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ORIGINAL PAPER

Rates and Correlates of Pathological Gambling Among VA Mental Health Service Users

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Abstract The rate and correlates of diagnosed pathological gambling (PG) among mental health patients in the Veterans Health Administration, the only national system of mental health care, have not been studied. Using fiscal year 2009 (FY2009) VA administrative data, a case–control study compared those with an ICD code of 312.31 (PG) versus those without. The analytic group was limited to 1,102,846 Veterans Affairs (VA) specialty mental health (MH) services users because 94.5% of all those diagnosed with PG in the U.S. VA health system received such services. Chi-square tests and logistic regression assessed associations between demographic and clinical factors and PG diagnosis. The past-year rate of PG diagnosis among veterans treated in specialty MH program was 0.2%, significantly lower than prevalence rates in other treatment samples and the general U.S population, suggesting under-diagnosis and/or a low-income sample. Being female, ages 40–74, and higher income increased the risk of PG diagnosis, as did past-year homelessness (Odds Ratio (OR) = 2.2), alcohol use disorders (OR = 2.8), bipolar disorder (OR = 2.1) and personality disorders (OR = 2.1). Depression, schizophrenia, and anxiety disorders other than PTSD, were also positively associated with PG diagnosis. Drug use disorder had no significant independent association with PG. PTSD, dementia, and living in isolated rural areas conferred reduced risk. More systematic screening and surveillance

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of PG among MH service users generally, and veterans with heavy alcohol use, severe mental illness, and homelessness specifically, appears warranted.

Keywords Pathological gambling · Veterans · Mental health services · Clinical epidemiology

Introduction

Gambling—i.e. wagering something valuable on an outcome that is unpredictable—is a pastime that has existed for millennia. Most forms of recreational gambling are harmless social activities—perhaps, even conferring some health benefits (Desai et al. 2007). However, for a minority, gambling can become excessive, destructive, and pathological. At present, the American Psychiatric Association conceptualizes pathological gambling (PG) as an impulse-control disorder (ICD) with the central feature of "persistent and recurrent maladaptive gambling behavior that disrupts personal, family, or vocational pursuits" and is defined as five or more (out of 10) symptoms not associated with a manic episode (American Psychiatric Association 2000). Yet, emerging evidence from the fields of epidemiology and neurobiology demonstrates many shared features between PG and addictive disorders (Grant et al. 2010). As a result, the DSM-V Task Force has suggested moving PG from its current classification as an impulse control disorder to a new classification termed, "Addiction and Related Disorders" that would include both substance use disorders and the so-called 'non-substance' or 'behavioral' addictions, of which PG is considered one (American Psychiatric Association 2010). Moreover, with increasing access in the United States to lotteries, casinos, online gaming, and other gaming outlets, there is growing interest in the prevalence, clinical correlates, consequences, and treatment of PG.

Over the past decade, epidemiologic research on PG in the general population has found rates of past-year PG between 0.3 and 2.0%, with a high degree of psychiatric co-morbidity—including substance use (Barry 2010; Bland et al. 1993; Brewer et al. 2010; Cunningham-Williams et al. 1998; Desai et al. 2007; Desai and Potenza 2008; Kessler et al. 2008; Ladouceur et al. 1999; Petry et al. 2005). Treatment-seeking samples reveal substantially higher rates of PG (Barry et al. 2009; Daghestani et al. 1996; Grant 2008a, b, c; Jiménez-Murcia et al. 2010; Pietrzak and Petry 2005; Shaffer et al. 2005), as high as 20% in one recent survey of veterans (Hierholzer et al. 2010). Furthermore, limited research suggests that much PG even in treatment-seeking populations often goes unrecognized. For example, in a population of adult psychiatric inpatients, while only 2% were admitted with an ICD diagnosis, later structured diagnostic assessment revealed a substantially higher rate of 30%, with one quarter of these meeting criteria for PG (Grant et al. 2005). However, no study has looked specifically at rates of PG diagnosis and associated demographic and diagnostic correlates using a national sample of mental health (MH) treatment-seeking recipients of VA mental health services. The current case–control study uses national administrative data from the Department of Veterans Affairs on veterans receiving specialized VA MH services to examine rates and correlates of PG diagnosis among VA MH service users. Veterans identified in the clinical recorder as having received a diagnosis of PG in fiscal year 2009 (FY2009; October 1, 2008 to September 30, 2009) were compared on demographic and clinical characteristics with those who were not. This study thus seeks to determine current rates of PG identification in a large MH treatment-seeking sample as well as to identify risk factors—easily identified in the clinical

record of service-using veterans—to allow more effective targeting of healthcare efforts to screen, prevent, and treat PG in users of mental health services.

Methods

Study Design

Using VA administrative data from FY2009, we conducted a case–control study of all veterans who used VA mental health specialty services in FY2009 (n = 1,102,846) and compared those with a diagnosis of pathologic gambling (n = 2,283, cases) to those without this diagnosis (n = 1,100,563, controls) in order to evaluate rates of PG diagnosis as well as disease risk and protective factors.

Sample

We defined PG as receiving an ICD-10 code 312.31 at any point during FY2009. An ICD-10 V-classification code exists for problem gambling (V69.3), a subthreshold yet potentially clinically relevant diagnosis. However, over 90% of identified records were identified as pathological (312.31), not problem (V69.3) gamblers. Therefore, given the very small numbers of clinically-recognized problem gamblers, and our primary interest in those diagnosed with PG, only individuals with the diagnosis of PG were included as study cases. Of all VA service users (n = 5,031,242), 0.05% (n = 2422) were diagnosed with PG in FY2009. MH service users (N = 1,102,846) comprised 94.5% of all those with this diagnosis (n = 2283) and were more than 50 times as likely to receive a PG diagnosis (odds ratio [OR] = 58.6). Thus, the analyzed sample was limited to MH service users only. The control population included 1,100,563 veterans who utilized specialty mental health services during FY2009 *but did not* receive a diagnosis of PG.

Measures

Demographic characteristics included gender, homelessness status, age, ethnicity, race, income, and geographic location. We defined recently homeless veterans as individuals who (a) used specialized VA homeless program services and/or (b) received a V60.0 ICD-10 diagnostic code (indicating lack of housing) during FY2009 (Edens, in press). Diagnoses were the working clinical diagnoses of VA clinicians as recorded in the electronic medical record. Diagnoses clustered together in our analysis represented dementia, schizophrenia, major depression, bipolar disorder, any anxiety disorder (excluding posttraumatic stress disorder), posttraumatic stress disorder (PTSD), alcohol and other drug use disorders, and any personality disorder. Veteran service-connected disability status was classified into three groupings: not service-connected, less than 50% service-connected, and service-connected 50% or greater. Service in the Wars in Afghanistan and Iraq, i.e. Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) status, was determined from data provided to VA by the Department of Defense. Urban/rural status was documented using zip codes and the Rural–Urban Commuting Area (RUCA) codes developed in 1998 at the University of Washington (Rural Health Research Center 2000), which allowed us to identify veterans residing in large urban locations, mid-size communities, small communities or isolated rural communities.

Analyses

Bivariate comparisons of individuals with versus without a diagnosis of PG were conducted with chi-square tests and odds ratios. Subsequently, logistic regression was used to identify risk and protective factors independently associated with a diagnosis. Variables representing age, race/ethnicity, geographic location, income, and service connectedness were dummy coded, with reference categories for these variables representing being age <40, white, urban location, incomes below $7,000, and non-service connected, respectively. *All analyses were performed using SAS for Windows, version 9.2.*

Results

Sample Description and Bivariate Analyses

Altogether, 2283 (0.21%) veterans receiving VA mental health services in FY2009 received a diagnosis of pathologic gambling (Table 1). Several demographic characteristics were found to increase the likelihood PG diagnosis on bivariate analysis. These included having been homeless during the year, being between ages 40–64, and reporting an income greater than $25,000 (Table 1). Excluding dementia and PTSD, most psychiatric diagnoses were positively predictive of PG. Most notably, the presence of an alcohol use disorder or a personality disorder each increased the odds of diagnosis more than 3.5 times.

Several factors appeared protective in bivariate analyses (Table 1). Veterans who participated in OEF/OIF were at lower risk for a PG diagnosis than the general population of veterans receiving mental health services through the VA health system. Additionally, being age 75 or older, non-white, or living in a small or isolated rural locale appeared protective as did being service-connected less than 50%, although being connected ≥50% had no predictive power. Having a diagnosis of dementia or PTSD both decreased the odds of PG on bivariate analysis.

Multivariate Analyses

In the logistic regression, most significant bivariate results remained unchanged with a few noteworthy exceptions. First, after controlling for all other demographic and diagnostic factors, males had significantly lower odds (by 20%) of a PG diagnosis compared to females (Table 2). Secondly, OEF/OIF status no longer proved protective against—nor was significantly associated with—a diagnosis of PG. Being ≥50% service-connected became a significant risk factor, whereas service-connected less than 50% was no longer protective. Controlling for multiple characteristics, being female, middle-age, having a higher income (in a linear direction), being service-connected ≥50%, and having a serious mental illness (excluding PTSD) or an alcohol use disorder remained significant risk factors for pathological gambling. Indeed, the presence of an alcohol use disorder increased the odds of a diagnosis of PG almost threefold, followed by having been homeless and the presence of a bipolar or personality disorder. Protective characteristics included being male, age greater than 85, black, living in an isolated rural area, income <7 K, and having a diagnosis of dementia or PTSD.

Table 1 Bivariate analysis of veterans diagnosed with pathological gambling (PG) among all VA mental health services users: fiscal year (FY) 2009 administrative data

Variable	Entire sample		Pathological gambling[a]		OR
	N = 1,102,846		N = 2283 (.21%)		
	N	%	N	%	
Male	1,006,961	91.5	2067	90.5	0.89
OEF/OIF veteran	85,108	7.7	89	3.9	0.48****
Homeless[b]	107928	9.8	584	25.6	3.19****
Age					
<40	187,238	17.0	208	9.1	–
40–49	162,259	14.7	467	20.5	2.60****
50–64	559,670	50.8	1318	57.7	2.12****
65–74	103,365	9.4	231	10.1	2.02
75–85	72,736	6.6	56	2.4	0.69****
>85	17,578	1.6	3	0.1	0.15****
Race/ethnicity					
White	282,576	25.6	689	30.2	–
Black	89,261	8.1	154	6.8	0.71*
Hispanic	30,769	2.8	44	1.9	0.58*
Other race	4164	0.4	13	0.6	1.28
Missing race	726,845	65.9	1427	62.5	0.80***
Geography					
Urban area	825359	74.8	1816	79.5	–
Large rural area	120,238	11.3	226	9.9	0.86
Small rural area	90,880	8.6	161	7.0	0.81*
Isolated rural area	66,369	6.3	80	3.5	0.55****
Income					
< 7 K	312,243	28.3	554	24.3	–
7–15 K	258,439	23.4	569	24.9	1.24
15–25 K	142,517	12.9	280	12.3	1.10
> 25 K	389,647	35.3	880	38.5	1.27**
Disability status					
Not service-connected (SC)	540808	49.0	1177	51.6	–
SC < 50%	200,508	18.2	333	14.6	0.76****
SC ≥ 50%	361,530	32.8	776	34.0	0.98
Diagnoses					
Dementia	22,086	2.0	6	0.3	0.13****
Schizophrenia	82,577	7.5	265	11.6	1.62****
Bipolar disorder	92,991	8.5	469	20.5	2.80****
Major Depression	227,700	20.7	644	28.2	1.51****
Anxiety disorder[c]	254,222	23.1	674	29.5	1.39****
PTSD	419,638	38.1	697	30.5	0.71****
Alcohol use disorder	200,915	18.3	1016	44.5	3.60****
Drug use disorder	162,719	14.8	685	30.0	2.47****

Table 1 continued

Variable	Entire sample		Pathological gambling[a]		OR
	N = 1,102,846		N = 2283 (.21%)		
	N	%	N	%	
Personality disorder	39,918	3.6	275	12.0	3.64****

OR odds ratio, *OEF/OIF* veteran veteran who participated in operation enduring freedom/operation Iraqi freedom, *SC* service connected, identifying those receiving service-connected disability compensation, *PTSD* posttraumatic stress disorder

* $P < .05$; ** $P < .01$; *** $P < .001$; **** $P < .0001$;– indicates reference level with OR = 1.0

[a] Pathological Gambling = veteran received an ICD-9 diagnostic code of 312.31 indicating a persistent and recurrent maladaptive gambling behavior

[b] Homeless = used VA homeless services at least one time during FY2009 or been given a v60.0 code indicating 'lack of housing'

[c] Not including posttraumatic stress disorder

Discussion

The most striking finding in our analysis is the low overall rate of PG diagnoses (i.e., 0.2%) among veterans utilizing mental health services in the VA setting during FY2009—a theoretically high-risk population. A study of Vietnam era veterans—not necessarily users of VA health services—found lifetime rates of PG and problem gambling comparable to other U.S. population studies (Eisen et al. 2004), indicating veterans' risk of PG generally resembles the wider population. Studies examining samples of treatment-seeking (Biddle et al. 2005; Hierholzer et al. 2010), American Indian and Hispanic (Westermeyer et al. 2005), and homeless (Castellani et al. 1996) veterans, however, have found elevated rates of PG, also comparable to non-veteran treatment-seeking samples. Therefore, when weighed against even a conservative general U.S. population prevalence estimate—where a past-year prevalence of 0.3% excluding all those with bipolar 1 diagnosis was found (Kessler et al. 2008)—it is noteworthy that VA MH clinicians identified one-third fewer proportion of cases. That this was found in a psychiatrically-ill population only adds import, given repeated demonstration that PG is highly comorbid with mental health problems (Cunningham-Williams et al. 1998; Desai and Potenza 2008; Kessler et al. 2008; Petry et al. 2005) and suicidal behavior (Kausch 2003). We conclude that our finding is indicative of PG under-diagnosis and treatment in the VA health system, rather than shedding light on actual prevalence rates among veterans who present for MH services. Lending further support to this is our finding that, among all VA service users, the rate of PG diagnosis was 0.05%—six times below national estimates. Nonetheless, playing devil's advocate, a recent analysis showed VA service users were over 5 times more likely than other veterans to have an income of less than $40,000 (Rosenheck 2004). In light of our finding that higher incomes confer greater risk of PG diagnosis, it is possible veterans using VA services are, indeed, at reduced risk for PG to some degree because of their low incomes. Still, given the strong associations of PG with comorbid mental illnesses, our examination of a high-risk group of VA service users—i.e. mental health service users, and our reliance on VA clinicians correctly identifying cases without a system-wide screening effort, we contend that the diagnosis of PG is underidentified in VA clinical settings and

Table 2 Logistic regression comparison of veterans diagnosed with pathological gambling (PG) among all past-year VA mental health services users: fiscal year 2009 administrative data

Variable	Total VA MH services users: N = 1,060,148	
	PG diagnosis (%): N = 2,198 (0.21)	
	OR	(95% CI)
Male	0.8**	(0.7–0.9)
OEF/OIF veteran	0.9	(0.7–1.2)
Homeless[a]	2.2****	(2.0–2.5)
Age		
40–49	1.8****	(1.5–2.2)
50–64	1.9****	(1.6–2.2)
65–74	2.3****	(1.9–2.8)
75–85	1.1	(0.8–1.4)
> 85	0.3*	(0.1–0.9)
Race/ethnicity		
Black	0.5****	(0.4–0.6)
Hispanic	0.8	(0.6–1.1)
Other race	1.3	(0.7–2.2)
Missing race	1.0	(0.9–1.1)
Geography		
Large rural area	0.9	(0.8–1.0)
Small rural area	0.9	(0.8–1.0)
Isolated rural area	0.6****	(0.5–0.8)
Income		
7–15 K	1.2***	(1.1–1.4)
15–25 K	1.4****	(1.2–1.6)
> 25 K	1.7****	(1.5–1.9)
Disability status		
SC < 50%	1.1	(0.9–1.2)
SC ≥ 50%	1.3***	(1.2–1.5)
Diagnoses		
Dementia	0.3**	(0.1–0.6)
Schizophrenia	1.3***	(1.1–1.5)
Bipolar disorder	2.1****	(1.8–2.3)
Major Depression	1.4****	(1.3–1.6)
Anxiety disorder[b]	1.2****	(1.1–1.4)
PTSD	0.7****	(0.6–0.7)
Alcohol use disorder	2.8****	(2.5–3.1)
Drug use disorder	1.1	(1.0–1.2)
Personality disorder	2.1****	(1.8–2.3)

Pathological gambling = veteran received an ICD-9 diagnostic code of 312.31 indicating a persistent and recurrent maladaptive gambling behavior

OR (95% CI) = odds ratio with 95% confidence interval, *OEF/OIF* veteran veteran who participated in operation enduring freedom/operation Iraqi freedom, *SC* service-connected, identifying those receiving service-connected disability compensation, *PTSD* posttraumatic stress disorder

* $P < .05$; ** $P < .01$; *** $P < .001$; **** $P < .0001$

[a] Homeless = used VA homeless services at least one time during FY2009 or been given a v60.0 code indicating 'lack of housing'

[b] Not including posttraumatic stress disorder

most likely elsewhere, since PG is not often thought of as falling under the purview of mental health practitioners or even addiction specialists.

Though we limited our analysis to individuals receiving MH services, thus selecting for individuals with mental disorders, the high rate of comorbid psychiatric diagnoses and PG is nevertheless noteworthy. This finding is consistent with virtually all studies of clinical

and general population samples showing high rates of comorbidity between PG and psychiatric diagnoses (Bland et al. 1993; Cunningham-Williams et al. 1998; Desai and Potenza 2008; Kessler et al. 2008; Petry et al. 2005). The psychiatric comorbidity conferring greatest odds of PG, controlling for others, was the presence of an alcohol use disorder, followed closely by personality disorders and bipolar disorder. The strong association of PG with bipolar disorder requires further comment. Indeed, 20% of veterans with PG were given a clinical diagnosis of bipolar disorder in the same year, and we cannot tell from the data available to us—which cover the entire year—whether PG symptoms emerged concurrently with a manic episode or not. Because the diagnosis of DSM-IV PG is excluded when found in presence of a manic episode, it is possible that some veterans with bipolar disorder were, indeed, manic when the diagnosis of PG was given, an improper use of the diagnosis. For our purposes and with available data, we have assumed the accuracy of the clinicians' use of the PG diagnosis. PG is, admittedly, a comparatively rare disorder. However, its strong association with several major mental health and addictive disorders and the increased risk of homelessness, suicidality, and other seriously disabling outcomes all beg the question of whether mental health (and, particularly, addiction) providers should receive training in screening, diagnosis, and treatment for PG. Indeed, a large epidemiologic study found that, while half (49%) of all individuals with a PG diagnosis had been treated for other mental health conditions, none had ever received treatment for gambling (Kessler et al. 2008). Given that effective psychosocial and pharmacological treatments are emerging as treatment options (Grant and Kim 2006; Grant et al. 2006, 2007, 2008a, b, c; Leung and Cottler 2009; Marceaux and Melville 2010; Pallesen et al. 2005, 2007), as is mutual self-help through Gamblers Anonymous, increased clinician knowledge of this disorder in order to improve detection and referral to treatment among those at greatest risk appears warranted.

Another striking finding is the increased risk of PG among women veterans in the adjusted analysis. This is dissimilar from two large general U.S. populations surveys, where men and women were found to have lower (Blanco et al. 2006; Petry et al. 2005) or similar (Kessler et al. 2008) rates of PG after controlling for lifetime gambling. Using the same sample as Petry et al., Desai and Potenza found increasing strength of associations between mental health problems and gambling problem severity, with stronger associations in women than men (Desai and Potenza 2008). Prior research among veterans has also demonstrated differences between female veterans and females from the general population (Gamache et al. 2003). Therefore, while our finding reached significance only to the .01% level—possibly indicating a type-I error given the very large sample size—we nonetheless conclude that clinicians should not neglect to screen, diagnose, and assist female veterans with PG, particularly those with other mental health needs.

Our study also highlights a strong association between PG and homelessness, net of other factors. This is consistent with research—with at least one exception (Shelton et al. 2009)—showing a significant relationship between PG and homelessness (Rota-Bartelink and Lipmann 2007; Shaffer et al. 2002) even after controlling for substance use disorders (Edens, in press). Given the Department of Veterans Affairs' recent emphasis on ending veteran homelessness, identifying and treating PG appears warranted in reaching this goal.

Several limitations deserve comment. First, we were limited by available data, impacting both study design and the measures used. Our study was a case control design using retrospective cross-sectional—i.e. rather than prospective—data. Thus, we cannot conclusively establish a causal relationship between comorbidities. A prospective study of PG, although ideal, would be exceedingly difficult and cost-prohibitive, given that PG is a rare event and vulnerable populations are difficult to follow over long periods of time.

Second, our measures, based on administrative data diagnoses, could not be validated. Our definition of pathological gambling, along with other psychiatric diagnoses, relies on clinicians' accurate screening and coding of symptoms at some clinical encounter in the past year. As previously mentioned, given low detection rates of PG in treatment-seeking samples generally (Grant et al. 2005) along with the absence of any VA system-wide screening procedure, it is likely that identified cases represent the most severe cases and should not be mistaken as a reflection of true prevalence rates among VA MH service users. Nonetheless, such cases could be valuable for informing treatment providers of various patient characteristics worth targeting in initial problem gambling screening efforts in the VA system.

Thirdly, any risk of developing PG is necessarily predicated upon lifetime exposure to gambling. In evaluating prevalence rates among veterans, we were unable to control for lifetime gambling exposure, since VA clinical data does not contain such information. For example, findings from the National Co-morbidity Study-Replication revealed that Non-Hispanic Blacks had "extremely high odds of developing a gambling problem once exposed to any gambling experience, although Non-Hispanic Blacks, generally, are significantly *less* likely to ever gamble" (Kessler et al. 2008). Thus, while in our study, Blacks were at decreased risk of being diagnosed with PG than Whites, this might be different were we able to identify the subset with any gambling exposure. This is related to a fourth limitation of our study: namely, that our categorization of race is substantially incomplete given that the largest category was "missing" race and thus, observed associations between race and PG should be considered with caution.

Finally, we made use of an extremely large sample, potentially inflating statistical power and magnifying minor differences. We have reported odds ratios with 95% confidence intervals to allow interpretation of the precision of effect size estimates.

Conclusion

Pathological gambling is very likely under-identified by VA mental health clinicians as well as those in other systems. Given serious associated comorbidities, along with the emergence of evidence-based treatments for PG, increased awareness of this condition among mental health clinicians could facilitate referral and utilization of effective services. Our results suggest that surveillance should be targeted among mental health users, generally, and those with alcohol use disorders, homelessness, and personality disorders, specifically.

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Conflict of interest None.

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