THE JOURNAL OF CONCURRENT DISORDERS

CDS PRESS

Open Access Case Study/Pilot

Case study of A Pilot Online Treatment Service for Problem Gambling

Nigel E. Turner, PhD[1,2,12*], Sherald Sanchez, MSc[1,3], Farah Jindani, MSW/PhD[1,4], Jing Shi, OT Reg. (Ont.)/PhD[1], Negar Sadeghi, MA[5], Mark van der Maas, PhD[1,6], Sylvia Hagopian, MEd[5], Dan De Figueiredo[5], Carolynne Cooper[5], Doriann Shapiro[5, 7], Robert Murray, MSW/CCAC[5], David C. Hodgins, PhD R.Psych[8], Danella Lobo, MD/PhD[9, 10], Tara Elton-Marshall, PhD[1, 11]

Citation: Turner, N.E.., Sanchez, S., Jindani, F., Shi, J., Sadeghi, N., van der Maas, M., Hagopian, S., De Figueiredo, D., Cooper, C., Shapiro, D., Murray, R., Hodgins, D.C., Lobo, D., Elton-Marshall, T. (2023). Case study of A Pilot Online Treatment Service for Problem Gambling. Journal of Concurrent Disorders.

Founding Editor-in-Chief: Masood Zangeneh, Ph.D.

Editor: Fayez Mahamid, Ph.D.

Received: 12/18/2022
Accepted: 01/26/2023
Published: 02/06/2023

[1]Institute for Mental Health Policy Research and Campbell Family Mental Health Research, Centre for Addiction and Mental Health, Toronto, Ontario, Canada
[2]Dalla Lana School of Public Health, University of Toronto, Ontario, Canada
[3]Institute of Medical Science, Temerty Faculty of Medicine, University of Toronto, Canada
[4]Seneca College, Canada
[5]Problem Gambling & Technology Use Treatment Service, Centre for Addiction and Mental Health, Toronto, Ontario, Canada
[6]Center for Gambling Studies, School of Social Work, Rutgers, The State University of New Jersey, USA
[7]George Brown College, Canada
[8] University of Calgary, Canada
[9] Addictions Research, Centre for Addiction and Mental Health, Toronto, Ontario, Canada
[10]Department of Psychiatry, University of Toronto, Canada
[11]University of Ottawa, Canada
[12]ORCiD 0000-0002-1035-2064
*Corresponding author: Nigel E. Turner, nigel.turner@camh.ca

Abstract. *Objective*: Most people with gambling-related problems do not seek treatment. Possible barriers to seeking treatment include stigma, travel distance, and competing obligations (e.g., childcare). Online group therapy may help reduce some of these barriers. *Method*: The current paper presents a small case study to assess the feasibility of an 8-week online group therapy program. This program called Skills for Change Online was designed as an introduction to treatment using a cognitive behavior therapy approach. It includes teaching coping skills, mindfulness, dealing with erroneous beliefs and emotions. Sixteen people consented to participate in the study, three were included in the group, but only two participants completed the treatment. The group was evaluated using a longitudinal case study design (pre-test, post-test, with a 1-year follow-up). In addition, 8 waitlist controls completed the follow-up up survey. Measures included the Problem Gambling Screening Index (PGSI), Mindfulness Attention Awareness Scale (MAAS), Random Events Knowledge Test (REKT), Perceived Social Support (PSS), Kessler Psychological Distress Scale (K6), and Quality of Life (QLI). *Results*: Both participants reported increases in their MAAS (d =.56), and REKT scores (d =1.06), and decreases in problem gambling, and gambling craving (d =-0.30) after treatment. In addition, both participants had clinically significant decreases in PGSI scores dropping from a severe problem gambling to a moderate level of gambling problems. These positive outcomes were sustained according to a 12-month follow-up survey. Participants provided feedback during treatment, that the treatment services were helpful but also discussed technological challenges involved in online group therapy. A group of participants who were not included in the treatment showed less overall improvement in gambling, mindfulness based on the MAAS and knowledge of random chance based on the REKT. *Conclusion*: The results are encouraging. However, the sample is very small and there is a need for further research with larger samples and randomized controlled designs. The difficulties of running on-line groups are discussed.

Keywords: Problem Gambling, Online, Treatment, Random Events Knowledge Test, Mindfulness Attention Awareness Scale, Quality of Life.

Introduction

Most people who experience problem gambling do not seek treatment. Only 6% of respondents in a survey reported feeling a need to seek treatment even though 56% had some degree of risk for problem gambling (Håkansson & Widinghoff, 2020). Although there are treatment services available across the province of Ontario, Canada, studies have shown that there are many barriers to treatment for people with gambling problems (Boughton & Brewster, 2002; Boughton, Jindani, & Turner, 2016, 2017). Barriers include lack of daycare, shift work, long-distance travel, mobility and sensory disabilities, and financial constraints (Oakes, Battersby, Pols, & Cromarty, 2008; Lee & Awosoga, 2015; Castren & Lahti, 2014; McKinley & Wright, 2012). Likewise, stigma, embarrassment, and shame may deter people from seeking treatment services (Boughton & Brewster, 2002; Cooper, 2004; Sanchez et al., 2019). These barriers are contributing factors to the lack of treatment seeking for people who experience problem gambling.

Online treatment services could potentially mitigate the barriers to accessing treatment experienced by many people with gambling problems (Boughton & Brewster, 2002; Boughton, Jindani, & Turner, 2016; Boughton, Jindani, & Turner, 2017). Online treatment could also increase accessibility for treatment during unanticipated events, such as the COVID-19 pandemic. In order to help addictions counsellors, utilize remote treatment, there is a need to understand best practices for remote healthcare and ensure that healthcare workers are well-trained and proficient in utilizing the technology, have adequate technology, and proper technological support (Sanchez et al., 2019; Torous et al., 2020; van der Maas et al., 2019). This research became particularly relevant during the COVID-19 pandemic which led to unprecedented changes including shutdowns (Walker et al., 2020), economic disruptions, hospitalizations, deaths (Walker et al., 2020), increases in mental distress (Soklaridis, Lin, Lalani, et al., 2020; Turner, 2020), and the potential to increase engagement in addictive behaviors (Håkansson et al., 2020).

There were only twenty-seven studies found on the use of internet services to provide problem gambling treatment in a scoping review (van der Maas et al., 2019). Online counselling was identified in several studies with one-on-one counseling with a trained therapist being the most common form of counseling (Dowling et al,. 2014; Oakes et al,. 2008; Rodda et al., 2015). Counseling methods included: text, video, and voice chats, as well as moderated discussion groups. Cognitive behavioral therapy and/or motivational interviewing were common frameworks used (Boughton et al, 2016; Canale et al., 2016; Casey et al., 2017). Other studies provided automated help in the form of personalized normative feedback, including three that explored treatment using video chat (Boughton et al., 2016; Oakes et al., 2008; Wood & Griffiths, 2007). Among the few studies that have been conducted, it appears that online treatment for gambling is a promising new area. Subsequent studies have generally followed along those same lines

including normative feedback studies (Cunningham, et al., 2020; Brazeau et al., 2021), Cognitive behavioral therapy with email or text-based support (Nilsson et al., 2020), remote therapy with telephone and internet support (Erevik et al., 2020), and mobile self-help applications (Bartel et al., 2020). In addition, three more literature reviews have been published on the topic (Blank et al., 2021; Rodda, 2021; Sagoe et al., 2021). These studies suggest that there is an increasing number of efforts to use the internet for therapeutic purposes for problem gambling, however, the limited number of studies highlight a significant lost opportunity to leverage technology to prevent or reduce gambling harm (Rodda, 2021). In addition, very few studies have examined the feasibility of full online interactive group therapy. Boughton et al. (2016) employed webinars with clients, but not interactive group therapy. In contrast, a small survey of counsellors in Ontario (Turner, 2021; Turner et al., 2022) found that most 56% were conducting therapy over the internet using video chat, and 31% were conducting group therapy using video chat functions.

A recent focus group study with clients who experience problem gambling reported that clients had a strong preference for internet-based services conducted by therapists, rather than using self-help resources (Sanchez et al., 2019). The client focus groups provided rich insight into the nature of the barriers they experienced or were currently experiencing in accessing professional help and suggested a strong desire for online treatment (Sanchez et al., 2019). Sanchez et al. (2019) also conducted focus groups with clinicians who similarly discussed how online treatment could help reduce the barriers experienced by clients. However, clinicians were concerned about the loss of body language as cues to understand the clients' mental health (Sanchez et al., 2019).

In addition to these background resources, we collected feedback from researchers, clinicians, and other stakeholders who had either been involved with previous delivery of treatment services over the internet or had expertise in other aspects of treatment service delivery such as management, legal requirements, privacy, or information systems and technology (Turner, 2018). These experts stressed the importance of: (1) organizational capacity to support online group therapy, (2) computer support to be able to deal with difficulties in communication, (3) training and computer literacy for both clients and service providers, and (4) issues related to cyber security. Cyber security issues include protecting client privacy, the need for secure encrypted communication protocols, and ensuring that any data that is retained is housed locally (e.g., within Canada) to ensure confidentiality.

Based on these sources of information, the goal of this study was to explore the feasibility of an online group treatment program for people who experience problem gambling. A pilot project for group therapy over the internet was developed, implemented, and evaluated. The pilot project was evaluated in terms of: (1) interest in the program (number of people who contacted us), (2) comparisons of pre-treatment and post-treatment

outcomes at 12-months, (3) feedback about the program (e.g., what was helpful, what needs to be improved) from the clients and the therapist post-treatment. This study was exploratory, with the goal of determining the feasibility, difficulties and opportunities associated with online group treatment.

Methods

Participants and Recruitment

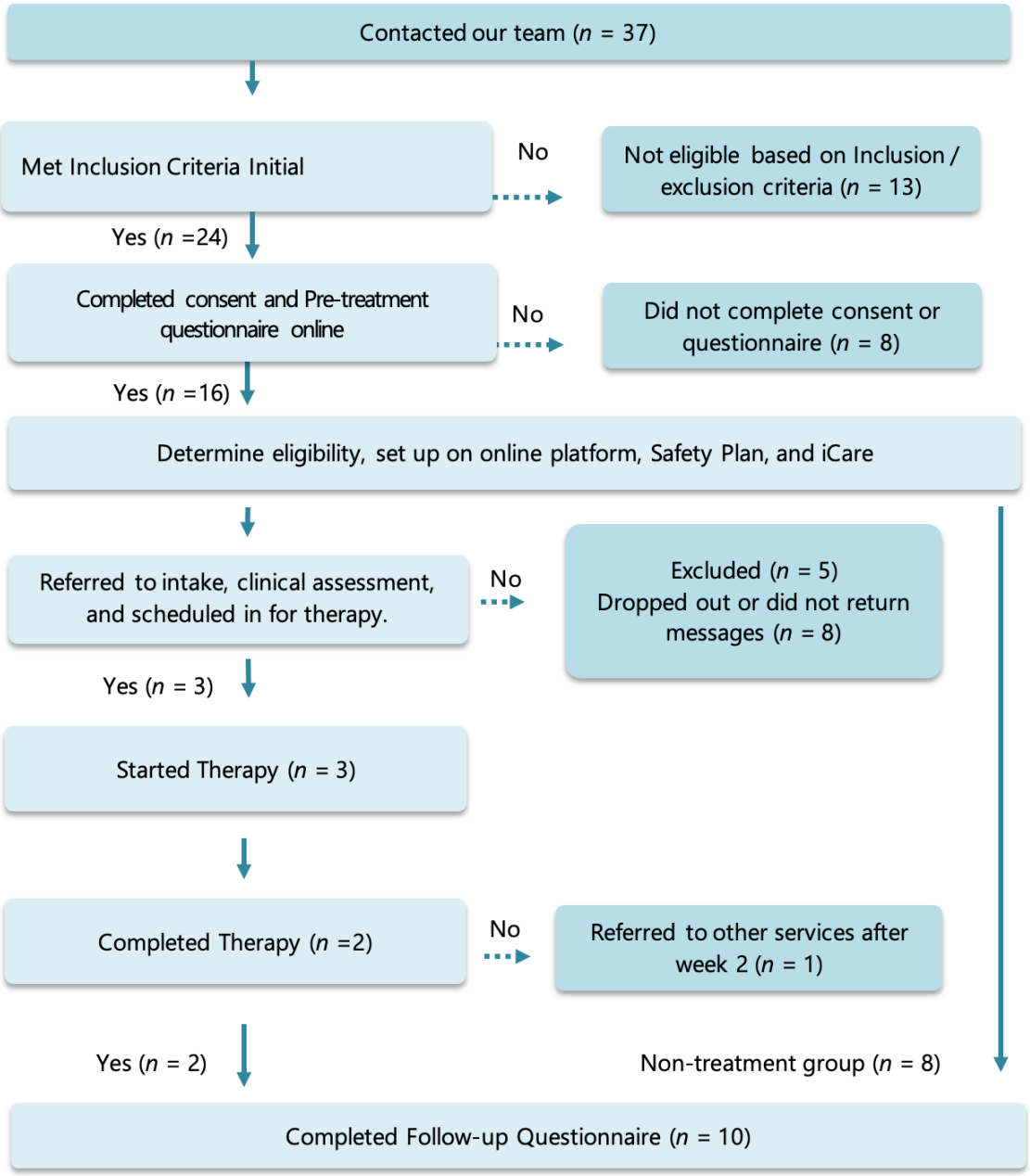
The study protocol was approved by the Research Ethics Board at the Centre for Addiction and Mental Health (CAMH) (Protocol #074/2018). This case study was designed as part of a three-year project including a literature review, focus groups, expert consultations (Turner, 2018), as well as the development and evaluation of the treatment protocol. We originally intended to include up to 100 participants, however, due to limitations in funding, only a single group consisting of two participants was conducted. However, it is felt that this paper provides several insights about the process of running a treatment group online. Participants were eligible if they were ≥ 18 years old, able to communicate in English, were seeking help for a gambling problem, resided in Ontario, had access to a reliable internet connection, felt comfortable using a computer, and were willing to attend weekly sessions for eight consecutive weeks.

Recruitment sources were primarily free social media ads (i.e., Facebook and Twitter accounts) at CAMH and community partners. Individuals who expressed interest in participating via the toll-free number or email account for the study received a follow-up call or email from the research coordinator (SS) to discuss the study in more detail and establish rapport. Those who met inclusion criteria were sent a link to the online survey for the consent form and pre-treatment questionnaire. All participants who clicked yes on the online informed consent form were then asked to complete the pre-treatment questionnaire. After completing the pre-treatment questionnaire, they were booked for a 15-minute video call to check technical requirements, complete CAMH admission forms, complete a safety plan (emergency information in the event of suicidal ideation), and gain familiarity with the online platform prior to the intervention.

From January to March 2019, 37 individuals contacted our phone number and expressed interest in the study — of which, 24 were determined to be eligible and sent a link to the consent form and questionnaires online. A total of 16 participants consented to participate and completed the pre-treatment measures. Of these 16 participants, five were determined to be ineligible after the further assessment that was part of the standard treatment including readiness for the group, willingness to participate in the group, and a suicide plan. Eight participants lost interest or stopped returning messages (see Figure 1). The dropouts were in part due to delays in getting the group sessions started. The group began with three participants, but one was removed and referred to other services, since the therapist felt the person was not ready for group therapy. Thus, the resulting group consisted

of two clients. Both treatment participants completed the post-treatment and a 12-month follow-up. We also collected follow-up data on eight individuals who were not included in the group. The 16 participants who completed the pre-treatment questionnaire received a $50 gift card of their choice as compensation for their time and input in the surveys. The group treatment participants received a $50 gift card as an honorarium for completing the post-treatment questionnaire. In addition, a $50 gift card was sent to the 10 participants who completed the 12-month follow-up questionnaire as an honorarium. The two participants who completed the group were a Caucasian male and a Caucasian female.

Figure 1. Intake workflow for Participants



Design

This pilot case study (Chopard, & Przybylski, 2021) used a longitudinal design to compare before and after outcomes (Bryman & Bell, 2012 pp 40-42). The participants completed a battery of questionnaires before treatment (pre-test), after treatment (post-test), and at a one-year follow-up. In addition, people who had not been through the program were

contacted and asked to complete the survey as a comparison group. The evaluation used quantitative analysis of surveys and post treatment feedback from participant. In addition, people who participated in the assessment were not included in the group were also asked to complete a 12-month follow-up survey as wait list comparison group (Steinert, *et al.,* 2017), however the comparison group were not randomly assigned to the comparison group.

Intervention

The study was a pilot trial of an eight-week internet-based therapist-guided intervention for problem gambling in Ontario, Canada called Skills for Change Online. The treatment protocol and manual for the project were developed based on information obtained from multiple sources, namely a scoping review (van der Maas, et al., 2019), a series of focus groups (Sanchez et al., 2019) and interviews with experts (Turner, et al., 2018), as well as collaborative efforts between the research team, and the management team at our hospital. The manual for the pilot intervention was modeled after an existing problem gambling treatment offered at CAMH, which was adapted for an online delivery consisting of eight weekly sessions lasting 60-90 minutes.

Skills for Change Online is an eight-week treatment program that focuses on developing cognitive behavioral skills that are helpful for clients to regain control of their lives including learning coping skills, understanding emotions, challenging erroneous beliefs, and mindful breathing. The therapy was provided through a secure video-calling platform wherein participants can interact with peers in a closed group facilitated by a CAMH therapist. It is an online version of the multi-phase Skills for Change in-person group program available as part of CAMH's Problem Gambling Treatment Services. The 8-week program covered the following topics: (1) Welcome to Group, (2) Triggers, Urges, and Coping Strategies, (3) Concurrent Disorders, (4) Emotions, (5) Value of Money, (6) Communication, (7) Meaningful Activities, (8) Relapse Prevention. Each session began with a check-in and a mindfulness exercise (e.g., mindful breathing). It is evidence-based, uses a cognitive behavior therapy (CBT) approach, and includes dealing with erroneous beliefs and emotions. Group members worked on activities together as they would in an in-person group. All participants had access to handouts, worksheets, and self-help tools provided by the therapist.

The intervention was conducted through a secure video-calling platform. The vendor was chosen as they had a product that was immediately usable and provided all the functionality needed (i.e., secure two-way document sharing, scheduling appointments, and group video conferencing for up to 15 participants in one session) and met the security requirements as dictated by CAMH Policy (i.e., servers located within Canada). The initial contact and coordination for the study was completed over the phone, and consent to research and assessment was done over the

internet using an online survey. Weekly treatment related questionnaires, workbooks, and feedback questions were transferred using the same secure video-calling platform.

Measures

Participants completed the questionnaires prior to the beginning of the study, at the end of the 8-week treatment program, and one year after completing the treatment program. The participants completed an online survey that included demographics (age, gender, education, ethnic group, and marital status), measures of gambling behavior, gambling problems, and several other psychometric measures as discussed below.

Gambling activities included: Poker, Slot Machines, Video Poker, TapTix, Lottery, Instant Lottery or Scratch Tickets, Racetrack/OTB, Bingo, Sports Betting, and an Other option. The participants were asked to check off which games they had played in the past six-months, and for those games, they were then asked to indicate how often they played the games on a 7-point scale ranging from Never to Every Day. They were also asked about their total spending in the past six months.

Gambling problems were measured using the Problem Gambling Screening Index (PGSI) (Ferris & Wynne, 2001). The PGSI consists of 9 items which are each scored on a 4-point scale (Never, Sometimes, Often, Almost Always) from 0 to 3 (alpha = .77). The total score is the sum of the items. The PGSI is a reliable and valid measure of gambling problems (Ferris & Wynne, 2001; Turner, Stinchfield, McCready, McAvoy, & Ferentzy, 2016; Williams, Volberg, & Stevens, 2012 Williams & Volberg, 2012).

A visual analog scale was used to measure cravings or desire to gamble. The scale is based on similar measures used in drug research (e.g., Duncan, et al., 2001; Berger, et al., 1996). This scale was made up of 5 items: (1) I would like to gamble, (2) I intend to gamble in the near future, (3) Gambling will make me feel better, (4) Gambling will get rid of my discomfort, (5). I feel I can control my gambling. These items were reliable, *alpha* = .81; however, item five had an item total correlation of r =-.01. This item was about self-control and is not correlated to the other items; therefore, it was not used to compute the total cravings score. The resulting *alpha* for 4 Craving of the remaining items was .90.

Several mental health variables were included: the Kessler 6 scale (Galea, et al., 2007) a measure of psychological distress, *alpha* = .82, Quality of Life Inventory (QLI) developed by the World Health Organization (Heun, et al., 2001) *alpha* = .89, Perceived Social Support (PSS) (Zimet et al., 1988). For the PSS we only examined the total social support score, *alpha* = 0.87 to 0.94.

Two other measures tested for specific changes related to aspects of treatment. The Random Events Knowledge Test (REKT) measures erroneous beliefs about random chance (Turner et al., 2006, 2022, *alpha* = .73), and the Mindfulness Attention Awareness Scale (Brown & Ryan,

2003). Each of these measures is a standardized scale. The Mindfulness Attention Awareness Scale (MAAS) scale of mindfulness is negatively related to problem gambling (Brown & Ryan, 2003; Lakey et al., 2007) and has strong internal reliability *alpha*> .9 (Chen et al., 2014). In addition, respondents were asked what leisure activities they engage in and what help resources they have utilized.

These measures were completed at pre-treatment and post-treatment of the pilot intervention, and 12-months after the end of the intervention to measure long-term follow-up.

Data Analysis

A repeated-measures design was used to assess the pilot intervention with data collected before the intervention, after the intervention, and at 12-months post-intervention. The non-treatment group completed the questionnaires twice, before the intervention and 12-months after the intervention.

Given the small sample size, the focus of the analysis was primarily on changes in scores for the two individuals who participated in the treatment. As noted above, an estimated effect size was computed based on the changes in scores from pre-test to post-test and pre-test to follow-up, divided by the standard deviation of the full sample at intake (n = 16) from the pre-treatment data. In addition, for the 12-month follow-up, the treatment group was compared to a non-treatment group (n = 8).

Feedback from our participants

The evaluation also included post treatment feedback to provide additional information from the clients about the treatment program. The purpose of the feedback session was primarily to help us understand the participants' perspectives on the program in terms of what worked and what did not work. At the completion of the 8-week program, the 3rd author asked participants questions over the phone (lasting approximately 30 minutes each). The 3rd author also spoke with the therapist who conducted the online treatment program to understand their perspectives on the program.

Participant responses were categorized to summarize the feedback in order to understand their experience as part of the group. The feedback from participants was transcribed and were read and re-read to identify key points. Formal qualitative analysis was not carried out due to the paucity of feedback generated from our small sample. Therefore, a pragmatic approach was taken with the feedback collected for the purpose of supplementing our quantitative results. Table 1 has a list of the questions for the participants.

Table 1. Questions post-interview for participants

Questions
1. How did you find the online treatment program?
2. What were the strengths and weaknesses of the online treatment program?
3. How would you describe the impact of the program?
4. To what extent does the online treatment program have merit or worth?
5. In what ways (if any) does the online treatment program mitigate barriers to face to face treatment? (e.g. list barriers)
6. In what ways (if any) could the online treatment program be improved?

Results

Pre-treatment data

The pre-treatment data was examined. Means and standard deviations at pre-treatment are given in Table 2. These means provided us with a standard deviation to use in assessing the impact of the therapy. Correlations between variables at pre-treatment are presented in Table 2. As expected, PGSI scores were significantly positively correlated with cravings. MAAS scores were negatively associated with Kessler scores, indicating that being mindful of one's thoughts was negatively associated with psychological distress. Social support was not significantly related to the other variables. REKT scores had a significant negative correlation with craving, indicating that participants who have an increased understanding of random chance, reported having lower levels of cravings for gambling.

Table 2. Correlations between variables at pre-treatment (n =16)

	Mean	*SD*	*N*	1	2	3	4	5	6
1. PGSI 1	15.1	6.1	16						
2. Craving	52.9	31.8	16	.53*					
3. Quality of life	14.3	4.4	16	.03	-.16				
4. Social Support	47.9	18.7	16	-.12	-.26	.35			
5. Kessler 6	12.5	5.1	16	.24	.43	-.53*	-.37		
6. MAAS Total	3.31	1.10	16	-.39	-.31	.21	.23	-.76**	
7. REKT	17.7	3.3	16	-.23	-.73**	-.09	.07	-.34	.12

Note: PGSI = Problem Gambling Severity Index; Kessler 6, a measure of psychological distress; MAAS is a scale measuring mindfulness; REKT is the Random Events Knowledge Test.

* p <.05; ** p <.01

Evaluation of a pilot intervention

Only two participants completed the pilot group, thus significance cannot be computed. However, as shown in Table 3 the estimated impact of the treatment for the individuals is indicated using an estimated effect size (d) computed by dividing the difference of scores on these various scales from pre-test to post-test and pre-test to follow-up with the standard deviation from the pre-treatment sample given in Table 2. The pre-treatment survey indicated that their average score on the PGSI was 15 over the past 6-months, which is well above the level for a severe gambling problem. PGSI score for both participants decrease from pre-test to post treatment by an average of six points which translates to an effect size of d =-0.98. On the 12-month follow up, the PGSI scores continued to decrease for both participants to an average of five yielding an effect size of d =-1.64. The key importance is that both participants dropped below the threshold for severe gambling problems (a score of 8) and into the moderate problem range, making these changes clinically significant. Similarly, cravings showed a small decrease from pre-test to post treatment test of d =-0.30, and a large decrease of d =-0.80 at the 12-month follow-up. Only one participant showed a decrease from pre-test to post-treatment test, but both

showed decreases at 12-month follow-up. Overall, the Kessler-6 showed a decrease in psychological distress from pre-test to post-treatment of d =-0.39 and at the 12-month follow-up of d =-0.59. However, an examination of the scores found that only one of the two participants showed a decrease in Kessler-6 psychological distress scores at 12 months; the other person's score had increased above baseline.

The REKT scores increased for both participants at post-treatment test, d =1.06, and at 12-month follow-up, d =1.21 suggesting a better understanding of random chance. Similarly, the MAAS Mindfulness score increased for both participants at post-treatment, d =0.56 and at 12-months, d =1.0. In addition, there was an overall increase in Quality of Life from pre-treatment to post treatment, d =0.45, and this was sustained at the 12-month follow-up (d =0.46). However, by examining the individual data it was found that only one participant reported improved quality of life at the 12-month follow-up.

In terms of gambling behaviours, both participants reported a decrease in the number of games they played, the frequency of play and the money spent. One participant reported not gambling at all in the past 6 months at follow-up. The other reported decreasing from $6000 prior to the treatment to $500 at the follow-up and decreasing from 3 games to only 1 game.

In summary, both participants decreased their PGSI, decreased their gambling, decreased craving, increased their mindfulness scores, and increased knowledge of random chance; all of which indicate improvement. In addition, there was an increase in quality of life and a decrease in psychological distress scores reported by one of the participants. The only variable that did not provide any positive results was social support, which decreased from 59.0 at the pre-treatment to 55.5 at follow-up. These results are promising, but given the small sample size, cannot be attributed to the treatment program versus chance. However, the mean and standard deviation of the pre-test sample suggest that the observed improvements in most of these scores represent moderate to large effect sizes.

Table 3. Pre-treatment and post-treatment scores and 12-months follow-up for group participants (n = 2).

	Pre *M* (*SD*)	Post *M* (*SD*)	Difference	Effect Size (*d*)	12-mths *M* (*SD*)	Difference	Effect Size (*d*)
MAAS Total	3.3 (0.7)	3.9 (0.5)	0.62	0.56	4.4 (0.6)	1.1	1.00
Quality of life	19.5 (2.1)	21.5 (21.5)	2.0	0.45	21.5 (5.0)	2.0	0.46
PGSI Total	15.0 (6.3)	9.0 (1.4)	-6.0	-0.98	5.0 (2.8)	-10.0	-1.64
Cravings	36.0 (3.9)	26.4 (19.3)	-9.1	-0.30	10.5 (10.6)	25.5	-0.80
Kessler 6	6.5 (2.1)	4.5 (2.1)	-2.0	-0.39	3.5 (5.0)	-3.0	-0.59
Social Support	59.0 (5.7)	55.5 (13.4)	-3.5	-0.19	55.5 (14.9)	-3.5	-0.19
REKT Total	20.0 (2.8)	23.5 (0.7)	3.5	1.06	24.0 (1.4)	4.0	1.21

Note: Pre is for pre-treatment; post is for post-treatment. PGSI Total is the Problem Gambling Severity Index; Kessler 6, is a measure of psychological distress; MAAS is a scale measuring mindfulness; REKT is the Random Events Knowledge Test. Effect size is computed by dividing the change of the person's scores by the standard deviation given in Table 2. Max Freq. is the highest frequency of the any of the games they reported playing.

Feedback Results

Both participants and the therapist provided feedback about their experiences of the treatment. The data was grouped into five categories of responses: (1) the effectiveness of the online treatment service, (2) changes they would like to see, (3) strengths of having an online group treatment program online, and (4) technology related challenges. In addition, during the conversation with the therapist, they also shared that (5) the delivery of treatment through the internet was a new experience and required a different style of building therapeutic rapport. These categories of responses are further discussed below.

According to the feedback, the participants found that the treatment service was effective at helping them reduce their gambling and gambling problems. Both participants shared that they found the program to be beneficial to them personally. They stated that they felt supported by the

therapist and had opportunities to discuss emotional aspects related to gambling in the treatment program. For example, one of the participants stated that the therapist was, “very understanding and empathetic.” In addition, they also reported feeling that there was an increase in social support from other people in their lives during and after completion of the program. One of them had quit gambling, and the other had reduced gambling. Both reported feeling less triggered to gamble. The participants stated that they were feeling better about themselves and more engaged in other areas of their lives including relationships with close family members and friends. For example, one participant said:

> "I am gambling less. I still gamble but not as often. I sometimes pull out the sheets that we worked on in treatment and review them. I find this helps with triggers and gets me through sometimes."

The other participant noted that:

> "Participating in this program we learnt some skills related to gambling. For the first time, I considered why I might be doing it, what might be leading to it. If I am upset, angry, have a bad day etc. this helped, and I am doing it less"

It was noted that “there was a connection between the handout materials online and the discussions had with the counselor.” Furthermore, a participant stated that the therapist “had both the flexibility and experience to work with participants.” A participant found the program to be “structured yet tailored to participants.” The other said the program itself was helpful in learning about new educational strategies for PG as well as the cognitive and emotional processes involved in gambling related triggers. Both participants stated that the program met their expectations and found it helpful in reducing their gambling behaviors.

Both participants noted changes that they would like to see in the program. They both shared that they would have appreciated having more participants complete the program, as it would have added to the group discussion and learning from their peers who also had problems with gambling. In addition, both stated that in the future, it may be helpful to have groups where all participants are at similar stages of their gambling treatment. One of the participants stated a preference for a more abstinence-based than harm reduction.

Both participants also expressed admiration for the online nature of the program. One stated the following:

> “This program was great for people who cannot attend physically. The material was valuable. There was a problem with connectivity regarding internet connections, but this is to be expected. This is the first time I have used something like this and overall, it was great.”

Similarly, the other participant in this program shared that the program was:

> "Accessible as people could connect from home. Having it online did not detract from the type of treatment received. The experience did not interfere with the ways I have done treatment in the past. It worked."

Aside from the strengths of the program above, participants noted challenges related to technology. Participants shared that "it interrupted the flow of the treatment program" when people were leaving and re-entering the program because of technical issues. Other technical issues were noted such as having "two people speaking at once and not being heard" and difficulties "coordinating who can speak." These are issues that need to be improved in the future. The therapist also discussed similar issues related to technology.

Lastly, the therapist in this program expressed differences between in-person and online treatments. They stated that "it's different than in-person" because one "cannot attend to all nonverbal cues like eye contact, body language" etc. but that it was "definitely possible to provide PG treatment in this manner and found it effective". The therapist also stated that it was "valuable to have handouts for participants to work on as this helped them work on their goals".

Comparisons with non-treatment participants.

For the 12-month follow-up survey, all participants who completed the pre-treatment survey were asked to complete a final follow-up time. This group was not a randomly selected waitlist group but did help us understand the impact of the treatment. Both treatment participants and 8 of the 14 participants who did not participate in the group completed the 12-month follow-up survey (62.5% completion rate). This allowed us to determine to what extent the improvements noted above could be attributed to non-specific factors. As noted above, the sample size is too small (n = 2) to conduct statistical analysis; however, Table 4, summarizes the variables to compare the treatment and non-treatment samples. As shown in Table 4, compared to the non-participation group, the treatment group had larger decreases in cravings, the K6 measure of psychological distress, total spending on gambling, maximum frequency of gambling, and the number of games played. In addition, the treatment group had larger increases in mindfulness and random events knowledge. Table 4 also indicates the percentage of each group which showed some improvement from pre-treatment to 12-month follow-up. Most of the participants showed some improvement. More people in the treatment group showed improvement on 7 of these variables whereas there were only two variables where more people in the non-treatment showed improvement.

Table 4.
Comparison of pre-treatment and 12-months follow-up data for the treatment group (n = 2) and the non-treatment participants (n = 8).

	Non-Treatment				Treatment			
	Mean	*SD*	*d*	% Improved	*Mean*	*SD*	*d*	% Improved
Quality of Life								
Pre-test	14.5	4.5			19.5	2.1		
12-months	16.6	5.0	0.48	75%	21.5	5.0	0.46	50%
Number of Games Play								
Pre-test	5.0	2.5			3.0	0.0		
12-months	2.1	1.8	-1.24	88%	0.5	0.7	-1.07	100%
Maximum Frequency								
Pre-test	6.0	1.3			5.0	1.4		
12-months	3.4	2.5	-2.30	75%	1.0	1.4	-3.54	100%
Total Spending								
Pre-test	4237.5	3924.3			4000.0	2828.4		
12-months	1118.6	1861.3	-0.26	75%	250.0	353.6	-0.31	100%
PGSI Total								
Pre-test	14.9	7.1			15.0	0.0		
12-months	6.6	3.7	-1.36	75%	5.0	2.8	-1.64	100%
% Severe problems (8+)								
Pre-test	87.5%				100%			
12-months	37.5%				0%			
Craving Score								
Pre-test	57.5	32.8			36.0	3.9		
12-months	45.0	17.9	-0.39	63%	10.5	10.6	-0.80	100%
Kessler 6								
Pre-test	13.6	5.6			6.5	2.1		
12-months	12.0	4.8	-0.31	75%	3.5	5.0	-0.59	50%
Social Support								
Pre-test	51.5	19.5			59.0	5.7		
12-months	51.5	19.2	0.00	50%	55.5	14.9	-0.19	50%
REKT								
Pre-test	17.5	3.7			20.0	2.8		

12-months	18.0	3.1	0.15	50%	24.0	1.4	1.21	100%
MAAS Total								
Pre-test	3.3	1.2			3.3	0.7		
12-months	3.6	1.2	0.29	75%	4.4	0.6	1.00	100%

Note: PGSI Total = Problem Gambling Severity Index; Kessler 6, a measure of psychological distress; MAAS Total is a scale measuring mindfulness; REKT is the Random Events Knowledge Test. Max Frequency this is the highest frequency of the games they reported playing: 7 = 5 or 7 days a week; 6 = 2 or 4 times a week; 5 = Once a Week; 4 = 2 or 3 times a month; 3 = Once a month; 2 = 2 to 6 times; 1 = Once; 0 = None. To estimate d the standard deviation of the pretest data was used. The last column "% Improved" is the percentage of participants who showed improvement in their scores from pre-test to 12 month follow-up. Note that this does not consider magnitude of the change but simply the arithmetic different of their post-test scores being higher or lower (depending on the variable) than pre-test.

Discussion

The study found several indicators for improvements for both of the participants in the group therapy program. For both clients, their Mindfulness scores and their Knowledge of Random Chance scores increased (d =1.0 and d =1.21 respectively), while their problem gambling scores on the PGSI decreased (d =-1.64). Quality of life improved for one client, but not for the other one. At post-treatment, cravings decreased for one client, and decreased for both in the 12-month follow-up. Both participants reported lower levels of psychological distress as measured by the Kessler 6 at 6-months, but at 12-months one reported less distress, while the other reported more distress. During the feedback phone calls, participants noted that they were feeling less triggered to gamble and reported gambling less frequently. Participants stated that they were feeling better about themselves and more engaged in other areas of their lives including relationships with close family members and friends.

Overall, the quantitative results are encouraging, especially the sustained increase in mindfulness and knowledge of random chance, and the sustained decrease in gambling and PGSI scores. These outcomes for both participants suggest the treatment program produced a positive impact on the participants' lives. This is also supported by the feedback collected directly from participants in the study. Participants stated that they were gambling less, felt less gambling related triggers and urges and had learnt new tools for dealing with gambling related urges. Participants also expressed that they felt supported by the therapist and had opportunities to discuss emotional aspects related to gambling. Both participants stated that they valued having the opportunity to participate in a program with a qualified mental health professional that was accessible and did not require transportation.

The decrease in quality of life and the increase in psychological distress for one of the participants is concerning although it should be noted that the 12-month follow-up occurred in the middle of the COVID-19

Pandemic that had led to an increase in mental distress in the general population (Soklaridis et al., 2020; Turner, 2020). Thus, the results of psychological distress for one of the participants may be unrelated to their gambling habits, but rather, reflect their current reality.

When the results of the treatment and the non-treatment group were compared, it was found that most of the participants from both groups showed some improvements in their gambling problems. Given that all participants were seeking help at the beginning of the study it is likely they all had some motivation to change, and thus it is not surprising that both treatment and non-treatment groups showed some reduction in gambling behaviors, gambling problems, and a reduction in cravings. In addition, the non-treatment participants were referred to other help resources. Nonetheless, the two participants who completed the group reported larger improvements in terms of a reduction in cravings, increased mindfulness, increased understanding of random chance, and a decrease in gambling participation. These findings suggest that the treatment was helpful to these two clients in addressing these variables; however, given the small sample size, these results cannot be generalized.

The feedback from the group for both participants indicated that participants had found the program to be helpful for them in learning how to deal with problem gambling. They noted that the material was structured, but tailored around them, that there was a connection between the handouts and the discussion and made positive remarks about the therapist. Participants did note some technical difficulties that need to be resolved in order to make online treatment a standard part of therapy. The therapist also noted that the delivery of group treatment services through the internet required a different style of building therapeutic rapport. However, she noted that it was definitely possible to provide group treatment in this manner.

On the other hand, 21 of the participants who contacted our number (57%) were either not eligible for the study or not interested in the group and chose not to complete the consent form and pre-test questionnaires. In some cases, individuals said they were looking for one-time support or advice over the telephone and were not interested in committing to eight weeks of group therapy. This is not surprising given the impulsive nature of problem gambling. Previous studies have found that people with gambling problems have a poor record of commitment to long therapy (Bartel et al., 2020, Rush, Moxam, & Urbanoski, 2002; Toneatto, 2016; Wall et al., 2021) and the attrition rate in therapy is high (Wulfert, Blanchard, Freidenberg, & Martell, 2006; Boughton et al., 2017; Wall et al., 2021). For example, in a recent study of brief support by Wall et al. (2021) only 23% of the participants completed all 4 modules, and only 10% of the participants completed the gambling log for longer than 14 days. Similarly, Boughton et al. (2017) had a completion rate of 44% (11/25) and only 15% of her clients attended all 12 of her webinar sessions. In addition, in the current study, among the 16 participants who completed the pre-treatment

questionnaire, only 3 individuals were scheduled for the therapy and only 2 completed the therapy. One implication is that there may be more of a market for one-time brief support than for ongoing therapy (see Toneatto, 2016, Wall et al., 2021). Nonetheless, the two individuals who participated in this pilot project were satisfied with the treatment they received and appreciated the web-based group interaction.

The results of this project were given additional relevance during the COVID-19 pandemic. A few months after the completion of the online group session, and before the follow-up data was collected, the world was hit by a global pandemic (Soklaridis, Lin, Lalani, et al., 2020; Turner, 2020; Walker et al., 2020). The importance of understanding the opportunities and challenges of online counseling became vital during the COVID-19 crisis. Many therapists had to cancel or modify in-person therapy in order to reduce the spread of COVID-19 (Mediavilla et al., 2020; Torous, Myrick, Rauseo-Ricupero, & Firth, 2020). As noted above, a survey of problem gambling therapists in Ontario (Turner, 2021; Turner et al., 2023) found that many had switched to remote therapy with 56% using video chatting, and 31% using video chatting for group therapy. Furthermore, 69% reported preferring video conferencing for therapy, and 56% reported wanting training in video group therapy. Given that treatment services have already started offering group therapy online during the COVID-19 pandemic (Turner, 2021; Turner, et al., 2023), researchers need to evaluate it and conduct research to define best practices for these new modalities of treatment.

In a recent focus group study (Sanchez et al., 2019), and in a previous study by Boughton et al. (2016), clients were very enthusiastic about having online group treatment as an option. However, our team experienced some difficulty in coordinating the treatment schedule for the therapist and the clients. The research project was a logistical challenge because it involved defining best practices for online treatment, developing a treatment manual for the project as well as a safety protocol (e.g., in the evident that the clinician suspects suicidal ideation), finding a suitable vendor for a secure communication service and secure document exchange, and helping clinicians and clients become comfortable with the technology. In addition, scheduling of assessment and treatment sessions had to work around the schedules for the therapist as well as the clients. Boughton et al. (2016, 2017) also reported some difficulty setting up and recruiting participants for her remote counseling webinars. These projects, however, do show that group therapy for people with gambling problems over the internet is possible and provides an important missing element to the clients who are participating in remote counseling. However, our experience is that running groups online requires a dedicated therapist, a good support team, reliable software, good internet connections, and enthusiastic

clients. As clients and clinicians become more familiar with the technology, it is expected that online group treatment will be an important option for clients. If the issues are all addressed, there is an opportunity for advancing e-mental health care initiatives that can reduce barriers, increase access to care and empower clients. The experts on information and technology that were consulted (Turner, 2018) postulated that online treatment could also expand the use of data analytics and would facilitate integrating research into standard service delivery.

Limitations

The main limitation of the current study is the small sample size. As such, it was not possible to conduct null hypothesis testing and the results cannot be generalized to the population. The main value of this study is an exploration of the difficulties and opportunities in creating online group therapy. Another limitation is that the non-treatment group was not randomly assigned and even if it was, it would not be an ideal comparison group. A better comparison group would be in-person group treatment to determine if there is any loss in efficacy compared to in-person treatment. In addition, such research should focus on the trade-off of different advantages of in-person compared to online therapy. It is most likely that in-person treatment would prove to be better than remote counseling, but this would be a trade-off with increasing access and reducing the cost of therapy (Islam, Ferdous, & Potenza, 2020; King, Delfabbro, Billieux, & Potenza, 2020; Valentin et al., 2020).

Conclusions

This study tested the feasibility of an online implementation of problem gambling treatment as a means of reducing barriers to treatment. The data from this treatment evaluation suggest that the pilot intervention was helpful for the two individuals who completed treatment in terms of increasing their mindfulness, reducing their cravings, improving their quality of life, and reducing erroneous beliefs. However, given the small sample size, the results cannot be generalized. Nonetheless, the findings warrant further assessment with larger samples. These findings suggest that group-based treatment of problem gambling over the internet is feasible and has the potential of increasing the number of people who access the treatment services and may be particularly useful during a pandemic. Our study helped our treatment services to adapt to the COVID-19 pandemic which they already had experience setting up and conducting groups online. However, setting up a group to run online is a complex process that requires much coordination between well-trained therapists and support staff, as well as secure but usable software. The initial learning curve of setting up this study was steep. However, it is expected that once groups have been set up, the process of running online treatment should become routine. Research is needed to define best practices for online group therapy.

Funding

This multi-stage project was funded by the Ministry of Health and Long-Term Care (MoHLTC) Health System Research Fund (HSRF) Grant #425. In addition, the MoHLTC provides salary and office space for all CAMH hospital staff.

Availability of data and material

The data that support the findings of the present study are available from the corresponding author upon reasonable request.

Conflict of Interest

The authors declare no conflict of interest.

Author's contributions

RM & NT conceptualized the study. NT & RM obtained funding with additional advice from DH, TEM, JS, MvdM, SH, and DL. All authors provided input on the development and implementation of the online gambling treatment program through regular meetings. SS and FJ along with NS, DDF, CC and RC, developed the treatment manual, and ran the clinical part of the study. SS coordinated the data collection, NT and SS wrote the REDcap program and managed the data collection. FJ conducted the post treatment interviews and summarized them. NT conducted the quantitative data analysis. NT wrote the first draft of this paper. NT and JS revised the manuscript for the final submission. All authors edited and approved the final draft. All authors significantly contributed to the research and preparation of manuscript.

Informed Consent

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants for being included in the study.

Ethics Approval

This study protocol was approved by the Research Ethics Board at the CAMH Research Ethics Board (Protocol #074/2018).

Acknowledgements:

We would like to thank the Problem Gambling Services team at the Centre for Addiction and Mental Health (CAMH) and in particular Robin Cuff for their collaboration and help with this project. In a special thanks to Laurie Farrant for helping with scheduling. We are particularly grateful to Negar Sadeghi for her pioneering work in the delivery of problem gambling

treatment online. In addition, a number of placement students from Humber College and Seneca Colleges, who helped with various aspects of this project: Yeji Ha, Anjuli Ner, Smridhi Narang, Ernest Molah, Chelsea Wood, Sarah Agasee, and Julia Tomasi. Finally, we are thankful to the OnCall Health team, in particular Alexandra Latter and Nicholas Chepesiuk, for providing the technology that allowed us to explore the feasibility of an online treatment service for problem gambling.

References

Awata, S., Bech, P. E. R., Yoshida, S., Hirai, M., Suzuki, S., Yamashita, M., ... & Oka, Y. (2007). Reliability and validity of the Japanese version of the world health organization-five well-being index in the context of detecting depression in diabetic patients. *Psychiatry and clinical neurosciences, 61(1)*, 112-119 DOI: 10.1111/j.1440-1819.2007.01619.x

Bartel, S. J., Huguet, A., Rao, S., Wozney, L., Varalli, V., Rozari, S., ... & Stewart, S. H. (2020). Initial Usability and Feasibility of a Web-Based Behavioural Activation Program for Young Adults With Comorbid Depression and Problem Gambling: A Case Study and Case Series. *Journal of Gambling Issues*, 45, 146-165. DOI: 10.4309/jgi.2020.45.8

Blank, L., Baxter, S., Woods, H. B., & Goyder, E. (2021). Interventions to reduce the public health burden of gambling-related harms: a mapping review. *The Lancet Public Health*, 6(1), e50-e63. DOI: 10.1016/S2468-2667(20)30230-9

Berger, S. P., Reid, M. S., Delucchi, K., Hall, S., Hall, S., Mickalian, J. D., & Crawford, C. A. (1996). Haloperidol antagonism of cue-elicited cocaine craving. *The Lancet*, 347(9000), 504-508. DOI: 10.1016/s0140-6736(96)91139-3

Boughton, R. R., & Brewster, J. (2002). *Voices of women who gamble in Ontario: A survey of women's gambling, barriers to treatment and treatment service needs.* Toronto: Ontario Ministry of Health and Long Term Care.

Boughton, R. R., Jindani, F., & Turner, N. E. (2016). Group Treatment for Women Gamblers Using Web, Teleconference and Workbook: Effectiveness Pilot. *International Journal of Mental Health and Addiction, 14*(6), 1074-1095. Doi: 10.1007/s11469-016-9700-4

Boughton, R., Jindani, F., & Turner, N. E. (2017). Closing a treatment gap in Ontario: Pilot of a tutorial workbook for women gamblers. *Journal of Gambling Issues*, *36,* 199-231. doi:10.4309/jgi.v0i36.3986

Brazeau, B. W., Hodgins, D. C., Cunningham, J. A., Bennett, K., & Bennett, A. (2021). *Augmenting an online self-directed intervention for gambling disorder with a single motivational interview: A Randomized Controlled Trial 3-Month Follow-Up* (Unpublished master's thesis). University of Calgary, Calgary, AB. Doi.org/10.1186/s13063-021-05912-3

Brown, K.W., & Ryan, R.M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84,* 822–848. DOI: 10.1037/0022-3514.84.4.822

Bryman, A. & Bell, E., (2012). *Social Research Methods, 4th Canadian Edition*. Toronto: Oxford University Press.

Canale, N., Vieno, A., Griffiths, M., Marino, C., Chieco, F., Disperati, F., et al. (2016). The efficacy of a web-based gambling intervention program for high school students: A preliminary randomized study. *Computers in Human Behavior, 55*, 946-954.

Castren, S, & Lahti T. (2014). Experiences from the field: Interned-based CBT intervention for Finnish gamblers. *Psykologia*, *49*(3)*,*198-210. DOI: 10.1111/sjop.12034

Casey, L., Oei, T., Raylu, N., Horrigan, K., Day, J., Ireland, M., et al. (2017). Internet-based delivery of cognitive behaviour therapy compared to monitoring, feedback and support for problem gambling: A randomised controlled trial. *Journal of Gambling Studies, 33*(3), 993-1010.

Chen, P., Jindani, F., Perry, J., & Turner, N. E. (2014). Mindfulness and problem gambling treatment. *Asian Journal of Gambling Issues and Public Health, 4*(1), 1-17. DOI:10.1186/2195-3007-4-2

Chopard, K. & Przybylski, R., (2021). *Methods Brief: Case Studies.* Justice Research and Statistics Association. www.jrsa.org/pubs/factsheets/jrsa-research-methods-brief-case-studies.pdf

Cooper, G. (2004). Exploring and understanding online assistance for problem gamblers: The pathways disclosure model. *International Journal of Mental Health & Addiction*, 2004, 1, 6.

Cunningham, J. A., Hodgins, D. C., Keough, M., Hendershot, C. S., Schell, C., & Godinho, A. (2020). Online interventions for problem gamblers with and without co-occurring unhealthy alcohol use: Randomized controlled trial. *Internet interventions, 19,* 100307. DOI: 10.1016/j.invent.2020.100307

Dowling, N.A., Rodda, S.N., Lubman, D.I., Jackson, A.C. (2014). The impacts of problem gambling on concerned significant others accessing web-based counselling. *Addictive Behaviors*, *39*(8), 1253-1257.

Duncan, E., Madonick, S., Chakravorty, S., Parwani, A., Szilagyi, S., Efferen, T., ... & Rotrosen, J. (2001). Effects of smoking on acoustic startle and prepulse inhibition in humans. *Psychopharmacology*, *156*(2-3), 266-272. DOI: 10.1007/s002130100719

Erevik, E. K., Pallesen, S., Mohn, M., Aspeland, T., Vedaa, Ø., & Torsheim, T. (2020). The Norwegian remote intervention programme for problem gambling: Short-and long-term outcomes. *Nordic Studies on Alcohol and Drugs, 37*(4), 365-383. DOI:10.1177/1455072520947247

Ferris, J., & Wynne, H. (2001). *The Canadian problem gambling index: Final report.* Submitted for the Canadian Centre on Substance Abuse. Retrieved from: http://www.problemgambling.ca/EN/ResourcesForProfessionals/pages/problemgamblingseverityindexpgsi.aspx

Galea, S., Brewin, C.R., Gruber, M., Jones, R.T., King, D.W., King, L.A., et al. (2007). Exposure to hurricane-related stressors and mental illness after Hurricane Katrina. *Archives of general psychiatry, 64*(12), 1427-1434. DOI: 10.1001/archpsyc.64.12.1427

Håkansson, A., Fernández-Aranda, F., Menchón, J. M., Potenza, M. N., & Jiménez-Murcia, S. (2020). Gambling During the COVID-19 Crisis - A Cause for Concern. *Journal of Addiction Medicine*, *14*(4), e10-e12. doi:10.1097/ADM.0000000000000690

Håkansson, A., & Widinghoff, C. (2020). Over-indebtedness and problem gambling in a general population sample of online gamblers. *Frontiers in Psychiatry, 11,* 7. doi: 10.3389/fpsyt.2020.00007.

Heun, R., Bonsignore, M., Barkow, K., & Jessen, F. (2001). Validity of the five-item WHO Well-Being Index (WHO-5) in an elderly population. *European Archives of Psychiatry and Clinical Neuroscience, 251*(2), 27-31. DOI: 10.1007/BF03035123

Islam, M. S., Ferdous, M. Z., & Potenza, M. N. (2020). Panic and generalized anxiety during the COVID-19 pandemic among Bangladeshi people: An online pilot survey early in the outbreak. *Journal of Affective Disorders, 276*, 30-37. doi: https://doi.org/10.1016/j.jad.2020.06.049

King, D. L., Delfabbro, P. H., Billieux, J., & Potenza, M. N. (2020). Problematic online gaming and the COVID-19 pandemic. *Journal of Behavioral Addictions, 9*(2), 184-186. doi:10.1556/2006.2020.00016

Lakey, C. E., Campbell, W. K., Brown, K. W., & Goodie, A. S. (2007). Dispositional mindfulness as a predictor of the severity of gambling outcomes. *Personality and Individual Differences, 43*(7), 1698-1710. DOI:10.1016/j.paid.2007.05.007

Lee B. K., & Awosoga O. (2015). Congruence couple therapy for pathological gambling: A pilot randomized controlled trial. *Journal of gambling studies*. *31*(3), 1047-68. DOI: 10.1007/s10899-014-9464-3

McKinley C. J., Wright P. J. (2012). Examining the presence of problem gambling awareness messages on college counseling centre websites. *Health Communication. 27*(1)*,* 98-106. DOI: 10.1080/10410236.2011.571756

Mediavilla, R., Fernández-Jiménez, E., Rodríguez-Vega, B., Gotor-Martínez, L., Rivelles-Sevilla, R. V., Rojano-Capilla, P., & Bravo-Ortiz, M.F. (2020). Adapting mental health care after the COVID-19 outbreak: preliminary findings from a public general hospital in Madrid (Spain). *Psychiatry Research. 289*, 113077. DOI: 10.1016/j.psychres.2020.113077

Nilsson, A., Magnusson, K., Carlbring, P., Andersson, G., & Hellner, C. (2020). Behavioral couples therapy versus cognitive behavioral therapy for problem gambling: a randomized controlled trial. *Addiction, 115*(7), 1330-1342. DOI: 10.1111/add.14900

Oakes J., Battersby M. W., Pols R. G., & Cromarty P. (2008). Exposure therapy for problem gambling via videoconferencing: A case report. *Journal of Gambling Studies, 24*(1)*,* 107-18. DOI: 10.1007/s10899-007-9074-4

Rodda, S. N. (2021). A systematic review of internet delivered interventions for gambling: prevention, Harm Reduction and Early Intervention. *Journal of Gambling Studies,* 1-25. https://doi.org/10.1007/s10899-021-10070-x

Rodda, S.N., Lubman, D.I., Iyer, R., Gao, C.X., Dowling, N.A. (2015). Subtyping based on readiness and confidence: the identification of help-seeking profiles for gamblers accessing web-based counselling. *Addiction, 110*(3), 494-501.

Rush, B., Moxam, R. S., & Urbanoski, K. A. (2002). Characteristics of people seeking help from specialized programs for the treatment of problem gambling in Ontario. *Journal of Gambling Issues*, 6.

Sagoe, D., Griffiths, M. D., Erevik, E. K., Høyland, T., Leino, T., Lande, I. A., ... & Pallesen, S. (2021). Internet-based treatment of gambling problems: A systematic review and meta-analysis of randomized controlled trials. *Journal of Behavioral Addictions, 10*(3)*,* 546-565. DOI:10.1556/2006.2021.00062

Sanchez S., Jindani F, Shi J, et al. (2019). Acceptability of internet-based interventions for problem gambling: a qualitative study of focus groups with clients and clinicians. *BMC Medical Informatics and Decision Making. 19*(1):290. doi:10.1186/s12911-019-1011-9

Saxena, S., Carlson, D., Billington, R., & Orley, J. (2001). The WHO quality of life assessment instrument (WHOQOL-Bref): the importance of its items for cross-cultural research. *Quality of life Research,10*(8), 711-721. DOI: 10.1023/a:1013867826835

Soklaridis, S., Lin, E., Lalani, Y., Rodak, T., & Sockalingam, S. (2020). Mental health interventions and supports during COVID-19 and other medical pandemics: A rapid systematic review of the evidence. *General Hospital Psychiatry*, *66*, 133-146. DOI:10.1016/j.genhosppsych.2020.08.007

Steinert, C., Stadter, K., Stark, R., & Leichsenring, F. (2017). The effects of waiting for treatment: A meta-analysis of waitlist control groups in randomized controlled trials for social anxiety disorder. *Clinical Psychology & Psychotherapy, 24(3),* 649-660.

Torous, J., Myrick, K. J., Rauseo-Ricupero, N., & Firth, J. (2020). Digital mental health and COVID-19: Using technology today to accelerate the curve on access and quality tomorrow. *JMIR Mental Health, 7*(3)*,* e18848. DOI:10.2196/18848

Toneatto, T. (2016). Single-session interventions for problem gambling may be as effective as longer treatments: Results of a randomized control trial. *Addictive Behaviors, 52*, 58-65. DOI: 10.1016/j.addbeh.2015.08.006

Turner, N.E. (2018). The context of gambling treatment: towards creating an online service to reduce problem gambling. Conference paper presented at the Conference of European Association for studies in Gambling. Malta, Sept. 2018. Available at https://www.easg.org/easg/assets/File/EASG_2018/Nigel_Turner.pdf

Turner, N. E. (2020). Covid-19 and Gambling in Ontario (Editorial). *Journal of Gambling Issues, 44*.

Turner, N.E., (2021). *Covid-19 and Gambling; Impact and Adaptation.* Webinar presentation presented at the Annual Alberta Institute for Gambling Research conference, April, 2021.

Turner, N.E., Agic, B., van der Maas, M., Agasee, S, Watson, T.M., Shi, J. (2023). The adaptation to COVID-19 by problem gambling and mental health treatment providers in Canada. Under review *Journal of Gambling Issues*.

Turner, N. E., Littman-Sharp, N., & Zangeneh, M. (2006). The experience of gambling and its role in problem gambling. *International Gambling Studies*, *6*, 237-266. DOI:10.1080/14459790600928793

Turner, N. E., Stinchfield, R., McCready, J., McAvoy, S., & Ferentzy, P. (2016). Endorsement of criminal behavior amongst offenders: implications for DSM-5 gambling disorder. *Journal of Gambling Studies, 32*(1)*,* 35-45. DOI:10.1007/s10899-015-9540-3

Turner, N.E., van der Maas, M., Shi, J., Liu, E., Zangeneh, M., Cool, S., Molah, E., Elton-Marshall, T. (2022). Knowledge of Random Events and Chance in People with Gambling Problems: An item analysis. *International Gambling Studies.* DOI: 10.1080/14459795.2021.2014930

Walker, P., Whittaker, C., Watson, O., Baguelin, M., Ainslie, K., Bhatia, S., . . . Cattarino, L. (2020). *Report 12: The Global Impact of COVID-19 and Strategies for Mitigation and Suppression.* Accessed Nov. 8, 2021 from https://spiral.imperial.ac.uk/handle/10044/1/77735. DOI:10.25561/77735

Wall, H., Magnusson, K., Berman, A. H., Bewick, B. M., Hellner, C., Jayaram-Lindström, N., & Rosendahl, I. (2021). Evaluation of a Brief Online Self-help Program for Concerned Gamblers. *Journal of Gambling Studies*, *37*,1277–1290. https://doi.org/10.1007/s10899-021-10005-6

Williams, RJ, & Volberg RA, Stevens RMG. (2012). *The Population Prevalence of Problem Gambling: Methodological Influences, Standardized Rates, Jurisdictional Differences, and Worldwide Trends.* Ontario Problem Gambling Research Centre and the Ontario Ministry of Health and Long Term Care.

Williams, R.J., & Volberg, R.A. (2012). *Population Assessment of Problem Gambling: Utility and Best Practice.* Ontario Problem Gambling Research Centre & Ontario Ministry of Health and Long Term Care.

Wood, R., & Griffiths, M. (2007). Online guidance, advice, and support for problem gamblers and concerned relatives and friends: An evaluation of the pilot service. *British Journal of Guid Council, 35*(4), 373-389.

Wulfert, E., Blanchard, E. B., Freidenberg, B. M., & Martell, R. S. (2006). Retaining pathological gamblers in cognitive behavior therapy through motivational enhancement: A pilot study. *Behavior Modification, 30*(3)*,* 315-340. DOI :10.1177/0145445503262578

Valentin, F., Sylvain, I., Oulmann, Z., Rachel, F. R., Joël, B., Pierre-Michel, L., . . . Sébastien, G. (2020). COVID-19 pandemic lockdown and problematic eating behaviors in a student population. *Journal of Behavioral Addictions*, *9*(3), 826-835. doi:10.1556/2006.2020.00053

van der Maas, M, Shi J, Elton-Marshall T, Hodgins D. C., Sanchez S., Lobo D. S., Hagopian S., Turner N. E. (2019). Internet-Based Interventions for Problem Gambling: Scoping Review. *JMIR Mental Health, 6*(1):e65. DOI: 10.2196/mental.9419

Zimet, G.D., Dahlem, N.W., Zimet, S.G. & Farley, G.K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *52*, 30-41. DOI:10.1207/s15327752jpa5201_2