



Brief Virtual Workshop on Gambling Disorder to Raise Knowledge and Awareness Among Health Service Providers

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Abstract

Gambling disorder is a “hidden disease” due to the lack of visible markers. It often negatively affects multiple domains of a person’s life and predicts adverse physical, mental, social, and financial outcomes. Health service settings are suited for early detection of gambling disorder because of its comorbid medical conditions and due to the trust patients have in their health service providers (HSPs). However, HSPs often lack the knowledge needed to screen for this disorder and to make appropriate referrals. This paper reports a quasi-experimental wait-list control study (experimental group $n = 18$; wait-list control group $n = 14$), with cross-over and a twelve-week follow-up which assessed whether a brief virtual gambling disorder training entitled *Gambling Know More* could improve gambling disorder knowledge among HSPs. Results showed workshop participation caused a significant increase in gambling disorder knowledge immediately after the workshop and twelve weeks later. Participation in *Gambling Know More* bodes well for increasing early detection of gambling disorder and appropriate treatment referrals among HSPs. Findings have important policy implications for the training of HSPs.

Keywords Gambling · Gambling disorder · Problem gambling · Brief workshop · Virtual training · Secondary prevention

Introduction

The gambling industry is booming. In 2018, the American Gaming Association (AGA) reported that the economic impact of casino gambling domestically was a record \$261 billion (AGA, 2019). That same year, state and federal governments received \$41 billion in related tax revenue and the casino industry employed 1.8 million Americans (AGA, 2019). Although gambling generates tax revenue and is considered by many to be entertainment, it also harbors the possibility of serious harm to society and the individual, (Mackay et al., 2015).

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According to the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5), gambling disorder refers to "persistent and recurrent problematic gambling behavior leading to clinical impairment or distress...." (American Psychiatric Association, 2013, p. 595). The lifetime prevalence rate of gambling disorder is 0.4–1.0% (American Psychiatric Association, 2013). It is considered a hidden disease because there are no blood tests or visible markers and those afflicted often hide their problem for years and may not even realize their illness (McNeilly & Burke, 2001). The etiology of gambling disorder is often complicated because it involves factors that combine biological, social, and psychological elements (Carter, 2016). The clinical presentation of gambling disorder varies from individual to individual which also makes it difficult to detect (Grant et al., 2014). Gambling disorder is associated with adverse outcomes across all areas of an individual's life (Langham et al., 2016). To improve such outcomes, early detection is essential and can reduce long-term harm of untreated gambling disorder. (Kerber et al., 2015).

While there is a lack of agreement regarding the various terms to reference negative gambling behavior, this paper will use the more inclusive term of "problem gambling" to refer to such behavior except when referring to prior work on gambling disorder. Problem gambling is not a diagnostic equivalent to gambling disorder because those with problem gambling might not meet the criteria for a gambling disorder diagnosis. However, conversely, all who can be diagnosed with gambling disorder do engage in problem gambling.

From a public health perspective, the harm an individual with problem gambling causes to themselves, their family, and society must also be considered (Browne et al., 2017). In many ways, problem gambling is akin to other public health threats, such as smoking, inasmuch as the detriment to the public outweighs any monetary gains (Browne et al., 2017). Adverse financial outcomes among gamblers are prevalent and common (Browne & Rockloff, 2018; Grant et al., 2014). Gambling is a "regressive" tax as it disparately affects the poor and exacerbates social inequities by widening the gap between the upper and lower economic classes (Fiedler et al., 2016; Ghent & Grant, 2010). Individuals at lower socioeconomic status (SES) are found to have greater negative consequences due to gambling when compared to higher SES groups (Maas, 2016). In severe cases, individuals may engage in theft, fraud, forgery, or embezzlement to support their gambling behavior (American Psychiatric Association, 2013; Binde, 2016; Langham et al., 2016). The regressive nature of gambling not only affects the individual's finances but may negatively impact other life areas as well.

Harms from gambling are diverse and can affect all domains of an individual's life: medical, psychological, social, family, work, and financial (Langham et al., 2016). Gambling disorder is also associated with a multitude of adverse physical outcomes (American Psychiatric Association, 1994; 2013), including cardiac problems, liver disease (American Psychiatric Association, 2013; Morasco et al., 2006), obesity (Chamberlain et al., 2017), hypertension (Langham et al., 2016), insomnia (Christensen et al., 2001; Langham et al., 2016), diabetes, and arthritis (Desai et al., 2007). Gambling disorder is associated with increased rates of psychological disorders (American Psychiatric Association, 2013; Chamberlain et al., 2017), including depression (Chamberlain et al., 2017; Kerber et al., 2015), anxiety (Chamberlain et al., 2017), personality disorders (American Psychiatric Association, 2013; Fernández-Montalvo & Echeburúa, 2004), and post-traumatic stress disorder (PTSD) (Caler et al., 2017). Prevalence of substance use disorders is also higher among those with gambling disorder (American Psychiatric Association, 2013; Chiu & Hassan, 2016; Hammond et al., 2020; Langham et al., 2016), including alcohol use disorder (Chamberlain et al., 2017), and nicotine use disorder (Welte et al., 2006). Those with gambling disorder also have higher rates of

self-injury, suicidal ideation, suicide attempts, and suicide completions (American Psychiatric Association, 2013; Black et al., 2015).

The social and work domains of gamblers are negatively affected as well (Christensen et al., 2001). Gambling disorder has been associated with smaller social networks, higher divorce rates, and relationship problems (American Psychiatric Association, 2013; Langham et al., 2016). Gambling disorder often affects the individual's school or workplace through increased absenteeism, lower productivity, decreased performance, job loss, and failing grades due to gambling (American Psychiatric Association, 2013; Kerber et al., 2015; Langham et al., 2016).

In today's society, stigmatizing attitudes toward those struggling with mental illness are common (Corrigan, 2000). This occurs when collective characteristics and traits that are associated with physical and mental disorders lead to negative and devaluing attitudes and behaviors toward afflicted individuals (Corrigan, 2000). With problem gambling, stigmatizing attitudes result from seeing the problem as a failure of willpower or discipline and within the individual's control. Such stigmatizing stereotypes, misconceptions, and negative attitudes result in feelings of shame and reduced help-seeking among problem gamblers.

Secondary prevention and early detection of problem are directed at those at highest risk including adolescents, military populations, and senior citizens (American Psychiatric Association, 2013; Fong, 2005). Historically, men have had higher rates of gambling disorder and pathological gambling (American Psychiatric Association, 1994; 2013; Welte et al., 2016). When compared to the general population, there are specific ethnic groups with higher rates of pathological gambling (Fong, 2005). Multiple studies have found that African Americans are most at risk for developing gambling disorder (Alegría et al., 2009; Welte et al., 2016), though some studies find Hispanics, not African Americans, are at greater risk (Caler et al., 2017). Other risk factors are living in disadvantaged neighborhoods and having lower levels of education (Tabri et al., 2017; Welte et al., 2016). If parents or friends gamble, then the risk for an individual to gamble in the future also rises (Wickwire et al., 2007). Undergoing treatment for Parkinson's Disease and Willis-Ekbom Disease (restless legs syndrome) has been shown to be a risk factor that can cause iatrogenic problem gambling behaviors (Carter, 2016; Chiu & Hassan, 2016). This can occur because the treatment for both illnesses is dopamine agonist therapy, which has been linked to the onset of pathological gambling in individuals who often had no prior history of gambling (Carter, 2016; Chiu & Hassan, 2016).

Gambling disorder rates are higher for those who have convenient access to gambling (Fong, 2005; Welte et al., 2016). When access to gambling opportunities rises, the prevalence of problem gambling also rises (Welte et al., 2016). An individual who lives within three minutes of a lottery retailer has twice the risk of becoming a problem gambler compared to an individual who live 10 min or more away (Welte et al., 2006). However, online access may be the most dangerous. With growing public acceptance of online gambling and eventual legalization of sports betting, online gambling opportunities will likely increase and be easily accessed from an individual's smartphone or computer (Conon, 2009; Gainsbury et al., 2019; Petry, 2006).

It is estimated that only 10% of problem gamblers receive treatment (McGlynn et al., 2009). However, a significant barrier to receiving treatment is the shame and stigma individuals experience when seeking help (Hing et al., 2016; Palmer et al., 2018). Such stigmatization is often insidious as it may be internalized by individuals affecting their psychological well-being, treatment-seeking, and recovery outcome (Hing et al., 2014).

While there is no standard agreed-upon first line of care for gambling disorder, there are effective treatments (Grant et al., 2014). However, heterogeneity of individuals with gambling disorder does complicate the research (Grant et al., 2014). Due to the paucity of gambling treatment research, there is a misconception that gambling disorder is untreatable, which is untrue (Rizeanu, 2015). Cognitive behavioral therapy (CBT) has the most substantial effectiveness evidence (Carter, 2016; Chiu & Hassan, 2016; Matheson et al., 2018; Rizeanu, 2015; Tolchard, 2017). Specifically, while research has found both cognitive and behavioral therapies to be effective, it has been recommended that a CBT approach should have a strong focus on cognitive restructuring, exposure therapy, and relapse prevention (Tolchard, 2017). In several studies, CBT has also been shown to be effective in the reduction of gambling severity and financial loss (Cowlshaw et al., 2012).

Although the U.S. Food and Drug Administration (FDA) has not approved any medication for gambling disorder, results thus far have been promising for opioid agonists and mood stabilizers (Goslar et al., 2019). The glutamatergic drug topiramate, a mood stabilizer, was effective when used in conjunction with a cognitive intervention (Goslar et al., 2019). Opioid antagonists, such as naltrexone, are considered effective in reducing gambling symptoms (Chiu & Hassan, 2016; Goslar et al., 2019). For example, in one study, participants taking naltrexone improved significantly more on a variety of gambling-related outcomes, compared to participants in the placebo group (Grant et al., 2008). Naltrexone has also consistently been found to be effective in reducing a variety of gambling behaviors and severity (di Nicola et al., 2019; Grant et al., 2008). While there is no standard agreed-upon first line of care for gambling disorder, most authors agree that a combination of psychotherapy, financial interventions, education, self-help approaches, and psychopharmacology tailored to the needs of the individual holds the most promise (Chiu & Hassan, 2016; Grant, et al., 2008; Rizeanu, 2015; Tolchard, 2017).

Gambling prevention programs have raised public awareness of the dangers of gambling while also advocating for more resources for the prevention and treatment of pathological gambling (Christensen et al., 2001; Messerlian et al., 2005). Public attitudes toward gambling can affect public policy, which can aid in the treatment and detection of gambling disorder (McAllister, 2014). Similar public health campaigns targeted at drunk driving and smoking have shown that an educated and aware public can help bring focus to health issues (Christensen et al., 2001).

The goal of primary problem gambling prevention programs is to prevent the development of related risk factors by increasing knowledge and awareness among the general public (Delfabbro et al., 2016; Messerlian et al., 2005). Secondary prevention programs are for those at risk for problem gambling to increase early identification to prevent any further escalation of gambling problems (Messerlian et al., 2005). Related prior studies have examined secondary prevention programs for example for casino or lottery employees (Giroux et al., 2008; Ladouceur et al., 2004; LaPlante et al., 2012). The results indicate that knowledge and attitudes related to identifying, assessing, intervening, and referring for treatment those with possible gambling disorder can be improved but changes often are not maintained at follow-up (LaPlante et al., 2012; Messerlian et al., 2005). Important components of secondary problem gambling prevention include early detection strategies, such as training and education to focus on knowledge and attitudes among health care workers to empower them to assess problem gambling risks and then respond effectively (Messerlian et al., 2005).

Given the co-occurrence of many adverse physical outcomes and psychological disorders, several studies have recommended that HSPs may be a particularly suitable target for program aimed at affecting knowledge and attitudes related to the early detection and

identification of problem gambling (Bazargan et al., 2001; Christensen et al., 2001; Fong, 2005; Kerber et al., 2015; Potenza et al., 2002). However, related knowledge and awareness among HSPs is often limited and there are gaps in the literature as to how extant scientific knowledge can be translated into practice (Mackay et al., 2015).

This purpose of the present study was to assess whether a brief virtual secondary prevention workshop can raise the level of gambling disorder knowledge among HSPs in hopes of improving early detection and appropriate referrals in the future. HSPs were specifically targeted for this virtual workshop because they are in an excellent position to provide early detection of problem gambling (Bazargan et al., 2001; Mackay et al., 2015).

This study seeks answers to these five research questions:

1. Can HSPs' attitudes towards gambling be affected by a brief training?
2. Can HSPs' perceived stigmatization of gamblers be affected by a brief training?
3. Can HSPs' knowledge about problem gambling, its detection, and appropriate referrals be improved after a brief training?
4. Will any improvement in HSPs' knowledge and attitudes about problem gambling, its detection, and appropriate referrals be maintained after twelve weeks?
5. How satisfied will HSPs be with the *Gambling Know More* brief training?

Method

Participants

Participants were recruited from among HSPs in a large metropolitan area in the Delta South. Those in the experimental group ($n=18$) were recruited from a multi-site community medical center, while the participants in the wait-list control group ($n=14$) were recruited from among trainees in health service psychology. Participants were required to be English-speaking, 18 years of age or older, and work as an HSP. Participant characteristics are reported in Table 1. All participating institutions approved the studies through their respective IRBs / Research Ethics Boards. All participants gave their informed consent.

Measures

Six instruments were used to measure gambling attitudes, gambling stigmatization, and gambling knowledge as well as demographic information, participant satisfaction, and interventionist workshop adherence.

Demographics Questionnaire

This questionnaire was created to obtain information regarding participants' gender, age range, ethnicity, education, job title, and whether they have ever had a friend or family member with a gambling problem.

Attitudes Towards Gambling Scale (ATGS-8; Canale et al., 2016)

This instrument was used to measure opinions concerning gambling. The ATGS-8 has been found to have sound psychometric properties over numerous studies with a Cronbach's

Table 1 Participant characteristics

Demographics	Groups		
	Experimental (<i>n</i> = 18) n (%)	Wait-List Control (<i>n</i> = 14) n (%)	Combined (<i>n</i> = 32) N (%)
Age range ^a			
18–24	0 (0.0)	3 (21.4)	3 (9.4)
25–34	6 (33.3)	10 (71.4)	16 (50.0)
35–44	5 (27.8)	0 (0.0)	5 (15.6)
45–54	4 (22.2)	1 (7.1)	5 (15.6)
55–64	2 (11.1)	0 (0.0)	2 (6.3)
65 and over	1 (5.6)	0 (0.0)	1 (3.1)
Gender ^b			
Male	3 (16.7)	6 (42.9)	9 (28.1)
Female	14 (77.8)	8 (57.1)	22 (68.8)
Prefer not to say	1 (5.6)	0 (0.0)	1 (3.1)
Race/ethnicity ^b			
White/Caucasian	12 (66.7)	10 (71.4)	22 (68.8)
Black/African American	5 (27.8)	4 (28.6)	9 (28.1)
Hispanic/Latino	1 (5.6)	0 (0.0)	1 (3.1)
Highest education ^b			
Some college, no degree	1 (5.6)	0 (0.0)	1 (3.1)
Bachelor's degree	2 (11.1)	4 (28.6)	6 (18.8)
Master's degree	14 (77.8)	8 (57.1)	22 (68.8)
Doctorate degree	1 (5.6)	2 (14.3)	3 (9.4)
Have friend or family member with a gambling problem ^b			
Yes	5 (27.8)	6 (42.9)	11 (34.4)
No	8 (44.4)	1 (7.1)	9 (28.1)
Maybe	5 (27.8)	1 (7.1)	6 (18.8)
Unsure	0 (0.0)	6 (42.9)	6 (18.8)

Per comparison *n* ranged from 30 to 38 due to missing data

^a Mann–Whitney U Test found a significant difference between groups at baseline ($U = 43.0$) The wait-list control group was on average 11 years younger than the experimental group.^bChi-square tests found no significant difference between groups at baseline. The random assignment yielded comparable groups even after attrition

alpha of 0.78 (Canale et al., 2016). Observed Cronbach's alpha across all administrations in this study was 0.76 ($N = 32$). The ATGS-8 yields a single scale with higher scores signifying positive public attitudes towards gambling, while lower scores indicated more negative public attitudes towards gambling.

Gambling Perceived Stigma Scale (GPSS; Donaldson et al., 2015)

This instrument was used to measure perceived stigma toward recreational and problem gamblers on two dimensions, contempt, and ostracism (Donaldson et al., 2015). The GPSS

has been found to have sound psychometric properties with a Cronbach's alpha of 0.89 for contempt and 0.87 for ostracism (Donaldson et al., 2015). Observed Cronbach's alpha in this study was 0.77 (N=32) for contempt and 0.80 (N=32) for ostracism. Higher scores on the GPSS indicate higher levels of stigma toward gamblers, while lower scores indicate less stigma. The overall scale is comprised of two subscales: contempt and ostracism.

Gambling Know More Survey (GKMS; LaPlante et al., 2012)

This instrument is in part based on the Gambling-Related Knowledge Survey (LaPlante et al., 2012). There are four domains of the Gambling-Related Knowledge signifying Science and best practices, defining addiction, gambling and public health, and gaming regulations. These subscales have good internal consistency with Cronbach's alphas ranging from 0.82 to 0.88. To create the GKMS seven questions from the Gambling-Related Knowledge Survey were used with an additional nine questions created to specifically query information covered in the workshop. The GKMS was scored by giving participants one point for each correctly answered question or partial credit for correct responses on those questions with multiple answers. The GKMS yields a single scale with higher scores signifying more knowledge about gambling.

Client Service Questionnaire-8 (CSQ-8; Attkisson & Greenfield, 2004)

This is a measure of consumer satisfaction used in various settings including medical and mental health facilities (Attkisson & Greenfield, 2004). The CSQ-8 that has been well validated, psychometrically tested, and has good internal reliability with a Cronbach's alpha ranging from 0.83 to 0.93 in prior studies (Attkisson & Greenfield, 2004). The CSQ-8 was adapted to measure study participants' satisfaction after the *Gambling Know More* workshop. Observed Cronbach's alpha in this study was 0.87 (N=32). The ATGS-8 yields a single scale with higher scores indicating more satisfaction with the training.

Facilitator Workshop Adherence Checklist

This checklist was designed as an implementation check to ensure that workshop modules, goals, and interventions were delivered as described. Higher scores meant better adherence to the workshop manual. Both workshops received perfect scores on the checklist.

The Intervention

The *Gambling Know More* workshop developed for this study, is a brief virtual gambling disorder knowledge and awareness training for HSPs based on existing scientific literature addressing gambling disorder. Components of *Gambling Know More* were created to raise knowledge and awareness among HSPs regarding identification, screening, and referral of problem gambling. By increasing knowledge and awareness through a brief virtual training process, the ultimate goal beyond the scope of this study is early detection of problem gambling in order to effect referrals to treatment. *Gambling Know More* was created through Prezi, an online presentation software company (Prezi, 2021). A full pdf version of *Gambling Know More* is available as a supplemental appendix.

There were two workshop facilitators. Presenter 1 was the workshop's creator, a male-identified biracial, Asian-American and Caucasian, advanced graduate student in health

service psychology. He presented the workshop for the experimental group and trained Presenter 2, a female-identified African American advanced graduate student in health service psychology presented the workshop to the wait-list control group. The purpose of having two workshop presenters was to ensure that the results of the study can be attributed to the workshop and are not due to the individual characteristics or traits of any single workshop facilitator.

Gambling Know More was designed to maximize short-term and long-term learning and be accessible to the largest number of HSPs. Therefore, a focus on the following aspects were prioritized:

1. *Visual Appeal of Gambling Know More* The design of the workshop included bright colors, simple and readable text, and animation of information and images within the Prezi presentation software slides. By creating a visually engaging training, the goal is to keep the participants' attention and focus on the presentation.
2. *Interactive Components of Gambling Know More* The design of the workshop included interactive features to facilitate audience participation to avoid any multitasking and distractions that may occur. By increasing focus and engagement, the participant may not only enjoy the training, but also learn valuable information about problem gambling. Specifically, a vignette about a senior citizen with a gambling problem was introduced to begin an audience discussion and an online poll in real-time was conducted as part of the workshop's lesson on risk factors for problem gambling.
3. *Brief Length of Gambling Know More* The length of the workshop was designed to be no longer than 40 min to accommodate the schedules of HSPs. By keeping the training brief, the goal was to increase workshop attendance of a workshop that could be presented during a lunch hour or grand rounds within a healthcare facility. When constructing a knowledge and awareness training for HSPs, it is important to realistically appraise the time burden that such training will have on its participants and the facility (Elliott et al., 2016; LaPlante et al., 2012).

Procedure and Design

The study utilized a quasi-experimental experimental group and wait-list control group design. A wait-list control group was used to control for threats of internal validity, such as history or maturation. Wait-list participants crossed over to the workshop condition after two measurements on study variables had been obtained. See Table 2 for the study design diagram. At the beginning of the study, the experimental group (A) completed their pre-test (O_1) consisting of the ATGS-8, the GPSS, and the GKMS, as well as a Demographics

Table 2 Study diagram

Group	Week number within study			
	Week 1	Week 5	Week 13	Week 17
NonR experimental group	$O_1 \times O_2$		O_3	
NonR wait-list control group	O_1	$O_2 \times O_3$		O_4

NonR quasi-experimental non-random assignment of participants to group, O_i indexed assessment, X Gambling Know More workshop

Questionnaire. The experimental group (A) was only asked to complete one pre-test. They then attended the *Gambling Know More* (X) via Microsoft Teams immediately after completion of their pre-test (O_1). After the workshop intervention (X), the experimental group (A) completed their posttest (O_2) which included the ATGS-8, the GPSS, GKMS, and CSQ-8. Concurrently, participants in the wait-list control group (B) completed their first pre-test (O_1) which included the ATGS-8, the GPSS, and the GKMS as well as a Demographics Questionnaire. Four weeks later, the wait-list control group completed their second pre-test (O_2), consisting of the ATGS-8, the GPSS, and the GKMS. They then immediately attended the *Gambling Know More* (X) workshop followed by their post-test (O_3) on the ATGS-8, the GPSS, the GKMS, and CSQ-8. Twelve weeks after each workshop, all participants completed their respective follow-up tests, consisting of the ATGS-8, the GPSS, and GKMS. For the experimental group their follow-up test is noted as (O_3) and for the wait-list control group, their follow-up test is noted as (O_4).

Data Analysis and Analytic Strategy

First, participant demographics were summarized. Because the groups might vary systematically in a quasi-experimental design, group equivalency was examined on sociodemographic and pre-test study variables. A between-groups Analysis of Covariance (ANCOVA) was conducted for each outcome measure, the ATGS-8, the GPSS, and the GKMS with group (experimental vs. control) as the independent variable and corresponding pre-intervention scores as the covariate. For subsequent analyses, data from the wait-list control group was combined with data from the experimental group as both eventually participated in the workshop. One-tailed paired sample t-tests were conducted for each of the outcome measures, the ATGS-8, the GPSS, and the GKMS, to evaluate whether there was a significant improvement among all participants from pre-test to post-test. Finally, analyses were conducted to see if pre to post changes were maintained at follow up. IBM SPSS 25.0 was used to conduct all analyses.

A power analysis was conducted using G*Power 3.1.9.6 which indicated that to achieve a power of 0.8, a sample size of $N=29$ would be required. The study had a sample size of $N=30$.

Results

Descriptive Statistics

The demographic information of participants is shown in Table 1 while the progression of participants through the study is shown in Fig. 1. The data of two participants in the wait-list control group was excluded from analysis because they were not HSPs.

Participants' mean pre-test scores (see Table 3) on the ATGS-8 and GPPS indicate neutral attitudes toward gambling and stigma. The ATGS-8 has a possible range of 8–40, with a higher score indicating a more positive attitude toward gambling. A score of 24 on the ATGS-8 indicates that the participant's responses are no more positive than they are negative. The experimental and wait-list control group's pre-test scores, 25.33 and 24.00 respectively, indicate a relatively neutral score. The GPPS has a possible range of 13–42, with a higher score indicating more stigmatization of gamblers. A score of 32.5 on the GPPS indicates that the participant's responses are more or less neutral in

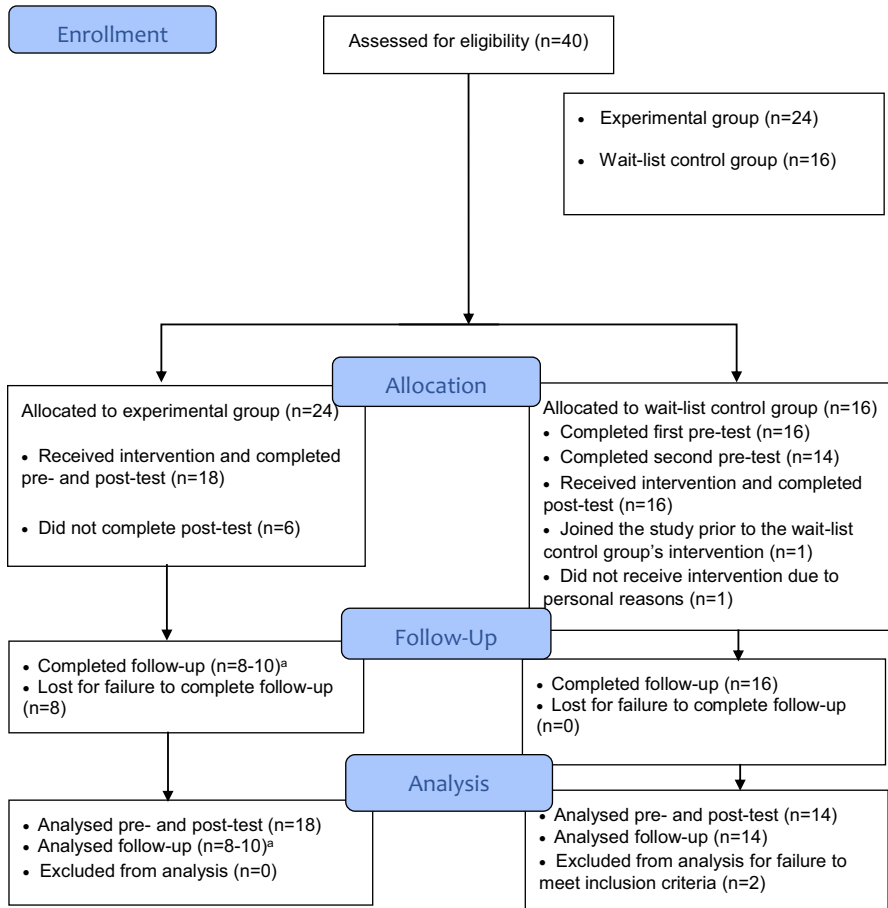


Fig. 1 CONSORT Flow Diagram. *Notes* ^aAt follow-up, 8 participants completed the Attitudes Towards Gambling Scale (ATGS-8), Gambling Perceived Stigma Scale (GPSS), and Gambling Know More Survey (GKMS), 9 participants completed the ATGS-8 and GPSS, and 10 participants completed only the GKMS

their levels of stigmatization. The experimental and wait-list control group's GPSS pre-test scores of 32.05 and 34.05 respectively, indicate a relatively neutral score. It should be noted that the standard deviations of both groups indicate a considerable variability on study measures within both groups. Finally, regarding gambling related knowledge, the GKMS has a possible range from 0 to 16. The experimental and wait-list control group's pre-test scores were 9.62 and 10.50, respectively.

A group equivalency evaluation was conducted to assess for differences between groups on their pre-test means. Independent sample t-tests were administered for all three measures, the ATGS-8, the GPSS, and the GKMS (see Table 3). There were no significant differences between groups on pre-test means with any measure.

Table 3 Group equivalence analysis of pre-test means on the ATGS-8, GPPS, and GKMS between the experimental group (n = 18) and the wait-list control group (n = 12)

Measure	Group		df	t	p
	Experimental pre-test M (SD)	Wait-list control pre-test M (SD)			
ATGS-8	25.33 (3.97)	24.00 (2.95)	28	0.99	.33
GPPS	32.05 (4.63)	34.50 (6.55)	28	-1.12	.24
GKMS	9.62 (1.97)	10.50 (1.43)	28	-1.32	.20

ATGS-8 attitudes towards gambling scale, GPPS gambling perceived stigma scale, GKMS gambling know more survey

Analysis of Intervention Effects

Training Effect Evaluation Between Groups

A series of ANCOVAs were conducted to evaluate how scores of the intervention group compared to those of the wait-list control group. Group assignment was the independent variable. For both groups, Observation 2 was the dependent variable. For the wait-list control group, Observation 2 was the second pre-test. For the experimental group, Observation 2 was their post-test. For all ANCOVAs, Observation 1 served as the covariate. (see Table 4).

There was a statistically significant group difference for gambling attitudes on the ATGS-8 ($F(1, 27) = 4.03, p = 0.027, \eta^2 = .13$). These results indicate that workshop participation significantly decreased participating HSP’s positive attitudes towards gambling. The effect size was medium.

There was not a statistically significant group difference for stigmatizing beliefs on the GPPS. These results indicate that workshop participation did not affect participants’ level of gambler stigmatization.

There was a statistically significant intervention effect on gambling knowledge on the GKMS ($F(1, 27) = 8.12, p = 0.004, \eta^2 = 0.23$). This indicates that workshop participation significantly increased participating HSPs problem gambling knowledge. The effect size was large.

Table 4 Means, standard deviations, and ANCOVA results for between group comparison at observation 2 using observation 1 as the covariate

Measure	Group		df	F
	Experimental observation 2 M (SD)	Wait-list control observation 2 M (SD)		
ATGS-8	22.17 (5.00)	24.67 (3.70)	1, 27	4.03*
GPPS	33.00 (5.99)	35.50 (4.08)	1, 27	0.58
GKMS	13.04 (2.88)	10.52 (1.89)	1, 27	8.12**

ATGS-8 attitudes towards gambling scale, GPPS gambling perceived stigma

Scale, GKMS gambling know more survey * $p < .05$; ** $p < .01$

Training Effect Evaluation Within Groups

For further analyses, data from both groups were combined. Observation 1 scores were used as the pre-workshop score for the experimental group, Observation 2 scores were used as pre-workshop scores for the wait-list control group. Observation 2 scores were used as post-workshop scores for the experimental group. Observation 3 scores were used as post-workshop scores for the wait-list control group (see Table 2 for timing of all observations). Results are summarized in Table 5.

Participants' ($N=32$) satisfaction with the workshop was evaluated based on their scores on the Client Satisfaction Questionnaire. The mean score of 29.56 (95% CI 28.5 to 30.6) indicates a high level of satisfaction with *Gambling Know More* training.

A paired-sample t-test comparing pre- and post-workshop scores confirmed a significant difference in attitudes toward gambling as operationalized by the ATGS-8 ($t(31)=2.96$, $p<0.003$, $d=0.52$, power=0.89). This means that participants' attitudes towards gambling were less positive after attending the workshop. The effect size was medium.

A paired-sample t-test on pre- to post-workshop changes in stigmatizing beliefs as operationalized by GPSS scores found the training did not significantly affect participants' stigmatization for those who gamble ($t(31)=-0.45$, $p>0.326$).

Regarding the impact of the workshop on participants' knowledge of problem gambling, as measured by the GKMS, a paired-sample t-test confirmed an increase in problem gambling knowledge after the workshop ($t(31)=-6.31$, $p<0.001$, $d=1.12$ (large effect size), power=0.99).

Analysis of Maintenance of Intervention Effects

The study included follow-up assessment for all measures to evaluate if workshop effects would be maintained after twelve weeks. For the experimental group the follow-up evaluation occurred at Observation 3, for the wait-list control group it occurred at Observation 4 (see Table 2).

Table 5 Comparison of outcome measures pre-test to post-test, post-test to follow-up, and pre-test to follow-up

Measure	N	Test			<i>t</i>	<i>d</i>
		Pre- <i>M</i> (<i>SD</i>)	Post- <i>M</i> (<i>SD</i>)	Follow-up <i>M</i> (<i>SD</i>)		
ATGS-8	32	25.16 (3.73)	22.75 (4.10)		2.96**	0.52
	24		23.12 (3.30)	25.67 (4.77)	-2.58**	0.53
	24	25.42 (4.05)		25.67 (4.77)	-0.32	
GPSS	32	33.59 (4.56)	34.00 (5.47)		-0.45	
	23		34.30 (4.29)	34.65 (5.89)	-0.31	
	23	33.83 (4.84)		34.65 (5.89)	0.73	
GKMS	32	10.08 (1.93)	13.05 (2.25)		-6.31**	1.12
	22		13.23 (1.86)	11.72 (2.16)	2.40*	0.51
	22	10.56 (1.85)		11.72 (2.16)	-2.11*	0.45

ATGS-8 attitudes towards gambling scale, GPSS = gambling perceived stigma scale; GKMS gambling know more survey. * $p<.05$; ** $p<.01$

Gambling attitudes as operationalized by the ATGS-8 at follow-up (see Table 5) had reverted significantly compared to post-workshop attitudes ($t(23) = -2.58, p < 0.008, d = 0.53$ (medium effect size), and power = 0.81) and were no longer different from baseline scores ($t(23) = -0.32, p > 0.377$). This means that the post-workshop effect, a reduction of positive attitudes towards gambling, was not maintained twelve weeks later.

Because the workshop did not significantly affect stigmatizing as measured by the GPSS, it stands to reason GPSS follow-up scores would be likewise unaffected. However, there is a phenomenon known as the “sleeper effect” in which the impact of a workshop may not immediately evident but occur only after a passage of time. To assess for a possible “sleeper effect”, participants’ GPSS pre- and follow-up-scores were compared using a paired samples t-test (see Table 5). No significant results were found indicating that there is no evidence of a “sleeper effect” of the workshop when it comes to stigmatizing attitudes ($t(22) = -0.73, p > 0.237$).

Regarding problem gambling knowledge as operationalized with the GKMS, findings indicated that despite a significant drop in knowledge from post-workshop to follow-up ($t(21) = 2.40, p < 0.013, d = 0.51$ (medium effect size), power = 0.75), when comparing pre-workshop to follow-up GKMS scores, knowledge at follow-up was still significantly higher than at baseline ($t(21) = -2.11, p < 0.023, d = 0.45, \text{power} = 0.65$). This means that problem gambling knowledge was still significantly better twelve weeks after the workshop than before the workshop. The effect size was small.

Discussion

Summary

The purpose of this study was to examine five research questions regarding the effects of a brief virtual training on attitudes, stigmatization, and knowledge of problem gambling among HSPs. The first research question was answered in the affirmative because the *Gambling Know More* workshop significantly lowered participants’ positive public attitudes toward gambling immediately after the workshop, however, in a partial answer to the fourth research question, this change was not maintained at follow-up twelve weeks later. In answer to the second research question, the workshop also did not have a significant effect on the participants’ level of stigmatization of problem and recreational gamblers. However, in answer to the third research question, the workshop did significantly increase participants’ knowledge regarding problem gambling over baseline. In partial answer to the fourth research question, despite some losses during the follow-up period, knowledge improvements were still evident twelve weeks after the workshop. And the fifth research question was answered in the affirmative because participants were highly satisfied with the *Gambling Know More* workshop.

Strengths and Limitations

The study has several strengths, including its quasi-experimental design, use of multiple outcome measures and workshop presenters, as well as a diverse participant pool. Despite their significant age difference, both groups positively responded to the workshop in a similar fashion. Besides the significant increase in knowledge among

participants, the *Gambling Know More* workshop was also shown to be feasible in its execution. The workshop was implemented as intended in two different settings by two different facilitators within the allotted time of approximately 35–40 min utilizing two different virtual formats. Finally, the participant satisfaction measure showed participants enjoyed the workshop and were extremely satisfied with the overall content, presentation, and value of the *Gambling Know More* workshop. Some of the comments included: “This training has opened my mind to the idea of those around me whom may be suffering but have not been diagnosed.” “It was a very helpful training.” “Very comprehensive and you used just enough detail for this to be useful to a clinician but also digestible for a lay person.”

Although participants’ positive attitudes towards gambling were significantly decreased immediately after training, their positive gambling attitudes at the follow-up were again comparable to pre-workshop levels. One explanation for this unexpected finding may be that the specific content of the workshop was chosen not to lower participants’ positive attitudes toward gambling, but to raise their knowledge regarding problem gambling. Another reason may be that while the workshop provided knowledge to participants, their attitudes toward gambling, though malleable in the short-term, may be more ingrained and this more difficult to change in the long-term.

Another unexpected finding was that participants’ level of stigmatization toward gamblers was also not significantly affected by the workshop. This may be a measurement artifact inherent in the GPSS instrument, specifically the wording of the statements. All of the statements in the GPSS either begin with or contain the words “most people” (e.g., “Most people believe that problem gamblers have no self-control.”) The *Gambling Know More* workshops likely did not affect participants’ idea of the negative views “most people” may have toward problem and recreational gamblers because the workshop focused on the self-beliefs of the participants. Further, the wording of items on the GPSS may create an undue focus and awareness on the problems of the gambler. By asking participants to focus solely on the negative attributes of the gambler, the measure may create a testing environment in which disapproval and stigmatization would be the only logical responses, regardless of the knowledge gained in the workshop. Another reason for a lack of change in stigmatization may be that the content of the workshop was chosen not to lower stigmatization of gamblers but help HSP’s acquire related knowledge.

The virtual presentation of the *Gambling Know More* workshop was chosen in part due to the COVID-19 pandemic. Participants in both the experimental and wait-list control group attended the workshop and completed the assessments remotely, possibly from home. While this was necessary due to safety concerns, participants’ focus and attention may have been diminished due to possible distractions.

Given the quasi-experimental design of the study, participants were assigned to groups in existing cohorts. However, analyses of participant demographics at baseline found that the experimental and wait-list control groups were comparable on variables of gender, race/ethnicity, highest level of education, and whether they knew of a friend or family member with a gambling problem. The only significant difference between the two groups was the mean age of the participants: the wait-list control group was approximately eleven years younger than the experimental group.

With any quasi-experimental study, threats to internal validity must always be considered. The attrition rate for the experimental group was very high with half of those participants failing to complete the follow-up assessment. There are several factors that may account for such attrition. First, the experimental group consisted of full-time HSPs in

a healthcare setting while the wait-list control group consisted of HSPs whose time was divided between academic and healthcare settings. Second, time and schedule constraints in a pandemic may have affected the experimental group more than the wait-list control group given the demands on HSP time in the midst of a pandemic. However, when combined, both groups showed similar responses to the workshop. Both groups showed a decrease in their positive attitudes towards gambling immediately after the workshop but returned to their baseline attitudes twelve weeks later. Both benefitted from an increase in their short- and long-term knowledge of problem gambling and both were satisfied by the workshop itself as evidenced by their scores on the *Gambling Know More* Survey and the Client Satisfaction Survey.

Due to lack of power, it was not possible to conduct subgroup analyses to see if results varied for specific HSPs, such as doctors or nurses. Also, participating HSPs identified mostly as White or Caucasian (68.8%) with a minority of Black or African American participants (28.1%) and one participant that identified as Hispanic or Latino (3.1%). There were no participants identified as American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islanders, or two or more races. While the racial makeup of the participants is representative of HSPs in the Delta South region, the relatively small number of non-White participants made a racial sub-group analysis impossible. It is therefore not known if the workshop differently affected members of diverse racial or ethnic groups.

Implications for Research

The findings of this study are consistent with prior research indicating an increase in knowledge after gambling workshop attendance, which may not be fully maintained at follow-up (Giroux et al., 2008; Ladouceur et al., 2004; LaPlante et al., 2012; Messerlian et al., 2005.) Future studies may benefit from specific elements, such as short “reminder” videos, or booster sessions to increase maintenance of effects (cf. LaPlante et al., 2012). Future research may also want to explore better ways to change HSP’s attitudes toward gambling and gamblers because these, in contrast to HSP knowledge were not sustainably improved in this study. c

While an in-person training format has many benefits, a virtual platform does as well. Successful knowledge and awareness trainings must be pragmatic in design and consider the time and resource drain of its participants (Elliott et al., 2016; LaPlante et al., 2012). Virtual trainings can offer a level of flexibility and accessibility, while remaining time and cost-effective as compared to an in-person format. Virtual trainings can also be an ideal format for reaching persons that would not otherwise be accessible due to practical concerns such as cost, location, and time.

One way to decrease attrition among participants may be to present the workshop and to collect follow-up data at times HSPs are already scheduled to meet, such as during their grand rounds, a monthly meeting of healthcare professionals within a hospital or medical care facility, instead of scheduling the workshop on a unique date and time. Another solution may be to present the workshop and collect follow-up data virtually at various times of the day over a designated period in order to accommodate the often demanding and hectic schedules of the HSP participants.

Future research would also benefit from including diverse participants including Asian and American Indian HSPs given the unique cultural influences of gambling among Asians and American Indians. From a logistical perspective, a virtual platform would likely be

ideal in making such workshops available to diverse groups who may not be reached as effectively in in-person trainings.

While created specifically for HSPs, the *Gambling Know More* workshop may be effective in other settings as well, such as for at-risk populations including veterans and senior citizens. Given that the prevalence of gambling disorder among veterans is twice that of the general population (Shirk et al., 2018), Veteran Administration (VA) hospitals across the country could adapt and present, such workshops. Senior citizens have a particular need for workshops such as this as they may suffer more negative and adverse consequences due to problem gambling because their income and earning potential tend to be limited if they are retired and on a fixed income (Bazargan et al., 2001; Kerber et al., 2015; McNeilly & Burke, 2001). Further, seniors may be more private and less help-seeking than other age groups which may keep any gambling problems hidden for a considerable time (Bjelde et al., 2008; Matheson et al., 2018; McNeilly & Burke, 2001). Finally, future research may wish to examine whether a workshop such as *Gambling Know More* leads to an increase in detection of and treatment referrals for problem gambling.

Implications for Practice

With an increase in knowledge of problem gambling, detection strategies, and local resources, HSPs may be better equipped to effectively respond to any potential patients with problem gambling (cf. Messerlian et al., 2005). Policies on training for HSPs should therefore include the ability to validly assess for gambling problems, using gambling screening measures, ability to do brief interventions, mainly with the goal of appropriately referring identified high-risk patients (Messerlian et al., 2005). The approach is particularly promising as patients already have confidence in their healthcare providers creating an excellent opportunity and environment for early detection of problem gambling (Bazargan et al., 2001; Kerber et al., 2015; Lee, 2014; Mackay et al., 2015). Findings of the present study therefore that participation in *Gambling Know More* may potentially lead to higher rates of detection and treatment referrals for gambling disorder and problem gambling. By utilizing a brief intervention model that considered the time and schedule demands of HSPs within the design, this study built upon prior literature that found similar models to effectively increase HSP knowledge, skills, and attitudes on a broad variety of topics (e.g., Elliott et al., 2016; Oordt et al., 2009; Sheffer et al., 2009).

Conclusion

When HSPs participate in the *Gambling Know More* workshop they increase knowledge and awareness of gambling disorder and problem gambling. This may allow for improving early detection of problem gambling and increase referrals to available treatment resources, thereby reducing the harm caused by prolonged and chronic problem gambling. Those who determine policies for the training and continuing education of HSPs may therefore want to consider adding participation in workshops such as *Gambling Know More* to training curricula.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10899-022-10176-w>.

Data Availability Study data are available upon IRB review.

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