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The impact of the initial Covid-19 lockdown upon regular sports bettors in Britain: Findings from a cross-sectional online study

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ABSTRACT

Background: In Britain, unprecedented restrictions on daily life associated with the Covid-19 pandemic included the suspension of professional sports events during the initial 'lockdown'. This provides opportunities to observe changes in sports bettors' behaviour when their primary form of activity is removed and assess the impact of Covid-19 related circumstances upon gambling.

Methods: In July 2020, we conducted an online cross-sectional survey of people who bet regularly (at least monthly) on sports before Covid-19 (n = 3866). Bi-variate analyses compared changes in gambling behaviours before and during the initial lockdown. Multi-variate logistic regression models explored associations between problem gambling (men) and moderate risk or problem gambling (MRPG) (women) with changes in Covid-19 related circumstances and changing gambling behaviours during Britain's initial 'lockdown' (March-June 2020).

Results: 29.8% of male sports bettors and 33.4% of female sports bettors stopped gambling altogether during the initial Covid-19 lockdown, though 17.3% of men and 16.5% of women started a new form of gambling during lockdown. Among men, adjusted odds ratios of problem gambling were higher among those starting a new gambling activity during lockdown (OR = 2.50 [95% CI 1.38–4.53]). Among women, adjusted odds ratios of MRPG were higher among those whose frequency of gambling on any activity increased during lockdown (OR = 4.21 [1.99–8.92] and among those shielding for health reasons. Poorer wellbeing was associated with problem gambling for men and MRPG for women.

Conclusions: Those changing gambling behaviours during the initial Covid-19 lockdown (e.g. increasing gambling frequency or starting a new gambling activity) are potentially vulnerable to gambling harms.

1. Introduction

The outbreak of the Covid-19 pandemic in early 2020 precipitated unprecedented global restrictions on daily life. In Britain, a population-wide 'lockdown' began on March 23rd 2020, with the closure of educational establishments, non-essential workplaces, shops, leisure and recreational facilities. This included all gambling venues including bookmakers, casinos, arcades and bingo halls. As elsewhere, almost all professional sports events (including horse racing) were suspended. These lockdown conditions remained in place until mid-June when some restrictions began to ease: British horseracing and championship snooker were reintroduced in Britain on 1st June; English Premier League football on 17th June and 20th June for English championship football, with other sports following thereafter (the Scottish Football Premier League resumed in August).

When lockdown was first imposed, concerns were raised about the impact of Covid-19 upon gambling behaviours. The British All Party Parliamentary Group for Gambling Harms suggested lockdown might encourage more people to gamble and increase vulnerability to harms (APPG, 2020). The British regulator, the Gambling Commission (GC),

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identified transitions to different forms of gambling, especially faster (online) forms of gambling, as an important Covid-19 related risk (GC, 2020).

These concerns were echoed elsewhere and some governments, including Spain and Sweden, banned gambling advertising and set strict loss limits during the early phase of the pandemic. Since then an emerging evidence base has suggested variable impact of Covid-19 on gambling behaviours, with studies from Sweden and Nordic countries noting an overall decline in gambling participation (Håkansson, 2020; Lindner et al, 2020; Auer et al, 2020), but some highlighting changing gambling behaviours being associated with elevated risk of harms (Håkansson, 2020) and emphasising associations with broader personal, social, and economic circumstances with harmful gambling (Price, 2020).

The suspension of most sports events in Britain during the initial lockdown provides an unprecedented opportunity to explore if and how the gambling behaviours of sports bettors change when opportunities for sports betting are restricted. In addition, we can assess how broader personal, social and economic conditions relating to Covid-19 impacts behaviour. The analysis presented here is part of a broader study of the impact of Covid-19 on young people and regular sports bettors, which includes qualitative interviews to explore experiences and behaviours in depth and analyses of marketing strategies and spend to understand industry's reactions (Hunt et al, 2020). Here we report analyses of a bespoke survey which investigated the extent to which regular sports bettors substituted one form of gambling (sports betting) for others during the initial lockdown and the extent to which changes in personal, social and economic circumstances relate to changing gambling behaviours and the experience of problem gambling. We aim to provide evidence to inform policy guidance in the continuing cycles of national lockdowns experienced in Great Britain and elsewhere.

Data reported here examine any differences in gambling behaviours in the three months prior to the initial Covid-19 lockdown (December 2019-February 2020) and during the initial lockdown in Britain (mid-March-mid June 2020). Our objectives were to a) understand any changes that regular sports bettors reported in their gambling behaviours during this lockdown period and b) conduct analysis to explore whether such changes were related to the experience of gambling harms.

Furthermore, as gambling is a maladaptive coping behaviour for some (Blaszczynski & Nower, 2002; Jauregui et al, 2017) and concerns about increases in maladaptive coping behaviours during Covid-19 (Ogueji et al., 2021; Piece et al, 2020), we hypothesised that changes in social and economic circumstances during the initial Covid-19 lockdown (e.g. becoming unemployed/furloughed, changes in financial or living circumstances) would be associated with the experience of gambling-related harms. As existing evidence suggests that life-stressors are also associated with heightened experience of gambling harms (Blaszczynski & Nower, 2002; Wang et al, 2020), we also hypothesised that changes in boredom, stress, conflict and free time would be associated with gambling-related harms (hypotheses were pre-registered: Hunt, Critchlow & Wardle, 2020).

2. Methods

2.1. Design

Data come from work package 1b of 'The Betting and Gaming Covid-19 Impact Study' (Hunt et al, 2020) and represent the first wave of longitudinal assessment of how the pandemic has impacted on 'regular' sports betters. A cohort of regular sports bettors from Britain completed an online survey between 6th and 19th July 2020 (n = 3,866) with follow-up waves scheduled for November/December 2020 and March/April 2021. This cross-sectional analysis uses data from the first survey on gambling behaviour, attitudes and circumstances during the initial Covid-19 lockdown (at the time of writing, follow-up data were not yet available). The survey was conducted by YouGov who recruited a cohort of sport bettors from their existing non-probabilistic panel of one million people. YouGov's panel contains information on members, allowing us to target specific panellists (Twyman, 2008; Kennedy et al, 2016). All participants who completed the survey received YouGov points (equivalent to between £0.50 and £1.50) in return for participation. Remuneration is determined by YouGov, with higher points offered to under-represented groups.

3. Sample and eligibility

This study focuses on 'regular' sports bettors in Britain. To be eligible, panellists had to be aged 18 or over, living in Britain, and to have previously reported betting on sports (including horse racing) at least monthly (hereafter 'regularly'). In total, YouGov identified 19,237 eligible panellists who were sent e-mail invitations. Of those who accessed the initial information and consent page using the e-mail link, 78% completed the survey. From this sample, only those who reported betting on sporting events (including horse racing) in the three months prior to the initial Covid-19 lockdown were included in the study. Survey data were weighted to reflect the age, sex, geographic and betting profile of the broader sample of regular sports bettors within the YouGov panel.

4. Measures

The survey covered topics relating to gambling behaviour before and during the initial Covid-19 lockdown, gambling attitudes, awareness of gambling marketing, experiences of gambling harm, and Covid-19 health and lifestyle experiences. It was devised by HW with input from research team members. Full details of the survey measures are available elsewhere (Hunt, Critchlow & Wardle, 2020); here we a provide a summary of key measures relevant to the current analyses.

4.1. Gambling behaviours before, and during, the initial Covid-19 pandemic

Regular gamblers take part in various activities and thus participants were asked to report engagement in 23 different gambling activities, covering all main subsectors (e.g. sports betting, casino and poker, gaming, lotteries etc) and formats (e.g. land-based, online etc) (see Table 1a/1b for full details). These questions were asked in two blocks, relating to the three months immediately prior to the initial Covid-19 lockdown (defined as December 2019 to February 2020) and then during this lockdown (defined as mid-March to mid-June 2020).

For each gambling activity reported, within each timeframe (pre/during lockdown), we collected three further metrics: frequency of participation recorded on an eight-point scale (*1 = Several times a day-8 = Never);* expenditure on each activity (estimated to nearest £GBP), and, with the exception of lotteries and scratchcards, the amount of time spent gambling on an eight-point scale (*1 = < 30 min per day to 8 = 8 + hours per day)*. For betting activities, participants were asked to estimate how long they spent planning and placing their bet.

Three main variables were derived from the gambling participation questions. First, we computed '*starting and stopping*' rates for each activity. The *'starting'* rate captures data on activities in which a participant reported no participation during the three months prior to the initial lockdown, but reported some participation during this lockdown, whereas the *'stopping rate'* is the inverse. From these variables, we also identified participants who: started any new form of gambling during the lockdown; stopped completely; and continued to gamble on some or all of their pre-lockdown activities. Second, we computed total expenditure on all gambling activities before and during the lockdown, and categorised participants as '*spent more during lockdown', 'spent less during lockdown',* or '*spent the about the same'* (i.e., spend deviated ≤£10 compared to pre-lockdown). Finally, for gambling frequency, participants were binary coded based on those who reported increasing

Table 1a
Participation in different forms of gambling, pre Covid-19 and during initial lockdown, among male sports bettors (N = 3084).

Covid-19-related experiences	(A) Pre-post Covid-19				(B) Starting/stopping rates				*p-value*
	Pre Covid-19 lockdown		During initial Covid-19 lockdown		Starting rate (% of those who did not do this prior to lockdown who started during lockdown)		Stopping rate (% of those who did this prior to lockdown who stopped during lockdown)		
	n	%(95% CI)	n	%(95% CI)	n	%(95% CI)	n	%(95% CI)	
Key sports betting activities									
Online betting on horse/dog races	1396	43.2 (41.4–45.1)	373	11.6 (10.5–12.9)	45	2.6 (1.8–3.4)	1068	76.5 (74.3–78.8)	*p < 0.001*
Online sports betting	2327	78.7 (77.3–80.1)	464	16.1 (14.8–17.6)	20	2.9 (1.7–4.1)	1883	80.3 (81.5–84.5)	*p < 0.001*
Betting on horse/dog races in a bookmakers	782	23.0 (22.0–25.0)	20	0.6 (0.4–1.0)	4	0.3 (0.1–0.5)	766	98.1 (97.1–99.1)	*p < 0.001*
Betting on sports in a bookmakers	806	26.7 (25.1–28.4)	27	1.1 (0.7–1.6)	11	0.6 (0.3–0.9)	790	97.5 (96.4–98.6)	*p < 0.001*
Other gambling activities still available during lockdown									
Lottery	1975	62.1 (60.3–63.9)	1581	48.7 (46.8–50.6)	59	5.9 (4.5–7.3)	453	25.2 (23,4–27.2)	*p < 0.001*
Scratchcards	769	26.6 (25.0–28.3)	435	14.7 (13.4–16.0)	31	1.5 (1.0–2.0)	365	49.0 (45.5–52.5)	*p < 0.001*
Online betting on esports	71	2.8 (2.2–3.6)	90	3.4 (2.7–4.2)	69	2.7 (2.1–3.3)	50	71.5 (61.0–82.0)	*p = 0.10*
Online betting on virtual sports/races	82	3.0 (2.4–3.8)	119	4.2 (3.6–5.2)	94	3.5 (2.8–4.2)	57	69.7 (69.8–79.6)	*p < 0.01*
Online betting on other events	252	8.8 (7.6–10.0)	85	2.9 (2.3–3.6)	42	1.5 (1.1–1.9)	209	83.3 (77.2–89.4)	*p < 0.001*
Online slot games	314	10.9 (9.7–12.1)	285	9.9 (8.8–11.2)	62	2.6 (2.0–3.2)	91	30.2 (24.0–36.4)	*p < 0.05*
Online casino games (excluding poker)	322	11.8 (10.6–13.1)	234	8.5 (7.5–9.7)	53	2.4 (1.8–3.0)	146	45.6 (40.2 51.0)	*p < 0.001*
Online bingo	137	4.8 (4.0–5.7)	114	4.1 (3.4–4.9)	37	1.4 (1.0–1.8)	60	43.0 (34.7–51.3)	*p < 0.05*
Online poker	198	7.0 (6.0–8.0)	180	6.7 (5.8–7.8)	71	3.1 (2.5–3.7)	89	46.0 (39.1–52.9)	*p = 0.18*
Private betting with friends/family	217	7.9 (6.9–9.1)	88	3.2 (2.5–3.9)	26	1.0 (0.6–1.4)	155	71.5 (65.5–77.5)	*p < 0.001*
Other gambling activities mainly unavailable during lockdown									
Betting on esports in a bookmakers	62	2.4 (1.8–3.2)	9	0.4 (0.2–0.8)	4	0.1 (0.05–0.37)	57	89.8 (82.3–97.3)	*p < 0.001*
Betting on virtual bets/races in a bookmakers	90	3.3 (2.7–4.1)	14	0.5 (0.3–0.9)	11	0.4 (0.2–0.6)	87	96.1 (88.8–98.7)	*p < 0.001*
Betting on other events in a bookmakers	142	4.7 (4.0–5.6)	6	0.2 (0.0–0.5)	5	0.2 (0.08–0.48)	141	99.4 (96.6–99.9)	*p < 0.001*
Slot machines	259	8.9 (7.9–10.1)	22	0.8 (0.5–1.3)	7	0.2 (0.11–0.51)	244	93.3 (90.3–96.3)	*p < 0.001*
Machines in a bookmakers	175	5.7 (4.9–6.6)	3	0.1 (0.0–0.5)	2	0.1 (0.03–0.51)	174	99.5 (97.2–99.9)	*p < 0.001*
Football pools	252	8.6 (7.6–9.8)	84	2.5 (2.0–3.2)	8	0.3 (0.1–0.5)	176	74.2 (68.9–79.5)	*p < 0.001*
Casino games at a casino	191	7.3 (6.3–8,4)	3	0.1 (0.04–0.6)	2	0.1 (0.03–0.55)	190	99.6 (97.8–99.9)	*p < 0.001*
Playing poker in pub/club/venue	74	2.6 (2.1–3.3)	4	0.2(0.06–0.42)	1	0.03 (0.01–0.18)	71	95.2 (86.5–98.4)	*p < 0.001*
Bingo in hall/club/other venue	105	3.7 (3.0–4.5)	2	0.1 (0.03–0.57)	2	0.1 (0.03–0.53)	105	100 (N/A)	*p < 0.001*

*Where starting and stopping rates are close to 0 or 100, Wilson's Confidence Intervals have been calculated.

frequency on *any* gambling activity during lockdown versus those whose frequency decreased or stayed the same.

4.2. Problem gambling

Participants completed the 9-item Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001) scored on a four-point scale *(0 = Never to 3 = Almost always)*. PGSI scores range from 0 to 27 where a score of 0 indicates non-problem gambling or non-gambling; 1–2 is low risk gambling; 3–7 is moderate risk gambling; and a score of 8 or more is indicative of problem gambling. In our sample, the composite score had strong internal consistency (Cronbach's $\alpha = 0.91$). Although PGSI usually uses a 12-month reference period, we purposively used a three month reference period to match the initial Covid-19 pandemic timeframe and reported involvement in gambling activities during the three month lockdown. Previous research has shown the utility of using a shorter PGSI timeframe when assessing the impact of interventions (Abbott et al, 2012; Kushnir et al, 2018).

4.3. Changes in circumstances due to initial Covid-19 lockdown

Several measures were adapted from the Centre for Longitudinal Studies Covid-19 Surveys (UCL, 2020) to capture changes in personal and financial circumstances resulting from the initial lockdown.

Concerning personal circumstances, participants reported changes during lockdown in the amount of spare time, boredom, stress and

Table 1b
Participation in different forms of gambling, pre Covid-19 and during initial lockdown, among female sports bettors (N = 782).

Covid-19-related experiences	(A) Pre-post Covid-19				(B) Starting/stopping rates				*p-values*
	Pre Covid-19 lockdown		During initial Covid-19 lockdown		Starting rate (% of those who did not do this prior to lockdown who started during lockdown)		Stopping rate (% of those did this prior to Covid-19 who stopped during lockdown)		
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	
Key sports betting activities									
Online betting on horse/dog races	415	50.5 (46.7–54.2)	80	9.2 (7.4–11.5)	5	1.5 (0.3–2.7)	340	83.2 (79.6–86.8)	*p < 0.001*
Online sports betting	443	61.4 (57.8–64.5)	70	9.9 (7.7–12.6)	3	0.8 (0.27–2.5)	376	84.3 (80.9–87.7)	*p < 0.001*
Betting on horse/dog races in a bookmakers	191	22.0 (19.0–24.8)	6	0.6 (0.3–1.4)	2	0.3 (0.08–1.12)	187	98.1 (95.2–99.3)	*p < 0.001*
Betting on sports in a bookmakers	126	16.1 (13.5–19.0)	3	0.5 (0.2–1.6)	1	0.1 (0.02–0.79)	124	97.6 (91.7–99.4)	*p < 0.001*
Other gambling activities still available during lockdown									
Lottery	523	65.2 (61.5–68.8)	380	45.8 (42.1–49.6)	18	6.5 (3.5–9.5)	161	33.2 (29.2–37.2)	*p < 0.001*
Scratchcards	316	42.7 (39.0–46.5)	159	21.1 (18.1–24.4)	11	2.7 (1.2–4.2)	168	54.3 (48.8–59.8)	*p < 0.001*
Online betting on esports	16	2.4 (1.5–4.1)	11	1.8 (1.0–3.2)	8	1.4 (0.6–2.3)	13	82.3 (54.8–94.7)	*p = 0.36*
Online betting on virtual sports/races	30	4.3 (2.9–6.0)	55	8.7 (6.6–11.4)	39	6.8 (5.0–8.6)	14	49.0 (31.1–66.9)	*p < 0.01*
Online betting on other events	56	7.8 (5.9–10.1)	17	2.3 (1.4–3.8)	88	0.9 (0.2–1.6)	47	81.2 (69.7–92.7)	*p < 0.001*
Online slot games	93	12.6 (10.3–15.4)	67	8.2 (6.4–10.4)	18	2.7 (1.5–3.9)	44	53.9 (43.8–64.0)	*p < 0.001*
Online casino games (excluding poker)	81	8.5 (9.3–14.3)	49	6.8 (5.1-0.9.0)	13	2.2 (1.1–33)	45	57.8 (47.0–68.6)	*p < 0.001*
Online bingo	100	13.5 (11.1–16.4)	74	9.3 (7.3–11.6))	21	3.4 (2.0–4.8)	47	53.4 (43.6–63.2)	*p < 0.01*
Online poker	27	4.1 (2.8–6.1)	19	3.0 (1.9–4.8)	6	1.1 (0.4–1.8)	14	52.8 (34.0–71.6)	*p = 0.12*
Private betting with friends/family	42	6.7 (4.8–9.1)	15	2.3 (1.3–4.0)	9	1.5 (0.6–2.4)	36	86.1 (75.6–96.6)	*p < 0.001*
Other gambling activities mainly unavailable during lockdown									
Betting on esports in a bookmakers	17	2.7 (1.6–4.4)	2	0.4 (1.9–4.8)	1	0.2 (0.04–1.1)	16	93.4 (66.9–99.0)	*p < 0.001*
Betting on virtual bets/races in a bookmakers	19	2.7 (1.6–4.4)	5	0.8 (0.3–2.0)	3	0.5 (0.18–1.6)	17	88.0 (62.2–97.0)	*p < 0.01*
Betting on other events in a bookmakers	44	5.2 (3.9–7.1)	4	0.7 (0.3–1.9)	3	0.6 (0.19–1.7)	43	96.6 (82.4–99.4)	*p < 0.001*
Slot machines	67	8.6 (6.8–10.9)	5	0.6 (0.3–1.6)	3	0.3 (0.1–0.9)	65	95.8 (85.6–98.9)	*p < 0.001*
Machines in a bookmakers	39	5.0 (3.6–6.8)	1	0.2 (0.0–1.2)	–	–	38	96.4 (81.5–99.4)	*p < 0.001*
Football pools	41	5.3 (3.8–7.3)	12	1.6 (0.9–3.0)	2	0.3 (0.09–1.2)	31	75.5 (62.3–88.7)	*p < 0.001*
Casino games at a casino	44	6.4 (4.8–8.7)	1	0.2 (0.0–1.4)	–	–	43	96.8 (83.4–99.5)	*p < 0.001*
Playing poker in pub/club/venue	13	1.7 (1.1–3.0)	1	0.1 (0.0–1.4)	–	–	12	95.2 (72.6–99.3)	*p < 0.001*
Bingo in hall/club/other venue	90	12.2 (9.8–15.0)	2	0.2 (0.0–0.8)	2	0.2 (0.06–0.86)	90	100	*p < 0.001*

*Where starting and stopping rates are close to 0 or 100, Wilson's Confidence Intervals have been calculated.

conflict with others they experienced. Responses were coded as more than before; same as before; less than before.

Questions asked about participants' financial circumstances during the initial lockdown on a five-point scale ranging from "much better off" to "much worse off" (because of base sizes collapsed to "about the same", "worse off", "better off"). Changes in job status were captured, specifically if participants had lost their job or were furloughed (i.e., undertaken government-supported leave of absence) during lockdown. Questions were asked about changes in living arrangements during lockdown. Due to base sizes for categories, participants were coded as '*did not cohabit pre/post lockdown*', '*cohabited with partner pre/post lockdown*' and '*cohabitation status with spouse/partner changed during lockdown*'. Finally, participants were asked whether they had been asked to 'shield' during the lockdown (*Yes/No*); 'shielding' was the official UK Government term used to advise those with underlying health conditions/vulnerabilities to stay home and avoid contact with others. It differs from self-isolating, which is what people are asked to do for a time-limited period if displaying symptoms or after contact with someone with the virus.

4.4. Wellbeing during the lockdown

Wellbeing was measured using the Short Warwick and Edinburgh Mental Wellbeing Scale (WEMWEBS) (Tennant et al., 2007) . Scores

range between 7 and 35, with those scoring between 7 and 20 identified as having lower wellbeing and those scoring 21 + having higher wellbeing. The composite score had acceptable internal consistency in our sample (Cronbach's α = 0.85).

4.5. Demographics

Information on age (coded: 18–34, 35–44, or 55 + years), gender (men, women), area level deprivation (based on postcode, divided into quintiles), and educational attainment (described in results) were provided by YouGov from existing information on panellists.

5. Ethics

Approval for the study was granted by the University of Stirling's General University Ethics Panel (ref: GUEP (19 20) 930).

5.1. Statistical analysis

Data were obtained from 4016 participants. We excluded 89 participants who completed the survey in ≤ 4/5 minutes, depending on their level of gambling involvement, who were judged to have not given proper consideration to questions. Timing thresholds were established by reviewing the first 250 responses. A further 61 participants were excluded on the basis of implausible answers about gambling (e.g.

Table 2a
Problem Gambling Severity Index Score, by Covid-19-related experiences among men.

Covid-19-related experiences	Problem gambling status (Problem Gambling Severity Index Score)								
	Non-problem gambling (0) (n = 2096)		Low risk gambling (1–2) (n = 564)		Moderate risk gambling (3–7) (n = 289)		Problem gambling (8 +)(n = 135)		p-values*
Men	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	
All male regular sports bettors		64.7		19.3		10.7		5.4	
Employment changes									
Became unemployed	79	62.8 (53.1–71.6)	18	14.3 (9.0–21.8)	21	20.4 (13.3–30.1)	3	2.5 (0.8–7.5)	p < 0.05
Furloughed	142	57.6 (50.5–64.4)	43	21.3 (16.0–27.8)	20	10.4 (6.6–16.0)	22	10.8 (6.9–16.4)	p < 0.05
Change in finances									
Worse off	489	57.7 (54.0–61.3)	164	21.4 (18.5–24.6)	90	12.3 (10.0–15.5)	57	8.6 (6.6–11.1)	p < 0.01
About the same	1057	68.8 (66.1–71.3)	245	17.6 (15.6–19.8)	120	9. 4 (7.8–11.3)	55	4.3 (3.2–5.6)	
Better off	550	64.2 (60.5–67.8)	155	20.3 (17.5–23.5)	79	11.3 (9.8–14.1)	23	4.2 (2.7–6.4)	
Change in stress levels									
More than before	620	58.1 (54.8–61.3)	206	21.1 (18.5–23.9)	125	13.2 (11.0–15.6)	67	7.7 (6.0–9.8)	p < 0.01
About the same	1212	70.2 (67.8–72.6)	282	18.0 (16.1–20.1)	122	8.7 (7.2–10.4)	42	3.1 (2.2–4.2)	
Less than before	264	60.0 (54.7–65.1)	76	19.7 (15.8–24.3)	42	12.1 (8.8–16.2)	20	8.2 (5.5–12.1)	
Change in levels of boredom									
More than before	860	59.6 (56.7–62.4)	280	21.4 (19.1–23.9)	155	12.6 (10.7–14.8)	74	6.4 (5.0–8.0)	p = 0.313
About the same	1109	70.8 (68.2–73.2)	237	16.6 (14.7–18.7)	112	8.3 (6.9–10.0)	51	4.3 (3.2–5.8)	
Less than before	127	58.0 (50.7–65.0	44	22.9 (17.5–29.4)	22	13.5 (8.8–20.2)	10	5.6 (2.9–10.4)	
Change in amount of free time									p = 0.058
More than before	929	60.2 (57.4–62.9)	288	21.1 (18.9–23.5)	155	12.3 (10.4–14.4)	76	6.4 (5.1–8.1)	
About the same	1029	70.3 (67.6–72.6)	232	16.9 (15.0–19.1)	114	8.9 (7.4–10.7)	44	3.8 (2.8–5.2)	
Less than before	138	61.8 (54.8–68.4)	44	20.5 (15.5–26.7)	20	10.4 (6.6–15.9)	15	7.3 (4.4–11.9)	
Change in amount of conflict with others									
More than before	204	46.4 (41.4–51.5)	107	25.5 (21.3–30.1)	64	17.4 (13.6–21.9)	41	10.8 (7.9–14.5)	p < 0.05
About the same	1527	70.5 (68.3–72.6)	342	17.5 (15.8–19,4)	151	8.1 (6.8–9.5)	67	3.9 (3.1–5.0)	
Less than before	365	58.6 (54.2–62.8)	115	20.5 (17.2–24.3)	74	14.7 (11.7–18.3)	27	6.2 (4.2–9.2)	
Whether shielding									
Yes	175	60.3 (54.0–66.3)	53	19.4 (14.9–24.9)	31	11.8 (8.3–16.4)	17	8.5 (5.2–13.6)	p < 0.05
No	1907	65.3 (63.4–67.2)	506	19.3 (17.8–20.9)	255	10.6 (9.3–12.0)	112	4.8 (4.0–5.8)	
Change in cohabitation status with spouse									
Did not cohabit pre/post lockdown	631	60.8 (57.3–64.2)	177	19.6 (17.0–22.6)	105	13.0 (10.7–15.8)	49	6.6 (4.9–8.8)	p = 0.054
Cohabitation status with partner changed during lockdown	25	45.7 (32.1–60.0)	14	27.1 (16.2–41.6)	7	12.5 (5.9–24.6)	8	14.7 (7.3–27.3)	
Cohabited with partner/spouse pre and post lockdown	1440	67.3 (65.1–69.4)	373	18.8 (17.1–20.7))	177	9.4 (8.1–10.9)	78	4.4 (3.5–5.6)	

*P-values compare rates of problem gambling within each variable. For employment changes, this compares becoming unemployed with not becoming unemployed or being furloughed with not being furloughed. Data not shown for each comparator group.

saying they gambled 'bi-weekly' at closed venues such as bookmakers during lockdown). Hence, 3866 participants (3084 men, 782 women) were included in the main analyses. Missing data within this final sample were minimal and are excluded unless explicitly stated.

As gambling behaviour is highly gendered, with patterns of engagement and the experience of harms differing for men and women (Wardle, 2015; McCarthy et al., 2018, 2019; Williams et al., 2021), we have followed recommendations (McCarthy et al, 2018; Forrest & McHale, 2020) to conduct analyses separately for men and women.

Frequencies examined the proportion of regular sports betters who participated in each of the 23 gambling activities before and/or during the initial Covid-19 lockdown and the *'stopping'* and *'starting'* rates for each activity. McNemar tests for paired nominal data were used to assess changes in participation prior to and during lockdown. Further bivariate analyses examined the extent to which personal and financial circumstances during the lockdown (e.g. furlough, cohabitation change) varied by PGSI status. A Walds-F test examined the extent to which problem gambling status varied by each independent variable presented in Tables 2a and 2b. All bi-variate analyses were performed using the complex survey module in SPSS v25.

Binary logistic regression models examined which factors were associated with PGSI status. For men, the dependent variable was

Table 2b
Problem Gambling Severity Index Score, by Covid-19-related experiences among women.

Covid-19-related experiences	Problem gambling status (Problem Gambling Severity Index Score)								
	Non-problem gambling (0) (n = 574)		Low risk gambling (1–2) (n = 124)		Moderate risk gambling (3–7) (n = 59)		Problem gambling (8 +)(n = 25)		p-values*
Women	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	
All female regular sports bettors		71.2 (67.6–74.6)		16.6 (14.0–19.7)		8.3 (6.4–10.7)		3.9 (2.5–5.9)	
Employment changes									
Became unemployed	23	72.4 (53.8–85.9)	2	4.9 (1.2–17.8)	7	22.7 (10.4–42.6)	0	–	n/a
Furloughed	54	59.9 (47.6–71.1)	14	19.9 (11.6–32.0)	10	14.5 (7.8–25.5)	3	5.6 (1.6–17.9)	$p < 0.05$
Change in finances									
Worse off	167	63.7 (56.7–69.8)	45	19.0 (14.3–25.0)	26	12.4 (8.4–17.9)	12	4.9 (2.8–8.6)	$p = 0.30$
About the same	291	75.2 (70.0–79.7)	54	14.7 (11.2–18.9)	21	5.9 (3.8–9.1)	11	4.3 (2.2–8.1)	
Better off	116	74.0 (65.7–80.8)	25	17.2 (11.5–25.0)	12	7.4 (4.2–12.9)	2	1.4 (0.3–5.8)	
Change in stress levels									
More than before	249	67.4 (61.9–72.4)	64	18.8 (14.8–23.6)	29	8.9 (6.1–12.8)	14	4.9 (2.8–8.6)	$p = 0.65$
About the same	237	76.3 (70.6–81.2)	39	13.0 (9.4–17.6)	20	7.5 (4.8–11.5)	8	3.3 (1.5–6.8)	
Less than before	88	70.7 (61.2–78.7)	21	18.4 (12.0–27.4)	10	8.5 (4.5–15.4)	3	2.3 (0.8–7.1)	
Change in levels of boredom									
More than before	263	69.2 (63.8–74.1)	68	18.5 (14.6–23.2)	31	9.0 (6.3–12.8)	11	3.3 (1.7–6.3)	$p = 0.457$
About the same	252	75.2 (69.9–80.0)	42	14.0 (10.4–18.7)	21	7.5 (4.8–11.3)	10	3.3 (1.8–6.1)	
Less than before	53	66.9 (54.7–77.1)	14	17.0 (9.9–27.5)	7	8.1 (3.8–16.6)	4	8.0 (2.9–20.6)	
Change in amount of free time									
More than before	300	70.6 (65.4–75.3)	61	16.8 (13.0–21.3)	31	8.7 (6.1–12.3)	15	4.0 (2.3–6.8)	n/a
About the same	226	71.8 (66.1–76.9)	52	16.0 (12.3–20.6)	21	7.4 (4.9–11.2)	10	4.7 (2.4–9.1)	
Less than before	48	72.7 (60.0–82.5)	11	17.9 (10.0–29.9)	6	9.4 (4.2–19.7)	0	–	n/a
Change in amount of conflict with others									
More than before	90	65.5 (56.4–73.6)	19	14.4 (9.2–21.7)	18	15.1 (9.5–23.1)	6	5.0 (2.1–11.6)	$p = 0.65$
About the same	396	76.6 (72.3–80.5)	70	14.3 (11.2–18.0)	25	5.2 (3.5–7.7)	15	3.8 (2.1–6.6))	
Less than before	88	58.3 (49.3–66.7)	35	26.7 (19.3–35.7)	16	12.1 (7.4–19.1)	4	2.9 (1.1–7.6)	
Whether shielding									
Yes	44	62.3 (47.9–74.7)	8	13.6 (6.4–26.6)	4	5.6 (2.1–14.5)	8	18.4 (9.0–34.0)	$p < 0.01$
No	527	72.0 (68.2–75.4)	116	16.9 (14.1–20.1)	53	8.6 (6.6–11.1)	16	2.5 (1.5–4.3)	
Change in cohabitation status with spouse									
Did not cohabit pre/post lockdown	192	70.5 (63.9–76.4)	42	18.1 (13.2–24.2)	21	8.7 (5.6–13.2)	6	2.7 (1.1–6.5)	$p = 0.15$
Cohabitation status with partner changed during lockdown	17	63.1 (39.5–81.7)	2	6.6 (1.6–23.5)	3	16.5 (5.2–41.3)	2	13.8 (3.3–42.5)	
Cohabited with partner/spouse pre and post lockdown	365	72.1 (67.7–76.1)	80	16.5 (13.3–20.2)	35	7.6 (5.4–10.5)	17	3.8 (2.3–6.3)	

*P-values compare rates of problem gambling within each variable. For employment changes, this compares becoming unemployed with not becoming unemployed or being furloughed with not being furloughed. Data not shown for each comparator group.

problem gambling (a PGSI score: >=8). For women, due to the smaller sample size, the number experiencing problem gambling was low (n = 25). Consequently, the dependent variable modelled was experience of moderate risk or problem gambling (a PGSI score ≥ 3). For comparability with women, an additional model was run for men using moderate risk or problem gambling as the dependent variable (see supplementary table S1). In each model, the key independent variables were changes in gambling behaviour or circumstances during the initial Covid-19 pandemic, which were selected for inclusion if the association with problem gambling according to the Wald's F test was<0.1. Additional covariates were included based on known associations with gambling harms (age, area deprivation, education levels, and wellbeing). All variables included in the models were categorical and were compared using the simple indicator contrasts. The reference categories are reported in the results. Missing data were excluded, except for shielding status among men (n = 28) which was coded as a dummy category.

Diagnostic checks on multi-collinearity were conducted by calculating the variance inflation factors (VIF) of all independent variables (Mansfield & Helms, 1982). Becoming unemployed and being furloughed were highly correlated, with VIF values > 5 in all models. Becoming unemployed was thus removed from the model. Results were checked using all permutations and this did not affect results. All other variables had VIF values of < 2, indicating they were not too closely correlated. Regression models were performed using the complex survey function in Stata v15 to adjust for the weighted stratified survey design (Rao and Scott, 1984). All estimates were weighted to match the age, sex, regional and sports betting profile of the broader sample of regular sports bettors within the YouGov panel. True (unweighted) bases and sample sizes are presented.

6. Results

6.1. Bivariate analyses: Changes in gambling behaviours

Table 1a and 1b (column A) shows the percentage of male (n = 3084) and female (n = 782) regular sports bettors who participated in each of the 23 gambling activities in the three month periods prior to, and during, the initial Covid-19 lockdown. Prior to lockdown online sports betting was the most commonly reported gambling activity (78.7% men, 61.4% women). Other common gambling activities pre-lockdown included: the lottery (62.1% men, 65.2% women); online betting on horse/dog races (43.2% men, 50.5% women); betting at a bookmakers on sports (26.7% men, 16.1% women) or horse/dog races (23.0% men, 22.0% women); and scratchcards (26.6% men, 42.7% women). For these activities, and most other gambling activities, the percent participating was lower post lockdown. For example, 78.7% of male participants bet on online sports events prior to the initial Covid-19 lockdown, falling to 16.1% during this lockdown. Only betting online on virtual sports/races saw a significant increase in participation during lockdown.

Tables 1a and 1b (Column B) also show starting and stopping rates for each of the 23 gambling activities and use the McNemar test for paired data to assess changes in participation prior to and during the initial Covid-19 lockdown The vast majority of male and female sports bettors stopped participating in key sports betting activities during lockdown, as did those taking part in other activities which were largely unavailable during lockdown. However, 2.9% (McNemar's $X^2 = 1975$, $p < 0.01$) of male sports bettors and 0.8% ($X^2 = 472$, $p < 0.01$) of female sports who had not previously bet on sports online started to do so during the initial Covid-19 lockdown. Among men, highest starting rates were observed for lotteries (5.9%, $X^2 = 301.65$, $p < 0.01$) and online betting on virtual sports/races (3.5%, $X^2 = 8.58$, $p < 0.01$). Among women highest rates were observed for online betting on virtual sports/races (6.8%, $X^2 = 10.87$, $p < 0.01$); lotteries (6.5%, $X^2 = 112.65$, $p < 0.01$) and online bingo (3.4%, $X^2 = 9.19$, $p < 0.01$). While the proportion starting new individual activities in these three months was relatively low, cumulatively 17.3% of men and 16.5% of women started gambling on at least one new form of gambling activity during the initial Covid-19 lockdown; 29.8% of men and 33.4% of women stopped all gambling during the initial Covid-19 lockdown; and 31.3% of male sports bettors and 30.3% of female sports bettors increased their frequency of gambling on at least one activity during the initial Covid-19 lockdown.

6.2. Problematic gambling and Covid-19 related experiences

Of the 3084 male and 782 female participants, 5.4% of male sports bettors (Table 2a) and 3.9% of female sports bettors (Table 2b) experienced problem gambling (PGSI score ≥ 8) during the initial Covid-19 lockdown in Britain. A further 10.7% of men and 8.3% of women experienced moderate risk gambling (PGSI score of 3–7).

Bivariate results showed that for both men and women, problem gambling rates were higher among those who were: furloughed (10.8% men (Walds F (5.9, 22971) = 2.69, $p < 0.05$); 5.6% women (F (5.7, 21923) = 1.7, $p < 0.05$) or shielding for health reasons (8.5% men (F (2.9, 11263) = 2.1, $p < 0.05$); 18.4% women, (F (2.9–11113) = 10.8, $p < 0.01$).; Additionally, for men, problem gambling rates were higher among those who reported more conflict with others during lockdown (10.8%, F (5.9, 22973) = 15.9, $p < 0.05$), who were financially worse off during lockdown (8.6%, (F (5.9–22814) = 4.9, $p < 0.01$) and who reported increased levels of stress (7.7%, F (5.9–23003) = 8.2, $p < 0.01$).

Multivariate logistic regressions are presented in Table 3a (men) and Table 3b (women). Men were more likely to experience problem gambling if they were younger (under 35 compared with over 55, adjusted odds ratios (AOR) 5.24 (95% CI: 2.62–10.49)); had lower rather than higher wellbeing scores (AOR: 2.23 (1.39–3.60)), had started a new form of gambling during lockdown (AOR: 2.50 (1.38–4.53)) compared with those who had not, or had changed their level of spending on gambling. Shielding status was associated with problem gambling but none of individual categories varied significantly from the reference group of not-shielding.

Multivariate logistic regressions for women showed that age, wellbeing, shielding status and increases in gambling frequency were all associated with moderate risk or problem gambling. AOR were: 4.06 (95% CI: 1.63–10.15) times higher among women under 35 than those over 55; 3.48 (1.97–6.16) times higher among those with lower rather than higher wellbeing scores; 4.08 (1.84–9.06) times higher among those who were shielding than those who were not; and 4.21 (1.99–8.92) times higher among those whose gambling frequency on any activity increased during lockdown.

7. Discussion

Among previously regular male and female sports bettors, the main impact of the initial Covid-19 lockdown was either a reduction in gambling activity or, for around a third of the sample, stopping gambling altogether. This is to be expected, given that the primary segment of sports bettors' gambling repertoires was generally unavailable to them during this time. Other studies have noted similar reductions during the initial Covid-19 outbreak (Håkansson, 2020; Lindner et al, 2020; Auer et al, 2020). However, when examining online sports betting, a minority continued to bet as some horse races and sports were still available in other jurisdictions. Furthermore, a minority initiated gambling on forms of activity they had not previously engaged in.

Whilst the starting rates for most individual activities were low, taken together around one in six sports bettors started a new form of gambling activity during the initial Covid-19 lockdown and around one in three increased their frequency of gambling on at least one activity. Thus, reductions in overall participation rates mask changes in gambling behaviours for some individuals. Importantly, our study, like Håkansson (2020), found that changes in gambling activity during lockdown were

Table 3a
Odd ratios (OR) for problem gambling among regular male sports bettors.

	Problem gambling			
	N (%)	OR	95% CI (lower)	95% CI (upper)
Age group (p > 0.01)				
55+	1387 (35.5%)	1 (ref)		
54–35	1296 (42.3%)	2.11	1.18	3.77
35 and under	401 (35.5%)	5.24	2.62	10.49
Highest Educational attainment (p = 0.08)				
Post-secondary education (including degree or higher)	1565 (52.1%)	1 (ref)		
A Level or equivalent	663 (22.2%)	1.28	0.76	2.15
GCSE Level or equivalent	566 (17.1%)	1.74	1.00	3.02
CSE or equivalent/other/none	290 (8.6%)	2.44	1.14	5.24
Area deprivation quintile (p = 0.68)				
Least deprived	739 (23.5%)	1 (ref)		
2nd	636 (20.7%)	1.16	0.61	2.24
3rd	605 (19.8%)	1.24	0.63	2.43
4th	574 (18.8%)	1.23	0.64	2.36
Most deprived	530 (17.2%)	1.60	0.84	3.02
Wellbeing (p < 0.01)				
Moderate/high wellbeing scores (>=20)	2025 (63.5%)	1 (ref)		
Lower wellbeing scores (<=20)	1059 (36.5%)	2.23	1.39	3.60
Change in employment status (p = 0.48)				
Employed pre and post lockdown	1856 (63.1%)	1 (ref)		
Employed pre covid, furloughed during lockdown	227 (7.8%)	1.45	0.72	2.91
Other employment status	1001 (29.0%)	0.87	0.48	1.55
Subjective change in finances (p < 0.05)				
About the same	1477 (66.4%)	1 (ref)		
Financially worse off	800 (14.9%)	1.50	0.93	2.41
Financially better off	807 (18.7%	0.73	0.43	1.23
Change in stress levels (p = 0.07)				
About the same	1658 (52.0%)	1 (ref)		
More than before	1018 (34.1%)	1.41	0.87	2.28
Less than before	408 (13.8%	2.15	1.11	4.18
Change in free time (p = 0.90)				
About the same	1419 (49.4%)	1 (ref)		
More than before	1448 (43.1%)	1.00	0.62	1.63
Less than before	217 (7.5%)	1.16	0.58	2.35
Change in levels of conflict with others (p = 0.27)				
About the same	2087 (14.9%)	1 (ref)		
More than before	416 (6.6%)	1.54	0.90	2.62
Less than before		1.09	0.60	1.98
	581 (18.7%)			
Whether shielding (p < 0.01)				
No	2780 (90.1%)	1 (ref)		
Yes	276 (8.3%)	1.98	0.97	4.01
Missing	28 (1.2%)	6.80	2.48	18.69
Change in cohabitation with spouse/partner (p = 0.68)				
Did not cohabit pre/post lockdown	962 (33.9%)	1 (ref)		
Cohabitation status with partner changed during lockdown	54 (2.1%)	1.52	0.52	4.45
Cohabited with partner/spouse pre and post lockdown	2068 (66.0%)	0.95	0.61	1.47
Change in gambling activities (p < 0.01)				
Continued gambling during lockdown	1693 (53.0%)	1 (ref)		
Started a new form of gambling during lockdown	490 (17.3%)	2.50	1.38	4.53
Stopped all gambling during lockdown	901 (29.8%)	0.81	0.44	1.51
Change in gambling expenditure (p < 0.05)				
Spent about the same during lockdown	363 (11.5%)	1 (ref)		
Spent less during lockdown	2554 (82.5%)	3.92	1.36	11.33
Spent more during lockdown	167 (6.0%)	3.55	1.07	11.82
Change in gambling frequency (p = 0.21)				
No change/frequency decreased	2167 (68.7%)	1 (ref)		
Frequency of gambling on any activity increased	917 (31.3%)	1.53	0.78	2.98

associated with elevated rates of problem gambling. For men, starting a new form of gambling during lockdown was associated with the experience of problem gambling. Notably change in gambling frequency was not associated with problem gambling for men, suggesting it may be the act of switching activity type, rather than increasing gambling frequency, that is a driver of harm.

This has implications for regulators and industry. Concerns were raised at the outset of the initial lockdown period that gambling operators may attempt to "cross-sell" sports bettors into other, potentially more risky, activities (All Party Parliamentary Group on Gambling Harms, 2020). The results presented here suggest that male sports bettors who did switch activity, regardless of level of risk, are more likely to experience gambling harms and should be viewed as vulnerable to harms. Relatedly, a review of the Gambling Act 2005 is currently being undertaken by the UK government, with debates exploring whether placing greater controls or restrictions on certain forms of gambling may generate changes in behaviour. The initial Covid-19 lockdown provides a quasi-experimental opportunity to look at what happens when certain forms of gambling are restricted. Our results show that among regular sports bettors, restrictions in supply generated changes in behaviour, including reductions in gambling for the majority, who did not appear to seek out other ways to gamble, but arguably stimulated engagement in new gambling activities among a minority. This stimulation may have been enhanced by industry actions, such as advertising and marketing.

Interestingly, among male sports bettors, both increased *and* decreased spending on gambling during lockdown were associated with problem gambling. This may be consistent with different behaviour trajectories among those experiencing gambling harms, with some

Table 3b
Odds ratios (OR) for moderate risk/problem gambling among regular female sports bettors.

	N (%)	OR	95% CI (lower)	95% CI (upper)
Age group (p < 0.01)				
55+	174 (26.1%)	1 (ref)		
54–35	235 (38.7%)	4.46	1.72	11.55
35 and under	283 (35.2%)	4.06	1.63	10.15
Highest Educational attainment (p = 0.98)				
Post-secondary education (including degree or higher)	442 (58.2%)	1 (ref)		
A Level or equivalent	148 (20.3%)	0.93	0.45	1.94
GCSE Level or equivalent	129 (14.1%)	1.04	0.48	2.22
CSE or equivalent/other/none	63 (6.3%)	1.23	0.36	4.17
Area deprivation quintile (p = 0.49)				
Least deprived	168 (23.1%)	1 (ref)		
2nd	165 (21.0%)	2.11	0.90	4.94
3rd	174 (20.2%)	1.77	0.71	4.43
4th	145 (18.5%	1.32	0.51	3.44
Most deprived	130 (17.2%)	1.52	0.63	3.65
Wellbeing (p < 0.01)				
Moderate/high wellbeing scores (>=20)	487 (59.9%)	1 (ref)		
Lower wellbeing scores (<=20)	295 (40.1%)	3.48	1.97	6.16
Change in employment status (p = 0.48)				
Employed pre and post lockdown	453 (60.1%)	1 (ref)		
Employed pre covid, furloughed during lockdown	81 (11.5%)	1.24	0.57	2.72
Other pre/post lockdown	248 (27.6%)	0.90	0.44	1.83
Subjective change in finances (p = 0.09)				
About the same	377 (63.0%)	1 (ref)		
Financially worse off	250 (18.7%)	1.79	0.99	3.22
Financially better off	155 (18.3%)	0.89	0.39	2.05
Change in levels of conflict with others (p = 0.31)				
About the same	506 (65.6%)	1 (ref)		
More than before	133 (15.8%)	0.75	0.39	1.42
Less than before	143 (18.6%)	1.27	0.55	2.95
Whether shielding (p < 0.01)				
No	718 (92.3%)	1 (ref)		
Yes	64 (7.7%)	4.08	1.84	9.06
Missing	N/A	N/A		
Change in gambling activities (p = 0.13)				
Continued gambling during lockdown	416 (50.5%)	1 (ref)		
Started a new form of gambling during lockdown	118 (16.5%)	1.83	0.91	3.68
Stopped all gambling during lockdown	248 (33.4%)	0.62	0.27	1.44
Change in gambling expenditure (p = 0.47)				
Spent about the same during lockdown	627 (79.8%)	1 (ref)		
Spent less during lockdown	119 (15.9%)	1.58	0.76	3.28
Spent more during lockdown	36 (4.4%)	1.38	0.44	4.33
Change in gambling frequency (p < 0.01)				
No change/frequency decreased	559 (69.7%)	1 (ref)		
Frequency of gambling on any activity increased	223 (30.3%)	4.21	1.99	8.92

increasing spending as behaviours become less controlled and others attempting to cut back. Among women, increases in gambling frequency, rather than changes in gambling spend or activity, were associated with moderate risk or problem gambling, although the sample may have been underpowered to detect changes in spend or type of gambling.

Whilst bivariate analyses showed some associations between problem gambling for men and moderate risk or problem gambling for women with Covid-19 related personal and financial circumstances, these were not borne out in the multivariate models. Thus none of our hypotheses about the impact of Covid-related personal circumstances upon gambling harms were supported in this initial assessment, though it is plausible that increased stress, anxiety or conflict may be associated with changes in gambling behaviours, which in turn are associated with gambling harms. Future waves of this study should assess this.

Among women, only 'shielding' status was significantly and substantially associated with moderate risk or problem gambling (AOR 4.08; 95% CI 1.84–9.06). Shielding people were advised to avoid all social contact for a long duration of time because of their underlying health problems. This evidence is commensurate with the noted association between poorer health and gambling harms (Cowlishaw and Kessler, 2016). Whilst general health status was not accounted for in the models, wellbeing was, and other mechanisms may contribute to this association – such as increased social isolation.

Finally, for both men and women, lower levels of wellbeing were strongly associated with gambling harms. This association has been documented previously (Farrell, 2018). However, studies have suggested that mental distress has increased significantly during Covid-19 (Pierce et al, 2020), suggesting that gambling behaviours should be considered within the nexus of Covid-19 related behaviours and experiences that may impact upon mental health and wellbeing (Price, 2020).

As with all research, this study has limitations. Results are cross-sectional, with attendant issues relating to inferring causality. Participants were recruited from a non-probability online panel, with consequent issues for generalisability. However, regular sports bettors are a hard to reach and niche group, and the YouGov panel allowed us to identify people who were regular (at least monthly) sports bettors prior to the Covid-19 pandemic and to sample from that pool. Non-probability panel surveys tend to produce higher estimates of risk-taking behaviours than random probability surveys (Callegaro et al 2014). However, analysis shows that closed non-probability online panels tend to produce similar conclusions to probability methods when focusing on multivariate analyses and when exploring the relationship between variables (Callegaro et al, 2014). Whilst data quality was generally high, there was some attrition between logging on to the survey and completion and a few participants (3.7%) were removed from the sample data on the basis of 'seriousness' checks. However, a strength of sampling from YouGov's panel of known sports bettors is that we could weight data for non-response by age, sex, geography and gambling behaviour. All data are self-reported and may be subject to a range of

biases, although, where possible, we used well-validated instruments. Participants were first asked to recall their behaviours pre-Covid-19, and then during lockdown. This may have been cognitively challenging for some participants. However, key outcome measures like problem gambling had reference periods explicitly defined (e.g. in the last three months) so that we could be sure that these were people's concurrent experiences during the initial gambling lockdown. Because regular gamblers take part in a range of activities, mapping changes in measures like frequency was complex and data were condensed for simplicity but may mask further patterns. Finally, analyses for women could only look at moderate and problem gambling combined and not examine problem gambling separately as base sizes were too small. However, additional models were run for men looking at the factors associated with moderate risk and problem gambling combined, giving broadly similar results (with the addition of any change in levels of conflict and gambling frequency being associated with MRPG among men).

8. Conclusions

Whilst a reduction in gambling was the norm for most regular sports bettors during the initial Covid-19 lockdown in Britain, some started new forms of gambling or increased their frequency of gambling on other activities. . Among men, those who switch forms of gambling under lockdown conditions and experience poorer wellbeing should be considered vulnerable to harms, as should women who increased their frequency of gambling on any activity. Among women, shielding status and poorer wellbeing were also associated with the experience of gambling harms during Britain's initial Covid-19 lockdown. Hence, those facing these challenges should be considered potentially vulnerable to gambling harms. Regulators and industry should take action to further protect these emerging vulnerable groups.

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Conflicts of Interest

HW was Deputy Chair of the Advisory Board for Safer Gambling between May 2015 and March 2020. She was remunerated by the Gambling Commission (the industry regulator) for this. She is a member of the WHO panel on gambling and in 2019 worked on a study looking at gambling and suicide funded by GambleAware. GR, FD, NC, RP and MS have worked together on one study funded by GambleAware, which examined the impact of gambling marketing/advertising on young people and vulnerable groups. The funders have no role in the design of the study; in the collection, analyses or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

CRediT authorship contribution statement

Heather Wardle: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Validation, Writing - review & editing. **Craig Donnachie:** Conceptualization, Data curation, Investigation, Validation. **Nathan Critchlow:** Writing - review & editing. **Ashley Brown:** . **Christopher Bunn:** Conceptualization. **Fiona Dobbie:** Conceptualization. **Cindy Gray:** Conceptualization. **Danielle Mitchell:** Writing - review & editing. **Richard Purves:** Writing - review & editing. **Gerda Reith:** Conceptualization. **Martine Stead:** . **Kate Hunt:** Conceptualization, Funding acquisition, Methodology, Project administration, Supervision.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.addbeh.2021.106876.

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