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## Prevalence and covariates of problematic gambling among a US military cohort

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### Abstract

The availability of and participation in gambling has increased substantially the past several decades, however studies of military members' gambling behaviors are limited. The present study aimed to investigate potential problematic gambling and its association with demographics and behavioral characteristics in a US military cohort. We analyzed cohort data from a telephone survey during 2015–2016 of 1553 Ohio Army National Guard members. We assessed potential problematic gambling by using the 3-item National Opinion Research Center Diagnostic Screen—Loss of Control, Lying, and Preoccupation Screen (NODS-CLiP). Potential correlates examined were demographics, depression, suicidal ideation, smoking status, alcohol use, legal and financial problems, perceived general health status, pain, and impulsivity. Results indicated past-year frequent gambling (at least once per week) and lifetime potential problematic gambling was reported by 13% and 8% of respondents, respectively. Problematic gambling and past-year gambling behaviors were associated in a dose-response relationship from 18% among soldiers gambling once per week to 44% among those gambling 4 or more times per week. Correlates of screening positive for potential problematic gambling included the following: being male, currently unmarried, having left the Guard or retired, minor depression, alcohol dependence, legal

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#### Contributions

All of the authors have made substantive intellectual contributions to the study. MSG and DSF designed the study and executed the analysis. MSG, DSF, LS, and MT were involved in drafting the first version of the manuscript. LS, GC, MT, IL, JC, and SG were involved in obtaining funding, developing the data collection protocol, and management of data collection. All authors contributed to, read, and approved the final manuscript.

#### Conflict of interest

None.

#### Declarations of interest

None.

problems, and increased pain. Given the higher prevalence of frequent gambling in this military cohort (8%), nearly twice the US prevalence (5%), and the association with negative psychological and behavioral outcomes, routine screening of gambling frequency and problem gambling may be needed to ensure military and veteran populations live the healthiest lives possible.

## Keywords

Gambling; Alcohol; Military; Depression; Impulsivity; Mental health

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## 1. Introduction

Gambling opportunities have increased rapidly over the past several decades in the United States (US) and worldwide. Expansion of online gaming coupled with the recent rise in popularity of urban casinos have reduced barriers to gaming and normalized gambling behaviors. Although the majority of people who participate will never experience adverse outcomes, approximately 5% of adults in the general population will experience some form of gambling problem during their life (Shaffer, Hall, & Vander, 1999; Welte, Barnes, Tidwell, Hoffman, & Wieczorek, 2015), with rates likely to be higher in populations exhibiting the same sociodemographic characteristics correlated with problem gambling, including being male, younger, single or divorced, unemployed, and having lower income or less education (Dowling et al., 2017). Given that the majority of US military personnel are male (84%), younger than 30 years (72%), with less than a college degree (92%) (Department of Defense, 2016), the burden of problem gambling may be particularly high in military populations. Despite this, little is known about the burden of problem gambling in military personnel.

Compared to the general population, military and veteran populations have a higher risk of substance abuse (Institute of Medicine, Substance Use Disorders in the U.S., 2013), mental health issues (Kessler et al., 2014), and suicide (Black, Galloway, Bell, & Ritchie, 2011), all conditions that are highly associated with problem gambling (Abdollahnejad, Delfabbro, & Denson, 2014; Black & Moyer, 1999; Kessler et al., 2008; Lorains, Cowlshaw, & Thomas, 2011; Zimmerman, Chelminski, & Young, 2006). Likewise, service members share demographic characteristics associated with problem gambling (e.g., male, young, less educated, unmarried) (Kessler et al., 2014). In addition, problem gambling may be associated with increased risk-taking (Goodie, 2005) and impulsivity (LaBrie, Shaffer, LaPlante, & Wechsler, 2003), both of which have been observed to increase post-deployment (Galloway, Millikan, & Bell, 2011; Killgore et al., 2008). However, with the exception of a few studies (Steenbergh, Whelan, Meyers, Klesges, & DeBon, 2008; United States Government Accountability Office, 2017; Weis & Manos, 2007), gambling behaviors among military and veteran populations have not been well studied. In a study of gambling-related problems among new Air Force recruits, 6% reported gambling problems (i.e., feeling bad about gambling or its related negative consequences in the past 12 months) (Steenbergh et al., 2008). In another study of patients seeking care at a naval psychiatric clinic, approximately 2% of incoming patients were diagnosed with lifetime prevalence of pathological gambling (Weis & Manos, 2007). Finally, a recent assessment found that during

2011–2015, < 1% of active-duty and reserve component service members examined were diagnosed with a gambling disorder or seen for problem gambling each year in the military health system (United States Government Accountability Office, 2017). Most of these studies provide prevalence estimates from convenience samples (i.e., new recruits or patients seeking care) or were completed > 10 years ago.

Aiming to fill this gap, we investigated the prevalence of potential problematic gambling by specific sociodemographic and military factors and the association between potential problematic gambling and behavioral characteristics among a cohort of US National Guard members from the state of Ohio.

## 2. Materials and methods

### 2.1. Design

We used data from the Ohio Army National Guard Mental Health Initiative (OHARNG MHI). The OHARNG MHI is a multiwave cohort survey that has annually collected data from US Army National Guard soldiers from November 2008 to present. The methods used in the survey have been described in detail by Calabrese and colleagues (Calabrese et al., 2011) The cooperation rate and response rate for this study is 67.5% and 43.2%, respectively. For this study, we used data from participants interviewed from 2015 to 2016.

### 2.2. Participants

A battery of psychiatric screeners were administered via a 60-min computer-assisted telephone interview at each wave of data collection. All participants were informed about the study procedures before giving their written consent. Ethical approval was granted by the Ohio National Guard and the Institutional Review Boards of University Hospital Case Medical Center (UHCMC), University of Toledo (UT), University of Michigan, Ann Arbor Veterans Administration Medical Center, Columbia University, Boston University, and the Office of Human Research Protections of the US Army Medical Research and Materiel Command.

### 2.3. Measures

**2.3.1. Gambling behaviors—**Past-year and lifetime gambling history was assessed by using two questions. First, respondents were asked, “In the past 12 months, how often have you bet money or gambled in any way?” with responses ranging from “not at all” to “4 or more times a week.” Those who responded “not at all” were asked a follow-up question, “Thinking about your entire lifetime, have you ever bet money or gambled in any way?” Respondents who had gambled one or more times during their lifetime were assessed by using the 3-item National Opinion Research Center Diagnostic Screen—Loss of Control, Lying, and Preoccupation Screen (NODS-CLiP) (Toce-Gerstein, Gerstein, & Volberg, 2009; Volberg, Munck, & Petry, 2011). Derived from the NODS (Gerstein, Volberg, Harwood, & Christiansen, 1999), a 17-item measure based on DSM-IV criteria for pathological gambling, the NODS-CLiP comprises 3 NODS items that best identified problem gambling across 8 separate community surveys. Respondents who endorsed one or more items on the screen were considered to screen positive for problematic gambling. By using this cut-off,

the NODS-CLiP has been found to have good sensitivity (0.80–0.99) and specificity (0.82–0.94) (Toce-Gerstein et al., 2009; Volberg et al., 2011).

**2.3.2. Demographic and behavioral questionnaires**—Sociodemographic variables included sex, education, marital status, age, annual household income, employment status, homelessness status, military status, and lifetime military deployment to a combat zone. Behavioral variables included depression symptoms (Patient Health Questionnaire-9 [PHQ-9]) (Fine et al., 2013; Kroenke, Spitzer, & Williams, 2001), smoking status, alcohol use (Mini International Neuropsychiatric Interview [MINI]) (Lecrubier et al., 1997; Sheehan et al., 1998), legal and financial problems (Calabrese et al., 2011), perceived general health, pain, and impulsivity (Barratt Impulsiveness Scale-Brief [BIS-Brief]) (Steinberg, Sharp, Stanford, & Tharp, 2013).

#### 2.4. Analytic strategy

The extent to which problem gambling differed across demographic, behavioral, and mental health characteristics was assessed. Chi-square t-distribution test statistics were calculated to test for significant differences across relevant categorical strata and continuous variables, respectively.  $P$ -values  $< .05$  were considered statistically significant. Unadjusted odds ratios (OR), adjusted odds ratios (aORs), and 95% confidence intervals (CI) were computed for the association between potential problematic gambling and behavioral characteristics. All models were adjusted for age, sex, education, and marital status. SAS (SAS Institute, Cary, NC) Enterprise Guide version 7.11 was used to complete all analyses.

### 3. Results

#### 3.1. Descriptive analyses

This sample of 1553 current ( $n = 911$  [59%]) and former ( $n = 642$  [41%]) Ohio Army National Guard members was predominantly male (85%), had at least some college education (87%), were employed full-time (79%), and had deployed one or more times to a conflict area (79%) (not shown).

#### 3.2. Problem gambling

About half (50%) reported gambling at least once during the past year, with 36% gambling  $< 10$  times and 13% gambling one or more times per week. Lifetime potential problematic gambling was reported by 8% of participants (Table 1). Positive screening for potential problematic gambling increased with past-year gambling behaviors, from 18% among soldiers gambling at least once per week to 44% among those gambling four or more times per week (not shown).

#### 3.3. Correlates of problem gambling

Demographic correlates of screening positive for lifetime potential problematic gambling included being male ( $P = .02$ ), currently unmarried ( $P = .003$ ), or having left the Guard or retired ( $P = .007$ ) (Table 2).

After adjusting for demographics (i.e., age, gender, education, marital status), respondents screening positive for potential problematic gambling were 2.6 times (95% CI = 1.5, 4.8) more likely to screen positive for minor depression than those with minimal symptoms, 3.6 times (95% CI = 2.1, 6.4) more likely to be dependent on alcohol than those who did not use it, and 1.4 times (95% CI = 1.1, 1.7) more likely to report increased pain than those who did not (Table 3). Finally, respondents screening positive for potential problematic gambling were 1.9 times (95% CI = 1.0, 3.5) more likely to report legal problems than those who did not.

#### 4. Discussion

This study is the first to examine the burden of problem gambling among a cohort of military personnel in which 13% reported past-year frequent gambling (at least once per week) and 8% screened positive for lifetime potential problem gambling. Lifetime potential problem gambling was significantly associated with two demographic factors (i.e., male gender, being unmarried) and four behavioral characteristics (i.e., depression, alcohol dependence, legal problems, increased pain). Although these correlates are consistent with those observed in studies of gambling nonmilitary populations (Dowling et al., 2017; Langham et al., 2016; Lesieur et al., 1991; National Gambling Impact Study Commission, 1999; Pulford et al., 2009), the prevalence of problem gambling was nearly twice as great for military personnel in this cohort (8%) than among the general US population (5%) (Welte et al., 2015).

Problem gambling among men in both military (Steenbergh et al., 2008; Weis & Manos, 2007) and nonmilitary (Castren, Kontto, Alho, & Salonen, 2018; Dowling et al., 2017; Orford, Wardle, & Griffiths, 2013; Williams & Wood, 2004) populations has been shown, but this is the first study to show that it is higher among service members who have never been married or were previously married (Ekholm et al., 2014). It is possible that the additional time, availability of more discretionary income, loneliness, or disconnectedness may contribute to more problem gambling among this military population (because similar reasons have been found among the general population) (Castren et al., 2018; Dowling et al., 2017; Ekholm et al., 2014).

There is a body of literature to support that problem gambling is associated with alcohol abuse or dependence (Dowling et al., 2017; Steenbergh et al., 2008; Weis & Manos, 2007) legal issues and financial problems (Lesieur et al., 1991; National Gambling Impact Study Commission, 1999), and poor general health (National Gambling Impact Study Commission, 1999; Pulford et al., 2009), which are common among other addictive behaviors (Bond, Toumbourou, Thomas, Catalano, & Patton, 2005; Hemphill et al., 2011; Vitaro, Brendgen, Ladouceur, & Tremblay, 2001). Persons with less money may see gambling as a means to improve their financial position; however, we found that respondents with potential gambling problems had higher odds of legal issues, and it is unlikely that gambling will improve a person's economic well-being over time. Moreover, these findings highlight the need for prevention efforts that target multiple problem behaviors, not just problem gambling (Scholes-Balog, Hemphill, Toumbourou, & Dowling, 2015; Vitaro et al., 2001). Our findings showed a similar pattern among a military population with alcohol

dependence and legal issues, suggesting that service members entering treatment for an addictive behavior, such as alcohol dependence, may also benefit from screening for problem gambling.

Gambling disorder has only recently been included in substance abuse policies and guidance documents (United States Government Accountability Office, 2017). Routine screening for problem gambling may be a means to reduce barriers to mental health treatment among people reluctant to seek these services because of stigma or other issues (Hoge et al., 2004). Moreover, incorporating a gambling disorder screener into the intake and periodic assessments of persons seeking military mental health treatment may identify persons with comorbid problem gambling before they experience adverse outcomes (United States Government Accountability Office, 2017). It may be important to routinely screen and monitor military personnel for frequency of gambling behaviors as part of routine (e.g., sick call), periodic (e.g., PHA) and post-deployment (e.g., PDHA/PDHRA) health assessments because some service members may be missed as they do not actively seek mental health treatment.

Our study findings have four limitations common among epidemiologic surveys. First, gambling behaviors and problem gambling were self-reported and could be subject to recall bias or underreporting because of social desirability. However, recall of gambling frequencies that were of greatest interest in this study (e.g., past-month, past-week) may be less subject to this bias because of their temporal proximity. Moreover, although a bias against reporting embarrassing behavior (61) and the perception of psychiatric illness stigma is prevalent in the military (62), we compensated for this concern by assuring participants' confidentiality, both verbally and in writing, before volunteering for this study and by conducting all assessments by telephone using civilian interviewers and no military personnel. Second, we used a short, three-item screener for lifetime problem gambling. Although a previous investigation of problem gambling screeners found the three-item NODS-CLiP to adequately detect both problem gambling and moderate-risk gambling, its ability to detect low-risk gambling was less than satisfactory (Volberg et al., 2011). Any such misclassification of low-risk gambling as no-risk gambling would lead to an underestimate of the true population prevalence of problem gambling. Third, as our study is cross-sectional, we are unable to make any temporal claims about the associations between any demographic or psychosocial characteristics and problem gambling. Longitudinal research is needed to examine both the course of problem gambling and the direction of association. An analysis over time of this cohort and the planned capture of additional gambling measures may enable a more robust assessment of the relationship between problem gambling and behavioral characteristics. Finally, our findings may not be generalizable to other reservists (e.g., Navy Reserve) from other states or active-duty military personnel. Although the OHARNG population is similar in several key demographic and social factors to the U.S. population (e.g., proportion of high school graduates, per-capita income) (US Census Bureau, 2013) and National Guard population (e.g., age, sex, rank) (Department of Defense, 2012), our study sample had a higher proportion of respondents who were divorced, separated, or widowed, a group shown to be at increased risk for mood or anxiety disorder. The higher number of divorced, separated, and widowed respondents may have resulted in increased incidence rates.

## 5. Conclusions

In summary, we found that lifetime potential problematic gambling was associated with negative psychological and behavioral outcomes among a large cohort of current and former Army National Guard members. Specifically, lifetime potential problematic gambling was significantly more likely among those reporting minor depression, alcohol dependence, legal problems, or increased physical pain. Problematic gambling was also significantly more common among males, unmarried persons, and soldiers who had separated or retired from the Guard. Although personal gambling is a relatively low-prevalence disorder among the general population, it is becoming a substantial concern for population health, the preoccupation it brings, its financial hardship, and its association with other psychiatric disorders and substance use. (United States Government Accountability Office, 2017). Given the higher prevalence of frequent gambling among military and veteran populations, routine screening of gambling frequency and problem gambling may be needed so that they can live the healthiest lives possible.

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## References

- Abdollahnejad MR, Delfabbro P, & Denson L (2014). The clustering of psychiatric disorders in high-risk gambling populations. *Journal of Gambling Studies*, 30, 933–947. [PubMed: 23774993]
- Black DW, & Moyer T (1999). Study finds other psychiatric ills accompany pathological gambling. *Outcomes & Accountability Alert*, 4, 4.
- Black SA, Galloway MS, Bell MR, & Ritchie EC (2011). Prevalence and risk factors associated with suicides of Army soldiers 2001–2009. *Military Psychology*, 23, 433–451.
- Bond L, Toumbourou JW, Thomas L, Catalano RF, & Patton G (2005). Individual, family, school, and community risk and protective factors for depressive symptoms in adolescents: A comparison of risk profiles for substance use and depressive symptoms. *Prevention Science*, 6 73–88. [PubMed: 15889623]
- Calabrese JR, Prescott M, Tamburrino M, Liberzon I, Slembariski R, Goldmann E, et al. (2011). PTSD comorbidity and suicidal ideation associated with PTSD within the Ohio Army National Guard. *The Journal of Clinical Psychiatry*, 72, 1072–1078. [PubMed: 21899816]
- Castren S, Kontto J, Alho H, & Salonen AH (2018). The relationship between gambling expenditure, socio-demographics, health-related correlates and gambling behaviour—a cross-sectional population-based survey in Finland. *Addiction*, 113, 91–106. [PubMed: 28667828]
- Department of Defense (2011). *Demographics: Profile of the Military Community*. (Accessed on March 25, 2019) [https://download.militaryonesource.mil/12038/MOS/Reports/2011\\_Demographics\\_Report.pdf](https://download.militaryonesource.mil/12038/MOS/Reports/2011_Demographics_Report.pdf).
- Department of Defense (2016). *Demographics Profile of the Military Community*. (Accessed on March 25, 2019) <http://download.militaryonesource.mil/12038/MOS/Reports/2016-Demographics-Report.pdf>.

- Dowling NA, Merkouris SS, Greenwood CJ, Oldenhof E, Toumbourou JW, & Youssef GJ (2017). Early risk and protective factors for problem gambling: A systematic review and meta-analysis of longitudinal studies. *Clinical Psychology Review*, 51, 109–124. [PubMed: 27855334]
- Ekhholm O, Eiberg S, Davidsen M, Holst M, Larsen CV, & Juel K (2014). The prevalence of problem gambling in Denmark in 2005 and 2010: A sociodemographic and socioeconomic characterization. *Journal of Gambling Studies*, 30, 1–10. [PubMed: 23138984]
- Fine TH, Contractor AA, Tamburrino M, Elhai JD, Prescott MR, Cohen GH, et al. (2013). Validation of the telephone-administered PHQ-9 against the in-person administered SCID-I major depression module. *Journal of Affective Disorders*, 150, 1001–1007. [PubMed: 23747208]
- Galloway MS, Millikan AM, & Bell MR (2011). The association between deployment-related posttraumatic growth among U.S. Army soldiers and negative behavioral health conditions. *Journal of Clinical Psychology*, 67, 1151–1160. [PubMed: 22042556]
- Gerstein DR, Volberg R, Harwood H, & Christiansen EM (1999). *Gambling impact and behavior study: Report to the National Gambling Impact Study Commission*. Chicago, IL: National Opinion Research Center at the University of Chicago.
- Goodie AS (2005). The role of perceived control and overconfidence in pathological gambling. *Journal of Gambling Studies*, 21, 481–502. [PubMed: 16311878]
- Hemphill SA, Heerde JA, Herrenkohl TI, Patton GC, Toumbourou JW, & Catalano RF (2011). Risk and protective factors for adolescent substance use in Washington state, the United States and Victoria. *Australia: a longitudinal study*, *J Adolesc Health*, 49, 312–320. [PubMed: 21856525]
- Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, & Koffman RL (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *The New England Journal of Medicine*, 351, 13–22. [PubMed: 15229303]
- Institute of Medicine, Substance Use Disorders in the U.S. (2013). *Armed Forces*. Washington, D.C.: National Academies Press.
- Kessler RC, Heeringa SG, Stein MB, Colpe LJ, Fullerton CS, Hwang I, et al. (2014). Thirty-day prevalence of DSM-IV mental disorders among nondeployed soldiers in the US Army: Results from the Army study to assess risk and resilience in Servicemembers (Army STARRS). *JAMA Psychiatry*, 71, 504–513. [PubMed: 24590120]
- Kessler RC, Hwang I, LaBrie R, Petukhova M, Sampson NA, Winters KC, et al. (2008). DSM-IV pathological gambling in the National Comorbidity Survey Replication. *Psychological Medicine*, 38, 1351–1360. [PubMed: 18257941]
- Killgore WD, Cotting DI, Thomas JL, Cox AL, McGurk D, Vo AH, et al. (2008). Post-combat invincibility: Violent combat experiences are associated with increased risk-taking propensity following deployment. *Journal of Psychiatric Research*, 42, 1112–1121. [PubMed: 18291419]
- Kroenke K, Spitzer RL, & Williams JB (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16, 606–613. [PubMed: 11556941]
- LaBrie RA, Shaffer HJ, LaPlante DA, & Wechsler H (2003). Correlates of college student gambling in the United States. *Journal of American College Health*, 52, 53–62. [PubMed: 14765759]
- Langham E, Thorne H, Browne M, Donaldson P, Rose J, & Rockloff M (2016). Understanding gambling related harm: A proposed definition, conceptual framework, and taxonomy of harms. *BMC Public Health*, 16, 80. [PubMed: 26818137]
- Lecrubier Y, Sheehan DV, Weiller E, Amorim P, Bonora I, Harnett SK, et al. (1997). The MINI international neuropsychiatric interview (MINI). A short diagnostic structured interview: reliability and validity according to the CIDI. *European Psychiatry*, 12, 224–231.
- Lesieur HR, Cross J, Frank M, Welch M, White CM, Rubenstein G, et al. (1991). Gambling and pathological gambling among university students. *Addictive Behaviors*, 16, 517–527. [PubMed: 1801575]
- Lorains FK, Cowlshaw S, & Thomas SA (2011). Prevalence of comorbid disorders in problem and pathological gambling: Systematic review and meta-analysis of population surveys. *Addiction*, 106, 490–498. [PubMed: 21210880]
- National Gambling Impact Study Commission (1999). *Final Report*, Washington, D.C.



- Orford J, Wardle H, & Griffiths M (2013). What proportion of gambling is problem gambling? Estimates from the 2010 British gambling prevalence survey. *International Gambling Studies*, 13, 4–18.
- Pulford J, Bellringer M, Abbott M, Clarke D, Hodgins D, & Williams J (2009). Reasons for seeking help for a gambling problem: The experiences of gamblers who have sought specialist assistance and the perceptions of those who have not. *Journal of Gambling Studies*, 25, 19–32. [PubMed: 19050996]
- Scholes-Balog KE, Hemphill SA, Toumbourou JW, & Dowling NA (2015). Problem gambling and internalising symptoms: A longitudinal analysis of common and specific social environmental protective factors. *Addictive Behaviors*, 46, 86–93. [PubMed: 25827336]
- Shaffer HJ, Hall MN, & Vander BJ (1999). Estimating the prevalence of disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health*, 89, 1369–1376. [PubMed: 10474555]
- Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry*, 59(Suppl. 20) 22–33;quiz 34–57.
- Steenbergh TA, Whelan JP, Meyers AW, Klesges RC, & DeBon M (2008). Gambling and health risk-taking behavior in a military sample. *Military Medicine*, 173, 452–459. [PubMed: 18543566]
- Steinberg L, Sharp C, Stanford MS, & Tharp AT (2013). New tricks for an old measure: The development of the Barratt impulsiveness scale-brief (BIS-brief). *Psychological Assessment*, 25, 216–226. [PubMed: 23148649]
- Toce-Gerstein M, Gerstein DR, & Volberg RA (2009). The NODS-CLiP: A rapid screen for adult pathological and problem gambling. *Journal of Gambling Studies*, 25, 541–555. [PubMed: 19603259]
- United States Government Accountability Office (2017). *Military Personnel DOD and the Coast Guard need to screen for gambling disorder addiction and updated guidance*, Washington, D.C.
- US Census Bureau (2013). *State and county quick facts*. Washington, DC: United States Census Bureau.
- Vitaro F, Brendgen M, Ladouceur R, & Tremblay RE (2001). Gambling, de-linquency, and drug use during adolescence: Mutual influences and common risk factors. *Journal of Gambling Studies*, 17, 171–190. [PubMed: 11761603]
- Volberg RA, Munck IM, & Petry NM (2011). A quick and simple screening method for pathological and problem gamblers in addiction programs and practices. *The American Journal on Addictions*, 20, 220–227. [PubMed: 21477050]
- Weis DR, & Manos GH (2007). Prevalence and epidemiology of pathological gambling at naval medical center Portsmouth psychiatry clinic. *Military Medicine*, 172, 782–786. [PubMed: 17691696]
- Welte JW, Barnes GM, Tidwell MC, Hoffman JH, & Wieczorek WF (2015). Gambling and problem gambling in the United States: Changes between 1999 and 2013. *Journal of Gambling Studies*, 31, 695–715. [PubMed: 24880744]
- Williams RJ, & Wood R (2004). The proportion of gaming revenue derived from problem gamblers: Examining the issues in a Canadian context. *Analyses of Social Issues and Public Policy*, 4, 33–45.
- Zimmerman M, Chelminski I, & Young D (2006). Prevalence and diagnostic correlates of DSM-IV pathological gambling in psychiatric outpatients. *Journal of Gambling Studies*, 22, 255–262. [PubMed: 16816991]

**HIGHLIGHTS**

- Burden of problem gambling and its correlates were investigated in a US military cohort.
- Military members reported frequent gambling at nearly twice the US prevalence.
- Problem gambling was correlated with depression, alcohol use and legal problems.
- Routine screening for problem gambling may be needed for military populations.

**Table 1**

Prevalence of reported gambling behaviors among Ohio Army National Guard members, 2015–2016 ( $N=1553$ ).

	n	%
<b>Total</b>	<b>1553</b>	<b>100.0</b>
Gambling History:		
Past 12 Months <sup>a</sup>		
Not at all	776	50.0
< 10 times	565	36.4
1–4 times month/1 time per week	146	9.4
2–3 times per week	35	2.3
4 + times per week	17	1.1
Lifetime <sup>b</sup>		
No	289	18.6
Yes	1246	80.2
Problematic Gambling Behaviors (Lifetime):		
Potential problematic gambler <sup>c</sup>		
No	1424	91.7
Yes	119	7.7
Spent a lot of time thinking about gambling		
No	1487	95.8
Yes	59	3.8
Tried to control gambling		
No	1474	94.9
Yes	70	4.5
Lied to family or friends about gambling		
No	1501	96.7
Yes	46	3.0

<sup>a</sup>In the past 12 months, how often have you bet money or gambled in any way?

<sup>b</sup>Thinking about your entire lifetime, have you ever bet money or gambled in any way?

<sup>c</sup>NODS-CLiP Short Problem Gambling Screen - Classified as “Potential Problematic Gambler” (i.e., further assessment is advised) if answered “Yes” to at least 1 of the 3 questions.

**Table 2**Demographic and military characteristics stratified by potential problem gambling ( $N= 1543$ ).

	Potential Problematic Gambler <sup>a</sup>				Chi-Square <i>P</i>
	Yes		No		
	n	%	n	%	
Total	119	7.7	1424	91.7	
Sex					0.02
Men	111	93.3	1223	85.9	
Women	8	6.7	201	14.1	
Education <sup>b</sup>					0.38
High School	11	9.2	190	13.3	
Some college	51	42.9	550	38.6	
College degree	57	47.9	684	48	
Marital status <sup>c</sup>					0.003
Married or living with partner	62	52.1	950	66.7	
Previously married	22	18.5	154	10.8	
Never married	35	29.4	319	22.4	
Age (years)					0.16
18–24	9	7.6	148	10.4	
25–34	46	38.7	631	44.3	
35–44	35	29.4	300	21.1	
45 +	29	24.4	344	24.2	
mean(standard deviation)	37.1 (10.1)		36.1 (10.5)		
Annual household income					0.2
< \$40,000	35	29.4	318	22.3	
\$40,000–\$80,000	46	38.7	572	40.2	
> \$80,000	38	31.9	525	36.9	
Employment status					0.3
Full-time	88	74.0	1128	79.2	
Part-time	19	16.0	158	11.1	
Unemployed	9	7.6	87	6.1	
Other	3	2.5	51	3.6	
Homeless					0.4
Yes	3	2.5	21	1.5	
Guardsman					0.007
Current	56	47.1	852	59.8	
Former	63	52.9	572	40.2	
Previously deployed					0.62
Yes	93	78.2	1084	76.1	

<sup>a</sup>NODS-CLiP Short Problem Gambling Screen - Yes to at least 1 of 3 questions below (further assessment is advised).

<sup>b</sup>Education – High School (some high school, GED equivalency, high school graduate, technical training); some college (including Associates Degree); college degree (college graduate, graduate work or degree).

<sup>c</sup>Marital status - Married or living with partner; previously married (divorced, separated, widowed); never married.

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**Table 3**

Adjusted<sup>a</sup> odds ratios (aOR) for the association between individual behavioral characteristics and potential problematic gambling<sup>b</sup> (N = 1543).

	Potential Problematic Gambler		aOR <sup>a</sup>	95% CI
	Yes	No		
	n	n		
Total	117	1424		
Depression <sup>c</sup>				
Minimal symptoms	88	1243	1.00	
Minor depression	20	91	2.64	(1.46, 4.78)
Major depression, moderate/severe	8	57	2.07	(0.93, 4.57)
Major depression, severe	3	33	1.45	(0.43, 4.93)
Current smoker <sup>d</sup>				
No	94	1179	1.00	
Yes	19	192	1.29	(0.75, 2.21)
Alcohol use <sup>e</sup>				
None/normal	87	1238	1.00	
Abuse	10	111	1.23	(0.60, 2.55)
Dependence	22	75	3.64	(2.08, 6.38)
Legal problems (in past year) <sup>f</sup>				
No	104	1325	1.00	
Yes	15	98	1.90	(1.04, 3.46)
Financial problems (in past year) <sup>g</sup>				
No	98	1259	1.00	
Yes	21	165	1.66	(0.98, 2.82)
	<u>mean</u>	<u>mean</u>		
General health <sup>h</sup>	2.3	2.5	1.23	(1.00, 1.52)
Bodily pain <sup>i</sup>	2.0	2.2	1.39	(1.11, 1.72)
Impact of pain <sup>j</sup>	1.7	2.2	1.31	(1.09, 1.57)
Impulsivity <sup>k</sup>	19.5	19.6	0.97	(0.90, 1.05)

<sup>a</sup>The association between each individual characteristic and problematic gambling was adjusted for age, sex, education, and marital status.

<sup>b</sup>NODS-CLiP Short Problem Gambling Screen - Yes to at least 1 of 3 questions (further assessment is advised).

<sup>c</sup>Depression (PHQ-9 cut-point thresholds: minimal symptoms [5–9]; minor depression, dysthymia, major depression-mild [10–14]; major depression-moderately severe [15–10]; major depression-severe [ > 20]).

<sup>d</sup>Current smoker (smoked cigarettes every day in the past 12 months or used e-cigarettes every day in the past 30 days).

<sup>e</sup>Alcohol use (DSM-IV criteria for alcohol abuse or alcohol dependence [self-reported]).

<sup>f</sup> Experienced stressful legal problems (e.g., being sued or suing someone else).

<sup>g</sup> Had serious financial problems (e.g., filed for bankruptcy).

<sup>h</sup> General health self-reported on Likert scale from excellent (Shaffer et al., 1999) to poor (Institute of Medicine, Substance Use Disorders in the U.S., 2013).

<sup>i</sup> Bodily pain self-reported in the past 4 weeks from none (Shaffer et al., 1999) to very severe (Institute of Medicine, Substance Use Disorders in the U.S., 2013).

<sup>j</sup> Extent to which pain interfered with work in the past 4 weeks from not at all (Shaffer et al., 1999) to extremely (Institute of Medicine, Substance Use Disorders in the U.S., 2013).

<sup>k</sup> BIS-Brief (summary score).

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