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SPRinG—a Smartphone-Delivered Intervention to Support Self-Management of Gambling Harm Reduction and Recovery: A Pilot Feasibility Study

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Abstract. Despite the growing interest in the potential for smartphone-delivered interventions to make gambling harm supports more accessible, few studies assess their implementation in real-world environments. The purpose of this pilot study was to explore the feasibility of SPRinG (Supporting People Recovering from Gambling), a smartphone-delivered digital health tool to support self-management of gambling harm reduction and recovery. We examined longitudinal, user-generated SPRinG app data from 249 participants collected between July 6, 2023 and March 28, 2024. Findings indicate the app reached a diverse set of people experiencing gambling-related harms, including women and people experiencing financial and housing insecurity. Women represented about one-third of the sample, and while most women in the sample were younger (under 35 years), nearly 40% were 45 years old or older. Nearly all participants (93.7%) met criteria for high risk of problem gambling. The majority were also not in treatment at the time of app adoption. Most Gambling Journal entries indicated gambling alone and at home. Findings also showed low app engagement after initial adoption, consistent with previous research. More work is needed to understand “what works” (i.e., features, approaches, designs, systems, platforms) to promote engagement with digital health interventions for gambling.

Keywords: Problem Gambling, mHealth App, Feasibility, Self-management, Gender Differences, Poverty, Homelessness.

INTRODUCTION

Problem gambling and gambling disorder are serious public health issues affecting between 0.12–5.8% of the general population (Calado & Griffiths, 2016). Although most adults who gamble do not develop problems, for those who do experience a gambling disorder (*Diagnostic and statistical manual of mental disorders : DSM-5-TR*, 2022), the consequences are often severe, such as depression, suicide, poverty and homelessness (Hahmann et al., 2020; Matheson et al., 2021; Shaffer & Korn, 2002).

Gambling Treatment

There are several evidence-based interventions for people experiencing gambling problems, including cognitive-behavioural therapy and brief interventions (Quilty et al., 2019), such as motivational interviewing (Cowlshaw et al., 2012). Gambling interventions are primarily delivered in-person via professional-clinical service contexts (Petry et al., 2017), but several barriers to services contribute to low rates of treatment-seeking and care, such as prohibitive commutes to services, long service wait times, unaffordable service costs, shame, stigma, and other self-identity concerns (Goslar et al., 2017; Guilcher et al., 2016; Hodgins & el-Guebaly, 2000; Pascoe et al., 2013; Pulford et al., 2009; Rockloff & Schofield, 2004; Suurvali et al., 2009; Tavares et al., 2002). Research shows that gambling harm prevention and treatment services are often inaccessible to the people who need them, when they need them, particularly among populations shouldering a disproportionate burden of gambling harms, such as people experiencing poverty and/or homelessness (*Gambling and Poverty*, 2022; Matheson et al., 2022; Matheson et al., 2014; Matheson et al., 2015). Given low rates of treatment participation and existing gaps in services and barriers to care, it is important to explore the potential of alternative treatment modalities and to design, develop, and implement gambling interventions in ways that increase their appeal, accessibility, and usability. Ultimately, we need to bridge the gap between *evidence for* and *engagement with* gambling interventions (Bijker et al., 2022).

Self-Management

Self-management is emerging as an effective alternative or complement to formal gambling treatment (Matheson et al., 2019; Matheson et al., 2018). In health research and practice, self-management refers to “an individual’s ability to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes inherent in living with a chronic condition. Efficacious self-management encompasses the ability to monitor one’s condition and to affect the cognitive, behavioural and emotional responses necessary to maintain a satisfactory

quality of life” (Barlow et al., 2002, p.178). Self-management for chronic health conditions has gained momentum as an important complement to clinical care (Barlow et al., 2002; Barrio et al., 2017; Gainsbury & Blaszczynski, 2011; Hulton et al., 2015; Lorig & Holman, 2003). Research indicates self-management interventions may also be effective interventions for drug and alcohol addictions (Barrio et al., 2017; Sakakibara et al., 2017), as well as behavioural addictions, such as excessive internet use (Akın et al., 2015). The use of self-management, self-help, and remote care strategies for problem gambling is an important area of gambling research (Boumparis et al., 2023; Brazeau et al., 2024; Brazeau & Hodgins, 2022; Gainsbury & Blaszczynski, 2011; Hodgins et al., 2019; Hodgins et al., 2001; Hodgins et al., 2013; Lubman et al., 2015; Matheson et al., 2019; Moore et al., 2012; van der Maas et al., 2019). But, more work is also needed to address the potential of self-management strategies among distinct subpopulations at risk of experiencing gambling harms, including women and those living in poverty (Kryszajtys et al., 2018; Matheson et al., 2019; Matheson et al., 2018).

Smartphone-Delivered Interventions

Mobile technologies may enable and enhance the delivery of self-management interventions (Cafazzo et al., 2012; Solomon, 2008), and reduce some of the barriers that have limited the uptake, engagement, and effectiveness of traditional gambling interventions (Businelle et al., 2020; Linnemayr et al., 2021; Santa Maria et al., 2021; Walters et al., 2022). The rapid innovation and development of smartphone technologies has created new opportunities for developing, delivering, and accessing addiction, relapse, and recovery supports (Savic et al., 2013). Digital health tools, such as smartphone-delivered mobile health (mHealth) apps, may improve access and adherence to care, and have the potential to address core challenges in current gambling services, such as high relapse rates and the reality that mental health and addiction services in Canada and other jurisdictions are not meeting public needs. Assessing app feasibility—uptake and use—is critical to the overall impact of digital health interventions, informing future design, development, and implementation (Naslund et al., 2015). Relative to other domains of problem behaviour (Marcolino et al., 2018), such as smoking, lifestyle, nutrition, and mental health (BinDhim et al., 2018; Linardon & Fuller-Tyszkiewicz, 2020; Verbiest et al., 2018; Volkova et al., 2016), there are few examples of gambling-focused mHealth apps in the app marketplace, and fewer still, studied and published in the research literature (Coral et al.; Humphrey et al., 2020; Merkouris, 2023; Pfund et al., 2019; Rodda et al., 2025; So et al., 2020).

Purpose

We heard from community service agencies that a self-management app would support people in managing their gambling urges and behaviours

and reduce gambling-related harms, particularly in the current service environment characterized by the absence of adequate, low-barrier, context-responsive support options. Our research team co-designed and -developed SPRinG—Supporting People Recovering from Gambling—with community partners and persons with lived experience (*SPRinG: Supporting People Recovering from Gambling*), a unique and low-barrier digital health tool to support anyone experiencing gambling concerns to self-manage their gambling urges, behaviours, recovery and harm reduction. Given the high rates of gambling problems among persons experiencing poverty and homelessness (Lepage et al., 2000; Matheson et al., 2014; Nower et al., 2015; Sharman, 2019; Sharman et al., 2015; Turner et al., 2023), we designed SPRinG to be responsive to (but not exclusive to) this context. Features include: (1) gambling problem self-assessment tools (Ferris & Wynne, 2001a, 2001b; Kim et al., 2009; Raylu & Oei, 2004) to establish a baseline for problematic gambling and tracking progress; (2) urge and gambling journals to identify triggers and high-risk situations; (3) weekly insights into gambling urges and patterns to increase awareness and inform decision-making; (4) tailored self-management tips to gain greater control and maintain progress; (5) urge distraction and grounding resources to help users deal with challenging situations; and (6) 24/7 connections to crisis and gambling help lines. We designed SPRinG to collect anonymized socio-demographic characteristics and real-time user data, which allowed us to examine app uptake and use.

The purpose of this pilot study is to explore the feasibility of SPRinG. Consistent with the mHealth app feasibility studies (Naslund et al., 2015), feasibility is defined as the degree to which participants adopted and used the app as intended. The primary objective of this research is to assess patterns of uptake and use of SPRinG. The secondary objective is to explore patterns in the urges and gambling behaviours of participants, including associations between urges, gambling and related situational factors. We also explore patterns of app uptake and use as well as patterns of gambling urges and behaviours stratified by gender.

METHODS

Study Design

We conducted a quantitative pilot feasibility study of the SPRinG app. We used the SPRinG app user data to explore patterns and correlates of uptake and use.

Eligibility Criteria

Individuals were eligible for inclusion in the study if they resided in Canada and were 19 years old or older.

Recruitment

We advertised the availability of the app through community partners and their networks including The Responsible Gambling Council,

who promoted SPRinG through the Ontario Lottery and Gaming PlaySmart Centres at brick-and-mortar gambling venues across Ontario. We also advertised SPRinG through clinician networks at Unity Health Toronto and the Centre for Addiction and Mental Health, through social media platforms including the Justice & Equity Lab's Twitter/X account, the Centre for Addiction and Mental Health EENet platform, Gamblers Anonymous Facebook Group, GamTalk, Reddit Problem Gambling Forum, and community partner LinkedIn accounts. The SPRinG app was available for download to anyone in Canada via the Apple App Store and Google Play. People who accessed SPRinG directly through Google Play or the Apple stores in Canada were actively recruited through the consent process within the app. In order to unlock the features and use SPRinG, individuals had to consent to research participation via an online form in the app.

Sample Size

Between July 6, 2023 and March 28, 2024, 369 individuals downloaded the app, 263 consented to participate in the study, and 249 completed the sociodemographic questionnaire. For the purposes of this study, we report on the 249 participants who completed the sociodemographic questions.

Descriptive Measures

Participants reported sociodemographic information, including age, gender, and housing, income, education, race, recent immigration, and current gambling treatment status. Participants also completed the Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001a; Wynne, 2003), a 9-item instrument, with possible scores of 0-27, which provides a measure of past-year problem gambling. A PGSI score of 0 indicates non-problem gambling; 1-2 low level of problems; 3-7 moderate level of problems; and 8+ problem gambling. Upon completion of the PGSI, the app displayed the PGSI score to the user with a description of their risk category (e.g., "If your score is between 8 and 27, your gambling is leading to negative consequences and you may have lost control of the gambling behaviour").

Feasibility Measures

App uptake refers to the intention, initial decision, or action to try or employ an intervention. We assessed app uptake via participant (a) recruitment defined as completion of sociodemographic data and the PGSI and (b) retention defined as the duration between date of consent and most recent journal or Gambling Symptom Assessment Scale (G-SAS) entry (Kim et al., 2009). We explored patterns and correlates of app uptake and use stratified by gender. *App use* refers to the degree to which people use the intervention as intended. We assessed app use via completion of journal entries (user-initiated) and/or G-SAS entries (users received weekly prompts to complete the G-SAS).

Data Collection

All quantitative data were collected through active data collection of user entries and activities within the SPRinG app.

Data analysis

Descriptive statistics provided profiles of baseline socio-demographic characteristics, gambling urges and behaviours, PGSI (Ferris & Wynne, 2001a; Wynne, 2003) and G-SAS scores (Cunningham et al., 2019; Kim et al., 2009). We calculated means and standard deviations for continuous variables and counts and percentages for categorical data. Gender identity differences with respect to sociodemographic characteristics, PGSI and G-SAS scores, number of journal entries, and days from enrollment to last journal entry were compared using the chi-square test or the Mann-Whitney test. The Spearman correlation coefficient was calculated to measure relationships between PGSI score, days of use and number of journal entries. Statistical significance was defined if the two-sided p-values were less than 0.05. All analyses were conducted using IBM SPSS Statistics for Windows, Version 24.0 (Armonk, NY: IBM Corp.).

Ethical Considerations

The study received ethics approval (Unity Health Toronto REB 22-060), and was conducted in compliance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. All participants provided consent within the app prior to having full access to the app's features. Within the app, participants were provided with the letter of information and consent (by checking "I agree") as well as self-declaration of age. Administrative data (i.e., user email addresses) and research data (e.g., journal entries) were stored in separate databases on a secure server at St. Michael's Hospital. Administrative data was not accessible to the research team, only to an approved third-party server maintenance service provider.

RESULTS

Table 1 presents the sociodemographic characteristics of participants. Between July 6, 2023 and March 28, 2024, 249 people participated in the study. Just over half of the sample was 19-34 years old (n=133, 53.4%), with 34.1% women and 1.6% gender diverse persons. Ten people reported they were of multi-racial identity. The primary source of income identified was from employment (n=207), with 55.0% of the sample reporting a college or university level education, while 20.9% reported precarious housing situations (i.e., rooming/multi-tenant house, social housing, staying with friends or family), and 21.7% reported annual incomes of less than \$25,000. The majority of participants were not currently in treatment for gambling problems (n=206, 82.7%).

Table 1. Participant sociodemographic characteristics (N = 249).

Sociodemographic Characteristics		
Age Group	19-24	51 (20.5%)
	25-34	82 (32.9%)
	35-44	60 (24.1%)
	45+	51 (20.5%)
	Prefer not to answer	5 (2.0%)
Gender Identity	Female/Woman	85 (34.1%)
	Male/Man	155 (62.2%)
	Other	4 (1.6%)
	Prefer not to answer	5 (2.0%)
Housing Situation	Apartment or condominium	59 (23.7%)
	House	121 (48.6%)
	Precarious Housing	52 (20.9%)
	Other	6 (2.4%)
	Prefer not to answer	11 (4.4%)
Annual Net Income	< \$25,000	54 (21.7%)
	\$25,000 - \$39,999	34 (13.7%)
	\$40,000 - \$54,999	32 (12.9%)
	\$55,000 - \$69,999	31 (12.4%)
	\$70,000 - \$84,999	20 (8.0%)
	\$85,000 +	57 (22.9%)
	Prefer not to answer	21 (8.4%)
Money Source	Employment income/wages	207 (83.1%)
	Gambling	28 (11.2%)
	Family and/ or friends	27 (10.8%)
	Government Financial Assistance [‡]	10 (4.0%)
	Pension	12 (4.8%)
	Other	18 (7.2%)
	Prefer not to answer	12 (4.8%)
Highest Education	University	82 (32.9%)
	College or other non-university certificate/diploma	55 (22.1%)
	High school graduate, diploma or equivalent	76 (30.5%)
	Registered Apprenticeship, Trades certificate/diploma	11 (4.4%)
	Less than high school	14 (5.6%)
	Prefer not to answer	11 (4.4%)
Current Gambling Treatment	No	206 (82.7%)
	Yes	30 (12.0%)
	Prefer not to answer	13 (5.2%)
Single vs. Multi-Racial Identity	Single-Racial	229 (92.0%)
	Multi-Racial	10 (4.0%)
	Prefer not to answer	10 (4.0%)

[‡] Ontario Works/Employment Insurance/Ontario Disability Support Plan

Table 2 presents sociodemographic characteristics stratified by gender. Women in the sample were more likely to be older while men were more likely to be younger ($p < 0.0001$). Most women ($n=56$, 65.9%) and about half of men ($n=79$, 50.9%) reported a college or university level education. There was a statistically significant association between education and gender ($p = 0.0239$). The primary source of income identified

was from employment for both women (n=69, 81.2%) and men (n=136, 87.7%). With respect to housing and financial insecurity, 18.8% of women (n=16), and 22.6% of men (n=36) reported precarious housing situations (i.e., rooming/multi-tenant house, social housing, staying with friends or family), and 10.6% of women (n=9) and 27.1% of men (n=42) reported annual incomes of less than \$25,000. Still, there were notable numbers of both women and men distributed across other income brackets, including incomes higher than \$85,000 (22.4% of women (n=19), 24.5% of men (n=38)). The majority of women (n=71, 83.5%) and men (n=130, 83.9%) reported not being in gambling treatment at study enrollment.

Table 2. Participant sociodemographic characteristics by gender identity.

Sociodemographic Characteristics		Gender Identity	
		Female/Woman N=85	Male/Man N=155
Age Group	19-24	7 (8.2%)	43 (27.7%)*
	25-34	18 (21.2%)	61 (39.4%)
	35-44	26 (30.6%)	34 (21.9%)
	45+	33 (38.8%)	17 (11.0%)
Housing Situation	Apartment or condominium	22 (25.9%)	35 (22.6%)
	House	45 (52.9%)	75 (48.4%)
	Precarious Housing	16 (18.8%)	35 (22.6%)
	Other	1 (1.2%)	4 (2.6%)
Annual Net Income	< \$25,000	9 (10.6%)	42 (27.1%)
	\$25,000 - \$39,999	15 (17.6%)	19 (12.3%)
	\$40,000 - \$54,999	13 (15.3%)	19 (12.3%)
	\$55,000 - \$69,999	12 (14.1%)	18 (11.6%)
	\$70,000 - \$84,999	9 (10.6%)	10 (6.5%)
	\$85,000 +	19 (22.4%)	38 (24.5%)
Money Source	Employment income/wages	69 (81.2%)	136 (87.7%)
	Gambling	10 (11.8%)	16 (10.3%)
	Family and/ or friends	9 (10.6%)	16 (10.3%)
	Government Financial Assistance [‡]	5 (5.9%)	3 (1.9%)
	Pension	11 (12.9%)	1 (0.6%)
	Other	10 (11.8%)	7 (4.5%)
	Prefer not to answer	2 (2.4%)	6 (3.9%)
Highest Education	University	27 (31.8%)	54 (34.8%)*
	College, or other non-university certificate/diploma	29 (34.1%)	25 (16.1%)
	High school graduate, diploma or equivalent	22 (25.9%)	52 (33.5%)
	Registered Apprenticeship, or other Trades certificate/diploma	4 (4.7%)	7 (4.5%)
	Less than high school	2 (2.4%)	11 (7.1%)
Current Gambling Treatment	No	71 (83.5%)	130 (83.9%)
	Yes	10 (11.8%)	19 (12.3%)

Significant chi squared test p value indicated by:

* p<0.05

*** p<0.001

Prefer not to answer (missing data) and other genders were removed prior to conducting statistical tests due to small cell counts.

[‡] Includes Ontario Works/Employment Insurance/Ontario Disability Support Plan

PGSI data (n=238) showed that 93.7% (n=223) were in the high-risk category. Nearly all men (96.8%) and most women (88.1%) scored high-risk on the PGSI, with mean scores of 17.92 (SD=6.05) and 17.38 (SD=7.27), respectively. Gender identity was not associated with PGSI score.

The data in SPRinG also allowed us to capture use of features. Table 3 presents social-situational contexts of gambling events. Most journal entries were gambling related (n=144, 79.5%; for number of journal entries stratified by gender, see Table 4). The most common social-situational contexts of gambling entries included gambling alone (n=113, 77.4%); playing slots/EMGs/VLTs (n=93, 61.6%); and losing less than \$500 (n=67, 48.4%). One quarter of gambling events included losses of \$1000+ (n=37, 24.5%).

Table 3. Social-situational contexts of gambling events identified in journal entries by gender identity.

		Gender Identity		
		Female/Woman	Male/Man	Total
		N=55	N=89	N=144
Amount of Money Lost	<500	29 (52.7%)	38 (42.7%)	67 (48.4%)
	500-999	14 (25.5%)	14 (15.7%)	28 (17.6%)
	>1000	9 (16.4%)	28 (31.5%)	37 (24.5%)
Gambling Location	Gambling Venue	12 (21.8%)	15 (16.9%)	27 (17.0%)
	Home	36 (65.5%)	66 (74.2%)	102 (73.0%)
	Work	7 (12.7%)	16 (18.0%)	23 (16.4%)
	Other	6 (10.9%)	9 (10.1%)	15 (10.1%)
Gambling Type	Slots/EGMs/VLTs	49 (89.1%)	44 (49.4%)	93 (61.6%)
	Table Games	4 (7.3%)	27 (30.3%)	31 (23.9%)
	Horse Racing	0 (0.0%)	3 (3.4%)	3 (2.5%)
	Lottery Games	4 (7.3%)	6 (6.7%)	10 (7.5%)
	Sports Betting	0 (0.0%)	23 (25.8%)	23 (14.5%)
	Poker	4 (7.3%)	29 (32.6%)	33 (26.4%)
	Other	1 (1.8%)	8 (9.0%)	9 (5.7%)
People with during Gambling Event	Gambling with Others	10 (18.2%)	14 (15.7%)	24 (18.2%)
	Gambling Alone	44 (80.0%)	69 (77.5%)	113 (77.4%)

Prefer not to answer (missing data) and other genders were removed prior to conducting statistical tests due to small cell counts.

Table 4. Number of journal entries stratified by gender identity.

		Gender Identity		Total
		Female/Woman	Male/Man	
		<i>N=74</i>	<i>N=104</i>	
Journal Type	Urge Journal	19 (25.7%)	15 (14.4%)	34 (20.5%)
	Gambling Journal	55 (74.3%)	89 (85.6%)	144 (79.5%)

Prefer not to answer (missing data) and other genders were removed prior to conducting statistical tests due to small cell counts.

Usage data also provided a snapshot of the level of participant engagement with particular features. Urge Journal usage data showed that 23 participants completed Urge Journal entries, with most completing one entry ($n=18$, 78.3%), and the remaining participants completing 2 ($n=2$, 8.7%), 3 ($n=1$, 4.3%), 4 ($n=1$, 4.3%), or 5 ($n=1$, 4.3%) entries. Gambling Journal usage data showed that 109 participants completed Gambling Journal entries, with most completing one entry ($n=92$, 84.4%), and the remaining participants completing 2 ($n=9$, 8.3%), 3 ($n=6$, 5.5%), 6 ($n=1$, 0.9%), or 10 ($n=1$, 0.9%) entries.

G-SAS usage data showed that 196 participants completed G-SAS entries, with most completing one entry ($n=182$, 92.9%), and a small group of participants completing 2-3 entries ($n=14$, 7.1%). The mean days from study enrollment to last journal was 1.85 (SD=8.27, median=0.00, IQR=0.00-0.00) and to last G-SAS entry was 1.49 (SD=6.69, median=0.00, IQR=0.00-0.00).

Gambling Journal usage data (not shown in tables) show 39 women completed Gambling Journal entries, with most completing one entry ($n=33$, 84.6%). Urge Journal usage data show 12 women completed Urge Journal entries, with most completing one entry ($n=9$, 75.0%). G-SAS usage data show 69 women completed G-SAS entries, with most completing one entry ($n=63$, 91.3%). Mean days from study enrollment to last journal entry among women was 0.81 (SD=2.59, median=0.00, IQR=0.00-1.00). Mean days from study enrollment to last G-SAS entry among women was 1.97 (SD=8.81, median=0.00, IQR=0.00-0.00).

We found similar usage among men. Gambling Journal usage data show 70 men completed Gambling Journal entries, with most completing one entry ($n=59$, 84.3%). Urge Journal usage data show 11 men completed Urge Journal entries, with most completing one entry ($n=9$, 81.8%). G-SAS usage data show 127 men completed G-SAS entries, with most completing one entry ($n=119$, 93.7%). Mean days from study enrollment to last journal entry among men was 2.43 (SD=10.14, median=0.00, IQR=0.00-0.00). Mean days from study enrollment to last G-SAS entry among men was 1.23 (SD=5.22, median=0.00, IQR=0.00-0.00). There was no significant association between gender and number of journal entries or days from enrollment to last journal entry.

The Spearman correlation between PGSI scores and days of use was -0.04 and between PGSI score and number of journal entries of -0.12.

DISCUSSION

The SPRinG feasibility study is one of only a few studies to date to explore real-world patterns and correlates of uptake and use of a mobile health app to support self-management of gambling concerns (Merkouris, 2023). With 249 participants, the sample is one of the largest among studies of smartphone-delivered interventions for gambling (Hawker et al., 2021; Humphrey et al., 2019; Pfund et al., 2019; Rodda et al., 2025; So et al., 2020). About one in five participants reported precarious housing situations, suggesting that smartphone-delivered interventions may be feasible and acceptable gambling interventions among unhoused and marginally-housed individuals, a historically underserved group in problem gambling services, especially when the intervention is targeted to them through service agencies that work with these populations (Matheson et al., 2021).

Most individuals who downloaded SPRinG had been experiencing gambling problems in the past-year, consistent with existing research that shows people tend to seek help when they experience greater gambling harms (Bijker et al., 2022). Still, despite 93.7% of participants scoring high risk on the PGSI, the majority of participants reported they were not currently in gambling treatment, suggesting smartphone-delivered interventions for gambling may appeal to individuals who are contemplating and/or preparing for behaviour change, but not interested in or connected to treatment due to a variety of factors, such as stigma or service scarcity, for example.

Journal data provided insight into when participants experienced urges and gambled. Most gambling journal entries indicated gambling alone and at home, suggesting participants tended to gamble in relative social isolation. Digital health interventions might reduce barriers to support among people experiencing gambling concerns (Merkouris, 2023), particularly in the context of social isolation (Kourgiantakis et al., 2017) and stigma (Suurvali et al., 2009). With the continued expansion of the online gambling marketplace worldwide, there might be opportunities to integrate digital health apps supporting gambling harm reduction and recovery into the suite of player health tools available to people gambling online, and reach people who gamble alone and at home.

Consistent with other studies of smartphone-delivered interventions for gambling (Hawker et al., 2021; Humphrey et al., 2019; Rodda et al., 2025), usage data also revealed a significant drop off in participants' engagement with the app over a short time, especially after completing the PGSI, one G-SAS entry, and one or two journal entries, limiting insight into the potential impact of using the app in reducing gambling-related harms with greater levels of engagement over an extended period (i.e., weeks or months). Data showed greater engagement with the Gambling Journal relative to the Urge Journal, which might suggest greater interest among participants in tracking gambling events (vs. urge events), including the characteristics and circumstances of those events (e.g., date, time, duration, location, and type of gambling). We intended for participants to complete

the G-SAS weekly, but 93% of participants completed one G-SAS entry. Results suggest that the inclusion of the G-SAS as a feature of smartphone-delivered interventions may require further attention to design and integration in order to be feasible, or inclusion may not be feasible altogether.

High dropout rates are characteristic of both traditional face-to-face gambling treatment (Ladouceur et al., 2001; Melville et al., 2007) and online self-help interventions (Hodgins et al., 2019; Melville et al., 2010; Rodda, 2022), suggesting low engagement with gambling interventions is a generic problem across intervention types and modalities. A few studies of smartphone-delivered interventions for gambling also show high dropout rates overall. For example, a recent review of smartphone-delivered interventions for problem gambling (Merkouris, 2023) identified four apps that have been evaluated in the literature (Hawker et al., 2021; Humphrey et al., 2019; Pfund et al., 2019; So et al., 2020). Three of those studies reported high dropout rates, including 40% (6/15 participants did not use the app to complete homework) (Pfund et al., 2019), 61% (34/56 participants did not use the app beyond the first week) (Hawker et al., 2021), and 90% (35/39 participants did not complete the study) (Humphrey et al., 2019). A notable exception is the GAMBOT study, which reported 6.7% dropout rate in an RCT study that included 197 participants. However, recruitment and retention in that study were financialized; participants received gift cards valued at 1000 Japanese yen (approximately 10USD) at baseline and at study completion (Coral et al.).

Although low levels of engagement with digital health apps have been a persistent challenge (Amagai et al., 2022), including in this study, even brief interventions have been found to be effective in reducing gambling behaviour (Quilty et al., 2019). For example, despite low rates of recruitment and retention during the five-week intervention period, an Australian study of a smartphone-delivered intervention for problem gambling found preliminary effectiveness in reducing urge and gambling frequency and urge intensity during the intervention, and symptom severity, urge and gambling frequency, and money spent on gambling post-intervention relative to pre-intervention baseline (Hawker et al., 2021). Our study design did not include post-intervention follow-up, which prevented us from assessing the impact of the SPRinG app as a brief intervention. Future research should consider the potential of brief digital health interventions (e.g., single use screening and assessments) to reduce gambling-related harms post-intervention.

Relatedly, contexts of app use may also contribute to patterns of app engagement. Consistent with self-management approaches more generally (Matheson et al., 2019), smartphone-delivered interventions for gambling may serve as both alternatives and adjuncts to in-person gambling care (e.g., clinical treatment or support groups) (Merkouris, 2023). Individuals with gambling concerns may be more inclined to consider and continue to use digital health tools when they are attending clinical or community based

problem gambling services to facilitate their participation and progress in these programs, especially when such tools are integrated into the design of the broader approach to care (Rodda et al., 2025). For example, a pilot study found participants preferred completing CBT “homework” via a smartphone app more than via pencil and paper (Pfund et al., 2019). Future research should explore whether integrating digital health tools into traditional gambling treatment services increases app engagement and effectiveness. As the next step in the implementation of SPRinG, we had planned to integrate the app into community-based programming, which might have improved uptake.

While gambling has been a male-dominated activity historically, and the prevalence of problem gambling and disordered gambling is higher among men, the expansion and normalization of gambling has contributed to increasing female participation (Korn & Shaffer, 1999; Welte et al., 2002). Women are more likely than men to seek help for gambling concerns and comprise about half of people seeking help (Crisp et al., 2004; Slutske, 2006; Slutske et al., 2009). Women also contend with a distinct set of gambling challenges, such as progressing to gambling-related problems more quickly than men and at later stages of life (Grant et al., 2012; Kairouz et al., 2017; Lesieur & Blume, 1991; Stephanie S. Merkouris et al., 2016; Potenza et al., 2001). In this study, women represented about one-third of the sample. While most women in the sample were younger (under 35 years), nearly 40% were 45 years old or older, suggesting feasibility (i.e., initial acceptability) of smartphone-delivered interventions across age. In this study the majority of both men and women met the criteria for high risk gambling; Of import, women were of equal risk of high risk gambling as were men. This differs from other research from general population studies that suggests differences in risk among men and women. For example, a recent systematic review and meta-analysis of prevalence studies found higher rates of problematic gambling among men (2.2%) than women (1%) in general population samples (Tran et al., 2024).

Both women and men in the sample tended to be well educated and employed, but the proportion of women and men experiencing housing and/or financial precarity was high, which may have been related to our recruitment approach via community partners serving these populations, such as shelter agencies. Stigma, discrimination, and social isolation and exclusion contribute to barriers to identifying and addressing gambling problems among people experiencing poverty and housing instability (Holdsworth & Tiyce, 2012a, 2012b). Self-management interventions for gambling—including smartphone-delivered interventions—may represent a lower barrier option for individuals contending with housing and financial precarity than traditional gambling treatment modalities (Matheson et al., 2019; Matheson et al., 2021).

There was also evidence of strong uptake among higher-income individuals, with nearly one quarter of sample comprising women and men earning \$85,000 or more. Overall, results suggest broad initial appeal and

acceptability of a smartphone-delivered intervention for gambling across income levels and genders, including among low-income individuals—for whom losing a few dollars gambling might mean the difference between eating or not eating, making rent or not making rent—and high-income individuals—for whom significant gambling-related financial losses, in absolute terms, are possible.

Strengths and Limitations

Several strengths and limitations of the study should be noted. As previously mentioned, the SPRinG study is one of the first feasibility studies of a digital health intervention for gambling widely available on the Apple App Store and Google Play. Relative to existing research, the study includes one of the largest samples to provide an initial descriptive window and real-world evidence on the uptake and use of a smartphone-delivered intervention for gambling. An integrated research database captured real-time user data, producing a unique longitudinal event-driven dataset with high ecological validity relative to more conventional cross-sectional designs. A further strength of the study is the analytical focus on gender and its intersection with other key status characteristics, such as PGSI status, gambling symptom severity, housing status, and income. The community-based approach to intervention design—including both community service providers and persons with lived experience—is another important strength of the study.

Limited use of the urge and gambling journals did not allow for meaningful assessment of patterns and correlates of either journal compliance or changes in urges (e.g., frequency, severity) or gambling (e.g., frequency, losses) over time. Similarly, limited use of the G-SAS did not allow for meaningful assessment of patterns and correlates of G-SAS compliance (i.e., rate of weekly completion) or changes in symptom severity over time as participants engaged with the intervention. Despite these limitations, the study provides unique insight into the real-world adoption of the SPRinG app, with a focus on gender.

Future qualitative research has the potential to illuminate the interpretive (i.e., how people make sense of and give meaning to) and interactional (i.e., how people engage digital health interventions in everyday situations) contingencies of app engagement, which could inform improvements to future app design and delivery that aim to enhance engagement and the potential impact of the app in reducing gambling-related harms (Rodda et al., 2025). For example, we did not assess participant motivation to change in this study, but readiness for change may be an important contributor to engagement and effectiveness of self-management interventions. For example, the transtheoretical model distinguishes among five stages of readiness for behaviour change: precontemplation, contemplation, preparation, action, and maintenance (Prochaska, 1979; Prochaska et al., 2013; Prochaska & DiClemente, 1982). Self-management apps may be best suited to the more motivated individuals

who are at least in the contemplation stage of change, but especially in the preparation, action, and/or maintenance stages of change. Intervention impact and study results may vary across readiness for change (S. S. Merkouris et al., 2016; Petry, 2005).

CONCLUSION

Smartphone-delivered interventions aimed at encouraging those who gamble in ways that are associated with lower levels of risk have been identified as an important emerging area of research, but research on gambling apps lags behind digital health apps for mental health, substance use, and addictions (McCurdy et al., 2023; Merkouris, 2023). The SPRinG study is one of the first feasibility studies of a smartphone-delivered self-management intervention for gambling, and one of only a few to be evaluated that were accessible to the public via mobile app stores (Merkouris, 2023; Rodda et al., 2025). By collecting anonymized user data, both socio-demographic characteristics and app engagement data, the project generated a unique dataset on the real-world uptake and use of a smartphone-delivered intervention (SPRinG) for gambling. Consistent with previous research (Merkouris, 2023), we found broad initial acceptability of the app, with a sample comprising a diverse range of sociodemographic characteristics. Also consistent with previous research, we found low rates of engagement and compliance with urge and gambling assessment features (i.e., journals) over time (Hawker et al., 2021). Few studies have assessed the uptake and use of smartphone-delivered interventions for gambling by gender, but some research has shown greater acceptability of online treatment modalities among women relative to men (Rodda & Lubman, 2014; Wood & Griffiths, 2007). The analytic focus on gender—and its intersection with other important status characteristics, such as income and housing status—contributes several key findings, including broad initial appeal and acceptability of a smartphone-delivered intervention for gambling across gender and across housing and income status—including among people facing housing and financial precarity as well as among individuals—both men and women—with high-risk profiles on the Problem Gambling Severity Index. More work is needed to understand “what works” (i.e., features, approaches, designs, systems, platforms) to promote engagement with digital health interventions for gambling.

Statement of Competing Interests

The authors do not declare any competing interests.

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Ethics Approval

The Unity Health Toronto Research Ethics Board approved the project, “SPRinG App Study,” on June 10, 2022 (REB# 22-060).

Relative Contributions

FIM, AM, MF, and AS conceived of the study. AM, MF, RN, and FIM designed and conducted the analyses. AM wrote the first draft of the paper. All authors revised the first draft and approved of the final version.

Research Promotion

The purpose of this study was to explore the real-world uptake and use of the SPRinG (Supporting People Recovering from Gambling), a smartphone-delivered digital health app to support self-management of gambling harm reduction and recovery. Key findings show the app reached a diverse set of people experiencing gambling-related harms, including women and people experiencing financial and housing insecurity. Nearly all participants met criteria for high risk of problem gambling, and most were not in gambling treatment. Findings also show low app engagement after initial adoption, suggesting more work is needed to understand engagement with digital health interventions for gambling.

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