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1	Running head: GAMBLING PROBLEMS IN PRIMARY CARE
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9	Gambling problems in primary care: A cross-sectional study of general practices
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Abstract

1

27	Background: Primary care is an important context for addressing health-related behaviours,
28	and may provide a setting for identification of gambling problems. Aim: To indicate the
29	extent of gambling problems among patients attending general practices, and explore settings
30	or patient groups that experience heightened vulnerability. Design and Setting: Cross-
31	sectional study of patients attending 11 general practices in southwest England. Method:
32	Adult patients ($n = 1,058$) were recruited from waiting rooms of practices that were sampled
33	on the basis of population characteristics. Patients completed anonymous questionnaires
34	comprising measures of mental health problems (e.g., depression) and addictive behaviours
35	(e.g., risky alcohol use). The Problem Gambling Severity Index (PGSI) measured gambling
36	problems, along with a single-item measure of problems among family members. Estimates
37	of extent and variability according to practice and patient characteristics were produced.
38	Results: There were 0.9% of all patients exhibiting problem gambling (PGSI 5+), and 4.3%
39	reporting problems that were low to moderate in severity (PGSI 1-4). Around 7% of patients
40	reported gambling problems among family members. Further analyses indicated that rates of
41	any gambling problems (PGSI 1+) were higher among males and young adults, and more
42	tentatively, within a student healthcare setting. They were also elevated among patients
43	exhibiting drug use, risky alcohol use and depression. Conclusion: There is need for
44	improved understanding of the burden of, and responses to, gambling problems in general
45	practices, and new strategies to increase identification in order to facilitate improved care and
46	early intervention.

47 KEY WORDS: gambling, general practice, cross-sectional study, England

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48 How this fits in: Gambling problems are emerging concerns for public health in the UK, and 49 primary care is a potential context for identifying patients who would benefit from early 50 intervention or specialist services, as such patients may already attend for related reasons. 51 However, there are no data on gambling problems in UK general practices, and this study 52 assessed the extent of these issues, and sought to identify patient groups that may be 53 particularly vulnerable. It suggests that gambling problems are important clinical issues for 54 primary care attenders, with around 1 in 20 patients reporting pasting year problems, which 55 were mostly of low to moderate severity. The findings highlight need for increased 56 acknowledgement and capacities to respond to gambling problems in general practices (e.g., 57 through training and support for GPs in order to identify patients and help facilitate access to 58 specialist services).

59	Participation in gambling is increasing in the UK, with surveys indicating that around
60	59% of British adults reported gambling activities (excluding National Lottery) in 2010,
61	which was an increase of 7% from 2007 [1]. These trends have occurred in the context of
62	developments in gambling technologies (e.g., electronic gambling machines, online
63	gambling) and increased exposure (for example, gambling-related advertisements grew by
64	almost 500% between 2007 and 2012) [2], and larger numbers of people experiencing
65	problems with gambling [1]. These problems encompass a spectrum of difficulties that are
66	defined mainly by gambling-related harms (e.g., financial crises, relationship breakdown) [3],
67	and can sometimes reach levels of severity that warrant diagnoses of pathological gambling
68	or gambling disorder (in the ICD-10 [4] and DSM-5 [5], respectively). Prevalence studies
69	indicate that around 7% of men (2% of women) experience at least some problems with
70	gambling annually in the UK, with higher levels among young adults (e.g., 17% of males
71	aged 16-24 reported at least some problems in 2012) [6]. There is also a socio-economic
72	gradient of risk, whereby elevated risk of gambling problems is associated with low income
73	and high deprivation [7].

74 Gambling problems cluster with other health-related behaviours [8], and are 75 associated with anxiety disorders and psychosomatic complaints, and high rates of suicidal 76 ideation and attempts [9]. These problems are also associated with overuse of health-care 77 services, with problem gamblers being twice as likely to consult their GP for mental health 78 concerns, five times as likely to be hospital inpatients, and eight times as likely to access 79 psychological counselling, when compared to people with no such problems [9]. However, 80 help-seeking for gambling is infrequent and usually crisis-driven [10], and thus occurs only 81 after experiencing severe gambling-related harms. Accordingly, there is a strong need for 82 initiatives to increase help-seeking and early intervention, and these include new means of 83 identification and response within generalist healthcare settings.

84	Primary care is an established context for addressing health-related behaviours (e.g.,
85	alcohol misuse) [11], and may be an important setting for identification of problematic
86	gambling [12]. High use of services [9] suggests overrepresentation of gambling problems in
87	primary care, and particularly within practices that serve vulnerable populations. This is
88	supported by U.S. data suggesting rates of gambling disorders ranging from 6% [13] to 15%
89	[14] among primary care attenders (relative to estimates from population-based studies that
90	range from 0.2-1.0%) [15], and higher levels within low income populations [14]. It is
91	already recommended that UK GPs screen high risk groups (e.g., those reporting financial
92	problems), and refer cases for specialist treatment [12]. This is notwithstanding the lack of
93	any evaluation of gambling problems in UK general practices, whereby the prevalence of
94	conditions remains unknown. In this context, the aims of this project were to:
95	1) Provide data on the extent of gambling problems among patients attending general
96	practices in England;
97	2) Explore variability according to practice and patient characteristics, and thus indicate
98	clinical settings or patient groups that experience heightened vulnerability.
99	Methods
	Treations
100	Participants and procedure
100 101	Participants and procedure The target population comprised patients attending general practices in the Bristol
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100 101 102 103 104	Participants and procedure The target population comprised patients attending general practices in the Bristol region of southwest England. Eleven practices were purposively sampled according to population deprivation and patient characteristics, as follows: (1) deprivation levels were quantified using data from the Office for National Statistics, which indicated four practices
100 101 102 103 104 105	Participants and procedure The target population comprised patients attending general practices in the Bristol region of southwest England. Eleven practices were purposively sampled according to population deprivation and patient characteristics, as follows: (1) deprivation levels were quantified using data from the Office for National Statistics, which indicated four practices from deprived areas (top 30% for deprivation in England), two practices in areas of low
100 101 102 103 104 105 106	Participants and procedure The target population comprised patients attending general practices in the Bristol region of southwest England. Eleven practices were purposively sampled according to population deprivation and patient characteristics, as follows: (1) deprivation levels were quantified using data from the Office for National Statistics, which indicated four practices from deprived areas (top 30% for deprivation in England), two practices in areas of low deprivation (bottom 30%), and three practices in a moderate band (middle 40% for

one practice provided services to a homeless population. The latter were targeted to assessrisk according to key population sub-groups.

110	Patients aged over 18 years and attending practices for any reason were eligible, but				
111	were excluded if they were unable to understand English, required immediate medical				
112	attention, or were unable to give consent. Patients were approached by a researcher in waiting				
113	rooms before appointments, and were provided with information about the study. Those who				
114	provided consent were given anonymous questionnaires. These were self-completed and				
115	returned in the waiting room or using pre-paid envelopes, and yielded $n = 1,058$				
116	questionnaires. Across practices sampled according to deprivation, the patient numbers				
117	ranged from $n = 58$ to $n = 122$. There was $n = 17$ and $n = 163$ participants recruited from the				
118	practice for homeless patients and the student health service, respectively. Socio-				
119	demographic characteristics are shown in Table 1.				
120	TABLE 1				
121	Measures				
122	Brief measures identified mental health concerns and addictive behaviours. These				
123	included the 2-item Whooley scale for depression [16], and the GAD-2 [17] scale for anxiety,				
124	which are recommended in primary care [18]. Risky alcohol use was measured using the				
125	three consumption items from the Alcohol Use Disorders Identification Test (AUDIT-C) [19,				
126	20]. Non-prescription and recreational drug use was assessed using a Single-Item Screening				
127	Question (SISQ) for unhealthy drug use [21]. The format of this item, which required				
128	numeric indications of number of times (in the past year) using an illegal drug or prescription				
129	medication for non-medical reasons, was modified and comprised a binary response (yes or				
130	no) indicating any past year usage.				
131	Gambling frequency was assessed using items derived from the British Gambling				

132 Prevalence Surveys [1], and asked about purchases of lottery or instant win / scratch tickets,

133	play on bingo, casino table games, slot machines and other electronic gambling machines,
134	games of skill against other individuals, or betting money on sporting events. These items
135	used past year timeframes ($0 = Never$, $6 = 4 + times a week$), along with an item about any
136	other gambling. Patients reporting gambling were then asked to complete the Problem
137	Gambling Severity Index (PGSI) [22], which consists of 9-items scored on 4-point response
138	scales $(0 = Never, 3 = Almost always)$ that relate to past year experiences. The study used a
139	criterion of PGSI 5+ for problem gambling (which has been shown to yield greatest
140	classification accuracy relative to clinician ratings involving detailed case conceptualisations)
141	[23], with scores of PGSI 1-4 indicating low to moderate severity problems (given all such
142	respondents were demonstrating at least some signs of problematic gambling). There was a
143	single-item about whether family members or close relatives had ever had problems with
144	gambling, which was adapted from epidemiological surveys [24] and had a binary response
145	format.
146	Data analyses

Data-file preparation was conducted using SPSS Version 21, while analyses were 147 conducted using Program R. These comprised descriptive analyses of rates of gambling 148 149 problems and other mental health concerns and addictive behaviours. Exploratory analyses of 150 variability according to practice characteristics were conducted, followed by evaluations of associations with patient-level characteristics. These comprised Pearson χ^2 -tests and logistic 151 152 regression models that explored significant effects. The latter specified gambling problems as 153 endogenous variables, and with patient characteristics treated as exogenous. These were 154 evaluated in separate models, which thus estimated bivariate associations through Odds 155 Ratios (ORs) and 95% Confidence Intervals (CIs).

156

157

158	Results				
159	Preliminary analyses indicated modest levels of missing data ranging from around 5%				
160	(depression) to 13% (alcohol) across most measures, and were managed through pairwise				
161	deletion. However, there were higher levels for the PGSI, with around 45% of eligible				
162	participants (i.e., reporting gambling in the past year) having missing data across items.				
163	Exploratory analyses indicated around 90% of these patients that reported gambling on				
164	lottery or with instant win tickets only, and suggested that missing data were attributable				
165	mainly to such patients failing to define these activities as gambling. Missing data were				
166	addressed using zero-fill techniques, and thus assumed no gambling problems.				
167	Table 2 indicates frequencies of gambling problems and mental health problems or				
168	addictive behaviours. There were around 1% of patients demonstrating problem gambling				
169	(PGSI 5+), and 4% exhibiting problems that were low to moderate in severity (PGSI 1-4).				
170	Thus, a total of 5.2% of patients (95% CI = 4.0% to 6.8%) exhibited at least some gambling				
171	problems across a spectrum of severity. There were 7.2% of patients reporting gambling				
172	problems among family members, and this included eight patients reporting problems with				
173	their own gambling (PGSI 1+). Levels were lower than rates of other mental health problems				
174	and addictive behaviours.				

175 TABLE 2

176 Subsequent analyses explored variability in gambling problems (PGSI 1+) according to practice characteristics. Given small numbers of practices in this study, the results (see 177 178 Table 2) are highly exploratory. However, they yielded trends ($p \le .10$) suggesting elevated 179 rates in the student health service, when compared to practices characterised by low (OR = 180 2.57, 95% CI = 0.99 to 7.47) and moderate deprivation (OR = 2.12, 95% CI = 0.95 to 4.73). 181 Modest elevations were observed for highly deprived practices but were not significantly 182 different when compared to practices characterised by low (OR = 1.91, 95% CI = 0.81 to

183 (OR = 1.58, 95% CI = 0.95 to 4.73). These deprived practices 184 included the clinic for homeless patients, which were too few for statistical comparison (n =17), but exhibited extremely high rates of gambling problems (29.4%). 185 186 Bivariate associations involving any gambling problems (PGSI 1+) and patient 187 characteristics are shown in Table 3. These indicated significant associations with gender, age 188 and relationship status. Logistic regression illustrated higher rates among: males (compared 189 to females: OR = 2.55, 95% CI = 1.44 to 4.55), patients aged 18-24 years (compared to 35-44 190 year olds: OR = 2.43, 95% CI = 1.21 to 5.06), and patients who were single / never married 191 (compared to married or cohabitating: OR = 2.35, 95% CI = 1.32 to 4.29). Patients screening 192 positive for depression demonstrated a 2-fold increase in rates of gambling problems (OR = 193 2.08, 95% CI = 1.15 to 3.94), while risky alcohol use was associated with a near 3-fold 194 increase (OR = 2.78, 95% CI = 1.60 to 4.89). Drug use was associated with a 5-fold increase 195 in gambling problems (OR = 5.03, 95% CI = 2.78 to 8.99). 196 Discussion 197 Summary 198 The results indicated around 5% of patients reporting problems with gambling across 199 a spectrum of severity, including approximately 1% who were problem gamblers (PGSI 5+), 200 and 4% reporting problems that were low to moderate in severity (PGSI 1-4). There were 201 around 7% reporting gambling problems among family members or close relatives, and were 202 also likely to encounter gambling-related harms [25]. These rates were lower than other 203 mental health concerns (e.g., depression: 56%) and addictive behaviours (e.g., risky alcohol

use: 32%) that have stronger traditions of recognition in primary are. Notwithstanding, the

study indicated groups and perhaps clinical contexts that were characterised by heightened

vulnerability. There were high rates among males and young adults (the extent of any

gambling problems among males aged 18-24 was 25.4%, 95% CI = 15.6% to 38.2%), and

208 more tentatively, within the student healthcare setting. Gambling problems were elevated

209 among patients demonstrating drug use, alcohol risk and depression.

210 Strengths and limitations

211 The study involved purposive sampling of practices, and recruitment of a sample that 212 was a reasonable approximation of patients encountered regularly in primary care. However, 213 the number of practices was small and participants were not randomly sampled, while data on 214 response rates were not recorded. Findings may be affected by refusals to participate and 215 missing data, which was high for the gambling problem measure. This comprised the PGSI 216 [22], which does not assess the full breadth of gambling-related harms [26]. To reduce 217 burden, the study used a single-item measure of gambling problems among family members, 218 while clinical characteristics were measured using brief screens that possess moderate 219 specificity [20, 27], and do not correspond to severe mental health concerns and addiction 220 problems.

221 *Comparison with existing literature*

222 Estimates of the extent of gambling problems were lower than those in prior research 223 from the U.S. [13, 14], and are similar to levels in population-based studies in the UK [1]. 224 Notwithstanding, the present findings highlight that gambling problems are important clinical 225 issues for primary care attenders, that are strongly linked with poor mental health [9] and 226 have major impacts that extend beyond the individual [28]. There is evidence that people 227 with gambling problems can benefit from therapeutic interventions, including intensive and 228 brief interventions [29, 30], and alongside minimal interventions for 'concerned significant 229 others' [31]. These provide the basic components of an intervention framework that aligns 230 with models of care for alcohol misuse, and comprises multiple tiers of intervention [32]. 231 These address a spectrum of severity (e.g., simple advice or brief interventions for hazardous

or harmful drinking, intensive therapies for dependence), as well as support needs of families,

and have bases in identification strategies that are situated within primary care [11].

234 Implications for research and practice

235 The study indicates around 1 in 20 patients that report some degree of gambling 236 problem in routine primary care, and highlights need for improved acknowledgement and 237 capacities to respond to these issues. It supports the recommendation that GPs and clinical 238 staff should be vigilant for gambling problems [12], and particularly among young males and 239 patients who are depressed or using alcohol and drugs. At a minimum, there should be 240 training and support for clinical staff in identification and pathways to care. However, in the 241 absence of visible signs of gambling problems that are low to moderate in severity, it seems 242 unlikely that such strategies (which exclude questioning in the absence of visible risk factors) 243 will identify many individuals who would benefit from early intervention. As such, it may 244 also be that selective screening [33] of high risk groups (e.g., depressed and/or young males), 245 or within particular contexts (e.g., university clinics), are potentially appropriate. 246 There is need for further evidence that indicates the burden of gambling problems in 247 primary care at a national level, and particularly illustrating co-occurrence and impacts on 248 other presenting problems. The development of strategies to identify gambling problems is 249 associated with particular research needs, including studies which demonstrate that initiatives 250 can yield improved access to interventions, and also that patients in primary care, who are not 251 seeking help for gambling, will benefit from interventions. Finally, these identification 252 strategies can only be justified if adequate services are available to deliver interventions. It 253 appears that such requirements are lacking in the UK, where intervention research for 254 gambling is virtually non-existent, while treatment services are grossly inadequate [34]. Such 255 inadequacies are notwithstanding the best efforts of service providers (which mainly

comprise voluntary sector organisations), and can be attributed to an unusual situation in the

257 UK whereby research and treatment are commissioned almost exclusively by gambling 258 industry affiliated bodies. Given that between 15-40% of most gambling revenues (depending 259 on type of activity) [35] is derived from people reporting problems with gambling in the UK, 260 there are conflicts of interest between public health and economic policy goals (whereby even 261 small reductions in numbers of people gambling heavily implies far larger reductions in 262 economic yield) [36]. Because of the vested interests of addiction industries [36, 37], 263 evidence and interventions that are supported through independent funding are needed. 264 Gambling should be formally recognised as a health-related issue in the UK, and included 265 within the remits of mainstream commissioning bodies that are responsible for public health 266 and service provision.

267

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279	who also participated in the study.				
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	n	%		
Gender (female)	636	64.7%		
Age				
18-24	211	20.7%		
25-34	154	15.1%		
35-44	137	13.4%		
45-64	284	27.8%		
65+	235	23.0%		
Relationship status				
Single (never married)	341	33.3%		
Married / living with partner	526	51.4%		
DSW / other	156	15.2%		
Education				
Secondary school or less	270	27.0%		
Post-secondary school education	627	62.6%		
Postgraduate education	60	6.0%		
Other	44	4.4%		
Employment				
Employed	398	39.33%		
Unemployed	126	12.45%		
Retired	226	22.33%		
Student	166	16.40%		
Other	96	9.49%		
Ethnicity (white)	889	87.67%		

Table 1. Sample socio-demographic characteristics (n = 1,058).

NB: Due to small amounts of missing data, patient numbers across categories may not aggregate to 100%.

	п	10 0/	95% CI		
		/0	LB	UB	
Gambling					
PGSI 5+	10	0.9%	0.5%	1.8%	
PGSI 1-4	45	4.3%	3.2%	5.7%	
Problems in the family	73	7.2%	5.7%	9.0%	
Mental health / addictive behaviours					
Depression (Whooley 1+)	561	55.8%	52.7%	58.9%	
Anxiety (GAD-2 2+)	262	27.0%	24.3%	30.0%	
Alcohol (AUDIT-C 5+)	307	32.4%	29.4%	35.5%	
Drug use (SISQ)	140	14.3%	12.2%	16.7%	
PGSI 1+ across practice characteristics					
High deprivation ($k = 4, n = 380$)	23	6.1%	4.0%	9.1%	
Moderate deprivation ($k = 3, n = 331$)	13	3.9%	2.2%	6.8%	
Low deprivation ($k = 2, n = 184$)	6	3.3%	1.3%	7.3%	
Student health service ($k = 1, n = 163$)	13	8.0%	4.5%	13.5%	

Table 2. Estimates of the extent of mental health problems and addictive behaviours, including gambling problems.

NB: Whooley = Whooley depression scale, GAD-2 = 2-item GAD scale for anxiety, AUDIT-C = 3-item consumption scale from the AUDIT, SISQ = single-item screening question for unhealthy drug use.

		п	%	χ2	р
Socio-demographic char	racteristics				
Gender	Male	29	8.4%	10.0	0.002
	Female	22	3.5%		
Age	18-24	22	10.4%	18.2	0.001
	23-44	8	5.2%		
	35-44	4	2.9%		
	45-64	13	4.6%		
	65+	5	2.1%		
Relationship	Single, never married	29	8.5%	11.9	0.003
status	Married/cohabitating	20	3.8%		
	DSW/other	4	2.6%		
Education	Secondary school or less	9	3.3%	2.6	0.272
Ро	t-secondary school education	37	5.9%		
	Postgraduate/other	6	5.8%		
Employment	Employed	21	5.3%	7.7	0.052
	Unemployed	11	8.7%		
	Student	11	6.6%		
	Retired/other	9	2.8%		
Ethnicity	White	45	5.1%	0.0	0.969
	Non-white	7	5.6%		
Clinical characteristics					
Depression	Whooley (1+)	38	6.8%	5.1	0.024
	Whooley (0)	15	3.4%		
Anxiety	GAD-2 (3+)	19	7.3%	2.3	0.127
	GAD-2 (<3)	32	4.5%		
Alcohol	AUDIT-C (5+)	30	9.8%	12.9	0.000
	AUDIT -C (<5)	24	3.7%		
Drug use	SISQ Yes	22	15.7%	32.8	0.000
	SISQ No	30	3.6%		

Table 3. Analyses of associations with any gambling problems (PGSI 1+) and patient-level socio-demographic and clinical characteristics.

NB: Positive endorsement of either item from the Whooley was used to indicate possible depression. Scores of 3+ on the GAD-2 were used to indicate potential anxiety. Scores of 5+ on the AUDIT-C were used to indicate high risk (including hazardous and harmful) drinking.