

Problem gambling worldwide: An update and systematic review of empirical research (2000–2015)

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Background and aims: Problem gambling has been identified as an emergent public health issue, and there is a need to identify gambling trends and to regularly update worldwide gambling prevalence rates. This paper aims to review recent research on adult gambling and problem gambling (since 2000) and then, in the context of a growing liberalization of the gambling market in the European Union, intends to provide a more detailed analysis of adult gambling behavior across European countries. *Methods:* A systematic literature search was carried out using academic databases, Internet, and governmental websites. *Results:* Following this search and utilizing exclusion criteria, 69 studies on adult gambling prevalence were identified. These studies demonstrated that there are wide variations in past-year problem gambling rates across different countries in the world (0.12–5.8%) and in Europe (0.12–3.4%). However, it is difficult to directly compare studies due to different methodological procedures, instruments, cut-offs, and time frames. Despite the variability among instruments, some consistent results with regard to demographics were found. *Discussion and conclusion:* The findings highlight the need for continuous monitoring of problem gambling prevalence rates in order to examine the influence of cultural context on gambling patterns, assess the effectiveness of policies on gambling-related harms, and establish priorities for future research.

Keywords: gambling, problem gambling, pathological gambling, adult gambling, prevalence

INTRODUCTION

Gambling has become widely viewed as a socially acceptable form of recreation (Stucki & Rihs-Middel, 2007). For most individuals, gambling is an enjoyable and harmless activity. However, for a small minority of individuals it can become both addictive and problematic with severe negative consequences (Meyer, Hayer, & Griffiths, 2009). Consequently, the expansion of legalized gambling has been identified as an important public health concern (Shaffer & Korn, 2002; Williams, Volberg & Stevens, 2012), and as a result, the number of individuals seeking assistance for gambling-related problems (Abbott, Volberg, & Rönnerberg, 2004; Suurvali, Hodgins, Toneatto, & Cunningham, 2008).

Concerns about gambling have encouraged public health workers to study the epidemiology of this behavior as they provide information about the incidence of problem gambling and the potential effectiveness of policies implemented to mitigate gambling's harm (Williams et al., 2012). Previous systematic reviews are now either outdated (e.g., Stucki & Rihs-Middel, 2007) and/or were not published in peer-reviewed journals (e.g., Williams et al., 2012). Thus, there is a need for conducting more systematic reviews in order to synthesize the disordered gambling trends and to analyze the comparative prevalence of problem gambling rates across different countries. Consequently, the aim of the present review is to present an update of recent international research (published since 2000) for

problem and pathological gambling prevalence rates among adults irrespective of data quality to highlight both countries that have carried out robust prevalence surveys and those that have not, with a particular emphasis on European countries as no recent review has done this. A recent systematic review on adolescent gambling surveys using the same method presented here was recently published by Calado, Alexandre, and Griffiths (2016).

METHODS

A literature search was carried out using the following databases: *Scopus*, *PsycINFO*, *ScienceDirect*, *PsycARTICLES*, *PubMed*, *Wiley Online Library*, *ProQuest Dissertations & Theses Academic Search complete*, and *Google Scholar*. The following search terms were used “gambling,” “prevalence,” “problem gambling,” “pathological gambling,” “gambling addiction,” “compulsive gambling,” and “disordered gambling.” The search was conducted with the same terms in English, French, Spanish, and Portuguese in order to obtain as many prevalence studies as possible and to avoid English publication bias. Additional published

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prevalence studies were sought via the Internet, more specifically through governmental websites, and through other reviews already available in the literature.

Inclusion and exclusion criteria: The goal was to locate all prevalence studies that were conducted at a national level. For countries that had prevalence data for problem gambling at both regional and national level, only national data were considered. However, in the case of countries where no national prevalence study data exist, regional studies with representative samples were included. The studies were selected on the basis of the following criteria: (a) being published since 2000; and (b) citing prevalence rates for adult problem and/or pathological gambling. Studies were excluded if they (a) comprised non-representative groups such as the elderly, college students, prisoners, casino patrons, community users, homeless individuals, and drug addicts, (b) had a sample size of less than 500 participants, and (c) did not use a standardized instrument to assess problem and/or pathological gambling.

Ethics

This paper does not contain any studies with human participants or animals performed by any of the authors.

RESULTS

In a first step, 92 studies were identified after a careful examination of the titles and abstracts of the studies generated by the search on the aforementioned databases and on the Internet. In a second step, studies were excluded due to the following criteria: (a) they comprised non-representative groups, such as the elderly, college students, prisoners, casino addicts, community users, homeless individuals, and drug addicts (21 studies); and (b) a sample of less than 500 participants (2 studies). Therefore, the final search yielded 69 prevalence studies that are summarized in Table 1.

The majority of studies were published in English ($n = 65$), two studies were published in French, one study in Spanish, and one in Portuguese. Three studies were conducted in North America, one in South America, 10 in Asia, five in Oceania, four in Africa, and 46 in Europe, comprising a total of 30 countries. Assessment of problem and pathological gambling used the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987), employed by 23 studies; Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001), employed by 21 studies; the American Psychiatric Association's Diagnostic criteria for pathological gambling (DSM-IV) (APA, 1994), employed by 21 studies; Diagnostic Interview Schedule for pathological gambling (DIS) (Robins, Marcus, Reich, Cunningham, & Gallagher, 1996), employed by three studies; Diagnostic Interview for Gambling Severity (DIGS) (Stinchfield, 2002), employed by one study; National Opinion Research Center DSM Screen for Gambling Problems (NODS) (Gerstein et al., 1999), employed by seven studies; Gamblers Anonymous Twenty Questions (GA20) (Gamblers Anonymous, 1984), employed by three studies; and Lie/Bet scale (Johnson et al., 1997), employed by two studies. The present review considers the combined rate of problem and pathological gambling, as

many studies merge problem gambling with pathological gambling (e.g., Abbott, Romild & Volberg, 2014).

Gambling and problem gambling worldwide

The empirical studies conducted worldwide since 2000 on adult gambling and problem gambling demonstrate that there are many countries that have never carried out studies on gambling behavior. Most studies on problem gambling have been conducted in Europe, Asia, North America, and Oceania. Despite the lack of research in some countries, the findings demonstrate that 0.1–5.8% of individuals meet diagnostic criteria for problem gambling across five continents during the year before the survey, and 0.7–6.5% meet criteria for problem gambling during their lifetime (notwithstanding differences in cut-offs among assessment instruments). It may also be noted that some variations in problem gambling prevalence rates occur across different continents. More specifically, in North America the past-year problem gambling prevalence rates ranged from 2% to 5%, in Asia 0.5% to 5.8%, in Oceania 0.4% to 0.7%, and in Europe 0.1% to 3.4%. Therefore, Asia and Europe appear to be the continents that show the greatest variations in past-year problem gambling prevalence rates. In the next section, a more detailed picture of gambling and problem gambling in Europe is presented.

Gambling and problem gambling in Europe

The remainder of this review focuses on studies carried out in Europe. In fact, Europe is mainly regulated by the European Internal Market, and is characterized by a standardized system of laws that apply in all member states and maintain common policies on various sectors (Eising, 2002). However, the gambling sector differs from other economic activities, because it is regulated almost exclusively at the national level rather than by the European Union law (Planzer, Gray, & Shaffer, 2014). In fact, national regulatory approaches to gambling vary widely across countries (Meyer et al., 2009), and according to some researchers (e.g., Kun, Balazs, Arnold, Paksi, & Demetrovics, 2012), there are large differences in gambling patterns between countries and cultures.

At the same time, the European Union appears to be moving toward a more continued expansion of gambling characterized by the legalization and liberalization of gambling markets in the past few decades (Kingma, 2008). Therefore, this variation of gambling patterns across European countries together with its expansion shows the need to provide prevalence estimates of problem gambling, as well as its associated demographics and other information available separately for each country.

To date, there have been two other reviews concerning gambling in Europe (i.e., Griffiths, 2009; Meyer et al., 2009), but these reviews are now outdated as they (a) did not provide national data from some countries that have since carried out gambling prevalence surveys (e.g., France, Italy, and Czech Republic); and (b) did not provide information for some countries that only have data in their native language (e.g., Austria and Portugal).

Table 1. Overview of adult gambling prevalence surveys across the world

	Country	Study	Measure	Sample characteristics	Response rate	Gambling prevalence	Problem gambling prevalence	Legal age to gamble
North America	Canada	Cox, Yu, Afifi, and Ladouceur (2005)	PGSI	National, 34,770 people aged 15 and over recruited by face-to-face and telephone interview	77%	Not reported	PGSI: Problem gambling (3+): 2% (past-year prevalence)	18 years for Alberta, Manitoba, Quebec, and 19 years for other states
	USA	Welte, Barnes, Wiczorek, Tidwell, and Parker (2002)	Diagnostic Interview Schedule (DIS)	National, 2,630 adults aged 18 and over recruited by telephone interview	65.4%	82.2% (past-year)	DIS: Problem gambling (3+): 3.5% (past-year prevalence)	From 12 to 21 years depending on states and gambling activities
South America		Welte, Barnes, Tidwell, Hoffman, and Wiczorek (2015)	DIS-IV and SOGS	National, 2,963 adults aged 18 and over recruited by telephone interview (landline and cell phone)	Landline: 54.0%; cell phone: 62.7%	76.9% (past-year)	DIS-IV: Problem gambling (3+): 4.6% SOGS: Problem gambling (3+): 5% (past-year prevalence)	
	Brazil	Tavares et al. (2010)	NODS	3,007 participants aged 14 and over recruited by face-to-face interview	66.4%	Not reported	NODS and DSM-IV-J: Problem gambling (1-4): 1.3%; pathological gambling (5+): 1%; combined rate: 2.3% (lifetime prevalence)	18 years
Asia	South Korea	Park et al. (2010)	DIS	6,510 aged 18-64, although only 5,333 adults fully completed the Korean DIS for pathological gambling, recruited by face-to-face interview	81.7%	Not reported	DIS: Problem gambling (1-4): 3%; pathological gambling (5+): 0.8%; combined rate: 3.8% (lifetime prevalence)	20 years
		Williams, Lee, and Back (2013)	PGSI	4,000 phone interviews aged 19 years and over supplemented by an online survey of 4,330 members	Cell phone: 17%; online panel: 20.2%	41.8% (past-year)	PGSI: Problem gambling (5+): 0.5% (past-year prevalence)	
	Singapore	MCYS (2005) ^a	DSM-IV	2,004 adults aged 18 and over recruited by face-to-face interviews	90%	58% (past-year)	DSM-IV: Problem gambling (3-4): 2%; pathological gambling (5+): 2.1%; combined rate: 4.1% (past-year prevalence)	21 years (casino gambling and 18 years for other gambling products)

(Continued)

Table 1. (Continued)

Country	Study	Measure	Sample characteristics	Response rate	Gambling prevalence	Problem gambling prevalence	Legal age to gamble
	MCYS (2008) ^a	DSM-IV	2,300 aged 18 and over recruited by face-to-face interviews	89%	54% (past-year)	DSM-IV: Problem gambling (3–4): 1.2%; pathological gambling (5+): 1.7%; combined rate: 2.9% (past-year prevalence)	
	National Council on Problem Gambling (2012) ^a	DSM-IV	3,315 people aged 18 and over recruited by face-to-face interviews	81%	47% (past-year)	DSM-IV: Problem gambling (3–4): 1.2%; pathological gambling (5+): 1.4%; combined rate: 2.6% (past-year prevalence)	
	National Council on Problem Gambling (2015) ^a	DSM-IV	3,000 adults aged 18 and over recruited by face-to-face interviews	73%	44% (past-year)	DSM-IV: Problem gambling (3–4): 0.5%; pathological gambling (5+): 0.2%; combined rate: 0.7% (past-year prevalence)	
Hong Kong	Wong and So (2003)	DSM-IV (modified Chinese version)	2,004 adults aged 15–64 recruited by telephone interviews	57.4%	Not reported	DSM-IV: Problem gambling (3–4): 4%; pathological gambling (5+): 1.8%; combined rate: 5.8% (past-year prevalence)	18 years
	Social Sciences Research Centre (2005) ^a	DSM-IV (modified Chinese version)	2,093 people aged 15–64 recruited by telephone interviews	74.7%	81.1% (past-year)	DSM-IV: Problem gambling (3–4): 3.1%; pathological gambling (5+): 2.2%; combined rate: 5.3% (past-year prevalence)	
	Wan et al. (2012) ^a	DSM-IV	2,024 people aged 15–64 recruited by telephone interviews	48.3%	62% (past-year)	DSM-IV: Problem gambling (3–4): 1.9%; pathological gambling (5+): 1.4%; combined rate: 3.3% (past-year prevalence)	
Macau	Fong & Ozorio (2005)	DSM-IV (modified Chinese version)	1,121 people aged 15–64 recruited by telephone interviews	68%	67.9% (past-year)	DSM-IV: Problem gambling (3–4): 2.5%; pathological gambling (5+): 1.78%; combined rate: 4.3% (past-year prevalence)	18 years (casinos for visitors) and 21 (casinos for locals)

Oceania	Australia	Gainsbury et al. (2014)	PGSI	National, 15,006 adults aged 18 and over recruited by telephone interviews	26.4%	64% (past-year)	PGSI: Problem gambling (8+): 0.6% (past-year prevalence)	18 years for most of the gambling activities and 16 years for lotteries in some states
		Dowling et al. (2015)	PGSI	National, 2,000 participants aged 18 and over recruited by telephone interview (landline and mobile phone)	19.5% (21.7% landline; 17.8% mobile)	63.9% (past-year)	PGSI: Problem gambling (8+): 0.4% (past-year prevalence)	
	New Zealand	Abbott et al. (2004)	SOGS-R	6,452 adults aged 18 and over interviewed by telephone	75%	86% (past 6 months)	SOGS-R: Problem gambling (3–4): 0.8%; pathological gambling (5+): 0.5%; combined rate: 1.3% (past 6 months prevalence) Problem gambling (3–4): 1.9%; pathological gambling (5+): 1%; combined rate: 2.9% (lifetime prevalence) PGSI: Problem gambling (8+): 0.4% (past-year prevalence) PGSI: Problem gambling (8+): 0.7% (past-year prevalence)	20 years for casino gambling and 18 years for other gambling activities
		Ministry of Health (2009) ^a	PGSI	12,488 adults aged 15 years and over interviewed face-to-face	68%	65.3% (past-year)		
		Health Sponsorship Council (2010) ^a	PGSI	1,740 adults aged 15 and over interviewed face-to-face	Not reported	80.7% (past-year)		
Africa	South Africa	Collins and Barr (2001) ^a	Gamblers Anonymous 20 (GA20) and SOGS GA20	5,800 people aged 18 and over interviewed face-to-face	Not reported	Not reported	GA20 (7+): 3.8% (lifetime prevalence) SOGS (5+): 4.8% (past-year prevalence) GA20 (7+): Problem gambling: 4.6% (lifetime prevalence)	18 years
		Collins and Barr (2003) ^a		National, 5,816 South Africans aged 18 and over interviewed face-to-face	Not reported	Not reported		
		Collins and Barr (2006) ^a	GA20	National, 3,003 aged 18 and over interviewed face-to-face	Not reported	Not reported	GA20 (7+): Problem gambling: 4.8% (lifetime prevalence) PGSI: Problem gambling (8+): 3.2% (past-year prevalence)	
		Kincaid et al. (2013)	PGSI	National, 3,000 urban adults aged 18 and over interviewed face-to-face	Not reported	Not reported	PGSI: Problem gambling (8+): 3.2% (past-year prevalence)	

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Table 1. (Continued)

Country	Study	Measure	Sample characteristics	Response rate	Gambling prevalence	Problem gambling prevalence	Legal age to gamble
Europe							
Austria	Kalke et al. (2011) ^a	DSM-IV	National, 6,300 people aged 14–65	Not reported	42% (past-year)	DSM-IV: Problem gambling: 0.4%; pathological gambling: 0.7%; combined rate: 1.1% (past-year prevalence)	It varies from 14 to 18 years depending on regions and gambling activities
Belgium	Druine et al. (2006)	DSM-IV	National, 3,002 people aged 16–99 interviewed by telephone	^b	60% (past-year)	DSM-IV: Problem gambling (3–4): 1.6%; pathological gambling (5+): 0.4%; combined rate: 2% (past-year prevalence)	18 years for lotteries, betting shops, and bingo, 21 for entering casinos and gaming arcades
Cyprus	Çakici (2012)	Turkish form of SOGS	929 people living in the Turkish Republic of Northern Cyprus interviewed face-to-face	Not reported	55% (lifetime)	SOGS: Problem gambling (8+): 2.2% (lifetime prevalence)	18 years
Czech Republic	Mravčík et al. (2014)	PGSI and Lie/Bet	National, 2,134 people aged 15–64	^c	25.5% (past-year)	PGSI: Problem gambling (3+): 2.3% (past-year prevalence)	18 years
Denmark	Bonke and Borregaard (2006)	SOGS-R and NODS	National, 8,153 adults aged 18–74 interviewed mostly by telephone. Face-to-face interviews were conducted with people who could not be contacted by telephone	70%	77% (past-year)	NODS: Problem gambling (3–4): 0.4%; pathological gambling (5+): 0.3%; combined rate: 0.7% (lifetime prevalence) Problem gambling (3–4): 0.3%; pathological gambling (5+): 0.1%; combined rate: 0.4% (past-year prevalence) SOGS-R: Problem gambling (3–4): 1.2%; pathological gambling (5+): 0.5%; combined rate: 1.7% (lifetime prevalence) Problem gambling (3–4): 0.8%; pathological gambling (5+): 0.2%; combined rate: 1.0% (past-year prevalence)	18 years for gambling in casinos and slot machines and 16 years for other activities

Problem gambling worldwide

Denmark	Ekholm et al. (2012)	Lie/Bet	National, 5,686 adults aged 16 and over interviewed face-to-face and following the interview completed a self-administered questionnaire	52.1%	Not reported	Lie/Bet: Problem gambling (1+): 0.9% (past-year prevalence); 2.6% (lifetime prevalence)	18 years for gambling in casinos and slot machines and 16 years for other activities
	Ekholm et al. (2012)	Lie/Bet	14,670 adults aged 16 or above interviewed face-to-face and following the interview completed a self-administered questionnaire	62.7%	Not reported	Lie/Bet: Problem gambling (1+): 0.8% (past-year prevalence); 2% (lifetime prevalence)	
Estonia	Faktum Uuringukeskus (2004)	SOGS	National, 986 people aged 15–74	^d	61% (lifetime)	SOGS: Problem gambling (3–4): 2.6%; pathological gambling (5+): 2.4%; combined rate: 5% (lifetime prevalence)	16 years for lottery and 21 for other gambling activities
	Laansoo and Niit (2009)	SOGS	National, 2,005 people aged 15–74 who completed a self-administered questionnaire	^d	75% (lifetime)	SOGS: Problem gambling (3–4): 3.1%; pathological gambling (5+): 3.4%; combined rate: 6.5% (lifetime prevalence)	
Finland	Ilkas and Turja (2003)	SOGS	National, 5,013 people aged 15–74 interviewed by telephone	Not reported	74% (past-year)	SOGS: Problem gambling (3–4): 4%; pathological gambling (5+): 1.5%; combined rate: 5.5% (lifetime prevalence)	18 years
	Aho and Turja (2007)	SOGS	National, 5,008 Finnish aged 15 and over interviewed by telephone	48%	73% (past-year)	SOGS: Problem gambling (3–4): 2.1%; pathological gambling (5+): 1%; combined rate: 3.1% (past-year prevalence)	
Finland	Castrén et al. (2013)	PGSI	National, 2,826 Finnish aged 15–64 recruited by postal survey	56.5% (calculation derived from data in the report)	Not reported	Problem gambling (3–4): 3.6%; pathological gambling (5+): 1.6%; 5.2% combined rate (lifetime prevalence) PGSI: Problem gambling (8+): 1.1% (past-year prevalence)	

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Table 1. (Continued)

Country	Study	Measure	Sample characteristics	Response rate	Gambling prevalence	Problem gambling prevalence	Legal age to gamble
France	Raisamo et al. (2014)	PGSI	National, 4,484 people aged 15–74 interviewed by telephone	40%	78% (past-year)	PGSI: Problem gambling (8+): 0.6% (past-year prevalence)	
	Costes et al. (2011)	PGSI	National, 25,034 aged 18–75 interviewed by telephone	60%	47.8% (past-year)	PGSI: Problem gambling (8+): 0.4% (past-year prevalence)	18 years
	Costes et al. (2015)	PGSI	National, 15,635 aged 15–75 interviewed by telephone	Not reported	56.2% (past-year)	PGSI: Problem gambling (8+): 0.5% (past-year prevalence)	
Germany	Buth and Stover (2008)	DSM-IV	National, 7,980 aged 18–65 recruited by telephone interview and online survey	Computer-based telephone survey: 55.8%; online survey: 68%	39.2% (past-year)	DSM-IV: Problem gambling (3–4): 0.64%; pathological gambling (5+): 0.56%; combined rate: 1.2% (past-year prevalence)	18 years
	Bühringer et al. (2007)	DSM-IV	National, 7,817 people aged 18–64 recruited by self-administered email survey supplemented with telephone interviews	48%	71.5% (lifetime)	DSM-IV: Problem gambling (3–4): 0.29%; pathological gambling (5+): 0.2%; combined rate: 0.5% (past-year prevalence)	
	Federal Center for Health Education (BZgA) (2008)	SOGS	National, 10,001 aged 16–65 interviewed by telephone	63.3%	Not reported	SOGS: Problem gambling (3–4): 0.41%; pathological gambling (5+): 0.19%; combined rate: 0.6% (past-year prevalence)	
	Sassen et al. (2011)	DSM-IV	National, 8,006 adults aged 18–64 recruited by postal questionnaires (46%), telephone interviews (42%) and online (12%)	50.1%	48% (past-year)	DSM-IV: Sub-threshold for pathological gambling (1–4): 1.1%; pathological gambling (5+): 0.3%; (past-year prevalence)	
	Meyer et al. (2015)	DSM-IV	National, 15,023 individuals aged 14–64 years recruited by telephone interviews (landline and mobile phone)	Landline telephone: 44.5%; mobile telephone: 36.8%	Not reported	DSM-IV: Sub-threshold for gambling problems (1–4): 1.7%; pathological gambling (5+): 0.3% (past-year prevalence)	

Problem gambling worldwide

Great Britain	Orford et al. (2003)	SOGS and DSM-IV	National, 7,680 aged 16 and over recruited by face-to-face interviews	65%	72% (past-year)	SOGS: Problem gambling (5+): 0.8%; (past-year prevalence) DSM-IV: Problem gambling (3–4): 0.4%; pathological gambling (5+): 0.2%; combined rate: 0.6% (past-year prevalence) PGSI: Problem gambling (8+): 0.5% (past-year prevalence) DSM-IV: 0.3% (3–4); 0.3% (5+); combined rate: 0.6% (past-year prevalence) PGSI: Problem gambling (8+): 0.7% (past-year prevalence) DSM-IV: Problem gambling (3–4): 0.5%; pathological gambling (5+): 0.4%; combined rate: 0.9% (past-year prevalence) DSM-IV: Problem gambling (3–4): 0.7%; pathological gambling (5+): 0.3%; combined rate: 1% (past-year prevalence) DSM-IV: Problem gambling (3+): 0.5% PGSI: Problem gambling (8+): 0.4% (past-year prevalence)	16 years for lottery and bingo, 18 years for other gambling activities
	Orford et al. (2010)	PGSI and DSM-IV	National, 9,003 people aged 16 and over recruited by face-to-face interviews, or by an online questionnaire, that was also available	52%	68% (past-year)		
	Wardle et al. (2012)	PGSI and DSM-IV	National, 7,756 people aged 16 and over recruited by computing-assisting interviewing, supplemented by telephone interview for those who refused to participate	47%	73% (past-year)		
Great Britain	APMS survey (Wardle et al., 2009) ^a	DSM-IV	National, 7403 adults aged 16 and over recruited by face-to-face interviews	99.2% (calculation derived from some data in the report)	65.9% (past-year)		16 years for lottery and bingo, 18 years for other gambling activities
	Combined data from the Health Survey for England and Scottish Health Survey (Seabury & Wardle, 2014) ^a	DSM-IV and PGSI	11,774 English and Scottish adults aged 16 and over recruited by face-to-face interviews	England: 56% (individual response rate); Scotland: 56% (individual response rate)	65% (past-year)		
Hungary	Kun et al. (2012)	SOGS	National, 2,710 people aged 18–64 recruited by face-to-face interviews and a self-administered questionnaire	85.1%	65.3% (lifetime)	SOGS: 1.9% (3–4); 1.4% (5+); combined rate: 3.3% (lifetime prevalence)	18 years

(Continued)

Table 1. (Continued)

Country	Study	Measure	Sample characteristics	Response rate	Gambling prevalence	Problem gambling prevalence	Legal age to gamble
Iceland	IMG-Gallup (2000); Jonsson, (2006)	NODS	National, 1,500 people aged 16–75 recruited by telephone interview	70.5%	Not reported	NODS: Problem gambling (3–4): 0.7%; pathological gambling (5+): 0.6%; combined rate: 1.3% (lifetime prevalence) PGSI: Problem gambling (8+): 0.5% DIGS: Problem gambling (3–4): 0.5%; pathological gambling (5+): 0.6%; combined rate: 1.6% (past-year prevalence) PGSI: Problem gambling (8+): 0.8% (past-year prevalence) CPGI: Problem gambling (3+): 2.2% (past-year prevalence)	18 years for most gambling products
	Olason and Grettarsson (2009)	Diagnostic Interview for Gambling Severity (DIGS) and PGSI	National, 3,358 adults aged 18–70 recruited by telephone interview	69.8%	69% (past-year)		
	Olason et al. (2015)	PGSI	National, 1,887 adults aged 18–70 recruited by telephone interview	61.8%	76% (past-year)		
Italy	Bastiani et al. (2011)	CPGI-short form	National, 31,984 people aged 15–64 recruited by anonymous postal questionnaire	35%	42.1% (past-year)		18 years
	Barbaranelli (2010)	SOGS and PGSI	National, 2,000 aged 18–74 recruited by self-administered questionnaire	Not reported	Not reported	Combined rate for SOGS and PGSI: 1.27% (past-year prevalence)	
The Netherlands	De Bruin et al. (2006)	SOGS	National, 5,575 people aged 16 and over recruited predominantly by telephone interview. Participants could also complete an online questionnaire	25%	Not reported	SOGS: Problem gambling (3–4): 1.5%; pathological (5+): 1%; combined rate: 2.5% (lifetime prevalence) Problem gambling (3–4): 0.6%; pathological (5+): 0.3%; combined rate: 0.9% (past-year prevalence) SOGS: Problem gambling (3–4): 0.68%; pathological (5+): 0.15%; combined rate: 0.8% (past-year prevalence)	18 years
	Bieleman et al. (2011); Goudriann (2014)	SOGS	National, almost 6000 participants (no more information is provided)	28%	Not reported		

Northern Ireland	Northern Ireland Statistics and Research Agency (2010) ^a	PGSI	1,032 adults aged 16 and over recruited by face-to-face residential interviews, although PGSI was completed privately	57%	75.3% (past-year)	18 years	PGSI: Problem gambling (8+): 2.2% (past-year prevalence)
Norway	Gotestam and Johansson (2003)	DSM-IV	National, 2,014 adults aged 18 and over recruited by telephone interview	47.8%	68.2% (lifetime)	18 years	DSM-IV: Problem gambling (3–4): 0.45%; pathological gambling (5+): 0.15%; combined rate: 0.6% (no specific time frame is provided) NODS: Problem gambling (3–4): 0.4%; pathological gambling (5+): 0.3%; combined rate: 0.7% (past-year prevalence) Problem gambling (3–4): 0.8%; pathological (5+): 0.6%; combined rate: 1.4% (lifetime prevalence)
	Lund and Nordlund (2003); Jonsson (2006)	SOGS and NODS	National, 5,235 adults aged 15–74 recruited by telephone interview or postal enquiries if the person was not reachable by phone	54.9%	80.6% (past-year)		SOGS: Problem gambling (3–4): 0.4%; pathological gambling (5+): 0.2%; combined rate: 0.6% (past-year prevalence) Problem gambling (3–4): 0.7%; pathological gambling (5+): 0.3%; combined rate: 1% (lifetime prevalence)
	Bakken et al. (2009)	NODS	National, 3,482 people aged 16–74 recruited by self-administered email surveys	36.1%	67.9% (past-year)		NODS: Problem gambling (3–4): 0.4%; (5+): 0.3%; combined rate: 0.7% (past-year prevalence) Problem gambling (3–4): 1%; pathological gambling (5+): 0.7%; combined rate: 1.7% (lifetime prevalence)
Portugal	Lopes (2009) ^a	SOGS	National, 3,850 people aged 18–70 recruited by telephone interview	51.3% (calculation derived from data in the report)	Not reported	18 years	SOGS: Problem gambling (5+): 0.2% (past-year prevalence)

(Continued)

Table 1. (Continued)

Country	Study	Measure	Sample characteristics	Response rate	Gambling prevalence	Problem gambling prevalence	Legal age to gamble
Slovenia	Makarovič et al. (2008); Makarovič (2010)	SOGS	National, 10,001 people (no specific information about age is provided)	Not reported	35.5% (past-year)	SOGS: Problem gambling (3–4): 1.45%; pathological gambling (5+): 0.46%; 1.9% combined rate (no specific time frame is provided)	18 years
Spain	Becona (2004)	NODS	Galicia region, 1,624 adults aged 18 and over recruited by face-to-face residential interviews	Not reported	Not reported	NODS: Problem gambling (3–4): 0.25%; pathological gambling (5+): 0.31%; 0.56% combined rate (past-year prevalence) Problem gambling (3–4): 0.18%; pathological gambling (5+): 0.92%; 1.1% combined rate (lifetime prevalence)	18 years
Sweden	Volberg et al. (2001)	SOGS-R	National, 7,139 people aged 15–74 recruited mainly by phone interview (89%) and by email (11%)	72%	95% (lifetime)	SOGS: Problem gambling (3–4): 2.7%; pathological gambling (5+): 1.2%; combined rate: 3.9% (lifetime prevalence) Problem gambling (3–4): 1.4%; pathological gambling (5+): 0.6%; combined rate: 2% (past-year prevalence)	18 years
	Abbott et al. (2014)	PGSI and SOGS	National, 8,165 people aged 16–84 recruited by phone interview, supplemented by email for those who could not be contacted by phone	55%	72% (past-year)	PGSI: Problem gambling (8+): 0.3% (past-year prevalence) SOGS: Problem gambling (3–4): 2.5%; pathological gambling (5+): 2%; combined rate: 4.5% (lifetime prevalence) Problem gambling (3–4): 1.3%; pathological gambling (5+): 0.9%; combined rate: 2.2% (past-year prevalence)	

Country	Author(s)	Study Design	Sample	Response Rate	Prevalence	Notes
Switzerland	Bondolfi et al. (2000)	SOGS	National, 2,526 people aged 18 and over recruited by telephone interview	59%	Not reported	18 years SOGS: Problem gambling (3–4): 2.2%; pathological gambling (5+): 0.8%; combined rate: 3% (past-year prevalence)
	Zangerl et al. (2007) ^a	SOGS	German and French speaking part of Switzerland, 1,000 people aged 15–74 years recruited by telephone interview	Not reported	74.4% (lifetime)	SOGS: Problem gambling (3–4): 1.8%; pathological gambling (5+): 1.6%; combined rate: 3.4% (past-year prevalence)
	Bondolfi et al. (2008)	SOGS	National, 2,803 people aged 18 and over recruited by telephone interview	47%	Not reported	SOGS: Problem gambling (3–4): 2.2%; pathological gambling (5+): 1.1%; combined rate: 3.3% (lifetime prevalence) Problem gambling (3–4): 0.8%; pathological gambling (5+): 0.5%; combined rate: 1.3% (past-year prevalence)
	Brodbeck et al. (2009)	NODS	6,047 people aged 18 and over in German and Italian speaking part of Switzerland, recruited by telephone interview	52.2%	35% (past-month)	NODS: Problem gambling (3–4): 0.5%; pathological gambling (+5): 0.3%; combined rate: 0.8% (lifetime prevalence) Problem gambling (3–4): 0.1%; pathological gambling (+5): 0.02%; combined rate: 0.12% (past-year prevalence)

^aStudies in non-peer-reviewed papers.

^bStudy only available in the overview provided by Druine (2009), which do not contain specific information about methodology, such as response rates.

^cStudy only available in the overview provided by Szezyrba et al. (2015), which do not contain specific information about methodology, such as response rates.

^dThese studies are only available in their native languages and the information reported is based on the overviews provided by Laansoo and Niit (2009), which do not contain so specific information about methodological procedures, such as response rates.

Therefore, the present paper attempts to fill this gap and provides a brief country-by-country analysis of the evidence of gambling and problem gambling, and associated demographics in alphabetical order. However, there are 21 European countries that have not carried out any empirical research on adult gambling (i.e., Albania, Andorra, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Ireland, Latvia, Lithuania, Liechtenstein, Luxembourg, Macedonia, Montenegro, Monaco, Poland, Romania, Russia, Serbia, and Slovak Republic).

Austria. Kalke et al. (2011) conducted the only gambling prevalence survey in Austria, with a sample size of 6,300 participants, aged 14–65 years. A total of 0.4% of the participants showed problematic gambling and 0.7% showed pathological gambling using DSM-IV criteria. The highest percentages of pathological gamblers were arcade slot machine gamblers (47%), followed by sports bettors (20%), and casino gamblers (17%).

Belgium. A study carried out by Druine, Delmarcelle, Dubois, Joris, and Somers (2006) examined adult gambling behavior with a representative sample of 3,002 Belgians, aged 16–99 years. The most popular forms of gambling reported were lotteries (46% past-year), scratch tickets (39%), and television phone-in quizzes (12%).

In the same study, respondents were also screened for gambling problems using the multiple response version of DSM-IV. The results showed that 1.6% scored as past-year “at-risk gamblers” (scoring 3–4) and 0.4% as past-year “probable pathological gamblers” (scoring 5+). Problem gambling was more prevalent among men (2.3%) than women (1.8%). The proportion of problem gamblers was significantly higher among the 16–24 year age group (4%), single (3.8%), and those from the lowest social groups, based on the occupation of the main income earner (3.2%).

Cyprus. A prevalence survey on adult gambling behavior was conducted in the Turkish Republic of Northern Cyprus, a Muslim part of the country. The study by Çakici (2012) comprised 929 individuals aged 18–65 years. The activities most played were lottery games (37.8%), sports lotto (24.5%), and instant scratch games (19.6%). With regard to problem gambling, 2.2% of the sample scored as lifetime pathological gamblers using a cut-off of 8 in the Turkish SOGS. The survey also reported that being male, being aged between 18 and 29 years, being unmarried or divorced, and not having any children contributed to an increased likelihood of experiencing gambling-related problems.

Czech Republic. The National Monitoring Centre for Drugs and Addiction, along with other organizations, conducted a survey assessing the prevalence of gambling and problem gambling in the country (Mravčík et al., 2014). The sample comprised 2,134 individuals aged 15–64 years. The results showed that the prevalence of problem gambling was 2.3% (PGSI 3+ points) and 1.8% as measured by the Lie/Bet. The rate for prevalence for substantial problems was 0.6% as measured by the PGSI (8+ points) (see also Szczyrba, Mravčík, Fiedor, Černý, & Smolová, 2015).

Denmark. In 2005, a survey comprising 8,153 individuals aged between 18 and 74 years was conducted (Bonke & Borregaard, 2006). According to this survey, the NODS showed a lifetime prevalence of pathological gambling at 0.3% (scoring 5+), 0.4% problem gamblers (scoring 3–4),

and 3.2% at-risk gamblers (scoring 1–2). Past-year prevalence rates in Denmark were 0.14% for pathological gamblers, 0.3% for problem gamblers, and 1.9% for at-risk gamblers. With regard to demographics, men, individuals aged between 18 and 44 years, single or unmarried individual, and individuals living in a home without children were more likely to be problem gamblers (Bonke & Borregaard, 2006).

In addition, another two representative surveys were carried out in 2005 and 2010, derived from the Danish Health Interview Survey and the Danish Health and Morbidity Survey, respectively (Ekholm et al., 2012). In both surveys, problem gambling was assessed using the Lie/Bet questionnaire. In 2005, data were obtained for 5,686 individuals aged 16 years and over. The results showed that the past-year prevalence of problem gambling among adults was 0.9%, and the lifetime prevalence of problem gambling was 2.6% (Ekholm et al., 2012).

In 2010, data were obtained from 14,670 individuals aged 16 years and over. The results showed that the past-year prevalence of problem gambling among adults was 0.8% and the lifetime prevalence of problem gambling was 2.0% (Ekholm et al., 2012). In both surveys, the prevalence of problem gambling was higher among men and individuals aged between 16 and 24 years.

Estonia. There have been two gambling prevalence surveys among the Estonian population aged between 15 and 74 years. In 2004, the estimates of probable pathological gamblers (SOGS score 5+) and problem gamblers (SOGS score 3–4) were 2.4% and 2.6% of the population, respectively (Faktum Uuringukeskus, 2004). In the 2006 survey, the respective percentages were 3.4% and 3.1%, as assessed by the SOGS.

In both the 2004 and 2006 surveys, potential problem gamblers and probable pathological gamblers were more likely to be male (Laansoo & Niit, 2009). Probable pathological gambling was generally more prevalent among young people, with the prevalence of problem gambling being the highest in the 15–29-year age group (Laansoo & Niit, 2009). Moreover, the study also showed that there were more problem gamblers among higher income groups. However, it was also noted by Laansoo and Niit (2009) that a large proportion of the risk groups had no regular income at all (e.g., students).

Finland. In 2003, the first national Finnish gambling prevalence survey was carried out (Ilkas & Turja, 2003), with 5,013 participants aged 15–74 years. The prevalence of problem gambling using the SOGS was 1.5% for probable pathological gamblers and 4% for potential pathological gamblers. The prevalence rate of probable pathological gambling among those aged 15–24 years was 10%. It was also reported that problem gamblers were more likely to be those on low incomes (Ilkas & Turja, 2003).

Another national gambling survey was carried out for the Ministry of Social Affairs and Health (Aho & Turja, 2007) comprising 5,008 individuals aged 15 years and over. The results indicated that 2.1% were classed as past-year problem gamblers (SOGS 3–4) and 1% were classed as pathological gamblers (SOGS 5+). Moreover, 3.6% were classed as lifetime problem gamblers (SOGS 3–4), with a further 1.6% being considered lifetime pathological gamblers (SOGS 5+).

Another gambling prevalence study was carried out among 2,826 individuals aged 15–64 years (Castrén et al., 2013). The results showed that a total of 1.1% were problem gamblers (scoring 8 or more on the PGSI scale). In addition, 33.3% of respondents gambled online at least once a week and gambling in this medium was associated with more severe gambling problems. This study also showed that younger age, male gender, and unemployment were significantly associated with problematic gambling.

A more recent study using data from the nationwide Finnish Gambling 2011 survey was carried out among 4,484 Finns aged 15–74 years (Raisamo, Mäkelä, Salonen, & Lintonen, 2014). The overall problem gambling prevalence rate was 0.6% (PGSI 8+), and problem gambling was more prevalent among males.

France. In 2010, the first national gambling survey was carried out by the French Institute of Drugs and Addictions (Costes et al., 2011). This survey used the PGSI to assess problem gambling, and 25,034 individuals aged 15–75 years participated. Among active players, 3.7% were classed as problem gamblers and 7.1% were classed as moderate-risk gamblers. With regard to socio-demographic characteristics, problem gamblers were more likely to be male (75.5%) and of younger age (6.9% of those aged between 25 and 34 years). Extrapolating these results to the French population, 0.4% were considered pathological gamblers and 0.9% were considered moderate at-risk gamblers.

More recently, the French Institute of Drugs and Addictions conducted the latest gambling prevalence survey in the country (Costes, Eroukmanoff, Richard, & Tovar, 2015). In this study, 15,635 individuals aged between 15 and 75 years participated. Among the participants, 0.5% were classified as problem gamblers and 2.2% were classified as moderate at-risk gamblers, according to the PGSI. In addition, problem gamblers were mainly male (69.7%) aged between 25 and 34 years (23.9%) and with lower academic qualifications (70.4%).

Germany. The first German national prevalence study was conducted by Buth and Stöver (2008) and comprised 7,980 individuals aged 18–65 years. To determine the prevalence rate of problem and pathological gambling, an instrument containing 19 items was used, and with one exception (withdrawal symptoms), two items each assessed one DSM-IV criterion of pathological gambling. The results indicated that 0.56% of the sample participants were classified as pathological gamblers (DSM-IV 5+), and a further 0.64% of participants were classed as problem gamblers (DSM 3–4).

The second representative population survey was carried out by Bühringer, Kraus, Sonntag, Pfeiffer-Gerschel, and Steiner (2007) and comprised 7,817 individuals aged 18–64 years. To diagnose pathological gambling behavior, the DSM-IV criteria (DSM-IV-TR) were adopted. The prevalence of problem gambling was 0.29% and the prevalence of pathological gambling was 0.2%.

Another representative study on gambling among the German population was carried out by the Federal Center for Health Education (BZgA) (2008). The sample comprised 10,001 adults aged 16–65 years. The results indicated that 0.19% individuals were classed as probable pathological gamblers (SOGS 5+) and 0.4% individuals were classed as problem gamblers (SOGS 3–4).

A study by Sassen et al. (2011) collected data in 2009 for the German Epidemiological Survey of Substance Abuse with participants aged 18–64 years. Using the DSM-IV criteria, past-year pathological gambling prevalence was 0.3% (cut-off of 5+ in the DSM). Pathological gambling was more prevalent among males (95.6%), among those aged between 18 and 29 years old (57%), among non-German participants (29.3%), and more likely to have an income of less than €1000 per month (59.7%).

Finally, the most recent study was carried out on behalf of the Pathological Gambling and Epidemiology program (see Meyer et al., 2015), with a sample of 15,023 individuals aged 14–64 years. The study reported a past-year pathological gambling prevalence rate of 0.3% (cut-off of 5+ in the DSM). Higher rates of gambling problems were found for males, younger ages, and individuals born abroad (see Meyer et al., 2015).

Great Britain. The first British Gambling Prevalence Survey (BGPS) comprised 7,680 individuals (Orford, Sproston, & Erens, 2003; Sproston, Erens, & Orford, 2000). The results showed that the most popular gambling activities were the National Lottery (65%), followed by scratch cards (22%) and slot machines (14%). Problem gambling using the SOGS was 0.8% (SOGS 5+) and 0.4% using the DSM-IV (DSM-IV 3–4). Moreover, 0.2% of the people endorsed five or more criteria on the DSM-IV, indicative of pathological gambling. Problem gambling was associated with male gender, younger age, having a parent with a gambling problem, and with single and separated/divorced status (Sproston et al., 2000).

The second BGPS was conducted comprising 9,003 individuals (Wardle et al., 2007). The results showed that the most popular gambling activities were again the National Lottery (57%), followed by scratch cards (20%), and betting on horse races (17%). Problem gambling prevalence rate as assessed by the PGSI was 0.5% (PGSI 8+) and 0.6% using the DSM-IV (DSM-IV 3+) and the prevalence of pathological gambling was 0.3 (DSM-IV 5+). Male gender, younger people, and Asian/Black British origin were associated with problem gambling.

The third BGPS was conducted comprising 7,756 individuals (Wardle et al., 2011). Problem gambling prevalence was 0.7% as assessed by the PGSI. According to the DSM-IV, problem gambling was 0.9% (DSM-IV 3+) and pathological gambling was 0.4% (DSM 5+). In this BGPS, conducted in 2010, problem gambling prevalence was higher in men, among younger age groups, among Asian/Asian British and Black/Black British origin, among those who were single and separated/divorced, and also among those whose parents gambled regularly.

Other robust prevalence data come from the Adult Psychiatric Morbidity Survey (APMS), which examined many types of psychiatric morbidity in a nationally representative sample of English (not British) adults aged 16 years ($n = 7,403$). Problem gambling was assessed using the DSM-IV criteria, and 0.7% of participants endorsed three or more diagnostic criteria, and were labeled as problem gamblers, whereas 0.3% met the threshold of five or more criteria, indicative of pathological gambling (Wardle, D'Souza, & Farrell, 2009).

More recently, Seabury and Wardle (2014) provided an overview of gambling behavior in England and Scotland

($n = 11,774$) (Seabury & Wardle 2014). According to the DSM-IV, problem gambling prevalence was 0.5% (DSM-IV 3+) and 0.4% using the PGSI (PGSI 8+).

Hungary. The first national study on gambling was carried out by Paksi, Rózsa, Kun, Arnold, and Demetrovics (2009), with 2,710 participants aged 18–64 years. According to this survey, the most popular gambling activities were lottery and other number draw games (59.5%), followed by scratch cards (31.4%) and sports betting (21.4%). The prevalence of problem gambling (SOGS 3–4) was 1.9%, and the rate of pathological gambling (SOGS 5+) was 1.4%. Pathological gambling and problem gambling were higher among men (5.3%) and among individuals aged 18–24 years (5%). Pathological gambling was significantly lower among unmarried individuals (0.7%) and significantly higher for households where income was lower (2.4% for individuals with a monthly income less than €160).

Iceland. In Iceland, Gallup (IMG-Gallup, 2000) conducted a national gambling survey using a lifetime version of the NODS. The sample comprised 1,500 participants aged 16–75 years (Jonsson, 2006). The total lifetime prevalence rate for problem gambling was 0.7% (NODS 3–4), and 0.6% were classed as pathological gamblers (NODS 5+). Pathological gambling was only found among men (1.2%).

Another national survey was carried out by Olason and Gretarsson (2009) and comprised a sample of 3,358 respondents who completed the 19-item version of the DIGS alongside questions examining gambling participation. The most popular gambling activities among adults were the Lotto, scratch tickets, and gambling machines. In this sample, 0.6% of the participants were considered probable pathological gamblers and 0.5% of participants were current problem gamblers. In addition, the findings showed that men, single individuals, and those who had only finished primary education were more at risk for developing problem gambling.

More recently, another study was conducted by Olason, Hayer, Brosowski, and Meyer (2015) with 1,887 individuals aged 18–74 years. 0.8% of the respondents were problem gamblers according to the PGSI (8+), with a further 1.7% being considered as moderate-risk gamblers (PGSI 3–7). Subsequently, analysis showed that males, those in the age group 18–25 years, and those with primary education were more likely to be categorized as problem gamblers (scoring 3+ on the PGSI).

Italy. Two gambling prevalence studies have been carried out in Italy (i.e., Barbaranelli, 2010; Bastiani et al., 2011).

The study carried out by Bastiani et al. (2011) comprised 31,984 participants aged 15–64 years. Problem gambling was assessed using the PGSI. The findings showed that 42.1% had gambled in the past 12 months and 33.8% were classified as “no-risk gamblers,” 6.1% as “low-risk gamblers,” and 2.2% as “moderate-risk/problem gamblers” (Bastiani et al., 2011). In addition, males were more likely to be moderate-risk/problem gamblers (73.4% males vs. 26.6% females).

Another study (Barbaranelli, 2010; Barbaranelli, Vecchione, Fida, & Podio-Guidugli, 2013), with a sample of 2,000 participants aged 18–74 years, was conducted. The prevalence of problem gambling reported using a

combination of the SOGS threshold for potentially pathological with the PGSI problem gambling was 1.27%. The rate of at-risk gambling was 1.56%, 50.73% were non-problem gamblers, and 46.44% were non-gamblers. The findings also showed that potentially problem/at-risk gamblers were more frequently male (66% vs. 55%), divorced (10% vs. 5%), with a higher income, and with at least one parent with gambling problems (12.2% vs. 4.4%). In addition, potentially problem/at-risk gamblers had difficulty in managing money (28% vs. 14%), and were in debt (11% vs. 2% spending more than they earn).

Northern Ireland. A gambling prevalence survey was conducted in Northern Ireland (Northern Ireland Statistics and Research Agency, 2010), with a random sample of 1,032 individuals aged 16 years and over. The overall prevalence of problem gambling using the PGSI (score 8+) was 2.2%. The highest rate of problem gambling was found among the 25–29-year age group (4.8%) and men (4%).

The Netherlands. Two gambling prevalence surveys have been conducted in the Netherlands. The first one (De Bruin, Benschop, Braam, & Korf, 2006) comprised 5,575 respondents aged 16 years and over. The findings showed that 1% were probable pathological gamblers (SOGS 5+) and 1.5% were potential problem gamblers (score of 3–4 in SOGS) – both lifetime prevalence rates. The past-year prevalence rates for pathological and problem gambling were 0.3% and 0.6%, respectively. The highest prevalence of problem gambling was present among male gender, among individuals aged between 30–50 years and between 18–30 years, among ethnic minorities, and among the unemployed.

The second prevalence survey was conducted in 2011 by Bieleman et al. (2011) comprising approximately 6,000 participants. The percentage of problem gambling (5+ in SOGS) was 0.15% and the prevalence of at-risk gambling (3–4 SOGS) was 0.68%. Moreover, the prevalence of recreational gamblers (<3 in SOGS) was 64.4%. The rates of at-risk and problem gambling did not change statistically between 2005 and 2011 (see also Goudriaan 2014).

Norway. The first Norwegian study of problem gambling prevalence was conducted in Trondheim among 2,014 participants (Götestam & Johansson, 2003). It was reported that 0.15% of participants were pathological gamblers (DSM-IV 5+), with a further 0.45% being considered at-risk gamblers (DSM-IV 3–4). Problem gambling (the combined rate of pathological and at-risk gambling) was more prevalent among men than women (0.95% vs. 0.28%, respectively) and among 18–30-years old age group than older age groups (1.97% vs. 0.19%).

Another Norwegian national survey was carried out in 2002 with a sample of 5,235 participants aged 15–74 years (Lund & Nordlund, 2003). The most popular gambling activities were the lotteries (73.7%), gambling machines (21.4%), and bingo (20.6%). Using the NODS, lifetime prevalence rate of pathological gambling was 0.6% and problem gambling was 0.8%. The past-year prevalence rates for problem and pathological gambling were 0.4% and 0.3% respectively. Using the SOGS, lifetime prevalence rate of pathological gambling was 0.3% and lifetime problem gambling was 0.7%. Past-year pathological and problem gambling were 0.2% and 0.4%, respectively.

The most recent prevalence gambling survey was conducted between January and March 2007 using the NODS (Bakken, Gotestam, Grawe, Wenzel, & Øren, 2009) and comprised 3,482 participants aged 16–74 years. Lifetime and past-year prevalence rates of problematic gambling (endorsement of 3+ items in the 10-item NODS) were 1.7% and 0.7%, respectively. Men scored significantly higher than women on all gambling measures, and lifetime and past-year problematic gambling decreased with age. In addition, being single, having a low educational level, and being born in a non-Western country were associated with problem gambling. The gambling activities most engaged by past-year problem gamblers were slot machines and online gambling.

Portugal. Lopes (2009) conducted the first study in Portugal, with a sample of 3,850 individuals aged 18–70 years. The findings revealed a problem gambling rate of 0.2% using the SOGS. According to this study, the gambling games that caused greater problems were private card games, Internet games, and slot machines (Lopes, 2009).

Slovenia. At the end of 2008, the first gambling prevalence survey was conducted in Slovenia by Makarovič, Rončević, Macur, and Besednjak (2008) with a sample of 10,001 individuals. The survey reported a rate of problem gambling (as assessed by SOGS) of 1.45% and a rate of pathological gambling of 0.46%. With regard to demographics, there were significantly more problem gamblers among men, single, and younger individuals.

Spain. With respect to empirical research conducted in Spain, a significant number of studies have been carried out, but most have been carried out on local or regional samples (e.g., Becona, 2004).

The most recent empirical available study was carried out by Becona (2004) in Galicia comprising 1,624 adults aged 18 years and over. The results indicated that 0.92% were pathological gamblers (NODS 5+) throughout their lifetime, and 0.31% were past-year pathological gamblers. In addition, 0.18% were problem gamblers (NODS 3–4) throughout their lifetime and 0.25% in the past-year. A further 0.31% were at-risk gamblers throughout their lifetime and 0.25% in the past-year (Becona, 2004). With regard to demographics, all lifetime pathological, problem, and at-risk gamblers were men. Moreover, 60% of pathological gamblers were married, whereas 26.7% were single. In addition, 50% of problem and at-risk gamblers were single, whereas 37.5% were married or with a partner. With respect to age, 40% of pathological gamblers were aged 65 years and over, whereas 33.3% were aged between 31 and 45 years. On the other hand, 50% of problem and at-risk gamblers were aged between 46 and 64 years and 37.5% were between 18 and 30 years (Becona, 2004).

Sweden. The first national gambling survey in Sweden was carried out with a sample of 7,139 individuals aged 15–74 years (Volberg, Abbott, Rönnerberg, & Munck, 2001). The results indicated that the combined rates of problem and pathological gambling were 3.9% (lifetime) and 2% (past-year) using the SOGS. Moreover, subsequent analysis showed that being male, having less than 25 years, and having born abroad were significant risk factors for gambling problems.

The most recent survey was conducted between November 2008 and April 2009 (Abbott et al., 2014), with

8,165 individuals aged 16–84 years. The most common gambling activity was the lottery (62%), followed by horse race betting (24%) and sports betting (19.4%).

Based on the PGSI, 0.3% of participants were classified as problem gamblers (8+ PGSI). Based on SOGS-R, the lifetime prevalence rate of problem gambling was 2.5% and the prevalence rate of pathological gambling was 2%. The past-year estimates were 0.9% for pathological gambling and 1.2% for problem gambling (Abbott et al., 2014). Men, individuals born outside Sweden, those residing in big cities, and those with primary education only also had significantly elevated problem gambling prevalence rates.

Switzerland. The first prevalence gambling study in Switzerland was carried out by Bondolfi, Osiek, and Ferrero (2000) with 2,526 participants. The results indicated that 2.2% were classified as potential pathological gamblers (SOGS 3–4) and 0.8% as probable pathological gamblers (SOGS 5+). The potential and probable pathological gambler group mainly comprised males (73%), individuals under age 29 years (43%), and those who started to gamble before 21 years (89%).

Another survey was conducted in the German and French speaking part of Switzerland, with 1,000 individuals aged 15–74 years (Zangerl et al., 2007). The results indicated that 1.8% were potential pathological gamblers (SOGS 3–4) and 1.6% were probable pathological gamblers (SOGS 5+). Furthermore, this study showed that the risk factors for a higher score in the SOGS-R were living in the German speaking part of Switzerland, being male, and being of younger age.

A third study was conducted in 2005 by Bondolfi, Jermann, Ferrero, Zullino, and Osiek (2008), with 2,803 individuals. The results showed a past-year prevalence of problem (SOGS 3–4) and pathological gambling (SOGS 5+) of 0.8% and 0.5%, respectively. The lifetime prevalence of problem gambling was 2.2% and pathological gambling 1.1%. No significant differences were found between problem and pathological gamblers' group and the non-problem gamblers and non-gamblers with regard to the socio-demographic characteristics, such as male gender, relationship status, income, and level of education.

More recently, another survey was carried out in the German and Italian speaking part of Switzerland (Brodbeck, Duerrenberger, & Znoj, 2009). The final sample included 6,047 participants aged 18 years and over. Lifetime prevalence rates of problem gambling were 0.5% (NODS 3–4) and 0.3% for pathological gambling (NODS 5+). Past-year prevalence rates were 0.1% for problem gambling and 0.02% for pathological gambling. As in other surveys, problem and pathological gamblers were more likely to be men.

DISCUSSION

Almost all national surveys have concluded that most individuals have gambled at some point during their lives, and there are more gamblers than non-gamblers. This highlights the need to conduct regular systematic reviews on gambling and problem gambling in order to examine gambling patterns across different countries. From a methodological point of view, the majority of gambling studies have

used telephone and face-to-face interviews to recruit participants. However, it should be noted that all studies mentioned are based on self-report data, which are subject to many well-known weaknesses such as the reliability of memory, social desirability, and the honesty of the responses given. Nonetheless, despite the relatively common procedure of data collection, other variations have been found.

The studies reported here used many different problem gambling screening instruments. It is well known that different problem gambling screens produce different rates of problem gambling. For instance, some researchers have suggested that the SOGS produces too many false positives and may yield higher rates for problem gambling (e.g., [Stucki & Rihs-Middel, 2007](#)). Looking at the studies that used the SOGS together with another screening instrument, it can be observed that the problem gambling rates measured by the SOGS were higher (e.g., [Bonke & Borregaard, 2006](#); [Orford et al., 2003](#)). In fact, a common finding is that DSM-based instruments tend to result in lower prevalence rates than SOGS, and that PGSI scores are somewhere in-between. Furthermore, different scoring criteria to designate problem gambling (sometimes within the same instrument used) also produce different rates of problem gambling. In addition, it is quite evident that different time frames (lifetime vs. past-year) generate different problem gambling rates with a lifetime frame expectedly producing a higher problem gambling rate than a past-year time frame. Finally, another difficulty was related to the lack of accessibility and quality of some studies. In fact, some countries only have their data published in non-peer-reviewed reports, which are only accessible in their native languages (e.g., Portugal, France).

Despite these challenges, it can be observed that lifetime prevalence of combined problem and pathological gambling across the world ranged from 0.7% (in Denmark) to 6.5% (in Estonia). One of the possible reasons for higher figures for problem gambling in Estonia may be attributed to the country's historical background. During the Soviet time, gambling was prohibited with the exception of lottery games. Since re-independence, the Estonian population has gained some freedoms and many gambling activities became available during this period, providing a range of gambling opportunities equal to that of Western Europe in a relatively short time. Most individuals were not able to evaluate the potential hazards of gambling, hence it was viewed as an innocent pastime ([Kun et al., 2012](#)). However, it should be noted that the most recent Estonian prevalence gambling survey was conducted in 2006 and might now be different.

With regard to past-year problem gambling prevalence, it varied between 0.12% and 5.8% across the world, the highest rate being in Hong Kong. This finding can be easily explained by the many gambling opportunities that exist in this country. However, it should be noted that this high prevalence rate of problem gambling was not found in the most recent gambling prevalence survey conducted in Hong Kong. Examination of the European past-year problem gambling prevalence rates showed that they varied between 0.12% and 3.4%, the highest rate in the German and French speaking part of Switzerland. This Switzerland prevalence

rate is more difficult to explain, especially because the lowest European prevalence rate was also found in Switzerland, more specifically in the German and Italian speaking part (see [Brodbeck et al., 2009](#)).

Examining the gambling trends in Europe, it may be noted that problem gambling rates remained stable in many countries that have conducted more than one gambling survey (e.g., Great Britain, the Netherlands, Germany). However, in other countries such as Estonia, there was an increase in problem gambling prevalence rates, suggesting the need for the development of policies that protect individuals from gambling-related harms.

Despite some variations in problem gambling prevalence rates, in most European countries, there were relatively consistent results with regard to socio-demographic characteristics. Problem gambling was more likely to occur among men (e.g., [Abbott et al., 2014](#); [Bondolfi et al., 2000](#); [Bonke & Borregaard, 2006](#); [Brodbeck et al., 2009](#); [Castrén et al., 2013](#); [Çakici, 2012](#); [Druine et al., 2006](#); [Ekholm et al., 2012](#); [Götestam & Johansson, 2003](#); [Kun et al., 2012](#); [Olason et al., 2015](#); [Orford, Wardle, Griffiths, Sproston, & Erens, 2010](#); [Raisamo et al., 2014](#); [Sassen et al., 2011](#)), single or divorced individuals ([Bakken et al., 2009](#); [Bonke & Borregaard, 2006](#); [Çakici, 2012](#); [Druine et al., 2006](#); [Makarovič, 2010](#); [Olason & Gretarsson, 2009](#); [Wardle et al., 2011](#)), individuals of a younger age ([Abbott et al., 2014](#); [Bondolfi et al., 2000](#); [Costes et al., 2011](#); [Ekholm et al., 2012](#); [Götestam & Johansson, 2003](#); [Kun et al., 2012](#); [Laanso & Niit, 2009](#); [Olason et al., 2015](#)), individuals with a lower level of education ([Abbott et al., 2014](#); [Bakken et al., 2009](#); [Costes et al., 2015](#); [Meyer et al., 2015](#); [Olason & Gretarsson, 2009](#)), individuals that belong to an ethnic minority ([Goudriaan, de Bruin, & Koeter, 2009](#); [Makarovič, 2010](#); [Seabury & Wardle, 2014](#); [Wardle et al., 2011](#)) or who had been born abroad ([Abbott et al., 2014](#); [Bakken et al., 2009](#); [Meyer et al., 2015](#)), and individuals unemployed or with a low income ([Castrén et al., 2013](#); [Costes et al., 2015](#); [Druine et al., 2006](#); [Goudriaan et al., 2009](#); [Ilkas & Turja, 2003](#); [Kun et al., 2012](#); [Meyer et al., 2015](#); [Sassen et al., 2011](#)).

However, in Estonia and Italy, the relationship between income and gambling appears to be different from that reported in the other European countries, with both low- and high-income groups being more at risk of problem gambling in Estonia ([Laanso & Niit, 2009](#), see also [Kun et al., 2012](#)) and in Italy, potentially problem/at-risk gamblers are more likely to have a higher income ([Barbaranelli, 2010](#)). These findings suggest a need to conduct more research in order to examine the meanings of gambling attributed by individuals with different types of incomes in various parts of Europe.

The most frequent gambling activities across most countries were lotteries, scratch cards, sports betting, and gambling machines (e.g., [Abbott et al., 2014](#); [Castrén et al., 2013](#); [Çakici, 2012](#); [Kun et al., 2012](#); [Lund & Nordlund, 2003](#); [Olason & Gretarsson, 2009](#); [Wardle, Griffiths, Orford, Moody, & Volberg, 2012](#)). However, despite the popularity of such games, the gambling activities most played by problem gamblers were slot machines and Internet gambling games ([Bakken et al., 2009](#); [Kalke et al., 2011](#); [Lopes, 2009](#)). The findings that the most problematic and

addictive gambling activities included those that involve high event frequencies and short interval between stake and payout (such as slot machines) confirm some previous studies (e.g., Parke & Griffiths, 2006), and should foster the development of new policies about the availability of these gambling machines.

Overall, the present review supports the findings of other reviews with regard to the variations of problem gambling prevalence rates across different countries, as well as the demographics, and gambling activities that are more associated with adult problem gambling (e.g., Meyer, Hayer & Griffiths, 2009; Stucki & Rihs-Middel, 2007). However, notwithstanding these similarities, this review expands and updates the previous reviews, which are now outdated. Moreover, this paper provided a country-by-country analysis of the European continent, which should encourage the development of a common prevention strategy. In addition, this review intended to provide a good starting point for both academic and gambling industries to fill the gaps on gambling research, more specifically in some countries, which demonstrated the lack of research in this field and to study the potential effectiveness of policies implemented to mitigate gambling's harm.

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