Screening for problem gambling within mental health services: A comparison of the classification accuracy of brief instruments

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Declaration of interests

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Abstract

Background and aims: Despite the over-representation of people with gambling problems in mental health populations, there is limited information available to guide the selection of brief screening instruments within mental health services. The primary aim was ~~therefore~~ to compare the classification accuracy of nine brief problem gambling screening instruments (2-5 items) with a reference standard among patients accessing mental health services.

Design: The classification accuracy of nine brief screening instruments was compared with multiple cut-off scores on a reference standard.

Setting: Eight mental health services in Victoria, Australia.

Participants: 837 patients were consecutively recruited between June 2015 and January 2016.

Measurements: The brief screening instruments were the Lie/Bet Questionnaire, Brief Problem Gambling Screen [BPGS] [2-5-item versions], NODS-CLiP, NODS-CLiP2, Brief Biosocial Gambling Screen [BBGS], and NODS-PERC. The Problem Gambling Severity Index (PGSI) was the reference standard.

Findings: The 5-item BPGS was the only instrument displaying satisfactory classification accuracy in detecting any level of gambling problem (low-risk, moderate-risk, or problem gambling) [sensitivity=0.803, specificity=0.982, diagnostic efficiency=0.943]. Several shorter instruments adequately detected both problem and moderate-risk, but not low-risk, gambling: two 3-item instruments (NODS-CLiP, 3-item BPGS) and two 4-item instruments (NODS-PERC, 4-item BPGS) [sensitivity=0.854-0.966, specificity=0.901-0.954, diagnostic efficiency=0.908-0.941]. The 4-item instruments, however, did not provide any considerable advantage over the 3-item instruments. The very brief (2-item) instruments (Lie/Bet and 2-item BPGS) similarly adequately detected problem gambling [sensitivity=0.811-0.868, specificity=0.938-0.943, diagnostic efficiency=0.933-0.934], but not moderate-risk or low-risk gambling.

Conclusions: The optimal brief screening instrument for mental health services wanting to screen for any level of gambling problem is the 5-item Brief Problem Gambling Screen (BPGS). Services wanting to employ a shorter instrument or to screen only for more severe gambling problems (moderate-risk/problem gambling) can employ the NODS-CLiP or the 3-item BPGS. Services that are only able to accommodate a very brief instrument can employ the Lie/Bet Questionnaire or the 2-item BPGS.

Key words (6-10): gambling, problem gambling, mental health, psychiatric, screening, services, classification accuracy, sensitivity, specificity, diagnostic accuracy

Introduction

Despite considerable related harms [1], problem gambling is associated with low rates of treatment-seeking [2,3]. Community-based mental health services are in a good position to enhance the identification and appropriate management of people with gambling problems as they are highly accessible services for at-risk individuals in which referral or generalist first level interventions can occur [4,5]. Problem gambling has been consistently associated with a range of co-morbid mental health disorders, including personality disorders, mood disorders, and alcohol and other drug use disorders [6-8]. Moreover, there is growing evidence to suggest that people with gambling problems are over-represented within mental health populations, with rates of lifetime or current problem gambling (including pathological gambling) ranging from 0.9 to 22.8% across various mental health populations [9-21]. The presence of problem gambling complicates the clinical profile of mental health patients, as it is associated with more severe psychiatric symptoms, alcohol and drug use problems, interpersonal problems, physical health difficulties, cognitive impairment, impulsivity, suicidality, quality of life impairment, social functioning difficulties, and financial problems [12-16,18,22-24]. Moreover, there is evidence that problem gambling precedes and predicts the onset of some mental health conditions [25-30]. Problem gambling therefore has the potential to compromise engagement, management plans and mental health outcomes, particularly if it goes undetected and untreated [4,25].

While these findings highlight the importance of routinely screening for problem gambling within mental health settings, there is emerging evidence to suggest that there are low rates of screening by clinicians within these services [31,32]. Routine screening has likely been hindered by the relatively slow development of brief screening instruments that are easy to use, have short administration times, are easily scored, and require minimal training [4,33-35]. However, since 2010, several brief instruments screening for lifetime or current problem gambling in population or clinical samples have been available, most of which were derived from DSM-IV criteria and have been developed/validated in North American adult samples.

There is, however, limited evidence regarding the validity of these brief instruments within mental health service settings. The selection of a screening instrument is generally determined by instrument classification accuracy within the relevant setting. Because clinical settings are generally associated with high base rates of problem gambling and provide opportunities for further assessment, the aim of most clinical settings is to capture as many problem gamblers as possible (high sensitivity), even at the expense of including relatively large numbers of non-problem gamblers (low positive predictive values) [35-37]. However, instrument efficiency in the face of the current climate of fiscal restraint present in many community mental health centres, as well as the number of items or duration of administration, may also be important [38]. The primary aim of this study was to compare the classification accuracy of multiple brief instruments (2-5 items) across problem gambling severity thresholds in the patients of mental health services. A secondary aim was to explore the degree to which the accuracy of these instruments are invariant across psychiatric sub-populations [39,40]. This study adhered to the STARD checklist for reporting diagnostic accuracy studies [41].

Method

Participants and procedure

The sample comprised 837 consecutively recruited participants from eight adult and youth mental health services (12 individual sites) in Victoria, Australia, between June 2015 and January 2016 (Table 1). The final sample size was pragmatically determined by accrual time related to the number of sites and recruitment per site [42]. The services included four state-funded (public) adult community mental health services (inner metropolitan, outer metropolitan and regional sites), two private adult mental health services, a large state-wide mental health community support service offering outreach rehabilitation and support, and one youth mental health service (18-25 years). This project was approved by the Eastern Health Human Research Ethics Committee (02-2015) and additional site approval granted by Alfred Hospital Ethics Committee (245/15), Albury Wodonga Human Research Ethics Committee (411/15/6), and Melbourne Health Office of Research (2015.158).

Ten trained researchers with undergraduate psychology degrees, who were stationed in the waiting rooms of mental health services during clinic opening hours, directly invited patients to participate. The data collection period varied at each site according to the number of clinicians and frequency of patient visits, but was generally 1-2 weeks. The researchers worked closely with clinical and administrative staff so that they did not approach acutely unwell patients. After providing informed consent, most participants completed an online survey using an electronic tablet and completed their surveys prior to their appointment. This methodology was adapted in the community outreach support service, whereby support workers trained in the administration of the survey invited patients to complete the survey on electronic tablets during home visits. All participants were offered a \$10 store voucher for their time.

Patients were eligible for inclusion to the study if they were receiving treatment from a participating mental health service during the data collection period, were not acutely unwell, and were over the age of 18 years. Overall, 1528 patients were eligible to participate (attended the service when researchers were present) and 1363 were approached to participate. Of the 855 participants agreeing to participate, 14 withdrew prior to survey completion and four under the age of 18 years were excluded. The final sample represented 55.0% of all patients attending the participating mental health services during the data collection period. Further information on participants and procedure is provided elsewhere [31].

[Insert Table 1]

Measures

The classification accuracy of nine brief screening instruments (2-5 items) were compared to the Problem Gambling Severity Index (PGSI) [43] as a reference standard. On the PGSI, respondents indicated how often each item applied to them in the previous 12 months on a four-point scale: (0) Never; (1) Sometimes; (2) Most of the time; and (3) Almost always. Scores can be used to classify individuals into non-problem (score of 0), low-risk (scores of 1-2), moderate-risk (scores of 3-7), or

problem (scores of 8-27) gambling categories. These instruments were administered only to participants who reported participation on any gambling activity in the previous 12 months.

The PGSI was selected as the reference standard in preference to a diagnostic interview and/or questionnaire measuring the diagnostic criteria for gambling disorder [40]. The use of a diagnostic interview would have likely reduced the response rate and sample size due to increased burden and decreased anonymity as it only results in superior diagnostic accuracy when clinicians are required to follow explicit and rigorous assessment procedures that minimise subjectivity [44,45]. Moreover, numerous different sets of self-report diagnostic questionnaires exist, each with different question wording and with differing numbers of questions per criterion [46-49].

In contrast, the PGSI is a standardised instrument that is the gold standard epidemiological tool for estimating the prevalence of problem gambling internationally [36,37,50]; and has been adopted as the preferred measurement tool for evaluating problem gambling severity in Australian population-level research [41], with all Australian surveys conducted since 2001 employing the PGSI to estimate the prevalence of problem gambling [51]. It is also increasingly being employed to measure the severity of gambling problems in Australian clinical settings [50]. There is evidence that the PGSI is psychometrically stronger than similar screening tools including the South Oaks Gambling Screen (SOGS), the Victorian Gambling Screen and diagnostic criteria-based scales [52-54]. The PGSI displays good internal consistency, test-retest reliability, unidimensionality, and item-response characteristics [36,37,43,54-58]. There is also consistent evidence that the PGSI displays good concurrent validity with other problem gambling measures [43] and diagnostic interviews or questionnaires [37,43,54,59], and criterion validity with measures of gambling involvement [37].

Underpinning the development of the PGSI is a definition of problem gambling in which there are negative consequences for the gambler, others in his or her social network, or the community [43]. The PGSI was specifically designed and validated as a quantitative index of problem gambling severity within the general population rather than disordered gambling. The combination of item diversity (gambling behaviour and negative consequences) and ordinal scaling allows the PGSI to identify at-risk gambling that that may be overlooked by dichotomous-scored, diagnostically-focused measures [43,55,57]. Ferris and Wynne [43], therefore, expected that the most severe end of the problem gambling continuum of the PGSI would be congruent with clinically derived measures like the SOGS and diagnostic measures, but that there would be less convergence in the middle range. Subsequent evidence suggests that while the PGSI displays modest to strong classification accuracy compared to diagnostic interviews across multiple cut-off scores, 5 appears to be the optimal cut-off score [36,37]. Moreover, Currie, Hodgins [55] found that although there was strong evidence for the validity of the non-problem and problem gambling categories, the low- and moderate-risk categories displayed relatively poor discriminant validity [54], which was considerably improved by a simple scoring modification in which moderate-risk gambling is defined by scores between 5 and 7.

The brief screening instruments included the Lie/Bet Questionnaire [60]; Brief Problem Gambling Screen (BPGS) [2-5-item versions] [61]; National Opinion Research Center Diagnostic Screen – Loss of Control, Lying and Preoccupation Screen (NODS-CLiP) [34]; Brief Biosocial Gambling Screen (BBGS)[62]; NODS-CLiP2 [35,61]; and National Opinion Research Center Diagnostic Screen – Preoccupation, Escape, Chasing and Risked Relationships screen (NODS-PERC) [35] (Table 2). The

PGSI Short Form [63] was also evaluated; however, this is included in the supplementary material given that the PGSI Short Form items are a subset of those from the reference standard. Instruments with lifetime timeframes were converted to 12 month timeframes to maintain timeframe consistency and because current timeframes are more likely to adequately discriminate between current problem gambling and remission or recovery [33,35].

[Insert Table 2]

Data analysis

Classification accuracy coefficients for each brief screening instrument using the PGSI as the reference standard were computed (Table 3). Measures of test accuracy included sensitivity, specificity, false positive rate, and false negative rate [39,40,64]. Estimates influenced by the problem gambling prevalence in the population being tested included positive predictive values, negative predictive values, and diagnostic efficiency [39,40,64]. The criterion for the selection of an appropriate brief screening instrument in this study was satisfactory classification accuracy, as indicated by sensitivity, specificity, and overall diagnostic accuracies equal to or greater than 0.80 [65,66]. For these estimates, 95% confidence intervals were also presented.

[Insert Table 3]

Past year non-gamblers were imputed with a score of zero on both the PGSI and the brief screening instruments so that the classification accuracy coefficients were based on the entire sample of patients attending the mental health services. This decision was made because the PGSI was designed to be administered to past year gamblers [43], imputing zeros for non-gamblers is standard practice in prevalence estimations of problem gambling [67-73], and very few past year non-gamblers (0.4%) positively endorse any PGSI item [74]. Classification accuracy coefficients were also computed for the sample of participants who had gambled in the previous 12 months and therefore completed the measures (see supplementary material). As expected, when the classification accuracy coefficients were computed using this sample, the specificity, negative predictive value, false positive rate and diagnostic efficiency were slightly lower than those for the entire sample, but the sensitivity, positive predictive value, and false negative rate were unchanged.

Because mental health services may have different needs in relation to the severity of gambling problem they wish to identify, multiple scores on the PGSI were employed as the reference standard against which the brief screening instruments were compared: (1) problem gambling cut-off score (PGSI scores ≥ 8); (2) revised moderate-risk gambling cut-off score (PGSI scores ≥ 5) [55]; (3) original moderate-risk gambling cut-off score (PGSI scores ≥ 3); and (4) low-risk gambling cut-off score (PGSI scores ≥ 1). See supplementary material for a cross-tabulation of the results of each brief screening instrument by the results of each PGSI scoring reference standard. The effect of site was non-significant in almost all fixed-effect logistic regressions in which each brief screening instrument predicted each PGSI cut-off score, controlling for site. The calculation of classification accuracy coefficients was repeated for subgroups of participants based on their self-reported current psychiatric diagnosis. Although there was considerable overlap between the self-reported current psychiatric diagnoses, there was a sufficient number of participants reporting a psychotic disorder

only (n=131) and major depressive disorder only (n=78) on which to conduct these sub-group analyses (see supplementary material).

Results

Classification accuracy using PGSI problem gambling as the reference standard

Table 4 displays the classification accuracy coefficients of the instruments using the PGSI problem gambling cut-off score (PGSI scores ≥ 8). All instruments met the criterion for satisfactory classification accuracy compared to this cut-off score. Based on the prevalence rate of 6.3% (proportion of participants with PGSI scores ≥ 8), between one-third and one-half (31.5%-50.0%) of patients positively screened with these instruments would be confirmed as true problem gamblers. For participants with major depression only, seven instruments (NODS-CLiP, BBGS, 3-item BPGS, NODS-PERC, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) displayed satisfactory classification accuracy. For participants with psychosis only, six instruments (Lie/Bet, 2-item BPGS, NODS-CLiP, BBGS, 3-item BPGS, and NODS-PERC) displayed satisfactory classification accuracy.

[Insert Table 4]

Classification accuracy using PGSI revised moderate-risk gambling as the reference standard

Table 5 displays the classification accuracy coefficients of the instruments using the PGSI revised moderate-risk gambling cut-off score (PGSI scores ≥ 5). All instruments displayed adequate specificity and diagnostic efficiency, but only seven instruments (NODS-CLiP, BBGS, 3-item BPGS, NODS-PERC, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) displayed adequate sensitivity compared to this cut-off score. Based on the prevalence rate of 10.4% (proportion of participants with PGSI scores ≥ 5), just over one-half (50.9-58.7%) of patients positively screened with most of these instruments would be confirmed as true moderate-risk (revised)/problem gamblers; the exception was the BBGS which displayed a higher positive predictive value (74.5%). For participants with major depression only, seven instruments (NODS-CLiP, 3-item BPGS, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) displayed satisfactory classification accuracy. For participants with psychosis only, all instruments displayed satisfactory classification accuracy.

[Insert Table 5]

Classification accuracy using PGSI original moderate-risk gambling as the reference standard

Table 6 displays the classification accuracy coefficients of the instruments using the PGSI original moderate-risk gambling cut-off score (PGSI scores ≥ 3). All instruments displayed adequate specificity and diagnostic efficiency, but only six instruments (NODS-CLiP, 3-item BPGS, NODS-PERC, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) displayed adequate sensitivity compared to this cut-off score. Based on the prevalence rate of 14.7% (proportion of participants with PGSI scores ≥ 3), almost three quarters (68.5-76.1%) of patients positively screened with these instruments would be confirmed as true moderate-risk (original)/problem gamblers. For participants with major

depression only, seven instruments (NODS-CLiP, BBGS, 3-item BPGS, NODS-PERC, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) displayed satisfactory classification accuracy. For participants with psychosis only, six instruments (NODS-CLiP, 3-item BPGS, NODS-PERC, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) displayed satisfactory classification accuracy.

[Insert Table 6]

Classification accuracy using PGSI low-risk gambling as the reference standard

Table 7 displays the classification accuracy coefficients of the instruments using the PGSI low-risk gambling cut-off score (PGSI scores ≥ 1). All instruments displayed adequate specificity and diagnostic efficiency, but only the 5-item BPGS displayed adequate sensitivity compared to this cut-off score. Based on the prevalence rate of 21.9% (proportion of participants with PGSI scores ≥ 1), almost all (92.5%) patients positively screened with this instrument would be confirmed as true low-risk/moderate-risk/problem gamblers. For participants with major depression only, five instruments (NODS-CLiP, 3-item BPGS, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) displayed satisfactory classification accuracy. For participants with psychosis only, five instruments (3-item BPGS, NODS-PERC, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) displayed satisfactory classification accuracy.

[Insert Table 7]

Discussion

This study is the first to explore the classification accuracy of problem gambling screening instruments in patients attending mental health services. All instruments displayed satisfactory diagnostic efficiencies and specificities across all PGSI cut-off scores, but not all displayed adequate sensitivity across all cut-off scores. The 5-item BPGS was the only measure to display satisfactory sensitivity in detecting any level of gambling problem on the PGSI (i.e., problem, moderate-risk, *and* low-risk gambling) within mental health services; this instrument detected 80% of patients endorsing at least one PGSI item. Moreover, this instrument displayed the highest sensitivity in detecting moderate-risk and problem gamblers on the PGSI; it detected 100% of patients meeting the problem gambling cut-off score, 98% of patients scoring meeting the revised moderate-risk gambling cut-off score, and 94% of patients meeting the original moderate-risk gambling cut-off score. In addition to its high sensitivity, the positive predictive value displayed by the 5-item BPGS suggests that it is an efficient instrument in detecting patients reporting any level of gambling problem on the PGSI, as 93% of positively screened patients would be confirmed as true low-risk, moderate-risk, or problem gamblers. It is, however, a less efficient instrument in detecting higher risk gamblers only. While three-quarters (73%) of positively screened patients would be confirmed as true moderate-risk (original scoring) or problem gamblers and half (54%) would be confirmed as true moderate-risk (revised scoring) or problem gamblers, only one-third (33%) would be confirmed as true problem gamblers. Despite this lower efficiency for identifying higher risk gambling, the 5-item BPGS is clearly the optimal brief screening instrument for detecting gambling problems across the continuum of severity within mental health services. The identification of low- and moderate-risk gamblers is particularly important given recent findings that the majority of total burden of harm can be attributed to these lower risk categories due to their larger prevalence in the population [1].

Some mental health services, however, may require a briefer screening instrument [38] or only wish to detect patients displaying more severe gambling problems. In this study, several shorter brief screening instruments displayed satisfactory sensitivity in detecting both moderate-risk and problem, but not low-risk, gambling on the PGSI. These included two 3-item instruments (NODS-CLiP, 3-item BPGS) and two 4-item instruments (NODS-PERC, 4-item BPGS). These four instruments displayed very similar classification accuracy coefficients for the detection of moderate-risk (original and revised scoring) and/or problem gambling. The 4-item instruments did not, however, seem to provide any considerable advantage over the 3-item instruments. The NODS-CLiP and the 3-item BPGS detected 90 to 93% of patients meeting the original moderate-risk gambling cut-off score, 97% of patients meeting the revised moderate-risk gambling cut-off score, and 98 to 100% of patients meeting the problem gambling cut-off score. The high sensitivities of these instruments are, however, offset by lower positive predictive values, which were similar to those displayed by the 5-item BPGS. Although it has been argued that the aim of clinical settings should be to detect people with gambling problems, even at the expense of including relatively large numbers of those without problems [35], mental health services may prefer to select a more efficient screening instrument, such as the BBGS. It is important to note, however, that this instrument failed to display satisfactory sensitivity in detecting moderate-risk gamblers using the original scoring protocols.

Some mental health services may only be able to accommodate a very brief (2 item) screening instrument, particularly if it is to be incorporated into a routine screening protocol. The Lie/Bet and 2-item BPGS displayed similar classification accuracy coefficients in detecting problem gambling, but neither displayed satisfactory sensitivity in detecting low- or moderate-risk gamblers on the PGSI. These items accurately detected 81 to 87% of patients meeting the problem gambling cut-off score and 48 to 49% would be confirmed as true problem gamblers. While these 2-item screening instruments displayed satisfactory sensitivity in detecting problem gambling, their inability to satisfactorily detect moderate risk gamblers suggests that the NODS-CLiP or the 3-item BPGS should be preferentially used if the service can accommodate a slightly longer measure.

The outpatient services participating in this research were characterised by patients with a range of psychiatric diagnoses. Subgroup analyses revealed that five of the brief screening instruments (NODS-CLiP, 3-item BPGS, 4-item BPGS, NODS-CLiP2, and 5-item BPGS) met the criteria for satisfactory classification accuracy in detecting PGSI low-risk, moderate-risk, and problem gambling for participants with a diagnosis of major depression only. These measures displayed identical classification accuracy coefficients across PGSI cut-off scores, with the exception of the NODS-CLiP2, which tended to display slightly lower specificities and diagnostic efficiencies. Given that the longer instruments do not seem to convey any advantage over the shorter instruments, the NODS-CLiP and 3-item BPGS would appear to be the optimal screening instruments for this psychiatric subpopulation. For participants with a diagnosis of psychotic disorder only, two instruments (3-item BPGS and NODS-PERC) displayed satisfactory classification accuracy across all PGSI cut-off scores. Again, given that the 4-item NODS-PERC does not appear to convey much advantage over the shorter 3-item BPGS, the BPGS would appear to be the optimal screening instrument for this psychiatric subpopulation.

Routine screening within mental health services may enhance the identification of people with gambling problems. Most of the screening instruments also identified a considerable proportion of people without gambling problems, particularly when screening for problems at the higher end of the severity continuum. A positive screen on a brief screening instrument should therefore trigger a more comprehensive clinical assessment of diagnostic status and/or problem severity, followed by an appropriate intervention for problem gambling, either within the mental health service or by specialist gambling services [4,5]. Although a diverse range of self-help, psychological and pharmacological options are available for the treatment of problem gambling [75-77], there is very little evidence on which to base treatment recommendations for different subpopulations of problem gamblers based on their psychiatric comorbidity [78].

Study limitations include a slight overlap (one to two items) between the BPGS (3-5 item) instruments and the reference standard [33,40]. While removal of these items from the BPGS instruments resulted in enhanced performance for the 3- to 4-item versions, it deflated the classification accuracy of the 5-item version at the lower PGSI cut-off scores. This limitation, however, cannot be completely eliminated as almost all screening and assessment instruments have been derived from DSM-IV diagnostic criteria [33]. Secondly, the use of the PGSI as the reference standard in this study introduces an imperfect reference standard bias [64]. Future research could employ a diagnostic interview so long as explicit and rigorous clinician assessment procedures are employed to improve diagnostic accuracy [44,45]. Although it involves a selection bias toward overestimates of accuracy measures, an alternative methodology could be to compare one group known to have the disorder, such as treatment-seeking gamblers, to a second group without the disorder, such as the general population [40,64]. Thirdly, the imputation of scores of zero on the reference standard and the index tests for non-gamblers in this study may have inflated some classification accuracy coefficients (namely, specificity, negative predictive value, false positive rate and diagnostic efficiency). Future research should therefore administer the reference standard and screening instruments to the entire sample. Finally, no data were collected to support the representativeness of the sample of mental health patients who completed the survey.

There are also several caveats in terms of the generalisation of the study findings. First, the classification accuracy coefficients may not generalise to other mental health settings. Given evidence that differences in service characteristics, particularly problem gambling base rates, will influence screening instrument performance [33,79], mental health services should ideally monitor screening accuracy until there is an accumulation of classification accuracy evidence across a diverse range of purposes, settings, and populations [39]. Second, the conversion of several brief screening instruments from lifetime to 12-month timeframes (Lie/Bet, NODS-CLiP, NODS-PERC, and NODS-CLiP2) may also limit the generalisability of the findings to those of previous research and to the lifetime versions of these instruments.

Despite these limitations and caveats, the findings of this study revealed a number of brief screening instruments that could be readily adopted within mental health services to improve early identification of gambling-related problems across the continuum of severity. The optimal brief screening instruments appear to be the 5-item BPGS for mental health services wanting to screen for any level of gambling problem, the NODS-CLiP or the 3-item BPGS for services wanting to employ a shorter instrument or to screen only for more severe gambling problems, and either the Lie/Bet or

2-item BPGS for services that are only able to accommodate a very brief instrument. Despite these findings, routine screening for gambling problems by mental health professionals is unlikely to be fully embraced without organisational and system structures in place to support staff and facilitate treatment and/or referral [80].

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Table 1. Characteristics of the sample of patients attending mental health services

Sample characteristic	Proportion of total sample ^a (%)	Sample characteristic	Proportion of total sample ^a (%)
Gender (male)	50.9	Current psychiatric disorder diagnoses (self-reported)	
Age (mean, standard deviation)	38.7 (13.2)	Major depression	54.7
Country of birth (Australia)	77.8	Any anxiety disorder	48.3
Highest educational qualification		Psychotic disorder	31.1
University	26.9	Bipolar disorder	17.3
Technical college	21.6	Drug abuse or dependence	6.8
Secondary school (Year 12)	25.0	Borderline personality disorder	8.5
Less than secondary school (Year 12)	25.9	Alcohol abuse or dependence	5.0
Employment status (full-time/part-time employment)	29.0	Eating disorder	3.5
Any gambling participation	41.6 ^b	Gambling disorder	0.7
Problem gambling severity (PGSI)		Other disorder	3.3
Problem gambling	6.3 ^b	Number of co-occurring current psychiatric disorder diagnoses	
Moderate-risk gambling (original/revised scoring)	8.4 ^b /4.1	0	11.4
Low-risk gambling	7.2 ^b	1	32.4
Non-problem gambling	19.7 ^b	2	32.5
Non-gambling	58.4 ^b	3	15.3
Type of mental health service		4 or more	8.5
Public adult	46.5		
Private adult mental health service	36.0		
Youth mental health service ^c	10.8		
Community outreach support service	6.8		

^a Sample sizes vary slightly due to small amounts of missing data[31] [ref]

^b Recent Australian national past year estimates and Victorian state estimates are 63.9-70.1% for any gambling participation, 0.4-0.8% for problem gambling, 1.9-3.7% for moderate-risk gambling, 3.0-8.9% for low-risk gambling, 52.3-58.6% for non-problem gambling, and 29.9-36.1% for non-gambling [67,81,82].

^c *headspace* National Youth Mental Health Foundation was sampled in this study as it was established to offer a youth-specific model (12-25 years) as an alternative to public adult mental health services or generic private or primary mental health services and approximately half of the clients are 18+ years (56% of males and 52% of females) [83,84]; it is likely that excluding this service would result in an under-sampling of adults aged 18 to 25 years accessing mental health services. Only *headspace* clients over the age of 18 years were included in the current study.

Table 2. Summary of the brief screening instruments employed in this study

Brief screening instrument	Development information	Number of items	Items	Scoring information	Sample type	Sensitivity	Specificity	References
Lie/Bet Questionnaire ^a	Items from a 12-item questionnaire measuring the DSM-IV diagnostic criteria that best discriminated between male Gamblers Anonymous members and non-problem gambling controls (Veterans Administration Medical Centre employees).	2	(1) Have you ever had to lie to people important to you about how much you gambled? (2) Have you ever felt the need to bet more and more money?	Response options: (1) Yes, (0) No. Positive endorsement of one or both items is indicative of problem gambling.	Adult community samples	0.92-0.96	0.89-0.97	[85,86]
					Discrimination between adult problem gambling treatment and community samples	0.86-1.00	0.78-1.00	[33,60,87]
					Adolescent community/school samples	0.65-0.93	0.85-0.94	[86,88]
					Adult alcohol dependent treatment samples	0.94	0.66	[38]
BPGS (2 item) ^b	Developed for the purpose of screening for problem gambling in both clinical settings and population research. Best-performing 2 items selected from a pool of 30 items from the four most widely used problem gambling assessment measures that best captured the largest proportions of pathological, problem, and at-	2	In the past 12 months: (1) Would you say you have been preoccupied with gambling? (2) Have you often gambled longer, with more money or more frequently than you intended to?	Response options: (1) Yes, (0) No. Positive endorsement of one or both items is indicative of problem gambling.	Adult community samples	0.73	0.99	[61]

	risk gamblers identified via clinical assessment in community and online samples.							
PGSI Short Form ^c	Developed for the purpose of tracking the prevalence of problem gambling in the general population. Comprised of three items from the PGSI.	3	Thinking about the last 12 months: (1) Have you bet more than you could really afford to lose? (2) Have people criticised your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? (3) Have you felt guilty about the way you gamble or what happens when you gamble?	Response options: (0) Never; (1) Sometimes; (2) Most of the time; and (3) Almost always. Scores range from 0 to 9. Cut-offs: 3+ = problem gambling, 1-2 = at-risk gambling, 0 = non-problem gambling. The cut-off of ≥ 1 was employed in the current study because it is most desirable in monitoring changes in the overall gambling harms in the population and maximises sensitivity over the alternative cut-off of ≥ 3 [54].	Adult community samples	0.87-1.00	0.63-0.97	[63]
NODS-CLiP ^{a,d}	Derived from the NODS, which is a 17-item measure based on the DSM-IV criteria for pathological gambling. The NODS was designed to improve the efficiency of identifying people with gambling problems in population research. NODS-CLiP comprises the 3 NODS items that best identified problem gambling across eight separate community surveys.	3	(1) Have there ever been periods lasting 2 weeks or longer when you spent a lot of time thinking about your gambling experiences, or planning out future gambling ventures or bets? (2) Have you ever tried to stop, cut down, or control your gambling? (3) Have you ever lied to family members, friends, or others about how much you gamble or	Response options: (1) Yes, (0) No. Positive endorsement of one or more items is indicative of problem gambling.	Adult community samples	0.80-0.99	0.82-0.94	[34,35]
					Discrimination between adult problem gambling treatment and community samples	0.98-1.00	0.48-0.98	[33]
					Adult problem gambling treatment samples	0.98-1.00	0.17-0.30	[35]
					Adult alcohol dependent treatment samples	1.00	0.54	[38]

			how much money you lost on gambling?					
BBGS ^e	Derived from the DSM-IV diagnostic criteria for pathological gambling as measured by the Alcohol Use Disorder and Associated Disability Interview Schedule (AUDADIS) in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).	3	During the past 12 months: (1) Have you become restless, irritable, or anxious when trying to stop and/or cut down on gambling? (2) Have you tried to keep your family or friends from knowing how much you gambled? (3) Did you have such financial trouble as a result of gambling that you had to get help with living expenses from family, friends, or welfare?	Response options: (1) Yes, (0) No. Positive endorsement of one or more items is indicative of problem gambling.	Adult community samples	0.96	0.99	[62]
					Discrimination between adult problem gambling treatment and community samples	0.90-1.00	0.83-1.00	[33]
					Adult problem gambling treatment samples	1.00	0.14-0.26	[4]
					Adult alcohol dependent treatment samples	0.91	0.87	[38]
BPGS (3 item) ^b	Developed for the purpose of screening for problem gambling in both clinical settings and population research. Best-performing 3 items selected from a pool of 30 items from the four most widely used problem gambling assessment measures that best captured the largest proportions of pathological, problem, and at-risk gamblers identified via clinical assessment in community and online samples.	3	In the past 12 months: (1) Have you needed to gamble with larger amounts of money to get the same feeling of excitement? (2) Have you often gambled longer, with more money or more frequently than you intended to? (3) Have you made attempts to either cut down, control or stop gambling?	Response options: (1) Yes, (0) No. Positive endorsement of one or more items is indicative of problem gambling [45].	Adult community samples	0.84	0.99	[61]
NODS-PERC ^{a,f}	Designed to be used in patients attending alcohol and other drug treatment and other clinical settings. Comprised of	4	(1) Have there ever been periods lasting 2 weeks or longer when you spent a lot of time thinking about your gambling experiences	Response options: (1) Yes, (0) No. Positive endorsement of one or more items is indicative of	Discrimination between adult problem gambling treatment and community samples	0.98-1.00	0.38-0.98	[33]

	the four NODS items that best identified problem gambling in a problem gambling treatment sample recruited from alcohol and other drug and medical treatment settings.		or planning out future gambling ventures or bets? (2) Have you ever gambled as a way to escape from personal problems? (3) Has there ever been a period when, if you lost money gambling one day, you would return another day to get even? (4) Has your gambling ever caused serious or repeated problems in your relationships with any of your family members or friends?	problem gambling.	Adult problem gambling treatment samples Adult alcohol dependent treatment samples	1.00 1.00	0.18-0.39 0.57	[35] [38]
BPGS (4 item) ^b	Developed for the purpose of screening for problem gambling in both clinical settings and population research. Best-performing 4 items selected from a pool of 30 items from the four most widely used problem gambling assessment measures that best captured the largest proportions of pathological, problem, and at-risk gamblers identified via clinical assessment in community and online samples.	4	In the past 12 months: (1) Have you needed to gamble with larger amounts of money to get the same feeling of excitement? (2) Have you often gambled longer, with more money or more frequently than you intended to? (3) Have you made attempts to either cut down, control or stop gambling? (4) Have people criticised your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?	Response options: (1) Yes, (0) No. Positive endorsement of one or more items is indicative of problem gambling [45].	Adult community samples	0.86	0.97	[61]
NODS-CLiP2 ^{a,d}	The NODS-CLiP2 adds Chasing and Escape to the 3 NODS-CLiP	5	The two additional items are: (1) Has there ever been a period	Response options: (1) Yes, (0) No. Positive	Adult community samples	0.90-0.93	0.62-0.90	[35]

	items. Validated in a problem gambling treatment sample recruited from alcohol and other drug and medical treatment settings.		when, if you lost money gambling one day, you would return another day to get even? (2) Have you ever gambled as a way to escape from personal problems?	endorsement of one or more items is indicative of problem gambling.				
BPGS (5 item) ^b	Developed for the purpose of screening for problem gambling in both clinical settings and population research. Best-performing 5 items selected from a pool of 30 items from the four most widely used problem gambling assessment measures that best captured the largest proportions of pathological, problem, and at-risk gamblers identified via clinical assessment in community and online samples.	5	In the past 12 months: (1) Would you say you have been preoccupied with gambling? (2) Have you needed to gamble with larger amounts of money to get the same feeling of excitement? (3) Have you often gambled longer, with more money and more frequently than you intended to? (4) Have you made attempts to either cut down, control, or stop gambling? (5) Have you borrowed money or sold anything to get money to gamble?	Response options: (1) Yes, (0) No. Positive endorsement of one or more items is indicative of problem gambling [45].	Adult community samples	0.91-0.99	0.61-0.99	[61]
					Discrimination between adult problem gambling treatment and community samples	0.98-1.00	0.31-0.92	[33]

^a All items scored over the previous 12 months

^b BPGS: Brief Problem Gambling Screen (PPGM: Problem and Pathological Gambling Measure; SOGS: South Oaks Gambling Screen)

^c PGSI: Problem Gambling Severity Index

^d NODS-CLiP/NODS-CLiP2: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Loss of Control, Lying and Preoccupation screen.

^e BBGS: Brief Biosocial Gambling Screen

^f NODS-PERC: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Preoccupation, Escape, Chasing and Risked Relationships screen

Table 3. Description of classification accuracy coefficients [39,40,64]

Classification accuracy coefficient	Description
Sensitivity	True positive rate; proportion of positive test results among those with gambling problems
Specificity	True negative rate; proportion of negative test results among those without gambling problems
False positive rate	Proportion of positive test results among those without gambling problems
False negative rate	Proportion of negative test rest results among those with gambling problems
Positive predictive values	Percentage of patients with a positive test who actually have a gambling problem
Negative predictive values	Percentage of patients with a negative test who do not have a gambling problem
Diagnostic efficiency	Overall proportion of correct test results; total number of true positives and true negatives divided by total sample size

Table 4. Classification accuracy of the brief screening instruments using PGSI score of 8+ as reference standard ^{a,b,c,d}

Screening measure	Sensitivity (95% CIs)	Specificity (95% CIs)	Diagnostic efficiency (95% CIs)	Positive Predictive Value	Negative Predictive Value	False Positive Rate	False Negative Rate
<i>2-item screening instruments</i>							
Lie/Bet ^e	0.811 (0.680-0.906)	0.943 (0.924-0.958)	0.934 (0.915-0.950)	0.489	0.987	0.057	0.189
BPGS (2-item) ^{e,f}	0.868 (0.747-0.945)	0.938 (0.918-0.953)	0.933 (0.914-0.949)	0.484	0.991	0.063	0.132
<i>3-item screening instruments</i>							
NODS-CLiP ^{e,g}	0.981 (0.899-1.000)	0.878 (0.852-0.900)	0.884 (0.860-0.905)	0.351	0.999	0.122	0.019
BBGS ^{e,h}	0.962 (0.870-0.995)	0.935 (0.915-0.951)	0.937 (0.918-0.952)	0.500	0.997	0.065	0.038
BPGS (3-item) ^{e,f}	1.000 (0.933-1.000)	0.871 (0.846-0.894)	0.879 (0.855-0.901)	0.344	1.000	0.129	0.000
<i>4-item screening instruments</i>							
NODS-PERC ^{e,i}	0.981 (0.899-1.000)	0.890 (0.866-0.911)	0.896 (0.873-0.916)	0.377	0.999	0.110	0.019
BPGS (4-item) ^{e,f}	1.000 (0.933-1.000)	0.866 (0.840-0.889)	0.875 (0.850-0.896)	0.335	1.000	0.134	0.000
<i>5-item screening instruments</i>							
NODS-CLiP2 ^{e,g}	0.981 (0.899-1.000)	0.856 (0.829-0.880)	0.864 (0.839-0.886)	0.315	0.999	0.144	0.019
BPGS (5-item) ^{e,f}	1.000 (0.933-1.000)	0.865 (0.839-0.888)	0.873 (0.849-0.895)	0.333	1.000	0.135	0.000

^a Total n=837 (n=53 PGSI 8+; n=784 PGSI <8); base rate = 6.3%

^b Sensitivity (the true positive rate, i.e., the proportion of positive test results among those with the disorder), specificity (the true negative rate, i.e., the proportion of negative test results among those without the disorder), and diagnostic efficiency coefficients (overall proportion of correct test results, i.e., the total number of true positives and true negatives divided by the total sample size) ≥ 0.80 are bolded

^c All items scored over the previous 12 months

^d PGSI: Problem Gambling Severity Index

^e Scored dichotomously: (0) No, (1) Yes

^f BPGS: Brief Problem Gambling Screen; caution required in interpreting the coefficients for the 3-5 item BPGS due to overlapping items with the reference standard (1-2 PGSI items)

^g NODS-CLiP/NODS-CLiP2: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Loss of Control, Lying and Preoccupation screen; NODS-CLiP2 adds Chasing and Escape to the three NODS-CLiP items.

^h BBGS: Brief Biosocial Gambling Screen

ⁱ NODS-PERC: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Preoccupation, Escape, Chasing and Risked Relationships screen

Table 5. Classification accuracy of the brief screening instruments using revised PGSI score of 5+ as reference standard ^{a,b,c,d}

Screening measure	Sensitivity (95% CIs)	Specificity (95% CIs)	Diagnostic efficiency (95% CIs)	Positive Predictive Value	Negative Predictive Value	False Positive Rate	False Negative Rate
<i>2-item screening instruments</i>							
Lie/Bet ^e	0.724 (0.618-0.815)	0.967 (0.951-0.978)	0.941 (0.923-0.956)	0.716	0.968	0.033	0.276
BPGS (2-item) ^{e,f}	0.770 (0.668-0.854)	0.963 (0.946-0.975)	0.943 (0.925-0.957)	0.705	0.973	0.037	0.230
<i>3-item screening instruments</i>							
NODS-CLiP ^{e,g}	0.966 (0.903-0.993)	0.915 (0.892-0.934)	0.920 (0.899-0.937)	0.568	0.996	0.085	0.034
BBGS ^{e,h}	0.874 (0.785-0.935)	0.965 (0.950-0.977)	0.956 (0.940-0.969)	0.745	0.985	0.035	0.126
BPGS (3-item) ^{e,f}	0.966 (0.903-0.993)	0.907 (0.884-0.927)	0.913 (0.892-0.931)	0.545	0.996	0.093	0.034
<i>4-item screening instruments</i>							
NODS-PERC ^{e,i}	0.931 (0.856-0.974)	0.924 (0.903-0.942)	0.925 (0.905-0.942)	0.587	0.991	0.076	0.069
BPGS (4-item) ^{e,f}	0.966 (0.903-0.993)	0.901 (0.878-0.922)	0.908 (0.886-0.927)	0.532	0.996	0.098	0.034
<i>5-item screening instruments</i>							
NODS-CLiP2 ^{e,g}	0.966 (0.903-0.993)	0.892 (0.868-0.913)	0.900 (0.877-0.919)	0.509	0.996	0.108	0.034
BPGS (5-item) ^{e,f}	0.977 (0.919-0.997)	0.901 (0.878-0.922)	0.909 (0.888-0.928)	0.535	0.997	0.099	0.023

^a Total n=837 (n=87 PGSI 5+; n=754 PGSI <5); base rate = 10.4%

^b Sensitivity (the true positive rate, i.e., the proportion of positive test results among those with the disorder), specificity (the true negative rate, i.e., the proportion of negative test results among those without the disorder), and diagnostic efficiency coefficients (overall proportion of correct test results, i.e., the total number of true positives and true negatives divided by the total sample size) ≥ 0.80 are bolded

^c All items scored over the previous 12 months

^d PGSI: Problem Gambling Severity Index

^e Scored dichotomously: (0) No, (1) Yes

^f BPGS: Brief Problem Gambling Screen; caution required in interpreting the coefficients for the 3-5 item BPGS due to overlapping items with the reference standard (1-2 PGSI items)

^g NODS-CLiP/NODS-CLiP2: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Loss of Control, Lying and Preoccupation screen; NODS-CLiP2 adds Chasing and Escape to the three NODS-CLiP items.

^h BBGS: Brief Biosocial Gambling Screen

ⁱ NODS-PERC: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Preoccupation, Escape, Chasing and Risked Relationships screen

Table 6. Classification accuracy of the brief screening instruments using PGSI score of 3+ as reference standard ^{a,b,c,d}

Screening measure	Sensitivity (95% CIs)	Specificity (95% CIs)	Diagnostic efficiency (95% CIs)	Positive Predictive Value	Negative Predictive Value	False Positive Rate	False Negative Rate
<i>2-item screening instruments</i>							
Lie/Bet ^e	0.610 (0.518-0.696)	0.982 (0.969-0.990)	0.927 (0.907-0.944)	0.852	0.936	0.018	0.390
BPGS (2-item) ^{e,f}	0.675 (0.584-0.756)	0.983 (0.971-0.991)	0.938 (0.919-0.953)	0.874	0.946	0.017	0.325
<i>3-item screening instruments</i>							
NODS-CLiP ^{e,g}	0.902 (0.836-0.949)	0.948 (0.929-0.963)	0.941 (0.923-0.956)	0.750	0.983	0.052	0.098
BBGS ^{e,h}	0.740 (0.653-0.815)	0.985 (0.972-0.992)	0.949 (0.931-0.963)	0.892	0.956	0.015	0.260
BPGS (3-item) ^{e,f}	0.927 (0.866-0.966)	0.944 (0.924-0.960)	0.941 (0.923-0.956)	0.740	0.987	0.056	0.073
<i>4-item screening instruments</i>							
NODS-PERC ^{e,i}	0.854 (0.779-0.910)	0.954 (0.936-0.968)	0.939 (0.921-0.954)	0.761	0.974	0.046	0.146
BPGS (4-item) ^{e,f}	0.935 (0.876-0.971)	0.940 (0.920-0.956)	0.939 (0.921-0.954)	0.728	0.988	0.060	0.065
<i>5-item screening instruments</i>							
NODS-CLiP2 ^{e,g}	0.919 (0.856-0.960)	0.927 (0.906-0.945)	0.926 (0.906-0.943)	0.685	0.985	0.073	0.081
BPGS (5-item) ^{e,f}	0.943 (0.886-0.977)	0.940 (0.920-0.956)	0.940 (0.922-0.955)	0.730	0.990	0.060	0.057

^a Total n=837 (n=123 PGSI 3+; n=718 PGSI <3); base rate = 14.7%

^b Sensitivity (the true positive rate, i.e., the proportion of positive test results among those with the disorder), specificity (the true negative rate, i.e., the proportion of negative test results among those without the disorder), and diagnostic efficiency coefficients (overall proportion of correct test results, i.e., the total number of true positives and true negatives divided by the total sample size) ≥ 0.80 are bolded

^c All items scored over the previous 12 months

^d PGSI: Problem Gambling Severity Index

^e Scored dichotomously: (0) No, (1) Yes

^f BPGS: Brief Problem Gambling Screen; caution required in interpreting the coefficients for the 3-5 item BPGS due to overlapping items with the reference standard (1-2 PGSI items)

^g NODS-CLiP/NODS-CLiP2: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Loss of Control, Lying and Preoccupation screen; NODS-CLiP2 adds Chasing and Escape to the three NODS-CLiP items.

^h BBGS: Brief Biosocial Gambling Screen

ⁱ NODS-PERC: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Preoccupation, Escape, Chasing and Risked Relationships screen

Table 7. Classification accuracy of the brief screening instruments using PGSI score of 1+ as reference standard^{a,b,c,d}

Screening measure	Sensitivity (95% CIs)	Specificity (95% CIs)	Diagnostic efficiency (95% CIs)	Positive Predictive Value	Negative Predictive Value	False Positive Rate	False Negative Rate
<i>2-item screening instruments</i>							
Lie/Bet ^e	0.448 (0.375-0.523)	0.991 (0.980-0.997)	0.871 (0.847-0.894)	0.932	0.865	0.009	0.552
BPGS (2-item) ^{e,f}	0.497 (0.423-0.572)	0.994 (0.984-0.99)	0.885 (0.862-0.906)	0.971	0.876	0.006	0.503
<i>3-item screening instruments</i>							
NODS-CLiP ^{e,g}	0.738 (0.668-0.800)	0.980 (0.966-0.989)	0.927 (0.907-0.944)	0.912	0.930	0.020	0.262
BBGS ^{e,h}	0.541 (0.466-0.615)	0.995 (0.987-0.999)	0.896 (0.873-0.916)	0.971	0.886	0.005	0.459
BPGS (3-item) ^{e,f}	0.776 (0.709-0.834)	0.982 (0.968-0.990)	0.937 (0.918-0.952)	0.922	0.940	0.018	0.224
<i>4-item screening instruments</i>							
NODS-PERC ^{e,i}	0.689 (0.616-0.755)	0.982 (0.968-0.990)	0.918 (0.897-0.935)	0.913	0.918	0.018	0.311
BPGS (4-item) ^{e,f}	0.798 (0.732-0.853)	0.982 (0.968-0.990)	0.941 (0.923-0.956)	0.924	0.946	0.018	0.202
<i>5-item screening instruments</i>							
NODS-CLiP2 ^{e,g}	0.787 (0.720-0.844)	0.968 (0.951-0.980)	0.928 (0.909-0.945)	0.873	0.942	0.032	0.213
BPGS (5-item) ^{e,f}	0.803 (0.738-0.858)	0.982 (0.968-0.990)	0.943 (0.925-0.957)	0.925	0.947	0.018	0.197

^a Total n=837 (n=183 PGSI 1+; n=658 PGSI <1); base rate = 21.9%

^b Sensitivity (the true positive rate, i.e., the proportion of positive test results among those with the disorder), specificity (the true negative rate, i.e., the proportion of negative test results among those without the disorder), and diagnostic efficiency coefficients (overall proportion of correct test results, i.e., the total number of true positives and true negatives divided by the total sample size) ≥ 0.80 are bolded

^c All items scored over the previous 12 months

^d PGSI: Problem Gambling Severity Index

^e Scored dichotomously: (0) No, (1) Yes

^f BPGS: Brief Problem Gambling Screen; caution required in interpreting the coefficients for the 3-5 item BPGS due to overlapping items with the reference standard (1-2 PGSI items)

^g NODS-CLiP/NODS-CLiP2: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Loss of Control, Lying and Preoccupation screen; NODS-CLiP2 adds Chasing and Escape to the three NODS-CLiP items.

^h BBGS: Brief Biosocial Gambling Screen

ⁱ NODS-PERC: National Opinion Research Center Diagnostic Screen for Gambling Disorders – Preoccupation, Escape, Chasing and Risked Relationships screen

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