivariable risk prediction algorithm for major depression in men was administered to estimate the risk (probability) of having MDE in the next 4 years for each participant [16]. This risk prediction model was designed to be used in individuals who do not have an MDE. Based on participant's exposure to a key set of risk factors (predictors) in the model, the algorithm can generate the absolute risk/probability of having MDE in the next 4 years, analogous to the Framingham risk prediction algorithm for coronary heart disease [17, 18]. The risk prediction algorithm for MDE in men was developed and validated using data from 4737 Canadian men who were aged 18+ years and who did not have MDE in the past 12 months [16]. The risk prediction algorithm contains 15 predictors including age, personal and family history of MDE, childhood trauma, ongoing stress and life events, and anti-depressant or sleeping pill use in the past month. The predictive power of the risk prediction algorithm was measured by C statistics (C = 0.7953) [16] which is equivalent with area under the curve when the outcome is binary. The model had excellent calibration with data as indicated by the Hosmer-Lemeshow test and visual comparison between the predicted and observed risks by decile risk groups [16]. In our study, 6.51+% were defined as high risk for men, which represents the top two decile risk groups in the Canadian male population. The predicted risk that was lower than 6.51% was defined as low risk.

Internet use was assessed using questions from the 2012 Canadian Internet Use Survey conducted by Statistics Canada.

Preferred design features of e-mental health program questions were developed by the BroMatters team members. Participants were asked "We want to hear your opinion about e-mental health programs for dealing with work and stress issues. E-health is defined as …… For the following features, please indicate how likely it is that you would use them." Seventeen questions about design features were asked. For each question, participants answered on a 5-point Likert scale ranging from: very likely to very unlikely. Open-ended questions were asked about any other features they may want in an e-mental health program, whether the participant and his male co-workers may use an e-mental health program to deal with work stress, and what make it difficult to use an e-mental health program.

Ineligible participants, administering the questions and instruments took an average of 22 minutes to complete. Participants who completed the survey received a CAN $20 gift card as a token of appreciation.

Statistical analysis

The background characteristics and proportions of likely use of design features were estimated and compared in men who were at high or low-risk levels of having MDE, using Chi square test. In men who were at high-risk of having MDE, the percentages were also estimated and compared by age groups and by language used in the interview (English vs. French), using Chi-square test. All analyses were conducted using the statistical program STATA 14.0 [16]. Tests were considered statistically significant when p was < 0.05. With this level of probability and a sample size of 841, the study had a level of statistical power of 0.89 to detect a small effect size (Cohen's d) of 0.20.

Results

A majority of the participants reported use of Internet for personal reasons in the past 12 months, with the proportion (95.7%) in the high risk men slightly higher than that in the low risk men (92.4%). The two groups did not differ in Internet use for searching medical information and in perceived usefulness of the Internet information in making decisions about health. However, high risk men (83.4%) were more likely to have reported that it was important to access health resources on the Internet than low risk men (75.0%).

Participants rated their level of interest in possible use of 17 different features that can be incorporated into the design of e-

mental health programs. We ranked the preferred design features of e-mental health program in descending order. The top three features that were identified by high-risk men as things they would likely to use were: "*information about improving sleep hygiene*", "*practice and exercise to help reduce symptoms of stress and depression*" and "*having access to quality information and resources about work stress issues*". The proportions of individuals endorsing the selected design features in the high-risk group were significantly higher than those in the low-risk group, except for the feature of "*information about improving sleep hygiene*".

We estimated and compared the proportions of preferred design features by age groups and languages used in the interview in men who were at high risk of MDE. The data showed that, compared to older participants (aged 65+ years old), younger participants preferred access to a program through smartphone or mobile applications and that the information be delivered in game format. Middle aged men (aged 30 to 64 years old) had a preference for receiving printed materials. The preferences for other design features did not vary by age.

English-speaking participants were more likely to use "practice & exercise to reduce stress", "access a program via smartphone or an app.", and "being able to ask questions and receive answers from mental health professionals" than French-speaking men; French-speaking men were more likely to use "being able to chart and track your mood" than English-speaking participants.

A majority of participants considered our survey questions about preferred design features to be comprehensive and did not have other features to add. For the open-ended questions, some participants suggested that, in addition to the design features encompassed in the survey, other valuable features of e-mental health programs may include: easy to use (e.g., "*online information in a format that's simple to use*."), confidentiality (e.g., "*Privacy, somehow to ensure privacy*"), credibility (e.g., "*having access to, to reliable information that's important to me*") and direct link to a professional (e.g., "*like some kind of call in line. Like a hotline ……. where you could access a live expert….. something personal*"). (Note: *italics* denote direct quotes.)

Among the participants, 69.0% reported "yes" or "maybe" to potentially using an e-mental health program to deal with work stress. The percentage was higher in the high-risk group (72.6%), those in the levels of higher education and personal income, younger age groups, and those working in mid and large companies, compared with their counterparts. No differences were found by language, marital status and employment status (employee vs. self-employed). High MDE risk participants who reported that they would not use an e-mental health program for dealing with stress were asked: "what would make it difficult to use an e-health program?" The reported barriers included perceived stigma associated with accessing e-mental health support (e.g., "*…social stigma, comfort of access*", "*….workplace ignorance and what do they call that where you stereotype* ..."), lack of personal interaction inherent to e-mental health (e.g., "*lack of personal face to face", "… don't see the value of it if you could talk to your family doctor…"*), lack of time (e.g., "*…if it was time consuming*…"), and lack of knowledge (e.g., "*Well the fact that I don't know what an e-health program is, makes it difficult. I'm not sure that (laughs)*"). (Note: *italics* denote direct quotes).

Discussion

This study is descriptive in nature as the results were used for guiding the development of e-mental health program. One key finding of this study was that 62.7% participants who were at high risk of having MDE had used the Internet for health information in the 12 months prior to the survey. This percent is slightly higher than a similar estimate from the 2012 Canadian Internet Use survey, in which 60.8% men reported use of Internet for medical or health related information [20]. Furthermore, over 75% of high MDE risk men in our sample considered health information on the Internet to be useful in helping them make health decisions and over 72% would use an e-mental health program to deal with work-related stress. Given that men often delay help-seeking for mental health problems because of perceived stigma and gender norms, our results suggest that the privacy inherent to e-mental health programs make e-mental health programs be a promising tool for improving men's mental health.

Acceptability of a tool is vital to the evaluation of its effectiveness and implementation. Therefore, to develop e-mental health programs for men, it is critical to understand their preferred design features. It is interesting to observe, in our survey, that "*information about improving sleep hygiene*" was the top design feature preferred by men, irrespective of their risk status. Individuals who are at high risk of MDE may be occupied by unhelpful thinking and look for strategies to solve the issues they encounter. Thus, it is not surprising that the second top feature they endorsed was "*practice and exercise to help reduce symptoms of stress and depression*" which is consistent with the principles of CBT, e.g., changing unhelpful thinking and behaviors, and problem-solving focused. We anticipated that CBT practices and educational information ("*having access to quality information and resources about work stress issues*") would be needed by the participants and this was demonstrated in this study. This also is consistent with the fact that most of the existing e-mental health programs (such as MoodGYM [21]) were developed based on the CBT approach [22]. We found that men who were at high risk of having MDE were more likely to have endorsed the design features than men who were at low risk. No age differences were found in preferred design features. English- speaking participants were more likely to use CBT techniques and an app and French-speaking participants were more likely to use mood monitoring tools. These results indicate that e-mental health programs incorporating these preferred features are likely to be used by men who are at high risk of MDE across age and English/French speaking categories.

Comparison with Prior Work

An understanding of barriers to the use of e-mental health programs is also important for the development, evaluation and implementation of the programs. Some features preferred by the participants reflect the concerns they have about e-mental health programs and potential barriers to the use. Based on the quantitative and qualitative data, confidentiality and privacy protection are the prominent concerns for high-risk participants. They were concerned about the consequences if others know that they use the program to deal with stress related issues (e.g., perceived stigma). Other barriers include the extent to which the program is easy to use and navigate, credible (e.g., information is provided by health professionals), relevant to one's personal situation, and interactive (e.g., being able to communicate with a

professional). Additionally, lack of time and knowledge about e-health are potential barriers reported by the participants. Schneider and colleagues investigated users' views of an online CBT program (MoodGYM) in a randomized controlled trial [23]. Wetterlin et al.'s cross-sectional study examined youth expectations for mental health websites [24]. Both studies reported preferences and perceived barriers that are consistent with the results of our survey.

Our study has several limitations. First, the survey data relied on self-report. Therefore, reporting and recall biases are possible. Second, our target population is Canadian working men who were aged 18 and older. Compared to men in the Canadian workforce in 2014, our sample was slightly older. The proportion of our participants aged 18 to 29 was 12.1%, while it was 20.2% in the Canadian workforce. Therefore, the proportions of some design features by age groups could have been over or underestimated due to potential selection bias. Given the increasing use of cell phones in young adults, future studies may investigate strategies for recruiting young adults through cell phones. Finally, our survey collected self-reported qualitative information about barriers to the use of e-mental health programs. The qualitative information should be considered preliminary. More studies are needed to provide definitive answers.

Conclusions

There is a pressing need for developing innovative strategies for prevention of depression in men. This is a challenging endeavor because of the gender norms and social stigma against depression and help-seeking among men. E-mental health holds potential as it can be confidential, easily accessible and economic if it is appropriately designed. However, the design of e-mental health solutions should consider the sex and age differences in terms of preferred features. More studies are needed to examine preferred design features and the barriers to use in different populations so that e-mental health strategies that meet the needs of different age groups and personal background can be developed.

Acknowledgements

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