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Published online: 17 Feb 2019.

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Gambling problems seldom come alone: prevalence and temporal relationships of mental health problems in casino excluders

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ABSTRACT

To estimate the effectiveness of gambling exclusion programmes, previous research focused on changes in gambling behaviour post-exclusion. Although other mental health problems, especially co-morbid mental disorders, may be crucial for relapse and recovery of gambling-related problems, these factors have rarely been studied in excluders. Therefore, this study aimed to assess a comprehensive mental health status of excluders using well-validated diagnostic instruments. Fifty-eight casino excluders participated in face-to-face diagnostic interviews and completed several validated questionnaires (e.g. Stinchfield Questionnaire, Brief Symptom Inventory). Retrospective temporal sequences of diagnosed mental disorders, help-seeking behaviour and exclusion were examined. The majority of excluders reported impairments in mental health aspects. About three-quarters met criteria of lifetime gambling disorder, more than half in the last 12 months whereby screening and diagnostic measures correlated moderately. Other mental disorders were frequent, especially affective and substance-related disorders and typically preceded the onset of gambling disorder. Six years passed between self-awareness of gambling problems and help-seeking. Two more years passed until exclusion. Frequent mental health problems suggest the need for individually tailored support beyond exclusion programmes (e.g. psychotherapy, pharmacotherapy, counselling services). Late help-seeking and exclusion entry claim for improved early detection and intervention concepts that consider underlying mental disorders.

Introduction

During the last two decades, exclusion programmes have become a major responsible gambling strategy to prevent gambling problems or to limit further aggravations (Nower & Blaszczynski, 2008). Exclusion programmes enable individuals to voluntarily

ban themselves (self-exclusion) or to be banned by third parties from one or more distinct gambling venues (forced exclusion; see Kotter, Kräplin, & Bühringer, 2017). Despite being excluded, previous research showed that up to 80% of programme participants continued gambling either in the excluded venue or in other venues (e.g. Croucher, Croucher, & Leslie, 2006; Kotter et al., 2017; Ladouceur, Sylvain, & Gosselin, 2007). To improve such programmes, it is thus crucial to understand why most casino excluders do not stop gambling. Possible explanations may relate to high rates of already existing mental health problems, which may increase the risk for the persistence or relapse of gambling behaviour (Lorains, Cowlishaw, & Thomas, 2011).

Previous studies in community samples have shown that gambling disorder often co-occurs with significant mental health problems (e.g. Grant & Kim, 2005; Petry, Stinson, & Grant, 2005). However, studies in exclusion samples mostly neglected the role of mental health problems (Nower & Blaszczynski, 2008). To address this research need, this study assessed a comprehensive mental health status of casino excluders; for example, mental health impairments, gambling and other mental disorders as well as help-seeking behaviour.

Indicators of mental health impairments

Previous studies on mental health impairments in casino excluders focused on a variety of indicators such as quality of life, general health, emotional health, daily activities, self-image, and gambling-related social, family or work impairments (Hayer & Meyer, 2011; Hing, Russell, Tolchard, & Nuske, 2015; Ladouceur et al., 2007; Ly, 2010; Nelson, Kleschinsky, LaBrie, Kaplan, & Shaffer, 2010; Tremblay, Boutin, & Ladouceur, 2008). These studies mostly reported positive changes in mental health indicators after exclusion (for a review, see Kotter, Kräplin, Pittig, & Bühringer, 2018). However, mental health impairments have rarely been assessed with psychometrically validated and reliable instruments. So far, only one study (Hing et al., 2015) applied the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988) to assess general well-being post-exclusion. However, comparisons to normative data were missing. Other studies only utilized self-developed instruments (e.g. Ladouceur et al., 2007; Nelson et al., 2010; Tremblay et al., 2008).

This lack of well-established assessments and corresponding normative data impedes comparisons to general community samples. For example, without normative data, it remains unclear whether aspects of impaired mental health normalize to population figures. Furthermore, the absence of validated instruments prevents direct comparisons between exclusion study outcomes. The present study thus systematically assessed mental health impairments post-exclusion using instruments with validated psychometric properties following the assessment of mental health characteristics in other fields (e.g. Merkouris, Thomas, Browning, & Dowling, 2016).

Gambling disorder

Recent research indicated that most – but not all – casino excluders (61–80%) showed pathological or problematic gambling (Hayer & Meyer, 2011; Ladouceur et al., 2007; Nelson et al., 2010; Steinberg, 2008; Tremblay et al., 2008). However, these studies applied

screening instruments instead of clinical diagnostic measures based on standardized and validated interviews. Such diagnostics are regarded as the gold standard in the assessment of prevalence rates (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). In contrast, screening instruments tend to overestimate gambling disorder figures due to their high sensitivity but low specificity (i.e. resulting in high rates of false positives; see Calado & Griffiths, 2016; Kessler et al., 2008). Therefore, comparisons of prevalence rates assessed via standardized interviews versus validated screening questionnaires in identical samples are needed to extend current knowledge about possible differences in published prevalence rates. Furthermore, the number of criteria required for a gambling disorder diagnosis was reduced from five criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 2000) pathological gambling to four criteria in DSM-5 gambling disorder (American Psychiatric Association, 2013). This lowered threshold may result in a serious increase of prevalence rates, especially in casino excluders. For example, Rennert et al. (2014) showed that the reduced cut-off led to an increase of 20.4% diagnoses relative to DSM-IV in a community sample. Therefore, the present study aimed to compare diagnostic interview prevalence rates of gambling disorder with screening results according to DSM-5 and DSM-IV.

Other mental disorders and temporal sequences

Apart from gambling disorder, few studies have examined symptoms of other mental disorders in casino excluders and full syndromes of disorders have never been examined. Prevalence rates have been reported for selected symptoms of depression (45–73%), anxiety (45–69%), and the use of tobacco (36–45%), alcohol (0–39%) and other substances (0–10%; see Cohen, McCormick, & Corrado, 2011; Lhommeau, Alexandre, Mete, Fatseas, & Auriacombe, 2015; Steinberg, 2008; Tremblay et al., 2008). The presence of such symptoms and mental disorders has been associated with increased gambling problems in community samples (Lorains et al., 2011). Therefore, (co-morbid) mental disorders may constitute an important factor that may facilitate gambling relapses and impair long-term gambling (disorder) reduction and recovery (Nower & Blaszczynski, 2008). However, studies on casino excluders did not assess temporal relationships of mental disorders so far. Following Blaszczynski and Nower's (2002) pathways model, gambling disorder could either occur (1) isolated, (2) before another mental disorder (behaviourally conditioned type) or (3) after another mental disorder (emotionally vulnerable type and antisocial, impulsive type). Improved knowledge on these variations of temporal relationships between gambling disorder and other mental disorders might help to elaborate responsible gambling strategies. The present study therefore aims to examine temporal sequences of mental health problems in casino excluders.

Treatment utilization and help-seeking behaviour

Knowledge on treatment utilization and help-seeking behaviour of excluders is scarce. In a previous study, treatment utilization was associated with greater gambling abstinence post-exclusion and quality of life in casino excluders (Nelson et al., 2010). Although this study has provided the first evidence that casino excluders were more likely to use professional treatment after exclusion than before, the precise temporal sequences between

first self-awareness of gambling problems and the initiation of exclusion as well as other help-seeking behaviour are still unknown. Such knowledge may help to determine whether self-exclusion indeed constitutes a preventive strategy or whether an even earlier detection of vulnerable individuals in casinos is needed. Thus, this study investigates the chronological order of exclusion, help-seeking behaviour and mental health problems in casino excluders.

Method

Design

In 2016, a naturalistic cohort study was conducted to examine the impact of casino exclusion in a non-experimental (naturalistic) group of German casino excluders (cohort). In detail, the study consisted of two components: a cross-sectional online survey of 157 excluders and a face-to-face interview with 58 additional excluded individuals (for the full study design and online survey results, see Kotter et al., 2017). Mental health problems were only assessed in the diagnostic interview. Therefore, this article refers to data from the cross-sectional interview sample.

Study sample of casinos

In Germany, some segments of gambling providers (casinos, state lotteries, class lotteries and some types of betting with high risk potential) are legally obliged to participate in a nationwide exclusion programme (Reeckmann & Walter, 2014). German casinos are state-run or state-licensed 'Monte-Carlo-type' gambling venues offering a traditional range of games like roulette and poker as well as slot machines. Access to casinos requires identity verification and is age-controlled.

Sample and recruitment of casino excluders

Twenty-six out of about 60 German casinos participated in this study. The reference population for the interview sample was taken from 1347 out of 4337 casino excluders (31.1%) from 5 selected casinos. Excluders enrolled in the programme from January 2008 until March 2016. Exclusions before 2008 were not included, as German gambling law and the corresponding exclusion regulations substantially changed in 2008. The study sample was recruited via blacklists of the participating casinos. We reached 947 casino excluders among the above-mentioned 1347 excluded individuals (reachability rate of 68.9%, blank returns due to relocation, decease or wrong address). Fifty-eight casino excluders out of 947 (response rate of 6.1%) participated in the personal diagnostic interview (for details, see Kotter et al., 2017).

Data collection

In compliance with data protection requirements, the casinos sent blinded envelopes including a reply form for a personal interview appointment to the excluded individuals. This procedure was repeated after eight weeks to maximize response rate. Before starting

the assessment, participants provided written and verbal informed consent, filled out the identical questionnaires that were used in the online survey ($\approx$ 30 min) and afterwards completed the standardized diagnostic interview ($\approx$ 120 min) conducted by trained clinical psychologists. During a one-day training session, these clinical psychologists were instructed in the standardized and computerized interview to increase interrater reliability of assessed data. After the interview, participants received a 50 € voucher for an Internet shopping portal. Data collection for the interview sample took place from March to July 2016.

Instruments

Demographics were assessed via questionnaire based on the German Epidemiological Survey of Substance Abuse (ESA; see Kraus & Pabst, 2010). Calculation of socio-economic status (SES) followed Lampert, Kroll, Müters, and Stolzenberg (2013).

The following instruments were used to assess a comprehensive mental health status of casino excluders. First, indicators of mental health impairments included: (1) satisfaction with life assessed via Satisfaction With Life Scale (SWLS; Schumacher, 2003); (2) general well-being assessed via Well-Being Scale (WHO-5 Index II; Bech, 2004); (3) psychological distress assessed via Brief Symptom Inventory (BSI; Franke, 2000); and (4) mental and physical disability days assessed with the standardized computer-based Composite International Diagnostic Interview (DIA-X CIDI; Wittchen & Pfister, 1997). Calculation of disability days followed Mack et al. (2015).

Second, prevalence rates of gambling disorder were examined by comparing diagnostic interview with screening questionnaire results. Therefore, the following instruments were used: (1) the gambling section of the DIA-X CIDI (Wittchen & Pfister, 1997) *to diagnose gambling disorders*, and (2) the 19-item Stinchfield Questionnaire (Bühringer, Kraus, Sonntag, Pfeiffer-Gerschel, & Steiner, 2007; Stinchfield, Govoni, & Frisch, 2005; Stinchfield et al., 2016) *to screen for gambling disorder* in the last 12 months. Both instruments allowed comparisons of DSM-5 with DSM-IV-TR criteria.

Third, the DIA-X CIDI (Wittchen & Pfister, 1997) was used to assess lifetime and 12-month prevalence of DSM-IV-TR affective, anxiety and substance-related disorders as well as onset ages of disorders for the examination of temporal relationships. The validity and reliability of mental disorders diagnosed with the DIA-X CIDI have been demonstrated (e.g. Wittchen, Lachner, Wunderlich, & Pfister, 1998). The Assessment of DSM-IV Personality Disorders Questionnaire (ADP-IV; Doering et al., 2007) was implemented to assess diagnostic prevalence rates of lifetime DSM-IV personality disorders. This questionnaire represents the only validated German-language questionnaire which is appropriate for both diagnosing and screening of personality disorders (Renn et al., 2008). Furthermore, attention deficit disorders were assessed with the Attention Deficit Hyperactivity Disorder Self-Rating Scale (ADHS-SB; Rösler, Retz-Junginger, Retz, & Stieglitz, 2008).

Fourth, treatment utilization and help-seeking behaviour were assessed with the DIA-X CIDI (Wittchen & Pfister, 1997) and adjusted for casino excluders (e.g. referring to age at exclusion). Therein, help-seeking behaviour included inpatient and outpatient rehabilitation, psychotherapeutic or psychiatric treatment, counselling and self-help groups.

Statistical analyses

A sample size of $n = 62$ was calculated a priori with G*Power 3 (power = .80, α-error = .05; Faul, Erdfelder, Lang, & Buchner, 2007) for medium effect sizes. Smaller sample or effect sizes tend to generate more conservative (not significant) results (Sullivan & Feinn, 2012). Comparisons of casino excluders (e.g. with and without gambling disorder) were conducted with t-tests for dependent means and logistic regressions. For correlative analyses, Pearson r correlations were calculated. Parametric (e.g. t-tests, Pearson correlations) and non-parametric (e.g. Mann-Whitney U test, Spearman's rank correlation coefficient) test statistics revealed comparable results. Therefore, we only report results of parametric statistics. Further on, we consistently reported confidence intervals of all test statistics. Missing values resulted from participants' opportunity to omit answers; for example, if they were unable to estimate a specific time frame (e.g. years being excluded) or if a question was perceived as being too personal (e.g. partnership, number of children). All analyses were conducted using STATA 14.1 (StataCorp, 2015) for Windows.

Compliance with ethical standards

All study procedures and materials, including informed consent, were in accordance with the ethical standards as laid down in the Declaration of Helsinki. The ethics committee and data safety board of the Technische Universität Dresden approved the study.

Results

Sociodemographics

Table 1 shows sociodemographic characteristics of the 58 casino excluders. Forty-four (75.9%) casino excluders were male. Mean age at the interview was 50.1 years ($SD = 14.8$). On average, participants enrolled in the exclusion programme 3.9 years ($SD = 2.4$) before the interview, ranging from 1 month to 8 years. Approximately half of the study sample was unmarried (50.0%), childless (50.9%) and/or in a partnership (56.6%). Most of the casino excluders were characterized by middle (53.5%) or high (32.8%) socio-economic status. The study sample included 48 self-excluders (82.8%) and 10 forced excluders (17.2%).

Indicators of mental health impairments

Indicators of mental health in casino excluders after exclusion are shown in Table 2. The majority of casino excluders (68.4%) reported impaired mental health in at least one observed indicator. However, 56.9% reported being overall satisfied with their life, 69.1% indicated general well-being, and 77.6% no or slight psychological distress. Furthermore, 68.4% experienced no disability day in the last four weeks due to mental issues. Casino excluders who gambled in the last six months reported significantly impaired mental health compared to abstinent excluded individuals, $OR = 0.25$, $p = .02$, 95% CI [0.08–0.82]. Furthermore, casino excluders with 12-month gambling disorder reported significantly impaired mental health compared to participants without gambling disorder, $OR = 0.19$,

Table 1. Sociodemographic characteristics of participants.

	Study sample (N = 58)	
	n	%
Sex		
Male	44	75.9
Female	14	24.1
Migrant background[a]	9	22.6
Age (years) at assessment		
M (SD)	50.1 (14.8)	
Range	24–75	
Years being excluded[b]		
M (SD)	3.9 (2.4)	
Range	0.2–8.0	
Marital status		
Unmarried	29	50.0
Married	17	29.3
Divorced	12	20.7
Current partnership[c]	30	56.6
Childless[a]	29	50.9
Education[d]		
Ungraduated	1	1.7
Low	7	12.1
Middle	17	29.3
High	33	56.9
Socio-economic status[e]		
Low	8	13.8
Middle	31	53.5
High	19	32.8
Voluntariness of exclusion		
Self-exclusion	48	82.8
Forced exclusion	10	17.2

Note: [a]n = 57.
[b]n = 48.
[c]n = 53.
[d]Detailed categories of education: Undergraduated = no educational qualifications, low = primary school qualification, middle = secondary school qualification, high = higher education entrance qualification.
[e]Socio-economic status regards household income, educational and employment status. Calculation followed Lampert et al. (2013).

$p = .01$, 95% CI [0.05–0.65]. No such differences were found between participants with and without lifetime gambling disorder ($p = .41$), lifetime other mental disorders ($p = .81$) and 12-month other mental disorders ($p = .63$).

Gambling disorder

Prevalence. Results for lifetime and 12-month prevalence of gambling disorder are displayed in Table 3. Forty-two excluded individuals (72.4%) reported lifetime DSM-5 gambling disorder assessed with the diagnostic interview. Furthermore, every excluded individual reported having experienced at least one criterion during lifetime. The 12-month prevalence rate of gambling disorder revealed large differences between diagnostic interview (22.4%) and screening questionnaire (58.6%). Here, up to 17.2% of individuals reported no criterion. The reduced diagnostic cut-off for DSM-5 gambling disorder led to an increase of 10.3% (diagnostic interview) and 8.6% (screening questionnaire) relative

Table 2. Self-reported indicators of mental health impairments in casino excluders (*N* = 58) after exclusion.

Variable according to cut-offs	n	%	Instrument	Period	M (SD)	Cut-off	Possible	Sample
Satisfaction with life			SWLS (Schumacher, 2003)	lifetime	22.0 (7.0)	≥ 20	5–35	5–34
Satisfied	33	56.9						
Unsatisfied	25	43.1						
General well-being[a]			WHO-5 Index II (Bech, 2004)	2-week	15.2 (5.8)	≥ 13	0–25	0–25
Good	38	69.1						
Poor	17	30.9						
Psychological distress			BSI (Franke, 2000)	1-week	51.7 (14.4)	≥ 63	20–80	24–80
No/slight distress	45	77.6						
Significant distress	13	22.4						
Mental disability days			DIA-X CIDI (Wittchen & Pfister, 1997)	4-week				
Not impaired[b]	39	68.4						
Impaired[b]	18	31.6			1.4 (4.2)	≥ 1	0–28	0–28
Due to gambling problems	7	12.1			0.9 (3.9)	≥ 1	0–28	0–23
Physical disability days								
Not impaired[b]	38	66.7						
Impaired[b]	19	33.3			2.6 (5.2)	≥ 1	0–28	0–28

Note: SWLS = Satisfaction With Life Scale (Schumacher, 2003). BSI = Brief Symptom Inventory (Franke, 2000). WHO-5 Index II = Well Being Scale (Bech, 2004). DIA-X CIDI = Composite International Diagnostic Interview (Wittchen & Pfister, 1997). Cut-off values based on community sample studies: SWLS (Glaesmer et al., 2011), WHO-5 Index II (Brähler et al., 2007), BSI (Franke, 2000), DIA-X CIDI (Jacobi et al., 2004; Mack et al., 2015).
[a] *n* = 55.
[b] *n* = 57 due to missing values.

Table 3. Different assessments of lifetime and 12-month prevalence of gambling disorder reported by casino excluders (N = 58).

	Instrument			Lifetime prevalence		12-month prevalence	
Criteria	M (SD)	Range	Cut-off	n	%	n	%
Diagnostic interview							
DIA-X CIDI (Wittchen & Pfister, 1997)							
DSM-5	5.4 (2.4)[c]	1–9[a]	≥ 4	42	72.4	13	22.4
DSM-IV-TR	5.5 (2.5)[c]	1–10[b]	≥ 5	36	62.1	-	-
Screening questionnaire							
Stinchfield Questionnaire (Stinchfield et al., 2005; Stinchfield et al., 2016)							
DSM-5	4.2 (3.2)[d]	0–9[a]	≥ 4	-	-	34	58.6
DSM-IV-TR	4.2 (3.2)[d]	0–10[b]	≥ 5	-	-	29	50.0

Note: DIA-X CIDI = Composite International Diagnostic Interview (Wittchen & Pfister, 1997). Correlation of DSM-5 criteria for 12-month prevalence rates assessed with DIA-X CIDI and Stinchfield Questionnaire: r = .45. Correlation of DIA-X CIDI lifetime prevalence rates for DSM-5 and DSM-IV-TR diagnostic criteria: r = .79.
[a]Possible Range: 0–9.
[b]Possible Range: 0–10.
[c]Lifetime prevalence.
[d]12-month prevalence.

to DSM-IV-TR. Correlation of the interview and questionnaire assessment (both DSM-5 criteria, 12-month prevalence) was r = .45. Furthermore, correlation of DSM-5 and DSM-IV-TR interview diagnostic (lifetime prevalence) was r = .79.

Other mental disorders and temporal sequences

Prevalence. Table 4 displays lifetime and 12-month prevalence of different affective, anxiety and substance-related disorders as well as the 4-week prevalence of attention deficit disorders. The lifetime prevalence rate for any mental disorder was 65.5% (increasing to 84.5% when including gambling disorder). Regarding the last 12 months, 25.9% reported at least one mental disorder (increasing to 39.7% when including gambling disorder). Highest lifetime prevalence was found for affective disorders (48.3%), followed by substance-related disorders (29.3%) and anxiety disorders (17.2%). Among those who reported affective disorders, most participants fulfilled criteria of a depressive episode (39.7%). Most frequent reported substance-related disorders were alcohol abuse (20.7%) and dependence (10.3%). Furthermore, most frequent anxiety disorders were panic disorder (without agoraphobia) and specific phobia (both 4.9%).

Eighteen casino excluders (38.3%) were screened positively for attention deficit disorders (period of last four weeks). Results of lifetime prevalence for diagnosing and screening of personality disorders are shown in Table 5. Three participants (6.4%) fulfilled diagnostic criteria for personality disorders. Using the screening cut-offs, the rate of lifetime personality disorders was 31.9%. Here, the most frequently reported personality disorders were narcissistic (21.3%), paranoid (10.6%) and antisocial (8.5%).

Co-morbidity pattern

Figure 1 shows types and numbers of different lifetime disorders in casino excluders. Eleven casino excluders (19.0%) reported isolated lifetime gambling disorder, six (10.3%) reported singular lifetime affective disorder and one (1.7%) singular affective disorder.

Table 4. Lifetime and 12-month prevalence rates of mental disorders reported by casino excluders (N = 58).

	Age of onset	Lifetime prevalence		12-month prevalence	
	M (SD)	n	%	n	%
Any mental disorder[a]		**38**	**65.5**	**15**	**25.9**
Affective disorder	31.6 (18.5)	28	48.3	10	17.2
Depressive episode		23	39.7	6	10.3
Major depressive disorder, single episode		9	15.5	3	5.2
Major depressive disorder, recurrent		6	10.3	1	1.7
Dysthymic disorder		3	5.2	2	3.5
Hypomanic episode		1	1.7	1	1.7
Hypomanic disorder		1	1.7	1	1.7
Bipolar disorder		0	0.0	0	0.0
Affective disorder due to known physiological condition		5	8.6	3	5.2
Anxiety disorder	19.6 (18.5)	10	17.2	6	10.3
Panic disorder		4	6.9	3	5.2
Specific phobia		4	6.9	3	5.2
Generalized anxiety disorder		4	6.9	0	0.0
Social phobia		0	0.0	0	0.0
Agoraphobia		0	0.0	0	0.0
(Panic attack)		(12)	(20.7)	(5)	(8.6)
Substance related disorder	22.8 (8.9)	17	29.3	3	5.2
Alcohol abuse		12	20.7	0	0.0
Alcohol dependence		6	10.3	1	1.7
Cannabis abuse		7	12.1	1	1.7
Cannabis dependence		4	6.9	2	3.5
Substance abuse[b]		5	8.6	0	0.0
Substance dependence[b]		0	0.0	0	0.0
(Regular smokers)		(35)	(60.3)	(20)	(34.5)

		4-week prevalence		Range	
M (SD)	Cut-off	n	%	Possible	Sample
Attention deficit hyperactivity disorder[cd]					
13.4 (10.8)	≥ 15	18	38.3	0–54	0–45

Note: [a]Prevalence rates of affective, anxiety and substance-related disorders were assessed using the Composite International Diagnostic Interview (DIA-X CIDI; Wittchen & Pfister, 1997).
[b]Reported substances included amphetamine, cocaine, hallucinogen and unknown substances.
[c]Prevalence rate of attention deficit hyperactivity disorder was assessed using the Attention Deficit Hyperactivity Disorder Self-Rating Scale (ADHS-SB; Rösler et al., 2008).
[d]n = 47 due to missing values.

Furthermore, all cases of substance-related disorders occurred in individuals with gambling disorder. Casino excluders with two or more mental disorders unexceptionally reported lifetime gambling disorder. Accordingly, lifetime gambling disorder was significantly associated with a higher number of other mental disorders compared to those without lifetime gambling disorder, $t_{(56)} = -3.03$, $p = .004$, 95% CI [−1.17, −0.24].

Temporal relationships

With a mean age of onset between 19.6 and 31.6 years for other mental disorders (see Table 4), gambling disorder occurred considerably later in casino excluders (mean onset age of 37.6 years, SD = 14.5). Regarding individual cases, 80.0% of anxiety disorders occurred prior to gambling disorder (M = 8.5 years before, SD = 19.2 years before), and 64.7% of substance-related disorders (M = 6.2 years before, SD = 10.9 years before) as well as 57.1% of affective disorders (M = 4.3 years before, SD = 14.1 years before) manifested before gambling disorder.

Table 5. Prevalence of lifetime personality disorders reported by casino excluders ($N = 47$).

| Personality Disorder	M (SD)	Range	Cut-off	Diagnosing		Screening	
				n	%	n	%
Any personality disorder[a]				**3**	**6.4**	**15**	**31.9**
Cluster A							
Paranoid	13.8 (6.1)	7–30	≥ 23	1	2.1	5	10.6
Schizoid	13.6 (6.9)	7–32	≥ 31	0	0.0	2	4.3
Schizotypal	17.0 (7.4)	9–35	n.r.	0	0.0	-	-
Cluster B							
Antisocial	12.0 (4.9)	8–26	≥ 20	0	0.0	4	8.5
Borderline	18.0 (9.5)	10–44	≥ 43	1	2.1	1	2.1
Histrionic	11.4 (5.2)	7–27	≥ 29	0	0.0	0	0.0
Narcissistic	17.9 (7.9)	9–42	≥ 26	2	4.3	10	21.3
Cluster C							
Avoidant	12.8 (7.2)	7–38	≥ 29	1	2.1	2	4.3
Dependent	12.9 (5.9)	8–33	≥ 30	0	0.0	1	2.1
Obsessive-compulsive	12.9 (5.9)	8–33	≥ 28	0	0.0	1	2.1
(Depressive)	12.9 (7.7)	7–41	≥ 29	1	2.1	3	6.4
(Passive-aggressive)	12.4 (5.5)	7–29	≥ 25	0	0.0	2	4.3

Note: [a]Prevalence rates of personality disorders were assessed using the Assessment of DSM-IV Personality Disorders Questionnaire (ADP-IV; Doering et al., 2007). Diagnosing followed the algorithm by Doering et al. (2007). Screening followed cut-off scores by Renn (2006).
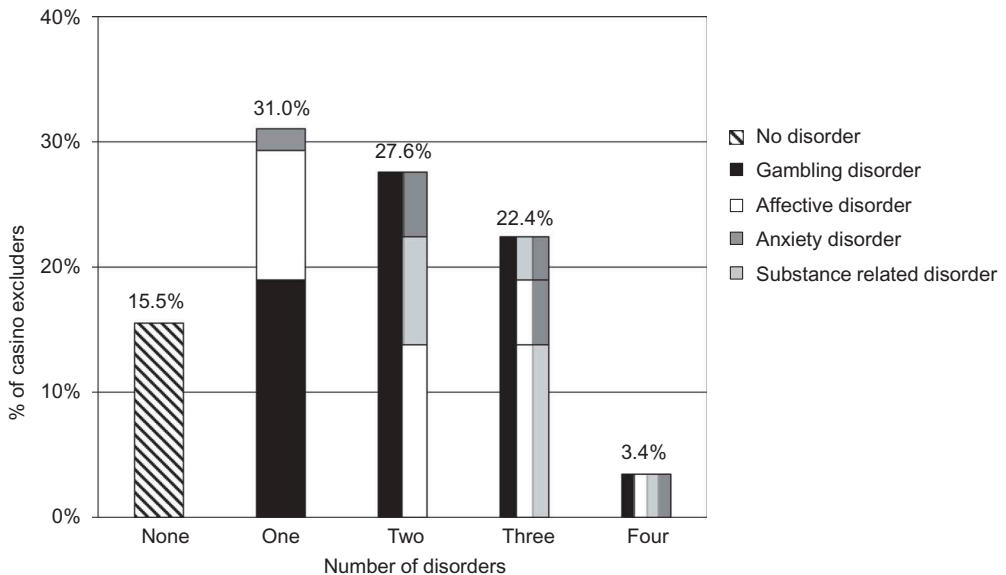
Figure 1. Type and number of different lifetime mental disorders in casino excluders ($N = 58$) including gambling, affective, anxiety and substance related disorders. For example, 22.4% of casino excluders reported three mental disorders (second bar from the right). Therein, 13.8% reported gambling, affective and substance-related disorder; 5.2% reported gambling, affective and anxiety disorder, and 3.4% reported gambling, substance-related and anxiety disorder (bar is described bottom-up).

Treatment utilization and help-seeking behaviour

More than half of the study sample (62.1%) reported having sought any treatment or help and 36% in the last 12 months. Most frequently mentioned were self-help groups (20.7%),
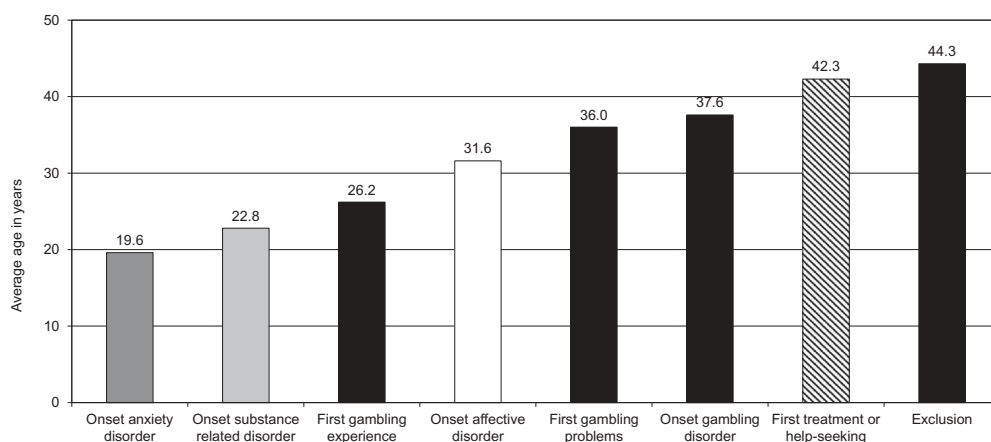
Figure 2. Temporal relationships of the average onset of different mental disorders, gambling, and treatment or help-seeking behaviour in casino excluders ($N = 58$).

followed by psychotherapy/psychiatric treatment (12.1%), counselling centre visits (12.1%) and outpatient (5.2%) and inpatient (3.2%) comprehensive rehabilitation treatment. Of those, 90.0% reported being overall satisfied with the respective treatment (average 12-month treatment or help-seeking participation: $M = 5.1$ days, $SD = 16.7$). Furthermore, eight casino excluders (14.8%) affirmed that they currently plan to seek treatment or help.

Temporal sequences of mental health problems and treatment/help-seeking behaviour are displayed in Figure 2. Casino excluders gambled for the first time at a mean age of 26.2 years ($SD = 14.0$). On average, occasional gambling began at a mean age of 30.4 years ($SD = 13.7$). First self-awareness of gambling-related problems occurred about six years later at a mean age of 36.0 ($SD = 15.4$). Regarding the 62.1% of casino excluders who did seek help, six more years passed until first treatment or help-seeking ($M = 42.3$ years, $SD = 14.7$) was initiated. It took another two years until participants entered an exclusion programme for the first time ($M = 44.3$ years, $SD = 15.0$). In three cases (7.1%), the first mental disorder (all affective disorders) occurred after exclusion was already initiated.

Discussion

The present study is the first that applied validated diagnostics to examine the prevalence and temporal relationships of mental health problems in casino excluders. The majority of casino excluders reported impairments in mental health. Affective, anxiety and substance-related disorders were frequently reported and often occurred prior to gambling disorder. Although the majority of programme participants reported help-seeking behaviour, about eight years passed between first self-awareness of gambling problems, help-seeking and exclusion.

Indicators of mental health impairments

In the current study, more than half of the casino excluders reported impairments in at least one mental health indicator up to eight years after exclusion. These

findings partly contradict a study by Hing et al. (2015). In this study, the average general health score (GHQ-12) of self-excluders significantly increased across time, but was relatively high even before exclusion (e.g. Kim et al., 2013). To our best knowledge, there have been no other studies so far that used validated mental health instruments. Therefore, a comparison with other research on casino excluders is not possible. Compared to community samples from Germany, casino excluders in the present study reported reduced average satisfaction with life and general well-being as well as increased psychological distress and mental and physical disability days (Brähler, Mühlan, Albani, & Schmidt, 2007; Franke, 2000; Glaesmer, Grande, Brähler, & Roth, 2011; Jacobi, Klose, & Wittchen, 2004; Mack et al., 2015).

Gambling disorder

For lifetime prevalence, gambling disorder was diagnosed in about 60% (DSM-IV-TR) to 70% (DSM-5) of casino excluders, and at least one criterion was met in each excluded individual (independent from classification system). Comparing DSM-5 with DSM-IV-TR, the reduction of diagnostic cut-off thus led to an increase of about 10%. This finding was half as much as found in Rennert et al. (2014), possibly resulting from an average higher severity of gambling disorder. Comparisons with *diagnostic* interview data from previous exclusion studies were neither possible for lifetime nor for 12-month prevalence. However, a comparison with previous 12-month (resp., 6-month) *screening* results was partly possible. Surprisingly, the present screening rate of 12-month gambling disorder post-exclusion was up to 4 times higher compared to previous screening results (e.g. 50–58% vs. 13–26%; Hayer & Meyer, 2011; Nelson et al., 2010; Tremblay et al., 2008). Moreover, a large difference was found comparing diagnostic with screening results for 12-month gambling disorder in the identical sample of casino excluders (diagnosting: 22.4% vs. screening: 58.6%). If confirmed in further studies, these results would challenge our knowledge on gambling disorder prevalence rates worldwide.

Other mental disorders and treatment utilization

In previous studies, casino excluders were often positively *screened* for symptoms of depression and anxiety (e.g. Kotter et al., 2018). However, this study reveals new insights by showing for the first time that (1) mental disorders – especially affective disorders – are also frequently *diagnosed* in casino excluders, and (2) other mental disorders typically manifest before gambling problems occur. Interestingly, our prevalence rates for mental disorders were comparable to those found in treatment-seeking individuals with pathological gambling, but, except for affective disorders, lower than in community samples with pathological gambling (Lorains et al., 2011; Petry et al., 2005). However, in contrast to individuals with gambling disorder in treatment and community samples, casino excluders showed relatively low rates of diagnosed personality disorders (Ibáñez et al., 2001; Odlaug, Schreiber, & Grant, 2013). Moreover, 'multi-morbidity' tended to be the rule rather than the exception.

Participants reported that it took about six years between the first self-awareness of gambling-related problems and first help-seeking behaviour, and two more years until exclusion. In contrast to Nelson et al. (2010), participants in the present study generally

sought help elsewhere before they were (in)voluntarily excluded. As suggested by Hayer and Meyer (2011), findings indicate that casino excluders might consider the ban as 'a necessary last course of action' rather than a preventive initiative.

Study limitations

Above all, the lack of an experimental study design only allows the careful interpretation of associations instead of causations. Moreover, the representativeness of the study sample might be limited by a relatively low response rate (6.1%) but comparable response rates have been reported in previous studies on casino excluders (e.g. 1.9–15.8%; Hayer & Meyer, 2011; Tremblay et al., 2008). Problematically, low response rates may result from lower participation rates among excluders with severe mental impairments. As high prevalence rates were reported across all mental disorders, this bias might be somewhat eliminated. Furthermore, the established diagnostic interview requires retrospective self-reports and therefore may lead to recall errors. To maximize the accuracy of prevalence rates, we implemented screening *and* diagnostic instruments as well as alternative cut-off values (e.g. gambling disorder, personality disorders). Despite the small sample size, the present study is the first that implemented valid diagnostic instruments to examine mental health problems and temporal sequences in casino excluders permitting valuable comparisons with community samples and replication in larger samples.

Practical implications

This study showed high rates of mental disorders along with impaired mental health in casino excluders. These results point to the necessity for several practical improvements: (1) earlier detection of problematic gambling and related mental problems by trained venue staff. To heighten the feasibility and likelihood of venue staff detections, these trainings should be mandatory by law and/or successful motivation to self-exclusion should be rewarded. After detection, the gamblers should be directed to trained counsellors. To heighten participation rates, detected gamblers should have a mandatory personal meeting with a counsellor before they are allowed to continue gambling. Within these personal meetings, (2) mental conditions in casino excluders beyond gambling problems should be assessed with validated instruments following latest classification systems. As a feasible solution, brief screening questionnaires could be applied. Gamblers with positive screenings should (3) be motivated to participate in individually tailored support and treatment options ranging from basic information on different mental problems and counselling to professional treatment to improve mental health of excluded individuals.

Acknowledgements

Conflicts of interest

Funding sources

Competing interests

Constraints on publishing

The authors declare that there were no constraints on publishing.

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