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The prevalence of gambling and problematic gambling: a systematic review and meta-analysis

Lucy T Tran, Heather Wardle, Samantha Colledge-Frisby, Sophia Taylor, Michelle Lynch, Jürgen Rehm, Rachel Volberg, Virve Marionneau, Shekhar Saxena, Christopher Bunn, Michael Farrell, Louisa Degenhardt

Summary

Background Gambling behaviours have become of increased public health interest, but data on prevalence remain scarce. In this study, we aimed to estimate for adults and adolescents the prevalence of any gambling activity, the prevalence of engaging in specific gambling activities, the prevalence of any risk gambling and problematic gambling, and the prevalence of any risk and problematic gambling by gambling activity.

Methods We performed a systematic review and meta-analysis. We systematically searched for peer-reviewed literature (on MEDLINE, Embase, and PsycInfo) and grey literature to identify papers published between Jan 1, 2010, and March 4, 2024. We searched for any gambling, including engagement with individual gambling activities, and problematic gambling data among adults and adolescents. We included papers that reported the prevalence or proportion of a gambling outcome of interest. We excluded papers of non-original data or based on a biased sample. Data were extracted into a bespoke Microsoft Access database, with the Joanna Briggs Institute Critical Appraisal Tool used to identify the risk of bias for each sample. Representative population survey estimates were firstly meta-analysed into country-level prevalence estimates, using metaprop, of any gambling, any risk gambling, problematic gambling, and by gambling activity. Secondly, population-weighted regional-level and global estimates were generated for any gambling, any risk gambling, problematic gambling, and specific gambling activity. This review is registered on PROSPERO (CRD42021251835).

Findings We screened 3692 reports, with 380 representative unique samples, in 68 countries and territories. Overall, the included samples consisted of slightly more men or male individuals, with a mean age of 29·72 years, and most samples identified were from high-income countries. Of these samples, 366 were included in the meta-analysis. Globally, 46·2% (95% CI 41·7–50·8) of adults and 17·9% (14·8–21·2) of adolescents had gambled in the past 12 months. Rates of gambling were higher among men (49·1%; 45·5–52·6) than women (37·4%; 32·0–42·5). Among adults, 8·7% (6·6–11·3) were classified as engaging in any risk gambling, and 1·41% (1·06–1·84) were engaging in problematic gambling. Among adults, rates of problematic gambling were greatest among online casino or slots gambling (15·8%; 10·7–21·6). There were few data reported on any risk and problematic gambling among adolescent samples.

Interpretation Existing evidence suggests that gambling is prevalent globally, that a substantial proportion of the population engage in problematic gambling, and that rates of problematic gambling are greatest among those gambling on online formats. Given the growth of the online gambling industry and the association between gambling and a range of public health harms, governments need to give greater attention to the strict regulation and monitoring of gambling globally.

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Introduction

The commercial gambling industry has seen a rapid expansion globally,[1] with estimates that the global gambling yield (the total amount of money lost by consumers to the gambling industry) will reach US$531 billion by 2025.[2] Alongside this global expansion, there is an increasing recognition of gambling as a public health issue.[3] This worldwide recognition was first shown through a definition of excessive gambling being introduced in the ICD in 1977,[4] closely followed by the inclusion of diagnostic criteria for pathological gambling in the Diagnostic and Statistical Manual of Mental Disorders, third edition (DSM-III).[4] Current iterations of both the ICD and DSM define gambling disorder as a persistent pattern of gambling behaviours, despite experiencing substantial distress or impairment within areas of functioning.[5,6] A range of harms have been identified as related to gambling, including adverse effects on an individual's financial situation, physical health, relationships, psychological health, employment, and education.[7–10]

Previous systematic reviews among adult populations have estimated the prevalence of problem gambling

Research in context

Evidence before this study

A search on PubMed on Jan 4, 2024, using key words of "gambling" and "prevalence" for reviews and meta-analyses in any language on gambling prevalences published since 2012 yielded 119 results. From the identified papers, there were only two global reviews that meta-analysed problematic gambling, with no reviews of any gambling activity prevalences. A 2022 review of studies since 2016 (from 23 studies covering 14 countries) estimated an adult prevalence of problem or pathological gambling of 1·29%, and estimated that 2·43% of adults engaged in moderate risk or at-risk gambling. An earlier review published in 2012 focused on problem gambling prevalence. This review estimated that 2·3% of adults were engaged in problem gambling from 202 studies published between 1975 and 2012. No reviews were identified for the global prevalence for any gambling activity. Most other reviews identified for adults were either reviews with no meta-analysis conducted or were focused on a single country, which were mostly European countries.

One identified review of adolescent studies examined overall gambling behaviours. A 2017 review identified 44 adolescent studies examining problem gambling, although no meta-analysis was conducted. There were country-level variations, with studies finding that 0·2–12·2% of adolescents met the criteria for problem gambling.

Two reviews published in 2021 examined the prevalence of problem online gambling. Neither review conducted meta-analyses, although they both found wide variations across studies. Among adult representative studies, they reported that 2·7–11·1% of people who gambled online would be engaging in problematic gambling. 22·9–57·5% of adolescents who gambled online were engaged in some level of risky gambling behaviours. There were no reviews examining a wide range of individual gambling activities among the population of people who gambled.

Added value of this study

This review is a comprehensive update to previous systematic reviews of gambling prevalence, focusing on both overall and activity-specific gambling behaviours, including peer-reviewed and grey literature sources. Our review of studies published since 2010 identified many more studies than earlier reviews: 380 unique samples using representative population sampling, comprising 3 441 720 individuals. We present global-level, regional-level, and country-level data on the prevalence of any risk, and of problem or disordered gambling behaviours; and the prevalence of different gambling activity use across people engaging in different levels of gambling, and rates of problematic gambling by activity.

Implications of all the available evidence

We identified representative studies reporting gambling data in 68 countries and territories, showing that among these jurisdictions, 46·2% of all adults and 17·9% of adolescents have gambled in the past 12 months. Given that 80% of global territories now legally permit some form of gambling, and that online gambling is also widely available in jurisdictions that do not permit gambling, there are many countries where the extent of gambling engagement and related harms are unknown and unmeasured. This gap is problematic given the rapid expansion in the global availability of gambling and the globalisation of the commercial gambling industry.

(panel) and note variations in national prevalence estimates,[3,11,12] although which countries or regions were included in these searches have differed. A 2017 review found that among adolescents, problem gambling ranged from 0·2 to 12·3%.[13] These previous studies have focused on problem or disordered gambling and not on the fuller spectrum of risk severity. The full spectrum ranges from people at the lower end of the spectrum, who might have some problems from gambling but with few or no negative consequences, to people at the higher end, who might have a range of negative consequences and gamble with a loss of control. Previous reviews have also not considered the overall prevalence of gambling, in any form and across different gambling activities. Nor have they considered differences in problem or disordered gambling across different gambling activities. Such differences matter: a recent review of risk factors for problem gambling found that different gambling activities had varying odds of problem gambling,[14] with online gambling, electronic gambling machines (EGMs), and poker having the highest odds of problems.

See Online for appendix

The aim of our study was to update and expand on previous reviews,[3] through synthesising both adult and adolescent estimates of: (1) the prevalence of any gambling activity; (2) the prevalence of engaging in specific gambling activities; (3) the prevalence of any risk gambling and problematic gambling; and (4) the prevalence of any risk and problematic gambling by gambling activity.

Methods

Search strategy

We conducted a systematic review and meta-analysis with summary estimates. Searches were conducted initially on June 21, 2021, with updated searches on March 4, 2024. The peer-reviewed databases that were searched included MEDLINE (via PubMed), Embase (via Ovid), and PsycInfo (via ProQuest). Papers were identified using a broader search strategy developed for peer-reviewed literature, and outlined in the appendix (p 7). Two search term strategies for gambling (eg, "gambl*", "lottery", and "casino") were developed on the basis of previous reviews[15] combined with terms

related to prevalence (eg, "prevalence", "incidence", and "epidemiology").

The grey literature sources were selected on the basis of a previous review[15] and expert consultation, with the full list of websites searched provided in the appendix (pp 7–8). Because many gambling estimates are less likely to be published in peer-reviewed literature, grey literature sources were searched to ensure that the maximum number of relevant gambling reports and estimates were included.

Eligibility criteria

Quantitative studies, including those reported in theses and dissertations, were included if they were published in or after 2010, and reported at least one of the following: (1) an estimation of the prevalence of gambling, any risk gambling, or problematic gambling; (2) an estimation of the prevalence of any risk or problematic gambling among people who gambled in the past 12 months (any gambling and those gambling on specific activities; ie, conditional prevalence); and (3) the number or proportion of people who engaged in different gambling activities. Studies reported in languages other than English were included, with translations undertaken by a research team member or using Google Translate.

Studies that did not report original research, had non-human participants, were clinical trials, or used case–control or trial methods were excluded. Samples that had fewer than 40 participants or were recruited on the basis of gambling disorder or another clinical diagnosis (eg, participants were recruited on the basis of depression or Parkinson's disease diagnosis) or other potentially biased samples (eg, only male participants aged 18–25 years) were excluded. The reference lists of identified reviews were checked for any additional studies not identified through our searches.

Study selection process

The results of the peer-reviewed searches were de-duplicated in Endnote 20, and then exported to Covidence for screening. Two team members screened each title and abstract (inter-rater agreement=75·2% and Cohen's κ=0·50) and full-text articles (inter-rater agreement=87·2% and Cohen's κ=0·54) for inclusion (LTT, SC-F, LD, and ML). All conflicts were resolved via a consensus. The grey literature reports were saved in EndNote and each paper was screened by two reviewers for inclusion (LTT, SC-F, LD, ML, HW, and VM). Figure 1 depicts a flowchart denoting the inclusion of studies.

Data extraction process

Studies were extracted into a bespoke Microsoft Access database (by LTT and SC-F). Extractions were double-checked by a second, different team member (LTT, SC-F, ML, or ST), and conflicts were resolved between the extractor and double-checker by discussion. We extracted data on study year, time period, location, recruitment strategies, study characteristics of total samples, gambling samples, any risk and problematic gambling, engagement in gambling activities, and related gambling behaviours. Summary estimates were sought. We only sought data for the entire cohort and by certain subgroups (eg, sex or gender, and adolescents *vs* adults, if applicable). If a paper reported disaggregated estimates by sex or gender, age groups, recruitment methods, location, or data collection year, we extracted each study separately where possible. A full list of the variables extracted is available in the appendix (pp 9–10).

***Panel:* Terms used to describe gambling behaviours**

- **Problem or problematic gambling:** a commonly used term to describe individuals who gamble in a manner that it creates multiple problems that disrupt personal, family, financial, and employment circumstances
- **Gambling disorder:** a recognised disorder in the two major classifications of mental and behavioural disorders: the Diagnostic and Statistical Manual of Mental Disorders 5 and ICD-11. These classifications identify gambling disorder as a persistent pattern of gambling behaviours despite experiencing significant distress or impairment within areas of functioning
- **Any risk gambling:** this term is used to include those who meet the thresholds for problematic gambling or gambling disorder but also includes those who, at minimum, report sometimes or occasionally experiencing at least one behavioural symptom or adverse personal, social, or health-related consequence from gambling. This group represents the full spectrum of risk severity

Risk of bias assessment

Two researchers (ML and ST) independently assessed the risk of bias by using the critical appraisal checklist for prevalence studies from the Joanna Briggs Institute[16] (appendix pp 11–12). Any disagreements were discussed and resolved by ML and ST. The items in the checklist identified risk on the basis of nine questions, with a higher number of yes responses linked to a lower risk of bias.

Our review did not conduct any publication bias testing or analysis because quantitative testing is not recommended for meta-analyses of proportional or prevalence estimates.[17] Although we could identify 380 representative samples, only 366 were included in our analyses. Because some studies quantitatively examining gambling prevalences might not be publicly available, it should be noted that publication bias might be present.

For the **Covidence website** see www.covidence.org

Synthesis methods

Only data from studies with samples representative of the country or region's population (representative studies) and reporting past 12-month gambling behaviours were included in the pooled analyses reported in this paper (appendix p 13). Data from studies that reported on the prevalence of any gambling, any risk gambling, and problematic gambling were synthesised using STATA 18, with each sample only

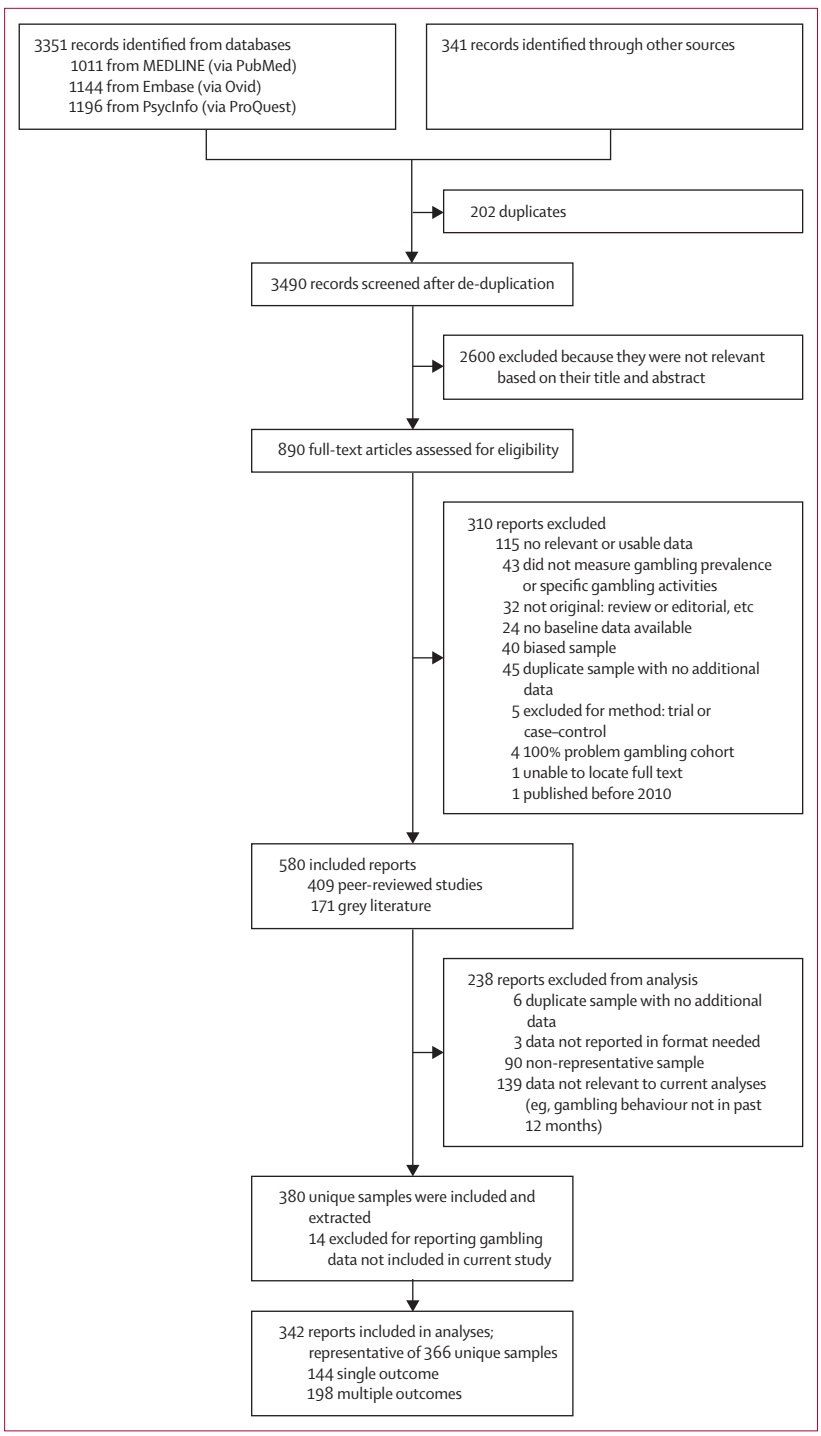


Figure 1: **Flowchart of included studies**

providing one data point (appendix pp 13–14). Random effects meta-analyses using the metaprop command were conducted to estimate the prevalence and 95% CIs of any, any risk, and problematic gambling by country. Global and regional estimates of the number of individuals related to each gambling type prevalence estimate were calculated using the methods developed in previous global reviews conducted by our team.[18–20] The appendix (pp 13–14) details the full methods to estimate regional and global estimates.

Measures and scales that were included in the analyses, with commonly used scales being included, are shown in the appendix (pp 15–16). Any risk was defined as being classified as engaged in any level of gambling risk behaviours, which for most measures consisted of a score of at least 1. Problematic gambling, for our analyses, was an indicator for a substantial risk of experiencing harms associated with gambling. The minimum measure score or cutoff to classify problematic gambling differed between measures, and these definitions are shown in the appendix (pp 15–16). These cutoffs were established by examining each measure and previous research.[21]

Random effects meta-regressions, similar to simple regressions,[22] were conducted to identify potential sources of heterogeneity within the overall prevalence of any, any risk, and problematic gambling within the past 12 months. The potential sources of study-based heterogeneity planned to be explored using meta-regressions were the percentage of women, mean age, percentage of people with alcohol use disorder, percentage of people with substance use disorder, year of data collection, country (other countries *vs* Australia, New Zealand, the UK, Canada, or the USA), and risk of bias score.

A similar analysis method was used to estimate the prevalence and 95% CI for individual gambling activities. Because studies varied in their reported categories of gambling activities, a guide was used to assist in activity categorisation for analyses (appendix pp 16–17). Random effects meta-analyses using the metaprop command estimated, for each individual gambling activity, the proportion among all respondents, people who gambled, and people engaged in problematic gambling in the past 12 months who self-reported engagement with the activity. Additionally, within each individual gambling activity, we estimated the proportion of problematic gambling among people who gambled using that activity in the past 12 months. To explore the potential effect of time on online gambling, we conducted a post-hoc stratification of online gambling prevalences among the general adult population by year of publication (before 2016, 2016–20, and after 2020).

Because of the differences between the availability of gambling avenues for adults and adolescents, we separately analysed studies on adolescents and studies on adults. Adolescent studies were defined as those conducted in primary or secondary schools or where all participants were younger than 18 years. Adult studies were defined as those with participants older than 18 years or did not report an age range. If a study included adolescents and adults but did not report the samples separately, the overall sample was included in the

analyses reflecting the age classification of most participants. Any comparisons made between subgroups were descriptive, with the 95% CI also indicating where differences could be inferred between subgroups. This review is registered on PROSPERO (CRD42021251835).

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Results

A total of 3692 papers published since 2010 were identified in our searches (figure 1). Of these, 580 identified reports met our inclusion criteria, of which 380 were unique representative samples covering 68 countries and territories and including 3 441 720 individuals (table 1; appendix pp 18–38). Overall, the included samples consisted of slightly more men or male individuals, with a mean age of 29·72 years (table 1). Most samples identified were from high-income countries. No estimates were identified in the Pacific Island states and territories, central Asia, and the Caribbean, with one sample available from the Middle East; nonetheless, the samples covered countries containing 43% of the global population (appendix pp 18–38). Adult samples were from 43 countries and territories, representing 41% of the global adult population. Adolescent samples covered 56 countries and territories and 50% of the global adolescent population.

Of these samples, 366 were included in the meta-analysis (figure 1), covering 67 countries and territories: 299 samples reported on any gambling activity, 209 samples on any risk gambling activity, and 166 samples on problematic gambling in the past 12 months. The full table denoting the studies available for each analysis can be found in the appendix (pp 38–39), with pooled country-level estimates in the appendix (pp 40–44). Across studies, numerous methods were used to measure any risk gambling and problematic gambling, with the most common being the Canadian Problem Gambling Index or Problem Gambling Severity Index, the DSM-IV or DSM-5 criteria, and South Oaks Gambling Screen (appendix pp 15–16).

First, we estimated the prevalence of any gambling, any risk, and problematic gambling. In total, 166 samples reported on any gambling activity in the past 12 months, with the highest number of studies from western Europe (k sample [number of studies]=69), followed by North America (k=38) and Australasia (k=33). Globally, 46·2% (95% CI 41·7–50·8) of adults were estimated to have engaged in a gambling activity in the past 12 months (table 2; figure 2); population estimates using 2021 UN population data are presented in table 3. This would translate to an equivalent of 2·3 billion adults (95% CI 2·1–2·6).

Men (49·1%; 95% CI 45·5–52·6) had higher rates of gambling globally than women (37·4%; 32·0–42·5; appendix pp 45–47). Australasia had the highest estimated prevalence at 70·0% (63·5–75·8), with similar levels in North America (61·3%; 51·3–70·8). Latin America had the lowest estimated prevalence at 31·7% (28·0–35·4), although this was based on only two studies.

Among adult samples, 8·7% (95% CI 6·6–11·3; women: 5·5%; 2·5–8·5, and men: 11·9%; 8·2–16·5) engaged in any risk gambling in the past 12 months. Western Europe (k=62), Australasia (k=29), and North

	k samples: representative studies (N=380)	Number of individuals (N=3 441 720)
Sex or gender		
Women	222	1 059 592
Men	222	1 388 196
Study sample		
Adult study	214	2 134 763
Adolescent study	166	1 305 151
Mean age, SD	29·72	15·05
Study region		
Australasian	36	299 126
East and southeast Asia	25	75 081
South Asia	2	6503
Middle East	1	3244
Eastern Europe	65	216 641
Western Europe	180	2 393 837
Africa	7	11 019
Latin America	5	66 829
North America	59	369 440
Gambling scale used to assess any risk gambling		
Brief Biosocial Gambling Screen	1	2000
Canadian Problem Gambling Index or Problem Gambling Severity Index	105	872 086
DSM-IV or DSM-5	31	210 198
Lie-Bet	9	132 021
National Opinion Research Centre DSM Screen for Gambling Problems or National Opinion Research Centre DSM Screen for Gambling Problems, Loss of Control and Lying, and Preoccupation Items	5	29 053
Problem and Pathological Gambling Measure	8	45 745
South Oaks Gambling Screen or South Oaks Gambling Screen, revised for adolescents	26	207 585
Other	7	56 075
Gambling scale used to assess problematic gambling		
Canadian Problem Gambling Index or Problem Gambling Severity Index	96	793 177
DSM-IV or DSM-5	46	304 818
National Opinion Research Centre DSM Screen for Gambling Problems or National Opinion Research Centre DSM Screen for Gambling Problems, Loss of Control and Lying, and Preoccupation Items	5	21 212
Problem and Pathological Gambling Measure	7	38 559
South Oaks Gambling Screen	30	174 883
Other	3	45 051

Note: the data in the table are based on all representative samples identified by systematic review. DSM=Diagnostic and Statistical Manual.

Table 1: **Included study characteristics**

	Any gambling activity				Any risk gambling				Problematic gambling			
	Adults		Adolescents		Adults		Adolescents		Adults		Adolescents	
	k samples: number of studies reporting outcome (N)	Estimated gambling prevalence, % (95% CI)	k samples: number of studies reporting outcome (N)	Estimated gambling prevalence, % (95% CI)	k samples: number of studies reporting outcome (N)	Estimated gambling prevalence, % (95% CI)	k samples: number of studies reporting outcome (N)	Estimated gambling prevalence, % (95% CI)	k samples: number of studies reporting outcome (N)	Estimated gambling prevalence, % (95% CI)	k samples: number of studies reporting outcome (N)	Estimated gambling prevalence, % (95% CI)
Australasia	33 (288 082)[23–55]	70·0% (63·5–75·8)	3 (17 936)[56–58]	9·4% (8·9–10·0)	29 (264 067)[23–26, 28–33,35–43,45–49, 51,54,55,59]	7·8% (6·3–9·5)	2 (11 559)[56,57]	2·7% (2·2–3·2)	27 (257 092)[23–26, 28–33,36–43,45–51,54,55]	0·7% (0·5–0·8)	1 (3746)[56]	0·7% (0·4–1·0)
East and southeast Asia	9 (18 545)[60–69]	49·0% (46·7–51·2)	3 (10 228)[70–72]	10·9% (9·9–12·0)	3 (9745)[63,64,73]	5·9% (5·3–6·6)	1 (4734)[70]	..	7 (23 234)[63,64, 67-69,74,75]	1·5% (1·2–1·8)	1 (4734)[70]	..
Eastern Europe	14 (26 560)[76–88]	41·3% (36·7–46·3)	32 (87 386)[81,89–92]	21·9% (19·1–25·0)	9 (24 714)[76-80,85, 93-95]	6·0% (3·3–10·3)	4 (5888)[89,91,96]	5·5% (4·8–6·4)	7 (20 596)[76–79, 85,93,94]	1·3% (1·0–1·7)	2 (2517)[89,91]	1·9% (1·2–2·9)
Western Europe	69 (559 398)[97–156]	49·0% (43·4–55·0)	77 (907 579)[90,92, 118,126,129,132,133,147,157–176]	26·6% (21·1–32·8)	62 (470 396)[98–100, 102,103,105–109,111,115–135,137–145, 148–153,155,177–184]	7·0% (5·0–9·3)	27 (201 038)[96,118, 129,132,133,147,159–165,167, 168,172,176,180,185–187]	4·6% (2·9–6·9)	51 (381 993)[97, 100,102,103,106–111,114,117,119–142,144,148–151,155,177,180–182,184,188,189]	1·3% (1·0–1·7)	15 (105 748)[129, 133,159–165,167,168,180]	1·6% (1·1–2·1)
Middle East	1 (3244)[190]	45·4% (39·9–50·8)	..	..	1 (3244)[190]	10·3% (7·6–13·6)	..	..	..	..	..	..
Africa	..	..	1 (378)[191]	18·9% (15·6–22·5)	1 (3000)[192]	10·7% (8·0–13·9)	1 (796)[193]	..	1 (3000)[192]	1·5% (1·1–2·0)	..	..
Latin America	2 (4307)[194,195]	31·7% (28·0–35·4)	..	..	..	..	..	..	1 (56 877)[196]	1·1% (0·8–1·6)	..	..
North America	38 (293 794)[197–233]	61·3% (51·3–70·8)	13 (33 567)[234–238]	33·7% (24·5–43·6)	26 (229 098)[198,201, 203,204,206–208,211,212,215–219, 221–224,226,228,229,231,239,240]	13·8% (9·1–19·4)	1 (2484)[236]	27·8% (26·0–29·6)	26 (212 237)[198,201, 203,206–208,211,212,215,216,218, 219,221–224,226,228,229,231,236, 239–242]	1·6% (1·0–2·5)	1 (2484)[236]	10·4% (9·2–11·6)
Global	166 (1 193 930)	46·2% (41·7–50·8)	129 (1 057 074)	17·9% (14·8–21·2)	131 (1 004 264)	8·7% (6·6–11·3)	36 (266 499)	..	121 (958 273)	1·4% (1·1–1·8)	20 (119 229)	..

If there were no or few data reported in a study, it resulted in no estimate calculated. No data were available for the Pacific Island states and territories, central Asia, south Asia, or the Caribbean.

Table 2: **Estimated pooled regional population prevalence of adults and adolescents engaged in any gambling activity, any risk gambling, and problematic gambling in the past 12 months**

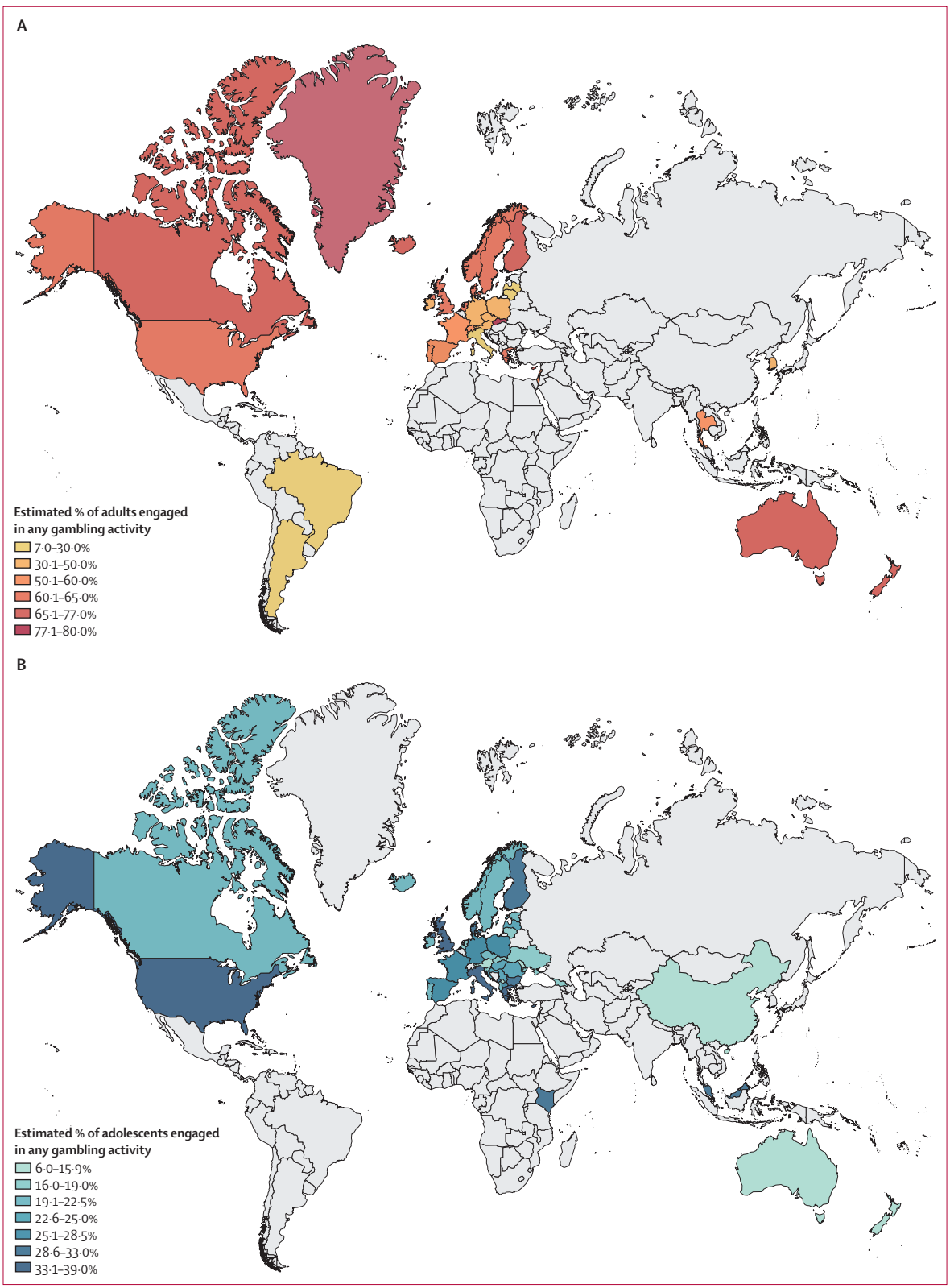


Figure 2: Estimated prevalence of adults (A) and adolescents (B) engaged in any gambling activities in the past 12 months among representative studies

	Any gambling activity	Any risk gambling	Problematic gambling
Adults			
Australasia	13 669 500 (12 409 500–14 813 500)	1 519 000 (1 222 000–1 864 000)	128 000 (97 000–162 500)
Pacific Island states and territories	3 434 000 (3 011 000–3 854 500)*	768 000 (557 000–1 021 500)*	105 500 (75 500–143 000)*
Central Asia	21 569 000 (18 913 500–141 000)*	4 824 000 (3 499 000–6 415 500)*	664 000 (474 500–897 500)*
East and southeast Asia	791 573 500 (755 454 000–827 693 500)	93 811 500 (83 802 000–104 461 500)	23 748 500 (19 629 000–28 363 500)
South Asia	582 364 000 (510 666 500–653 661 500)*	130 251 500 (94 470 500–173 220 000)*	17 922 000 (12 817 000–24 238 000)*
Eastern Europe	87 789 000 (77 928 000–98 369 500)	12 716 000 (6 949 500–21 887 500)	2 840 500 (2 135 500–3 643 500)
Western Europe	138 917 500 (122 903 500–155 712 000)	20 129 500 (14 533 000–26 960 500)	3 618 000 (2 735 500–4 712 500)
Middle East	78 123 500 (68 735 500–87 459 500)†	17 768 500 (13 062 000–23 409 000)†	2 394 500 (1 713 500–3 236 000)*
Africa	339 822 000 (297 985 000–381 426 000)*	80 311 000 (59 951 500–104 661 000)†	11 175 500 (8 115 500–14 928 500)†
Caribbean	12 483 000 (10 946 000–14 011 000)*	2 792 000 (2 025 000–3 713 000)*	384 000 (274 500–519 500)*
Latin America	130 076 500 (114 753 000–145 421 500)	41 504 500 (30 103 000–55 196 000)*	4 775 000 (3 451 000–6 406 500)†
North America	147 238 000 (123 285 000–170 106 500)	33 199 000 (21 743 000–46 626 500)	3 932 500 (2 301 500–6 040 000)
Global	2 347 059 500 (2 116 991 500–2 576 738 500)	439 594 500 (331 917 000–569 436 500)	71 688 000 (53 820 000–93 291 500)
Adolescents			
Australasia	245 500 (231 500–260 500)	70 000 (58 000–83 000)	17 500 (11 000–25 000)
Pacific Island states and territories	352 000 (289 000–420 000)*	..	..
Central Asia	1 618 000 (1 329 000–1 930 000)*	..	..
East and southeast Asia	23 792 000 (21 591 500–26 087 500)	..	..
South Asia	47 694 000 (39 169 500–56 888 000)*	..	..
Eastern Europe	5 233 000 (4 550 000–5 964 000)	1 322 000 (1 136 000–1 524 000)	460 500 (296 500–690 000)
Western Europe	8 768 500 (6 965 000–10 803 500)	1 524 500 (970 500–2 261 500)	528 500 (379 500–707 000)
Middle East	6 299 500 (5 173 500–7 514 000)*	..	..
Africa	40 519 500 (33 354 000–48 234 500)*	..	..
Caribbean	864 500 (710 000–1 031 000)*	..	..
Latin America	12 765 000 (10 483 500–15 225 500)*	..	..
North America	11 430 000 (8 314 000–14 764 500)	9 409 000 (8 818 000–10 011 500)	3 518 000 (3 121 500–3 935 500)
Global	159 581 000 (132 160 500–189 122 000)	..	..

Data are n (95% CI), and are rounded to the nearest 500. *No estimates were reported for analysis, so the calculated global prevalence estimate was used to calculate the estimate for these regions. †Region only had one country estimate, so the estimated number of individuals was mainly based on the calculated global prevalence estimate. Where there are no estimates, this was because of an absence of data.

Table 3: **Estimated number of individuals engaged in any gambling activity, any risk gambling, and problematic gambling in the past 12 months by region**

America (k=26) provided most of the 131 estimates of any risk gambling. The highest estimate was for North America (13·8%; 9·1–19·4). Other regional estimates ranged from 5·9% (5·3–6·6) in east and southeast Asia to 10·7% (8·0–13·9) in Africa.

The majority of the 121 samples reporting on adult prevalence of problematic gambling were from western Europe (k=51), Australasia (k=27), and North America (k=26). We estimated that 1·4% (95% CI 1·1–1·8) of adults (women: 1·0%; 0·5–1·8; and men: 2·2%; 0·9–3·9; appendix pp 45–47) engaged in problematic gambling in the past 12 months, equating to 71·7 million (95% CI 53·8–93·3 million) people. Regional estimates ranged from 0·7% (0·5–0·8) in Australasia to 1·6% (1·0–2·5) in North America.

Among adolescent samples with any gambling estimates (k=129; appendix pp 18–39), the majority were studies from western Europe (k=77) and eastern Europe (k=32). An estimated 17·9% of adolescents had gambled in the past 12 months (95% CI 14·8–21·2; table 2; figure 2). Of the 44 samples reporting any gambling estimates by sex or gender, the estimated prevalence was again lower among girls (21·0%; 15·4–27·9) compared with boys (40·8%; 33·9–48·0; appendix pp 47–49). North America (k=13) had the highest regional estimate at 33·7% (24·5–43·6). Regional estimates otherwise ranged from 9·4% (8·9–10·0; k=3) for Australasia to 26·6% (21·1–32·8; k=77) for western Europe.

There were few data on adolescents for any risk and problematic gambling, resulting in an inability to establish a representative global estimate. 36 samples reported any risk gambling. Most of the data came from western European samples (k=27). North America (k=1) had a higher any risk gambling estimate at 27·8% (95% CI 26·0–29·6) compared with other regions, which ranged from 2·7% (2·2–3·2; k=2) for Australasia to 5·5%

(4·8–6·4; k=4) for eastern Europe. Across regions (k=12), boys were estimated to engaged in any risk gambling at higher rates (9·3–38·1%) than girls (2·5–25·6%).

We found 20 samples estimating the prevalence of problematic gambling among adolescents, most from western Europe (k=15). North America (k=1) had a significantly higher estimate of 10·4% (95% CI 9·2–11·6) compared with other regional estimates ranging from 0·7% (0·4–1·0; k=1) in Australasia to 1·9% (1·2–2·9; k=2) in eastern Europe. Eight samples reported problematic gambling data by sex or gender, with higher rates of boys engaging in problematic gambling (4·7–14·5%) compared with girls (0·5–4·9%).

Conditional estimates were also calculated for the prevalence of any risk and problematic gambling among people who gambled in the past 12 months. An estimated 14·2% (95% CI 9·6–19·7; women: 10·9%; 9·5–12·6; and men: 17·9%; 16·2–19·9) of adults who gambled engaged in any risk gambling, of whom 2·8% (1·9–3·9; women: 1·2%; 0·8–1·7; and men: 2·8%; 2·2–3·6) were estimated to engage in problematic gambling (table 4; appendix pp 47–49). Eastern Europe (k=9; 21·9%; 14·8–30·2) and North America (k=22; 20·6%; 13·6–28·6) had the highest estimates of any risk gambling among those who gambled. The highest regional estimates of problematic gambling were North America (k=25; 4·7%; 3·1–6·6) and eastern Europe (k=6; 4·0%; 3·0–5·0).

Of adolescents who gambled, samples reporting on any risk gambling (k=25) and problematic gambling (k=18) were mostly from western Europe (k=19 and 13, respectively). Similar to adolescent population estimates, North America (k=1; 34·0%; 31·9–36·1) and Australasia (k=3; 33·7%; 30·7–36·7) had higher estimates of any risk gambling compared with western Europe (k=19; 18·4%; 14·7–22·5). Australasia (k=1) had the highest conditional estimate for problematic gambling (12·8%; 8·4–17·8) with the lowest estimate for western Europe (k=13; 5·2%; 2·9–8·9).

Meta-regressions (appendix p 50) indicated that the country of study was the factor most consistently identified as being associated with variations in gambling estimates. Adult samples from Australia, New Zealand, the UK, Canada, and the USA were associated with higher estimates of any gambling activity in the past 12 months compared with all other countries (appendix p 50). For other population estimates, compared with other countries, USA and Canadian samples were found to have higher any risk gambling estimates. Among people who had gambled in the past 12 months, UK and Canadian samples had lower estimates of any risk gambling, and US studies had higher estimates of problematic gambling, compared with all other countries. Samples with higher proportions of women had higher conditional estimates of any risk gambling, but lower estimates of problematic gambling.

Meta-regressions of adolescent estimates found that samples with lower proportions of women and people from the USA were associated with higher estimates of any gambling activity in the past 12 months (appendix pp 50–51). However, Australian samples and later data collection years were associated with lower estimates of any gambling activity. Among population estimates, samples with lower proportions of women and samples from the USA, compared with samples from other

	Any risk gambling				Problematic gambling			
	Adults		Adolescents		Adults		Adolescents	
	k samples: number of studies reporting outcome (N)	Prevalence of gambling, % (95% CI)	k samples: number of studies reporting outcome (N)	Prevalence of gambling, % (95% CI)	k samples: number of studies reporting outcome (N)	Prevalence of gambling, % (95% CI)	k samples: number of studies reporting outcome (N)	Prevalence of gambling, % (95% CI)
Australasia	29 (160 441)[23-26,28-33,35-43,45-49,51,53-55,59]	14·1% (11·4–17·0)	3 (2436)[56-58]	33·7% (30·7–36·7)	26 (152 275)[23-33,36-43,45,47-49,52,54,55]	1·2% (0·9–1·5)	1 (196)[56]	12·8% (8·4–17·8)
East and southeast Asia	2 (1949)[63,64]	4·5% (3·6–5·6)	1 (1324)[70]	..	8 (6889)[60,61,63-65,67-69]	1·4% (0·9–2·1)	2 (1982)[70,71]	11·6% (9·3–14·0)
Eastern Europe	9 (10 853)[76-80,85,93,95,243]	21·9% (14·8–30·2)	1 (453)[89]	..	6 (6642)[76-79,85,93]	4·0% (3·0–5·0)	1 (453)[89]	..
Western Europe	59 (264 229)[99,102,103,105-108,111,114-135,137-146,148-155,179,181,243]	17·0% (9·9–25·6)	19 (69 794)[118,129,132,133,147,159-165,167,168,175,176,244]	18·4% (14·7–22·5)	47 (216 160)[101-104,106-108,111,117,119-142,144,146,148-151,155,166,180,181]	2·6% (1·8–3·4)	13 (42 448)[129,133,159-164,167,168,175,176]	5·2% (2·9–8·9)
Middle East	1 (1626)[190]	19·4% (13·1–26·8)	..	..	1 (1626)[190]	3·5% (2·4–4·8)	..	..
Latin America	1 (2159)[245]	20·3% (14·0–27·6)	..	..	1 (2159)[245]	3·5% (2·4–4·8)	..	..
North America	22 (126 148)[198,203,204,206-208,211,212,215-219,222-226,228,231]	20·6% (13·6–28·6)	1 (2030)[236]	34·0% (31·9–36·1)	25 (117 909)[198,202,203,206-208,211-214,216,218,219,221-226,228,231,246]	4·7% (3·1–6·6)	1 (2030)[236]	12·7% (11·3–14·2)
Global	123 (569 106)	14·2% (9·6–19·7)	25 (76 248)	..	114 (503 660)	2·8% (1·9–3·9)	18 (47 109)	..

If there were no or few data reported in a study, it resulted in no estimate calculated. No data were available for the Pacific Island states and territories, central Asia, south Asia, Africa, or the Caribbean.

Table 4: **Estimated conditional prevalence of adults and adolescents engaged in any gambling activity, any risk gambling, and problematic gambling in the past 12 months**

	Among general population		Among people who gambled in the past 12 months		Among people with problematic gambling		Among people engaging in this activity, prevalence of problematic gambling	
	Adults (k=131)	Adolescents (k=103)	Adults (k=130)	Adolescents (k=87)	Adults (k=39)	Adolescents (k=3)	Adults (k=36)	Adolescents (k=5)
Lottery or raffle tickets	44·7 (42·0–47·4)	11·0 (9·7–12·3)	74·5 (71·5–77·5)	44·5 (40·4–48·6)	70·7 (61·2–79·5)	53·6 (39·3–67·6)	2·0 (1·4–2·7)	11·2 (6·3–17·3)
Instant lottery or win	23·9 (21·6–26·3)	13·2 (8·1–19·2)	39·3 (35·3–43·5)	42·9 (29·8–56·5)	52·7 (43·8–61·5)	71·6 (45·3–92·0)*	2·6 (1·9–3·5)	9·6 (3·9–17·6)
Online gambling	7·8 (6·2–9·5)	10·3 (9·3–11·4)	13·3 (10·4–16·6)	48·7 (43·2–54·1)	43·2 (34·6–52·0)	..	8·6 (6·0–11·5)	10·9 (10·1–11·7)*
Online casino or slots gambling	2·7 (2·1–3·4)	3·9 (2·7–5·2)	4·4 (3·2–5·9)	13·6 (8·8–19·2)	19·4 (11·5–28·7)	28·6 (24·5–32·9)*	15·8 (10·7–21·6)	26·4 (22·3–30·7)
Electronic gambling machines	11·6 (9·8–13·5)	4·9 (3·9–6·0)	18·1 (15·6–20·7)	19·5 (16·0–23·2)	64·6 (56·1–72·7)	64·6 (34·4–89·9)	8·1 (5·5–11·1)	19·6 (2·7–46·6)*
Casino gambling	5·6 (4·8–6·5)	8·3 (7·1–9·5)	9·1 (7·9–10·4)	36·4 (31·5–41·6)	32·4 (26·2–39·0)	46·7 (21·7–72·4)*	10·0 (6·0–14·7)	28·6 (26·9–30·4)*
Sports betting	6·9 (6·0–7·8)	9·1 (7·9–10·4)	11·5 (10·2–12·8)	38·8 (34·2–43·6)	34·3 (27·1–41·9)	65·1 (35·8–89·6)*	8·9 (5·2–13·5)	16·3 (5·9–30·5)*
Betting on races	8·4 (6·7–10·4)	1·4 (1·0–2·0)	12·7 (10·3–15·4)	6·5 (4·6–8·7)	37·2 (29·4–45·3)	..	5·9 (3·6–8·6)	29·1 (26·8–31·5)*
Private or non-commercial betting	6·6 (5·6–7·6)	10·2 (6·3–14·8)	10·8 (9·1–12·5)	48·5 (32·4–64·7)	23·7 (15·2–33·3)	78·6 (61·2–92·1)*	4·4 (2·9–6·1)	3·6 (2·2–5·2)*
Financial market gambling	1·9 (1·2–2·7)	..	3·2 (2·0–4·6)	..	9·7 (6·1–13·9)	..	8·6 (3·9–14·7)	..
Bingo	5·4 (4·7–6·1)	6·7 (5·7–7·8)	9·6 (8·2–11·2)	20·8 (16·3–25·7)	20·8 (12·0–31·2)	46·7 (21·7–72·4)*	5·0 (2·3–8·7)	19·9 (18·7–21·1)*

Data are proportion (95% CI). k is the number of samples. *Three or fewer samples reported estimates.

Table 5: **Proportion of individuals engaged with different gambling activities**

countries, had higher estimates of problematic gambling. Australian studies were also found to have higher estimates of any risk gambling, and later data collection year studies had lower estimates of problematic gambling among people who gambled in the past 12 months.

We then looked at individual gambling activities. 131 adult samples reported estimates of individual gambling activities among the general population (table 5; appendix p 39). The most common form of gambling activity was lottery or raffle tickets (44·7%; 95% CI 42·0–47·4) and instant lottery or win games (23·9%; 21·6–26·3). A pooled estimate of 11·6% (9·8–13·5) of adults had engaged with EGMs and 8·4% (6·7–10·4) had placed a bet on races. 7·8% (6·2–9·5) reported gambling online.

Among adults who gambled in the past 12 months, most had used lottery or raffle tickets (74·5%; 95% CI 71·5–77·5), followed by instant lottery or win games (39·3%; 35·3–43·5). 11·5% (10·2–12·8) had engaged in sports betting, 13·3 (10·4–16·6) had engaged in online gambling, and 18·1% (15·6–20·7) had engaged in EGMs.

There was a variation in risk associated with problematic gambling among each of the gambling activities. The highest risk of problematic gambling was estimated for people who used online casino or slots (15·8%; 95% CI 10·7–21·6) and casino gambling (10·0%; 6·0–14·7). EGMs, sports betting, any online gambling, and financial marketing gambling had similar prevalences of problematic gambling among people using those activities to gamble, ranging from 8·1% (5·5–11·1) to 8·9% (5·2–13·5). The most common activities of lottery or raffle tickets (2·0%; 1·4–2·7) and instant lottery or win games (2·6%; 1·9–3·5) had the lowest prevalences of problematic gambling.

For adolescents, in total, 103 adolescent samples assessed the prevalence of individual gambling activities (table 5; appendix p 39). The highest estimated prevalences were for instant lottery or win games (13·2%; 95% CI 8·1–19·2), lottery (11·0%; 9·7–12·3), any online-based gambling (10·3%; 9·3–11·4), and private or non-commercial gambling (10·2%; 6·3–14·8).

Four individual gambling activities were estimated to be used by 40–50% of adolescents who gambled in the past 12 months: instant lottery or win games (42·9%; 95% CI 29·8–56·5), lottery or raffle tickets (44·5%; 40·4–48·6), private or non-commercial gambling (48·5%; 32·4–64·7), and online-based gambling (48·7%; 43·2–54·1).

Only five samples reported on the prevalence of problematic gambling among adolescents engaging in each gambling activity (table 5). Online casino or slots gambling (26·4%; 22·3–30·7) had the highest rate of problematic gambling among adolescents compared with all other activities.

Considering online gambling, in studies conducted before 2016 (k=40), it was estimated that 5·5% (95% CI 3·6–7·7) of adults engaged in online gambling in the past 12 months. This rate increased to 9·4% (6·7–12·4) among studies conducted between 2016 and 2020 (k=36) and 10·0% (6·3–14·3) for studies conducted after 2020 (k=22).

Regarding risk of bias, overall, representative studies varied from an overall risk score of 4 to 10 (appendix pp 52–70). The majority of adult (86%) and adolescent (73%) studies scored 7 or more, which would map onto an overall judgement of low to moderate risk of bias. When studies did not score a 10, they commonly did not report on participants and the setting in detail or provide an associated error measurement for the study's

prevalence. Meta-regressions using risk of bias found that a higher risk of bias score was associated with lower estimates of any risk gambling among adults who gambled in the past 12 months.

Discussion

This study provides a comprehensive assessment of what is known about gambling prevalence rates globally, for both adults and adolescents, based on representative surveys. We show that an estimated 46·2% of adults globally have gambled in the past 12 months, equating to 2·3 billion people worldwide. Our review also indicated that more than one in six adolescents (17·9%) had gambled in the past 12 months, including on commercial forms of gambling, which are largely age-restricted, equating to an estimated 159·6 million adolescents.

Lotteries were the predominant form of gambling, and an estimated 7·8% of adults and 10·3% of adolescents had gambled online in the past 12 months globally. Online gambling through rapid, ongoing digitalisation is driving industry growth. In Europe, where online gambling markets are mature, the bulk of revenue from gambling is derived from online products.[247] Globally, revenues from online gambling are projected to increase to US$205 billion by 2030.[248] Our study reflects the increased prevalence of gambling in recent years, with pooled estimates of studies since 2016 being higher than those from studies produced between 2010 and 2016. A number of jurisdictions globally, including but not limited to the USA, are legalising online gambling for the first time.[249] This legalisation is often accompanied by widescale advertising, marketing, and sponsorship campaigns to promote online gambling.[250] In addition, growth in online gambling might be further influenced by the COVID-19 pandemic, with shifts to online gambling during this period.[251] Among adolescents, our review showed that online gambling was already the second most prevalent form of gambling activity. Digitalisation and developments in the online market are therefore likely to also shape future gambling trends as this cohort ages.

To our knowledge, our study is the first to estimate global rates of any risk gambling, reflecting the full spectrum of risk severity. We estimated that 8·7% of adults engaged in any risk gambling in the past 12 months. This estimate equates to 439·6 million (95% CI 331·9–569·4) adults engaging with any risk gambling globally. We further estimated the population prevalence of problematic gambling at 1·41% among adults. This estimate is slightly higher than a previous population estimate of 1·29% by Gabellini and colleagues,[11] although the 95% CIs overlap (95% CI 0·63–1·51 in the study by Gabellini and colleagues). The difference is probably due to the wider inclusion of recent studies from a broader geographical area in our review.

The gambling industry is expanding rapidly into new markets, including the USA and many low-income and middle-income countries. We found high regional estimates of problematic as well as any risk gambling in these areas, suggesting that the growth of gambling is translating into growth in associated problems and harms. There was an absence of the adolescent data needed to establish a global estimate. However, regional data estimates show that 2·7–27·8% of adolescents are engaging with any risk gambling.

Population estimates of problem gambling can be misinterpreted (ie, the effect of gambling is small and those experiencing harms are a minority of the population).[252] The Australian Productivity Commission highlights that a focus on population estimates is misleading for policy purposes, because the inclusion of non-gamblers or people who gamble very occasionally masks the true risk of harms associated with gambling and with specific gambling products.[253] Individuals who are below the threshold for problematic or disordered gambling have been shown to bear the greatest burden of harm from gambling.[254–256] Any risk gambling is likely to be a better measure of the full effect of gambling on individuals and societies and our review shows that a substantial number, approximately one in seven, of those who gamble globally experience some risk from gambling.

Assessing the variance in the prevalence of harms among people participating in specific gambling formats is also important. Our data confirm substantial variance by product: among adults engaging in gambling, the pooled estimated prevalence of problematic gambling among those using online casinos (15·8%), casino gambling (10·0%), online gambling (8·6%), and sports betting (8·9%) was substantially higher than for other forms. This finding supports other evidence connecting online gambling products with a higher prevalence of harms.[14,257–260]

The increasing market share and global spread of online gambling products, particularly online EGMs, is likely to exacerbate gambling harms in the future. In terms of a public health response to preventing and limiting these harms, a stronger focus is needed on addressing developments in online environments and regulating harmful product characteristics, as well as limiting the widespread availability and marketing of these products in online environments.

Our study has some limitations. First, there are limitations in the available data. Most studies included in this review used surveys to collect data, through either self-completion or completed by an interviewer. Surveys rely on the individual responding in a truthful manner to questions regarding their gambling, and not engaging in social desirability bias, for a true representation of gambling prevalences and exposure to gambling harms. For a more comprehensive view of gambling behaviours and harms, studies with alternative methods are needed. Studies using more indirect measurement methods could allow for the better capturing of people who gamble, particularly those experiencing harms or feeling

stigmatised by their gambling behaviour.[261] These methods could use multiple data sources, including prevalence studies as one source, which can provide more insight into groups of people that might not be captured through a single household survey.

Second, the included studies varied in sampling frames, methods, and gambling-related definitions, which might have contributed to heterogeneity across studies. Although all but four countries (Argentina, China, Kenya, and Malaysia) had at least one sample using a national sampling frame (appendix pp 18–38), studies varied in the number of regions and populations included in sampling frames. Studies also varied in the methods used to collect data. There has been an increasing push to online-based methods, which, when combined with studies being described as a gambling study, might result in increased estimated gambling prevalence rates.[262]

Another difference across studies was how individual gambling activities and gambling risk severity were defined. To maximise consistency, we used a guide to ensure that only comparable definitions were combined for each individual activity (appendix pp 16–17). Furthermore, numerous measures have been developed to identify gambling risk severity experienced by individuals (appendix pp 15–16), although most studies used either the Canadian Problem Gambling Index or Problem Gambling Severity Index, DSM-IV or DSM-5 criteria, or South Oaks Gambling Screen. These study-level differences might have contributed to heterogeneity.

Our review revealed significant gaps in the knowledge of global gambling behaviours. Only 67 countries and territories reported a gambling estimate, resulting in some regions' estimated population numbers (table 3) relying on extrapolated data (in line with our methods; appendix pp 13–14). Commercial forms of gambling are available worldwide, and it is estimated that more than 80% of jurisdictions offer some form of legal gambling.[249] However, only a minority of jurisdictions are producing data that monitor the effect of such legalisations. This issue represents a substantial gap in the understanding of global gambling trends and ability to identify emerging trends.

Finally, although we searched a range of databases and online websites, we might have missed some studies. Nonetheless, we reviewed all other systematic reviews to ensure no studies had been missed in our searches, reviewed reference lists of identified studies, and consulted with experts in the field of gambling epidemiology. We made efforts to minimise errors in the screening and extraction of data by having two people screen every report or paper, and all extractions were double-checked by another researcher. Additionally, our review did not account for country changes in legislation regarding restrictions or availability of gambling activities.

In conclusion, available data on engagement with any gambling activity and individual gambling activities have shown that almost half of all people globally have recently engaged with gambling, and a notable proportion have engaged with any risk gambling. Our data show that one in seven adults who gamble globally engage with any risk gambling and that the prevalence of any risk or problem gambling is much higher for those engaging in specific gambling products—notably, online gambling formats. Given that online gambling is the greatest growth area for the industry, and the findings from our review show that a notable proportion of adolescents globally engage in online gambling, governments need to take actions to protect their populations from harms.

Contributors

LD, HW, MF, SC-F, and RV contributed to the conceptualisation and data curation. LTT, LD, HW, MF, VM, SC-F, and RV contributed to the literature searches with LTT, SC-F, ST, and ML contributing to the data extraction. LTT conducted the formal analyses. LTT led the writing of the manuscript. All authors commented on and contributed text to the manuscript. LTT, LD, HW, MF, and SC-F accessed and verified the data.

Declaration of interests

In the last 5 years, HW has received grant funding for gambling-related research from The Economic and Social Research Council, National Institute for Health Research, Wellcome Trust, the Gambling Commission (including their regulatory settlement fund), Office of Health Disparities and Improvements and Public Health England, Greater London Authority, Greater Manchester Combined Authority, Blackburn with Darwen Local Authority, and the Department of Digital Culture Media and Sport; received funding from GambleAware in 2018–19 for a project on gambling and suicide; received consulting fees from the Institute of Public Health, Ireland, and the National Institute for Economic and Social Research; received payment for the delivery of seminars from McGill University, the University of Birmingham, Johns Hopkins University, and from the British Broadcasting Corporation; has been paid as an expert witness by Lambeth and Middlesbrough Borough Councils; has received travel costs paid by Gambling Regulators European Forum, the Turkish Green Crescent Society, Alberta Gambling Research Institute, the REITOX Academy (administered through the Austrian National Public Health Institute), and the University of Helsinki; served as the Deputy Chair of the Advisory Board for Safer Gambling between 2015 and 2020, remunerated by the Gambling Commission; is a member of the WHO panel on gambling (ongoing); provided unpaid advice on research to GamCare for their Safer Gambling Standard (until mid-2021); runs a research consultancy for public and third sector bodies only, but has not, and does not, provide consultancy services to gambling industry actors; in researching the gambling industry and their practices, has occasionally attended events where gambling industry actors are present (including industry-sponsored conferences); and as part of her work on the Gambling Survey for Great Britain, is required by the Gambling Commission (the funder) to participate in events disseminating research findings to their stakeholders, which includes the industry, but is independently funded and does not involve collaborations or partnerships with industry. VM has received grant funding for gambling-related projects from the Academy of Finland (project numbers 349589 and 31834), the Finnish Ministry of Social Affairs and Health, and the Finnish Ministry of Justice; as a member of the Gambling Harms Evaluation Committee (2021 onwards) and the Indicators for Gambling Harms work group (2019–21) under the Finnish Ministry of Social Affairs and Health, she interacts with the Finnish gambling monopoly to evaluate company products and practices and to analyse company data; has received a fee for delivering a webinar from Bochum University; did a paid peer review for Routledge; received funding for travel from the Finnish Foundation for Alcohol Studies, University of Bergen, and the Council of Europe; and provides consultation for public and third sector actors, but not the gambling industry. CB has received grant funding for gambling-related projects from The British Academy, The Economic and Social Research Council,

the National Institute of Health Research, Blackburn with Darwen Local Authority, and the Department for Culture, Media and Sport. RV has received grant funding for gambling-related projects from the Massachusetts Gaming Commission, the Connecticut Department of Mental Health & Addiction Services, the Evergreen Council for Problem Gambling, The University of Massachusetts Donahue Institute, Gambling Research Exchange Ontario, NORC Boston, North Dakota Department of Health & Human Services, British Gambling Commission, Public Health Agency of Sweden, Canadian Centre on Substance Abuse, and the Center for Gambling Studies, Rutgers University; has received consultancy fees for gambling-related research from the National Centre for Social Research UK, Gambling Research Exchange Ontario, and the Karolinska Institute; has received honorarium from McGill University for the delivery of a webinar, from the Evergreen Council on Problem Gambling, the Institut für Glücksspiel und Gesellschaft, and the New York State Council on Problem Gambling; and has received travel costs from the Alberta Gambling Research Institute in 2022 and 2023 and from the Nigerian National Lotteries Regulatory Commission in 2023. JR has received funding from various national and international public funding agencies (the Canadian Institutes of Health Research, US National Institutes of Health, the EU, and WHO); and funding for travel from WHO. In the past 5 years, LD and MF have received untied educational grant funding from Indivior and Seqirus for the study of new opioid medications in Australia. SS has been a senior advisor to the McKinsey Health Institute since 2023 for issues on mental health. All other authors declare no competing interests.

Data sharing

Researchers wishing to undertake additional analyses of the data are invited to contact the corresponding author (thi.b.tran@unsw.edu.au).

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