

Classification accuracy of brief screens for problem gambling: A systematic review and meta-analysis

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Introduction

Screening for problem gambling in clinical settings

- Relatively few people with gambling problems seek professional help
- Considerable delays between symptom presentation and first attempt to seek help
- Services located in local communities are well placed to enhance identification and appropriate management of people with gambling problems (e.g., primary care, AOD services, mental health services)



Introduction

Screening for problem gambling in clinical settings

- Meta-analytic evidence suggests that problem gambling is consistently associated with a range of co-morbid mental health disorders:
 - In community and treatment-seeking populations
 - High rates of personality, mood, anxiety and alcohol and other drug use disorders
- Also evidence that people with gambling problems are over-represented in primary care, alcohol and other drug use services and mental health populations:
 - 3.0% - 15.7% in primary care settings
 - 26.0% in university medical and dental clinics
 - 10.0% - 43.4% (M=22.8%) in alcohol and substance use treatment services
 - 0.9% - 17.1% across various mental health populations



Introduction

Screening for problem gambling in clinical settings

- Complicates the clinical profile of mental health patients - problem gambling has the potential to compromise engagement, management plans and mental health outcomes, particularly if it goes undetected and untreated
- Highlights the importance for primary care, alcohol and other drug use, and mental health services to accurately screen for problem gambling
- Health providers have generally negative attitudes towards screening and report low rates of screening behaviour
- Perceived barriers to screening:
 - lack of time, knowledge and skills
 - absence of information about the effectiveness of screening
 - presence of gambling-related stigma
 - perception that problem gambling has a low burden of disease
 - absence of effective interventions and limited access to specialist referral services



Introduction

Screening for problem gambling in clinical settings

- Low screening rates may also be due to the relatively slow development of brief screening instruments for gambling problems
- Essential that screening instruments employed in these clinical settings are:
 - easy to use
 - have short administration times
 - are easily scored
 - require minimal training



Introduction

Screening for problem gambling in research

- Brief screening instruments are also increasingly employed in problem gambling research, including population-level epidemiological studies
- The Problem Gambling Severity Index (PGSI) is currently the preferred measurement tool for evaluating problem gambling severity internationally
 - Such an extended assessment is not always practical or affordable
- Accurate brief screening instruments that can be incorporated into population surveys where many topics are covered are more cost-effective than conducting gambling-specific studies



Brief screening instruments	Year	Number of items	Intended setting	Age-group	Intended timeframe
Lie/Bet Questionnaire	1997	2	Not reported	Adult	Lifetime
Short South Oaks (SOGS) Gambling Screen	1999	5	Not reported	Adult	Past year
One item screen	2008	1	Primary Care	Adult	Lifetime
Case Finding and Help Assessment Tool (CHAT)	2008	2-3 item versions	Primary Care	Adult	Current
NODS-CLiP	2009	3	Epidemiological, research and clinical settings	Adult	Lifetime
Brief Biosocial Gambling Screen (BBGS)	2010	3	General population	Adult	Past year
Brief Problem Gambling Screen (BPGS)	2011	2-5 item versions	Clinical and population research	Adult	Past year
NODS-CER	2011	3	Clinical	Adult	Past year
NODS-CPR	2011	3	Clinical	Adult	Past year

Brief screening instruments	Year	Number of items	Intended setting	Age-group	Intended timeframe
NODS-PERC	2011	4	AOD and other clinical settings	Adult	Lifetime
NODS-CLiP2	2011	5	Epidemiological, research and clinical settings	Adult	Lifetime
PGSI Short Form	2012	3	Population research	Adult	Past year
Consumption Screen for Problem Gambling (CSPG)	2012	3	Clinical settings	Adult	Past year
NLCLiP	2013	3	Population	Adolescence	Past year
Rapid Screener for Problem Gambling (RSPG) – Interview version	2017	3	Population research	Adult	Past year
Rapid Screener for Problem Gambling (RSPG) – self-assessment version	2017	4	Population research	Adult	Past year
Brief Adolescent Gambling Screen (BAGS)	2017	3	Population	Adolescence	Past 3 months

Rationale and Aims

- Accurate screening instruments have the potential to improve care and reduce healthcare costs.
- Currently limited systematic evidence to guide clinicians and researchers in their selection of a psychometrically sound instrument to screen for problem gambling for their purpose, population, or setting of interest.
- The overall aim of the systematic review and meta-analysis was to explore the classification accuracy of brief self-report screening instruments for problem and at-risk gambling in order to make clinical and research recommendations for different purposes and settings.
 - Preliminary results of the meta-analysis



Methods

- Systematic search of peer-reviewed and grey literature (1990-January 2018)
 - Electronic database search (i.e., Medline, PsycInfo)
 - Reference list search
 - Google search
- Inclusion criteria:
 - Published from 1990 onwards in English language
 - Evaluated any brief screening or assessment measure of problem gambling, pathological gambling or gambling disorder (i.e., 1 to 5 items)
 - Examined and reported the classification accuracy of a brief screening instrument compared to a criterion standard (e.g., PGSI, DSM criteria)
- Criterion standard could not be another brief screening instrument



Meta-analysis

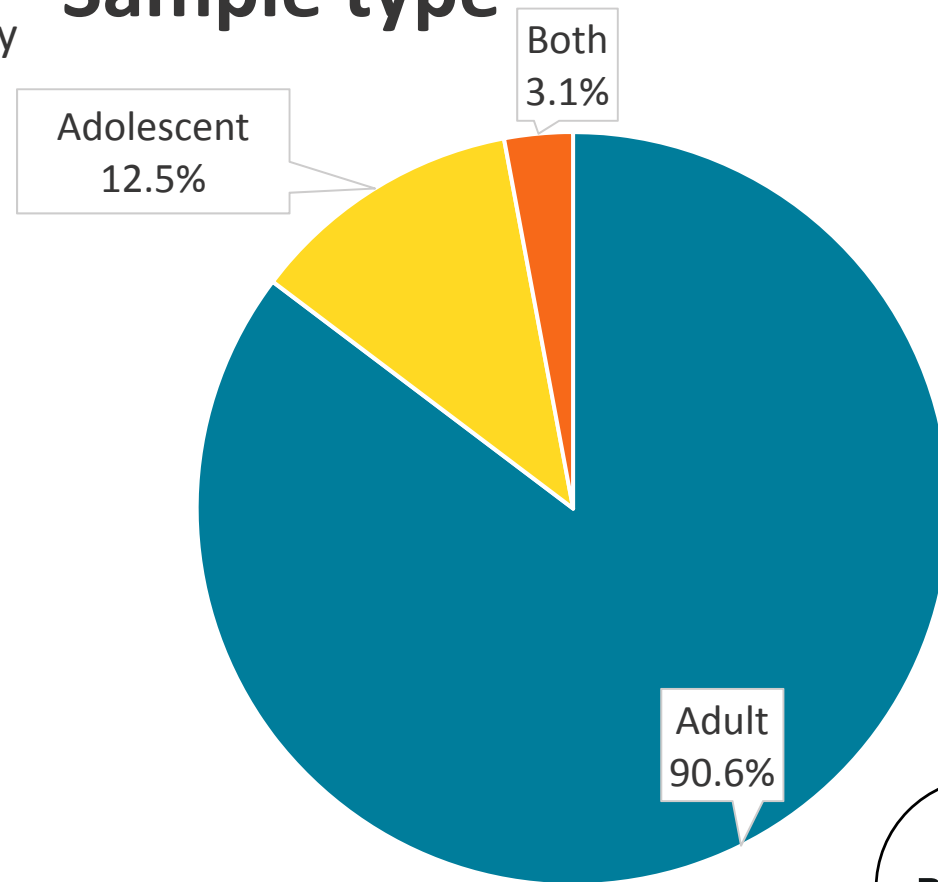
- Classification accuracy refers to how well the instrument identifies those with and without gambling problems
 - Sensitivity = the true positive rate, i.e., the proportion of positive test results among those with the disorder
 - Specificity = the true negative rate, i.e., the proportion of negative test results among those without the disorder
- Meta-analysis conducted in R
 - Bivariate approach jointly analyses pairs of sensitivity and specificity
 - Included in meta-analysis if 2 studies or more
 - Two reference standards: (1) problem gambling only; and (2) at-risk gambling (including problem gambling)
- The criterion for selection of an appropriate brief screening instrument is a sensitivity and specificity of 0.8 or above



Results

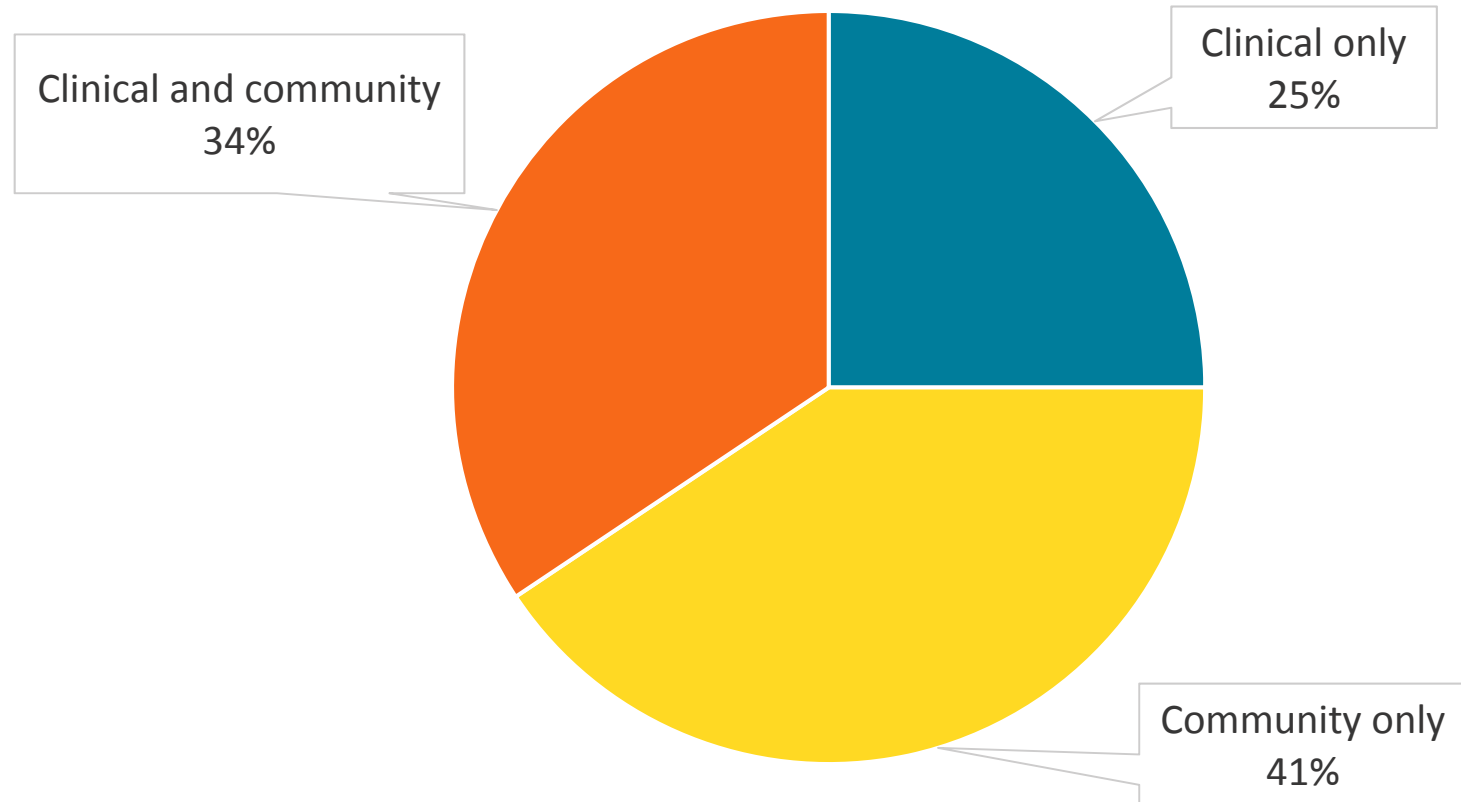
- 23 included articles from 32 study samples
- Published from 1997 – 2017
- Most studies conducted in US (n=12; 37.5%); Australia, Canada and UK (n=3, 9.4%)

Sample type



Results

Setting

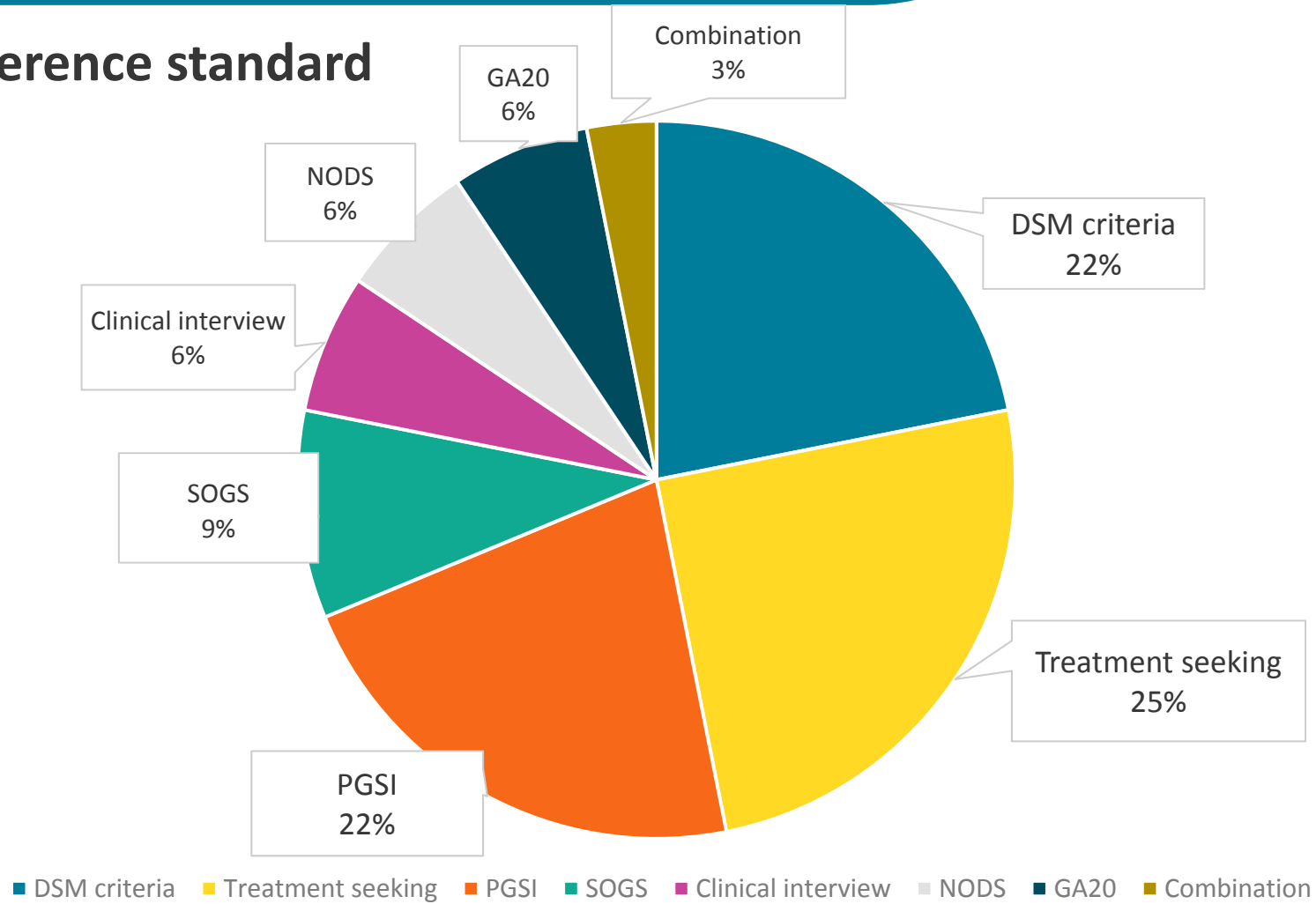


■ Clinical only ■ Community only ■ Clinical and community



Results

Reference standard



Results – problem gambling

Brief screen	Number of items	Number of samples	Mean sensitivity (i.e., true positive rate) (95%CI)	Mean specificity (i.e., true negative rate) (95% CI)
One-item screen	1	9	0.934 (0.821-0.977)	0.963 (0.932-0.980)
Lie/Bet	2	14	0.957 (0.924-0.976)	0.903 (0.852-0.938)
CHAT	2	2	0.848 (0.604-0.953)	0.975 (0.961-0.984)
NODS-CLiP	3	12	0.990 (0.984-0.994)	0.827 (0.666-0.920)
BBGS	3	12	0.975 (0.949-0.988)	0.912 (0.800-0.964)
PGSI-SF	3	3	0.928 (0.898-0.950)	0.986 (0.958-0.996)

Results – problem gambling

Brief screen	Number of items	Number of samples	Mean sensitivity (i.e., true positive rate) (95%CI)	Mean specificity (i.e., true negative rate) (95% CI)
NODS-PERC	4	11	0.988 (0.980-0.993)	0.817 (0.628-0.922)
Short SOGS	5	8	0.974 (0.957-0.985)	0.889 (0.783-0.947)
BPGS-5	5	9	0.990 (0.982-0.994)	0.700 (0.516-0.836)

- 10 brief screens examined in one study (RSPI-I, RSPG-SA, 2-item BPGS, NODS-CER, NODS-CPR, 3-item BPGS, 4-item BPGS, CSPG, NODS-CLIP2 and BAGS)
- NLCLIP examined in no studies



Results – at-risk gambling

Brief screen	Number of items	Number of samples	Mean sensitivity (i.e., true positive rate) (95%CI)	Mean specificity (i.e., true negative rate) (95% CI)
Lie/Bet	2	4	0.756 (0.498-0.906)	0.954 (0.858-0.986)
2-item BPGS	2	2	0.623 (0.380-0.817)	0.998 (0.984-1.000)
3-item BPGS	3	2	0.811 (0.743-0.864)	0.988 (0.973-0.995)
NODS-CLiP	3	3	0.802 (0.440-0.954)	0.917 (0.576-0.989)
PGSI-SF	3	4	0.450 (0.372-0.530)	1.000 (0.999-1.000)

Results – at-risk gambling

Brief screen	Number of items	Number of samples	Mean sensitivity (i.e., true positive rate) (95%CI)	Mean specificity (i.e., true negative rate) (95% CI)
NODS-PERC	4	2	0.882 (0.400-0.988)	0.975 (0.947-0.988)
4-item BPGS	4	2	0.836 (0.764-0.889)	0.977 (0.964-0.985)
5-item BPGS	5	2	0.865 (0.730-0.939)	0.988 (0.972-0.995)

- Five brief screens examined in one study (BBGS, NLCLiP, NODS-CER, NODS-CLiP2 & NODS-CPR)
- Six brief screens examined in no studies (CHAT, CSPG, one-item, RSPG-I, RSPG-SA & Short SOGS)



Summary of findings

- All 1-, 2-, 3-, 4- and 5-item brief screens for problem gambling presented adequate mean specificity and sensitivity in detecting problem gambling
 - Exception of 5-item BPGS
- Where a very brief screening instrument is required (i.e., 1-2 items):
 - One-item screen – validated in community and clinical samples
 - Lie/Bet – validated in community and clinical samples
 - CHAT – only validated in primary care setting
 - But do not adequately detect at-risk gambling (inc. problem gambling)
- When trying to detect at-risk and problem gambling have to use a 3-5 item brief screens: the NODS-CLiP, the NODS-PERC, or the 3-, 4- or 5-item BPGS



Limitations and future research

- Limited by the small number of studies examining the classification accuracy of some of these brief screens
- Emerging and growing field
 - More studies needed across various settings, ages and populations
- Clinicians may have other reasons for selecting a brief screen not just based on classification accuracy, these factors will be looked at in future subgroup analysis, within this review:
 - age
 - setting
 - time-frame



Implications

- First systematic review and meta-analysis of diagnostic accuracy for brief gambling screens:
 - Resource for health service providers and researchers in the identification of the most accurate brief screening tools for problem and at-risk gambling for their specific purposes and populations
 - Potential to overcome screening barriers relating to lack of time and absence of information about effectiveness of screening



Questions?

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