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Screening and Assessment of Gambling in Military Populations: A Systematic Review and Gap Analysis

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Abstract

Purpose of Review This review evaluates the use of assessment and screening tools for gambling behaviour in military populations. Although military personnel and veterans face elevated risks, most available tools were developed for general populations and may not account for military-specific factors. The review identifies the screening and assessment measures used in military population studies, assesses their psychometric properties, and highlights key methodological gaps through a structured gap analysis.

Recent Findings Across 46 studies, 28 screening or assessment tools were identified, including commonly used measures such as the PGSI, SOGS, BBGS, GRCS, MAGS, and NODS-CLiP. While these tools vary in length and purpose, none were specifically designed or validated for use with military populations. Validation studies showed inconsistent reliability, sensitivity, and specificity. Notably, no tools adequately reflected military-relevant issues such as deployment stress, occupational impact, or co-occurring mental health conditions. Barriers to accurate screening, including stigma and underreporting, further complicate assessment in this context.

Summary There is a critical need for the development of validated, military-specific screening and assessment tools that address the unique experiences and risks within this population. Existing measures may underestimate or misclassify gambling-related harm, limiting early identification and effective intervention. Future research should prioritise the design and validation of tailored tools that can support accurate screening and assessment, reduce stigma, and inform better-targeted prevention and treatment strategies for military personnel and veterans.

Keywords Gambling · Military · Veteran · Screening · Validation · Gap analysis

Introduction

Gambling is a widely practised form of entertainment with behaviour that involves staking something of value on an uncertain outcome [1]. When gambling behaviour becomes excessive, it can develop into a serious behavioural disorder. Gambling disorder (GD) is defined by a persistent and recurrent pattern of excessive gambling behaviour that leads to significant impairment and/or distress [2]. In the literature, several inter-related terms have been used, such as 'problematic' or 'pathological' gambling, with the terminology often reflecting the specific screening tool or diagnostic criteria employed; however, these terms are not always synonymous, as 'problematic gambling' is sometimes used to refer to subclinical levels of gambling-related harm. For those affected, the consequences of gambling behaviour, collectively referred to as gambling-related harm, can be severe. Such harms may include experiences of financial difficulties, adverse effects on mental and physical health, and negative impacts on families, social relationships, and communities [3]. Given the substantial decrements posed by gambling-related harm, gambling has been identified as a growing public health issue [4].

There is also a growing body of evidence that highlights specific subpopulations may be at a disproportionately heightened risk of excessive gambling behaviour, including military populations, such as currently serving personnel and ex-serving personnel– i.e. veterans. International

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evidence indicates substantial variability; lifetime prevalence rates for gambling disorder (GD) among military populations typically range between 2% and 29%, significantly exceeding general population estimates of approximately 0.4–1.6% [5, 6]. One study from the United Kingdom [7] identified veterans in their sample were 10 times more likely to experience 'problem gambling', that is, scoring 8 or more on the Problem Gambling Severity Index (PGSI) [8] than age and gender matched non-veterans. Similar trends are observed in Australian veteran populations, with a combined at-risk (scoring above 1 on the PGSI) and problem gambling rate of 13.4%—again substantially above the comparable general Australian population rate of 7.9% [9]. Moreover, United States veterans have consistently shown elevated rates of problem gambling, ranging from 2.2% [10] to 9.0% [11], compared to civilian comparisons which range between 1.0% and 4.0%. Although methodological differences across studies contribute to variation in estimates, the evidence clearly indicates that military populations face a disproportionate burden of gambling-related harm, which emphasises the need for ongoing development and refinement of standardised screening tools [9, 12].

Beyond estimating prevalence, it is important to assess gambling behaviour in military groups to understand its relationship with other risky behaviours and health outcomes. Research suggests that gambling problems in military contexts often co-occur with or signal broader behavioural health risks [5, 13, 14]. For example, a survey of over 2,000 UK Royal Air Force personnel found that 12.5% indicated experiencing 'problem gambling' as measured with the PGSI, with higher gambling risk disproportionately observed among younger, male airmen of lower rank [15]. Similarly, a recent study of currently serving personnel in the UK Armed Forces reported that 23% had experienced some level of gambling-related harm; those with greater gambling involvement were more likely to report concurrent mental health difficulties, including elevated symptoms of depression, anxiety and post-traumatic stress disorder (PTSD) [16]. In both studies, younger age, male gender and lower rank or educational attainment emerged as risk factors for gambling harm. In addition, certain military-specific stressors may contribute to gambling behaviour. Exposure to combat deployment [17] and the strains of frequent family separation [18], for instance, have been identified as potential triggers or exacerbating factors for problem gambling in service personnel. Help-seeking among serving members of the UK Armed Forces presents a number of challenges, with barriers including fear of stigma, concerns about the potential impact on careers, and limited awareness of available gambling treatment options or military-specific interventions [18]. These barriers may contribute to the under-identification of gambling problems and delay access to support. In this context, cognitive distortions—such as erroneous beliefs about control or luck—have been shown to be closely linked with gambling behaviour and co-occurring psychological distress, particularly post-traumatic stress symptoms, which are common in military populations. Assessing these cognitions can provide a less direct, stigma-sensitive means of identifying individuals at elevated risk and may facilitate earlier intervention before significant gambling-related harm develops [19]. This highlights the need for proactive and comprehensive screening and assessment approaches that consider a range of military-specific factors, including deployment experiences, family dynamics, and the nature and extent of gambling harm.

Given the likelihood of increased risk of gambling harm among military populations, it is imperative that any instrument used for this purpose be psychometrically *valid* (accurately measuring and determining excessive gambling behaviour) and *reliable* (yielding consistent results over time and across evaluators). However, the effectiveness of screening and assessment tools can vary depending on cultural and contextual factors [20] - a measure developed and validated in a civilian context may not perform equally well in a military environment, where unique stressors and cultural norms exist. Additionally, there is a trend towards developing shorter tools that are easier to administer, particularly in clinical and community settings. Consequently, there is often a trade-off between the brevity of the tool and the comprehensiveness of the information it gathers [21]. The setting and manner in which screening or assessment occurs also influence its utility. Notably, many standard gambling screens were originally validated with clinical or help-seeking populations, and their performance in broader military samples (including among individuals who have not sought help) is often untested or unknown [20]. To overcome barriers such as stigma and confidentiality concerns, recent efforts have explored digital platforms for gambling screening. Online or computer-based screening can offer greater anonymity and accessibility, which may be especially advantageous in military contexts where personnel could be hesitant to disclose gambling issues [21]. Despite the availability of various screening and assessment tools, research consistently highlights the need for ongoing refinement and evaluation to ensure that the tools in use remain accurate and context-appropriate for military populations [20].

Previous reviews of gambling screening and assessment tools for the general population have focussed on evaluating effectiveness, reliability, and validity [22, 23]. A variety of screening and assessment tools have been developed to identify different levels of gambling-related problems, including 'problem gambling' and 'pathological gambling', such as the South Oaks Gambling Screen (SOGS), the

PGSI, and tools based on Diagnostic and Statistical Manual of Mental Disorders (DSM) IV/DSM-5 diagnostic criteria for gambling disorder [24, 25].Validated tools should also demonstrate reliability across different populations and contexts [26, 27]. Thus, while research supports the use of general gambling screening tools like the PGSI and SOGS, their validity in military populations is not yet fully established and that they may not capture the specific stressors and experiences of military personnel, leading to either under- or over-identification of gambling problems [6, 28].

Previous reviews have collated and synthesised data surrounding the prevalence of gambling behaviour in military populations [5, 29], the likely predictors and associated factors of gambling in military populations [30], and common comorbidities [31]. A recent meta-review [27] concluded that screening for GD in the general military population in the US was likely to overburden resources unnecessarily due to the high likelihood of false positives but should be continued for sub-populations such as those seeking substance use or mental health treatment. This conclusion was challenged however for not considering the complexity of the issue and impact of gambling-related harms on military personnel [6], and it exists in opposition to the recommendations of other reviews [5, 29, 30]. Hence, existing tools may need to be adapted to improve sensitivity and specificity if generalised screening is to be disseminated widely among the military and to address concerns about confidentiality, stigma, and the potential impact on a service member's career [28].

In contrast to Segura et al. [27], which was a meta-review of the screening properties of gambling assessment tools in non-military populations with the aim of informing identification and treatment of gambling problems in military personnel, we instead sought to identify gambling assessment tools used in international studies with military populations. The present review addresses a key gap by not only cataloguing these tools but also evaluating their psychometric performance—specifically their validity, reliability, sensitivity, and specificity—within this unique context. Given that many of these instruments have not been validated for military use, there is a pressing need to examine their performance in general population samples as a preliminary step in assessing their potential suitability for military settings.

Accordingly, this systematic review seeks to advance understanding in the field by pursuing three interrelated aims. First, it aims to identify the screening and assessment tools that have been used to evaluate gambling behaviour and gambling-related harm in military populations. Second, it evaluates the psychometric properties of key tools used in general population samples, focusing on available evidence of their validity, reliability, sensitivity, and specificity. The secondary aim is conducted in general population samples due to the limited literature available in military samples. Third, it conducts a systematic gap analysis to identify limitations in the current evidence base and to inform future research and clinical practice [31]. By addressing these aims, the current systematic review provides a timely and comprehensive synthesis of how gambling and its associated harms are assessed in military contexts and offers practical insights to guide the development of more effective and contextually appropriate screening and assessment strategies.

Method

Search Strategy

The review was registered with PROSPERO (ID: CRD42023468135) and conducted in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [32]. There were two stages to the search strategy which focused on: (i) identifying studies that measured gambling behaviour or gambling related harm with military populations; and (ii) the identification of articles validating the six most commonly used screening tools found in search stage one.

Search Stage One: Identifying Measures

Medline/PubMed, ProQuest and PsycINFO databases were searched for articles published between 2013 and 2023. Two search rounds were conducted at this stage. The first of these was completed in September 2023 and used the search terms: (Gambl*) AND (Military OR Veteran) AND (Assess*). A second more comprehensive search round was conducted in November 2023 and used the terms (Gambl*) AND (Military OR Veteran OR Army OR Navy OR "Air Force" OR "Armed Force*" OR "Ex-Serv*") AND (Assess* OR Measure* OR Screen*). These terms were expanded following consultation with the wider team at the Centre for Military Gambling Research, Swansea University.

Search Stage Two: Validating Measures

Stage one of the review found that there were six main screening tools or measures used in studies of gambling in military populations. Stage two of the review therefore sought to identify articles validating any of these six measures, searching Medline/PubMed, ProQuest and PsycINFO databases between 2013 and 2024. The search for these articles was conducted in May 2024 and used the following search terms: (Screening Tool Title OR Acronym OR

Abbreviation) AND (Valid* OR Reliability OR Specific* OR Sensitiv*).

For both search stages, consideration of additional articles from citation searches, expert consultation, and checking the reference lists of included articles were undertaken to ensure representative findings. A more comprehensive hand search for 'unpublished' or grey literature was not undertaken due to the relatively large number of peer-reviewed journal articles returned by the database searches. Hartling et al. [33] found that the inclusion of grey literature "rarely impacted the results and conclusions" (p. 1) of systematic reviews and may be more useful where there are few relevant studies in the 'published' literature.

Inclusion Criteria

Search Stage One: Identifying Measures

Articles were considered for inclusion in search stage one if they had been peer-reviewed and specifically measured gambling behaviour and/or gambling-related harm within a military or veteran population.

Search Stage Two: Validating Measures

The second search stage only included articles which specifically discussed the validity, reliability, sensitivity or specificity of any of the six key screening tools identified within stage one. These were the: PGSI, SOGS, Brief Biosocial Gambling Screen (BBGS), Massachusetts Gambling Screen (MAGS), National Opinion Research Centre Diagnostic Screen—Loss of Control, Lying, and Preoccupation Screen (NODS-CLiP), and Gambling Related Cognitions Scale (GRCS).

For both stages of the review, all types of study methodology were included, except for reviews. Studies published prior to 2013 were excluded and searches were limited to articles published or translated into English. Articles which discussed previously reported statistics from other studies, the validation of translated or adapted scales as well as the validation of new scales in relation to the scales discussed were also excluded.

Review Process

Search Stage One: Identifying Measures

Searches were conducted by one researcher (CR) and the screening processes involved four independent researchers (CR, ST, HC, GD) who screened articles by title and abstract and excluded irrelevant articles ($k = 0.534$, $p < .001$). The full texts of the remaining articles were then screened independently by two researchers (CR, ST) according to the inclusion criteria ($k = 0.945$, $p < .001$).

Study selection and the two-rounds of the search and screening process are shown in Fig. 1. The combined search and screening rounds identified 46 unique articles. The first round of the search yielded 23 articles and the second round, after removing duplicates, also found 23 additional articles that met the study inclusion criteria. It is of note that one of the included papers was obtained through citation searching [34].

Search Stage Two: Validating Measures

Searches for stage two, and the screening of articles by title, abstract and full text against the inclusion criteria were conducted by one researcher (CR). Study selection and the search and screening process for this stage of the review are shown in Fig. 2, which shows that there were 16 articles returned by the process that met the inclusion criteria.

Searches and screening by title, abstract and full text were conducted by one researcher (CR).

Quality Appraisal

Research quality of included studies was evaluated with the Mixed Methods Appraisal Tool (MMAT) [35], reflecting the variety of methodologies used in the included studies. This tool appraises the methodological quality of five categories of study: qualitative research, randomized controlled trials, non-randomized studies, quantitative descriptive studies, and mixed methods studies. It uses a number of criteria for each type of methodology against which studies were appraised, detailed in Online Resource Two. Whilst MMAT guidance highlights the importance of presenting this detail to draw attention to the more problematic aspects of study methodology where appropriate, they have also more recently suggested that an overall score or category of scores can also be provided such as low, moderate, good and excellent [36]. Two researchers independently completed the quality appraisal for review stage one (CR, ST), and two researchers independently completed the quality appraisal for review stage two (CR, GD).

Gap Analysis

Given the extant literature and discussion with members of the Centre for Military Gambling Research at Swansea University, a set of research gaps will be posited. The gap analysis adheres to three of the steps set out by Lawn et al. [37], which are a modified version of the approach taken by Otto et al. [38]:

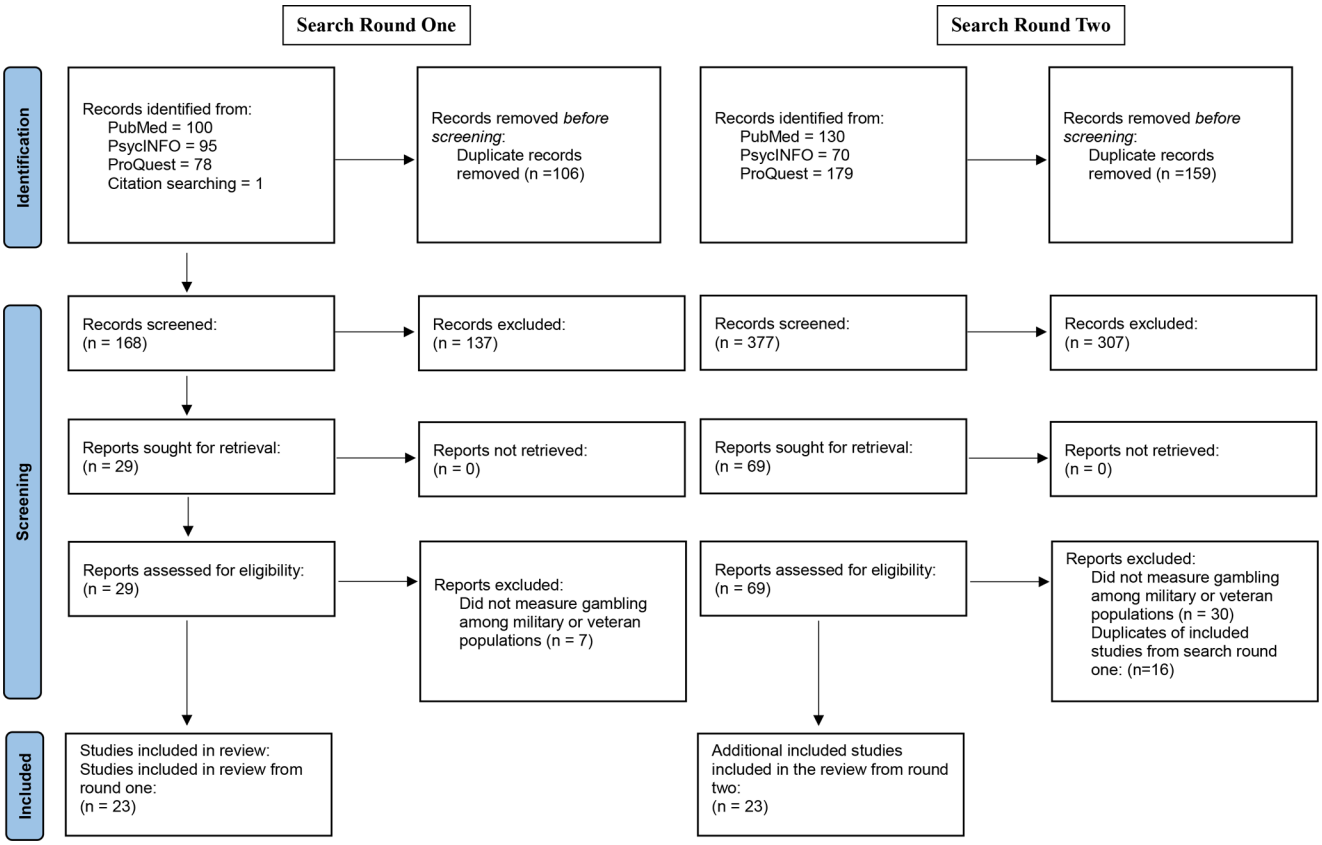

Fig. 1 PRISMA diagram for search stage one: identification of measures

1. Identifying the limitations, recommendations and gaps in research related to gambling assessment and measures, as reported in the articles included in the review.
2. Considering the recommendations and gaps that exist in the wider research literature regarding gambling screening and assessment.
3. Consulting the wider research team, all of whom research gambling amongst currently serving or former military personnel, to identify any further recommendations or gaps in the research regarding gambling screening and assessment.

Lawn et al. [37] also suggested a typology to categorise gaps, including methodological, knowledge and practical/public health. However, given that the present review was concerned with gambling measures, only methodological gaps will be discussed.

Results

Stage One– Identification of Screening and Assessment Tools

Table 1 presents the 46 included studies identified in search stage one. It includes the screening or assessment tools used in each study including the number of items, purpose of the tools and delivery method. It also includes details of the population type included in the studies. Across the 46 studies, 28 different screening/assessment tools were identified, including six brief measures specifically designed for individual studies and 22 standardised scales (Online Resource 1). The most used were the SOGS which was utilised in nine studies and PGSI which was used in eight studies, respectively. The BBGS was used within six studies, the MAGS in 4 studies and, the GRCS in three studies. The 3-item NODS-CLiP and the International Classification of Diseases, versions 9 or 10 (ICD-9/ICD-10) were both used within three studies and two studies used DSM-IV Pathological Gambling criteria. The six studies which adopted novel measures for gambling did not design these scales specifically for serving military or veteran populations. The remaining 14 types of screening/assessment tool identified

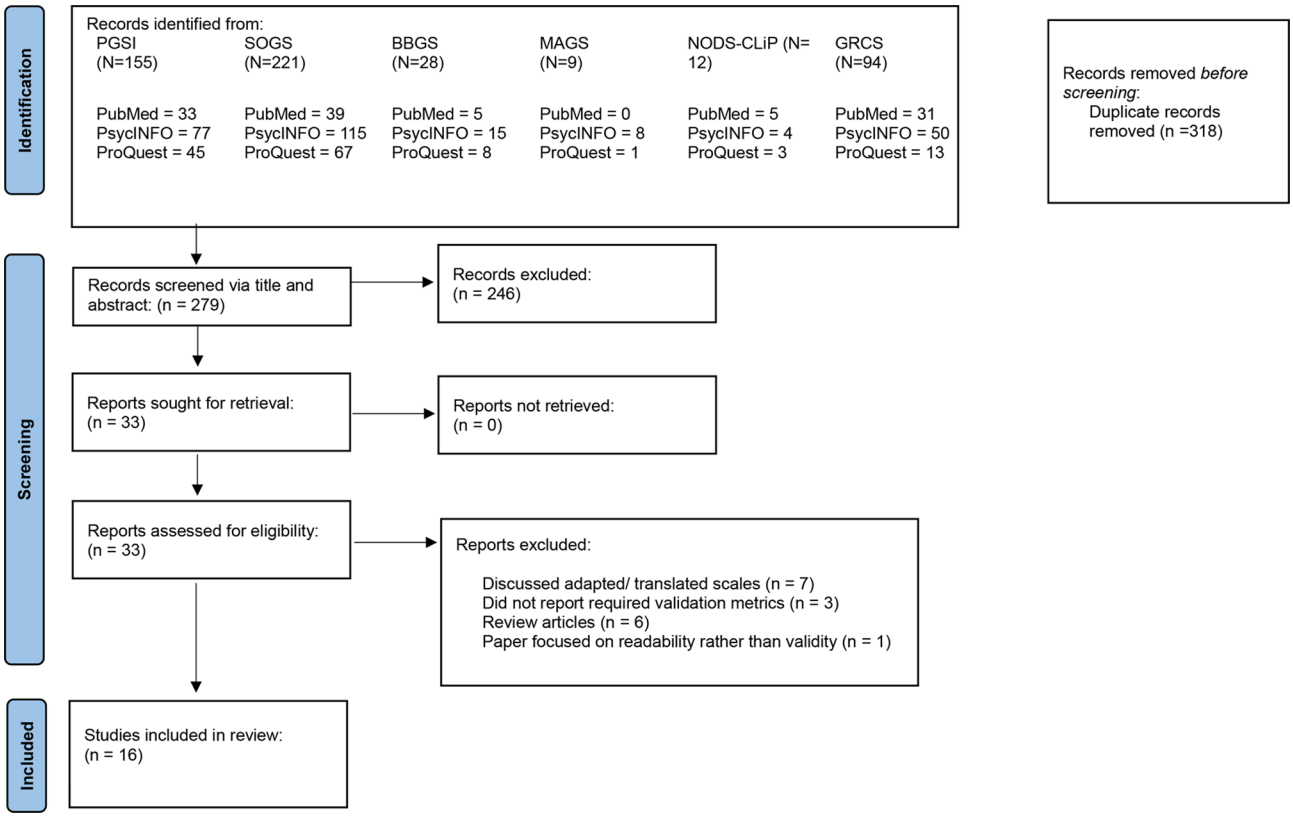

Fig. 2 PRISMA diagram for search stage two: measure validation

were only used once within the identified studies suggesting a large variance in the methods used to assess gambling behaviour and related harms among veteran and serving military populations.

Populations Studied

Most of the studies focused on US veterans, largely recruited from VA Health Services. Whilst some studies did consider differing populations, such as, New Zealand veterans accessing VA Healthcare, serving UK RAF personnel, and Australian veterans, the variance of sub-populations studied remains minimal. It is evident that veteran samples are also studied more frequently than currently serving or active service military.

Screening and Assessment Tools

A total of 22 standardised measures or scales were identified, alongside 6 novel screens developed for specific studies, two structured clinical interview schedules (DSM IV(C-DIS4) and IPDE), and the use of ICD codes. These findings suggest a wide range in the way gambling and associated behaviours or harm are assessed within military and veteran populations. When exploring how these measures are designed and delivered, it was evident that most self-report screening tools consisted of approximately 16 items, although some tools contained significantly more items ($M = 16.81$, $SD = 15.11$). One of the standardised scales was administered by clinicians. Finally, one structured clinical interview was conducted via a computerized model which adopted a self-reporting delivery method. Many of the studies adopted multiple measures to identify gambling behaviour. SOGS and the PGSI were the most used screening tools in studies on gambling behaviour among military and veteran populations. The SOGS is more frequently used in US-based studies ($N = 8$), while the PGSI is more common in UK ($N = 4$) and Australian ($N = 3$) studies.

Combined Assessment Measures

A total of five measures were identified of gambling behaviour and comorbidities such as substance misuse or mental health conditions. Three of these measures, the Global Risk Scale (GRS) [39], the Risky, Impulsive and Self-Destructive Behaviour Questionnaire (RISQ) [40], and the Post Trauma Risky Behaviours Questionnaire (PRBQ) [41], assessed a variety of risky behaviours related to negative affect or experiences. The final two combined assessment measures, the modified version of eCHAT (VeCHAT) [42],

Table 1 Standardised screening and assessment tools

Tool	Items	Purpose	Population type	Study(s)	Delivery Method
Problem Gambling Severity Index (PGSI)	9 items.	Screen non-problem gambler, low-risk gambler, moderate-risk gambler, problem gambler (self-assess).	U.K. Royal Air Force	Champion et al. 2022	Self-Report
			Australian Defence Force	Cowlishaw et al. 2020	Self-Report
			U.K. Armed Forces Veterans	Dighton et al. 2023	Self-Report
			U.K. Armed Forces Veterans	Harris et al. 2023	Self-Report
			Australian Defence Force Members	Metcalf et al. 2022	Self-Report
			Australian Defence Force Veterans	Metcalf et al. 2023	Self-Report
			U.K. Royal Air Force	Pritchard & Dymond, 2022	Self-Report
			U.S Military (Serving & Veterans)	van der Maas & Nower, 2021	Self-Report
South Oaks Gambling Screen (SOGS)	20 items.	Screen for pathological gambling (DSM-III).	New Zealand Veterans	Goodyear-Smith et al. 2021	Self-Report
			U.S Military Veterans	Grubbs et al. 2018	Self-Report
			U.S Military Veterans	Grubbs & Chapman, 2019	Self-Report
			U.S Military Veterans	Grubbs et al. 2019	Self-Report
			U.S Military Veterans	Grubbs et al. 2023	Self-Report
			U.S Military Veterans	Gutierrez et al. 2020	Self-Report
			U.S Military Veterans	Sadeh & Baskin-Sommers, 2017	Self-Report
			U.S Military Veterans	Stefanovics et al. 2023	Self-Report
			U.S Military Veterans	Shirk et al. 2018	Self-Report
Brief Biosocial Gambling Screen (BBGS)	3 items.	Screen for gambling problems (DSM-IV PG criteria).	U.S Military Veterans	Kraus et al. 2020	Self-Report
			U.S Military Veterans	Hienz et al. 2017	Self-Report
			U.S Military Veterans	Najavits et al. 2018	Self-Report
			U.S Military Veterans	Stefanovics et al. 2017	Self-Report
			U.S Military Veterans	Way et al. 2023	Self-Report
Massachusetts Gambling Screen (MAGS)	12 items.	Screen for DSM-IV criteria for PG.	U.S Military Veterans	Grant et al. 2017	Self-Report
			U.S Military Veterans	Scoglio et al. 2017	Self-Report
			U.S Military Veterans	Scoglio et al. 2021	Self-Report
			U.S Military Veterans	Whiting et al. 2016	Self-Report
Gambling Related Cognitions Scale (GRCS)	23 items.	Measures five cognitive styles associated with PG.	U.S Military Veterans	Grubbs, et al. 2019	Self-Report
			U.S Military Veterans	Grubbs et al. 2018	Self-Report
			U.S Military Veterans	Gutierrez et al. 2020	Self-Report
National Opinion Research Centre Diagnostic Screen - Loss of Control, Lying, and Preoccupation Screen (NODS-CLiP)	3 items.	Screen for lifelong PG.	U.S Military	Gallaway et al. 2019	Self-Report
			U.K. Armed Forces Veterans	Williamson et al. 2023	Self-Report
			U.S Military	Sampson et al. 2021	Self-Report
International Classification of Diseases, versions 9 or 10 (ICD-9/ICD-10)	Clinical diagnosis.	Coding attached to medical records identifying PG.	U.S Military Veterans	Ronzitti et al. 2019	Clinician assigned.
			U.S Military	Garvey-Wilson et al. 2021	Clinician assigned.
			U.S Military Veterans	Stefanovics et al. 2023	Clinician assigned.
DSM-IV Problem Gambling Diagnostic Criteria	10 items.	Binary questions relating to the ten DSM-IV criteria for PG.	U.K. Armed Forces Veterans	Dighton et al. 2018	Self-Report
			U.K. Armed Forces Veterans	Roberts et al. 2020	Self-Report
Gambling Belief Questionnaire (GBQ)	21 items.	Screen for gambling-related cognitive distortions.	U.S Military Veterans	Shirk et al. 2018	Self-report.

Table 1 (continued)

Tool	Items	Purpose	Population type	Study(s)	Delivery Method
Gambling Symptom Assessment Scale (G-SAS)	12 items.	Screens for gambling urges, gambling-related thoughts/behaviours, and interpersonal functioning.	U.S Military Veterans	Shirk et al. 2018	Self-report.
Yale-Brown Obsessive-Compulsive Scale for Gambling Disorder (PG-YBOCS)	10 items.	Screens for the severity of GD symptoms.	U.S Military Veterans	Shirk et al. 2018	Clinician administered.
Structured Clinical Interview for DSM-IV	11 probes & follow up questions for each.	Screen for pathological gambling (a diagnosis) and problem gambling.	U.S Military Veterans	Shirk et al. 2018	Structured interview, clinician led.
			U.S Military Veterans	Grubbs et al. 2023	Structured interview, clinician led
Risky, Impulsive and Self-Destructive Behaviour Questionnaire (RISQ)	38 items.	Screen for a diverse range of behaviours and their associated affective triggers, consequences, and chronicity.	U.S Military Veterans	Sadeh & Baskin-Sommers, 2017	Self-report.
International Personality Disorder Examination (IPDE): excessive gambling (Question 76a).	157 items (6 parts).	Examination for personality disorders.	U.S Military Veterans	Lusk et al. 2017	Structured interview, clinician led.
Brief Problem Gambling Scale	5 items	Combines items from other widely used tools to capture different levels of problem-gambling severity	U.S Military Veterans	Stefanovics et al. 2023	Self-Report
			U.S Military Veterans	Stefanovics et al. 2023	Self-Report
Global Risk Scale (GRS)	10 items	Screen for eight types of risk behaviours.	U.K Armed Forces Veterans	Harris, et al. 2017	Self-report.
Centre for Addiction and Mental Health-Inventory of Gambling Situations (CAMH-IGS)	63 items (10 clusters).	Screen to determine the patterns of behaviour, thoughts or feelings which may trigger PG, enabling tailored treatment and relapse-prevention.	U.S Military Veterans	Grubbs & Chapman, 2019	Self-report.
Gambling Functional Assessment– Revised (GFA-R)	16 items.	Screen for gambling motivations.	U.K Armed Forces Veterans	Dighton et al. 2023	Self-report.
A modified version of eCHAT (VeCHAT)	Unknown	Screen for mental health and lifestyle issues of contemporary veterans.	New Zealand Veterans	Goodyear-Smith et al. 2021	Self-report.
Problem and Pathological Gambling Measure (PPGM).	14 items.	Screen for PG.	U.S Military Veterans	Freeman et al. 2019	Self-report.
Post Trauma Risky Behaviours Questionnaire (PRBQ).	16 items.	Screen for extent of past month post-trauma risky behaviours and PTSD E2 criterion.	U.S Military Veterans	Forkus et al. 2022	Self-report.
Diagnostic Interview Schedule-IV(C-DIS4)	10	Screen for pathological gambling (a diagnosis) and problem gambling (sub-threshold) categories, as well as lifetime psychiatric comorbidity	U.S Military Veterans	Westermeyer et al. 2013	Computerised Interview

and the clinician administered International Personality Disorder Examination (IPDE) [43], identified gambling behaviour within assessments surrounding general mental health or specific mental health disorders.

Brief Gambling Behaviour Screening Measures

Dowling et al. [20] suggested that brief gambling measures consist of 5 items or fewer. This review identified three brief measures: the BBGS, the NODS-CLiP, and the Brief Problem Gambling Scale (BPGS). The BBGS is a three-item scale that uses a past-year timeframe with yes/

no responses, covering withdrawal, lying, and financial consequences. Endorsing at least one item indicates at-risk or problem gambling. Way et al. [44] reported acceptable internal consistency (α = 0.72) for the BBGS. The NODS-CLiP is also a three-item scale designed using a one-year timeframe, with binary yes/no answers. Answering 'yes' to any of the three questions about trying to control or stop gambling, lying and preoccupation with gambling indicates at-risk or problem gambling. The NODS-CLiP is considered to have lower reliability in measuring gambling behaviour and related harms, such that while it effectively detects problem and moderate-risk gambling, it is less effective at identifying low-risk gambling, potentially leading to underestimation of problem gambling prevalence [45]. The BPGS is a five-item, past-year, screening tool with binary yes/no response categories. It includes questions about gambling motivation, behaviour and consequences, with an endorsement of any of these items indicating 'at-risk or problem gambling'. Among veterans, the BPGS demonstrated good internal consistency (Cronbach's α = 0.76) [46].

Clinician Administered Measures

Three studies were identified which measured gambling behaviour or related harms via clinician administered interviews or assessments [43, 47, 48]. A further three studies utilised ICD-9/ICD-10 codes to identify gambling prevalence mong their samples [49–51]. The indication of these codes suggests that previously clinicians have assigned a diagnosis of problem gambling to individuals following clinical assessment.

Online Assessment Methods

Most of the articles implemented the use of online self-reported surveys to assess gambling behaviour and related harms. One study also used a computerised version of a structure clinical interview [52]. While it is likely that the use of online delivery methods increased accessibility and reduced participant burden, this was rarely discussed. One study did however note the nature of the delivery method [42]: the VeCHAT measure, which aimed to classify a range of psychosocial difficulties among a population of veterans in order to inform their respective case managers and clinicians of arising problems, was delivered via an interactive online platform.

Stage Two- Validation, Sensitivity and Specificity of Key Tools

Our review identified 28 different screening and assessment tools, and only one combined measure claimed to be for veterans [42]. The second stage aimed to identify articles which discussed the validity, reliability, sensitivity or specificity of the six most commonly used screening tools identified from stage one. Following searches and screening 16 articles discussing the validation of one or more of these scales were included for analysis (Table 2).

Of the 16 articles which report screening and validation metrics, five discuss PGSI [53–57], four discuss NODS-CLiP [20, 58–60], three discuss SOGS [61–63], three discuss BBGS [20, 64, 65], two discuss GRCS [66, 67] and one discusses MAGS [63]. The majority of articles report internal consistency, with MAGS having an acceptable internal consistency (α = 0.72) [63] and SOGS reporting a good internal consistency (α = 0.82–0.87) [62, 63]. Internal consistency for GRCS was reported as excellent (α = 0.90–0.97) [66, 67], whereas internal consistency for PGSI ranged between adequate and (α = 0.75) [54] and excellent (α = 0.93) [55]. No internal consistency was reported in articles discussing NODS-CLiP or BBGS.

The specificity and sensitivity of the scales was reported in a similar majority of articles. Four of the articles compared diagnostic ability against clinical interviews or assessments with SOGS reportedly having a specificity ranging between 88 −90.4%, and a sensitivity ranging between 71 −98% [62, 63], and MAGS identified a specificity of 99% and a low sensitivity of 34% [63]. The diagnostic ability for NODS-CLiP was assessed against the full NODS scale, with the specificity for inferring 'problem gambling' reported as 30.3% [59] and the sensitivity reported as between 96.2% and 98.4% [59, 60]. NODS-CLiP was also assessed against a score of 5 on PGSI [58], and PGSI's problem gambling category (PGSI 8+) [20], with specificities of 97.6% and 87.8%, and sensitivities of 100% and 98.1% respectively. Similarly, BBGS was compared against PGSI's problem gambling category with specificity of 93.5% and sensitivity 96.2%. BBGS was also compared against the diagnostic ability of semi-structured telephone interviews returning, a relatively low, specificity of 14.1% and sensitivity of 99.9% [65]. One article assessed active play metrics, such as days gambled in a month, and amount wagered in a month against BBGS as means of predicting harmful gambling behaviour with BBGS specificity being reported as 70%, and sensitivity ranging from 32.6 −56.5% [64]. Finally, PGSI diagnostic ability was compared against clinical interview, with an adjusted cutoff of 5.5, with specificity 85% and sensitivity of 89% [55].

Quality Appraisal of Included Studies

The quality assessment identified that most of the research included within this review was of good to excellent quality; however, some studies did present with significant

Table 2 Validation of the PGSI, SOGS, BBGS, GRCS, MAGS and NODS-CLiP

Paper	Scale(s)	Population	Extracted metrics of validation, reliability, specificity, and sensitivity.
Brett et al. 2014	BBGS	Unique callers to the Problem Gamblers Help Network of West Virginia ($n=2750$)	Specificity: (BBGS1 + vs. semi-structured telephone interview) = 14.1%; Sensitivity (BBGS1 + vs. semi-structured telephone interview) = 99.9%; PPP (BBGS1 + vs. semi-structured telephone interview) = 83.4%; NPP (BBGS 0 vs. semi-structured telephone interview) = 97.3%
Cowlishaw et al. 2018	NODS-CLiP	Primary care attendees in England ($n=1058$)	Specificity: (NODS-CLiP 1 + vs. PGSI 5+) = 97.6%; Sensitivity: (NODS-CLiP 1 + vs. PGSI 5+) = 100%; PPP (NODS-CLiP 1 + vs. PGSI 5+) = 28.6%; NPP (NODS-CLiP 0 vs. PGSI < 5) = 100.0%
Currie et al. 2013	PGSI	Secondary analysis of Canadian population level data of adult gamblers ($n=25,584$)	Reliability: (Intraclass correlation coefficient) = 0.63 ($F=4.51$, $p<.001$) between time point 1 and 2 for PGSI categories.
Dellis et al. 2014	PGSI	Gamblers in South Africa ($n=127$)	Concurrent validity (with diagnostic interview) = $r=.87$, $p<.01$; Internal Consistency (Cronbach's α) = 0.93; Specificity: (PGSI 5.5 + vs. diagnostic interview) = 85%; Sensitivity: (PGSI 5.5 + vs. diagnostic interview) = 89%; PPP (PGSI 8 + vs. diagnostic interview) = 85.0%; NPP (PGSI < 8 vs. diagnostic interview) = 85%
Dowling et al. 2018	BBGS, NODS-CLiP	Service users of adult and youth mental health services in Australia ($n=837$)	BBGS: Specificity: (BBGS 1 + vs. PGSI 8+) = 93.5%; Sensitivity: (BBGS 1 + vs. PGSI 8+) = 96.2%; PPP (BBGS 1 + vs. PGSI 8+) = 50.0%; NPP (BBGS 0 vs. PGSI < 8) = 99.7% NODS CLiP: Specificity: (NODS-CLiP 1 + vs. PGSI 8+) = 87.8%; Sensitivity: (NODS-CLiP 1 + vs. PGSI 8+) = 98.1%; PPP (NODS-CLiP 1 + vs. PGSI 8+) = 35.1%; NPP (NODS-CLiP 0 vs. PGSI < 8) = 99.9%
Goodie et al. 2013	SOGS	Adult U.S. gamblers ($n=353$).	Predictive validity (with DSM-IV clinical interview) $r=.66$; Internal Consistency (Cronbach's α) = 0.87; Sensitivity (SOGS 5 + vs. DSM-IV clinical interview) = 98%; PPP (SOGS 5 + vs. DSM-IV clinical interview) = 36%; FAR = 81%; Sensitivity (SOGS 5 + vs. DSM-V clinical interview) = 97%; PPP (SOGS 5 + vs. DSM-V clinical interview) = 45%; FAR = 78%
Gorenko et al. 2022	PGSI	Secondary analysis of an older adult's sample from the Quinte Longitudinal Study ($n=518$) and Leisure, Lifestyle, and Lifecycle Project ($n=195$)	Concurrent validity (with monthly gambling frequency) r_s (516) = 0.20, $p<.001$; Internal Consistency (Cronbach's α) = 0.86
Louderback et al. 2021	BBGS	Secondary analysis of gambling operator data of online gamblers ($n=2255$)	Specificity: 70.0% Sensitivity: (BBGS 1 + vs. gambling more than 10.9 days/month) = 40.5%, (BBGS 1 + vs. > 167.97€ wagered per month) = 54.9%, (BBGS 1 + vs. > 6.71% yearly income spent on wagers) = 56.2%, (BBGS 1 + vs. > 26.11 Net outcome of gambling per month) = 55.7%, (BBGS 1 + vs. > 35.14€ SD of daily amount wagered) = 56.5%, (BBGS 1 + vs. > 0.065 slope of daily amount wagered in first 6 months) = 32.6%
Merkouris et al. 2020	PGSI	Secondary analysis of service user data from Australian Gambling Help Online (GHO $n=5881$) and online self-directed program (GamblingLess $n=198$)	GHO PGSI: Internal Consistency (Cronbach's α) = 0.75 GamblingLess PGSI: Internal Consistency (Cronbach's α) = 0.89
Miller et al. 2013	PGSI	Secondary analysis of Canadian population level data ($n=33,301$)	Internal Consistency (Cronbach's α) = 0.86
Smith et al. 2016	GRCS	Service users of a gambling treatment centre in Australia ($n=454$)	Internal Consistency (Cronbach's α) = 0.90
Taylor et al. 2014	GRCS	High school students in Ontario ($n=1490$)	Predictive validity (with DSM-IV-J) $r=.57$; Internal Consistency (Cronbach's α) = 0.97
Toce-Gerstein et al. 2009	NODS-CLiP	Secondary analysis of U.S. population level data ($n=17,180$)	Specificity: (NODS-CLiP 0 vs. NODS < 3) = 90.0%; Sensitivity: (NODS-CLiP 1 + vs. NODS 3+) = 96.2%;
Volberg et al. 2011	NODS-CLiP	Adult gamblers using substance treatment centres in Connecticut ($n=375$)	Specificity: (NODS-CLiP 1 + vs. NODS 3+) = 30.3%; Sensitivity: (NODS-CLiP 1 + vs. NODS 3+) = 98.4%; PPP (NODS-CLiP 1 + vs. NODS 3+) = 86.9%; NPP (NODS-CLiP 1 + vs. NODS < 3) = 80.0%

Table 2 (continued)

Paper	Scale(s)	Population	Extracted metrics of validation, reliability, specificity, and sensitivity.
Weinstock et al. 2007	MAGS, SOGS	U.S university students ($n=160$)	MAGS: Predictive validity (with diagnostic interview) $r=.71$, $p.<001$; Internal Consistency (Cronbach's α) = 0.72; Specificity (MAGS 5 + vs. diagnostic interview) = 99%; Sensitivity: (MAGS 5 + vs. diagnostic interview) = 34%; PPP (MAGS 5 + vs. diagnostic interview) = 93%; NPP (MAGS < 5 vs. diagnostic interview) = 83% SOGS: Predictive validity (with diagnostic interview) $r=.61$, $p.<001$; Internal Consistency (Cronbach's α) = 0.82; Specificity (SOGS 5 + vs. diagnostic interview) = 88%; Sensitivity: (SOGS 5 + vs. diagnostic interview) = 71%; PPP (SOGS 5 + vs. diagnostic interview) = 64%; NPP (SOGS < 5 vs. diagnostic interview) = 91%
Williams & Volberg, 2014	SOGS	Secondary analysis of gamblers from Ontario ($n=2193$) and international gamblers from 105 countries ($n=5079$).	Internal Consistency (Cronbach's α) = 0.83; Specificity (SOGS 5 + vs. clinical assessment) = 90.4%; Sensitivity: (SOGS 5 + vs. clinical assessment) = 85.9%; PPP (SOGS 5 + vs. clinical assessment) = 56.5%; NPP (SOGS < 2 vs. clinical assessment) = 97.8%

Note: *SD* refers to Standard Deviation. *PPP* refers to Positive Predictive Power. *NPP* refers to Negative Predictive Power

methodological issues which may impact upon the reliability and transferability of reported findings (Online Resource 2). The included articles for stage one comprised of 35 descriptive studies, 8 quantitative non-randomised studies, two RCTs, one mixed methods study, and one qualitative study. The risk of nonresponse bias was found to be high in a number of studies which tended to reflect sampling strategies which often failed to capture a representative sample of the target populations. Some examples of this include convenience sampling [47, 68] and online only advertisement strategies [7, 41], which may not have the sensitivity required to establish a representative sample. Most studies reported the use of standardised measures or validated assessment methods to capture data however there were a number of studies which reported the use of study specific screening tools [69], or a reduced number of scale items [68], reducing the reliability of results. Several studies used ICD-10 codes when determining the prevalence of problem gambling within the populations studied, this presents several concerns surrounding reliability with little to no consideration of how and when these codes were attributed to individuals [50]. When examining the reported methods for data analysis most studies were found to have utilised appropriate forms of analysis in relation to the research questions and the types of data collected. Some studies failed to report key information such as demographic distribution [41], or potential confounding variables [70].

The 16 included articles in stage two were all considered to be quantitative descriptive studies and, while most were of good to excellent quality, several exhibited significant concerns regarding nonresponse bias [20, 51, 54, 55, 57, 58, 60, 65, 67]. These studies did not adequately address or discuss nonresponse bias, with insufficient reporting of response rates or the characteristics of non-responders common throughout. This is a concern, particularly in those using convenience samples through online recruitment methods or focusing on specific subpopulations, such as clinical service users, and could impact the reliability and generalisability of findings.

Gap Analysis

We identified a number of interlinked methodological gaps in the research: (i) the potential need for a standardised and validated measure for use with military populations; (ii) the optimal cut-off thresholds for such a measure; (iii) the possible use of a combination of assessment modes and measures to deliver a more comprehensive assessment of gambling in the military population, all of which should be informed by, (iv) further research on individual and systemic factors linked with gambling-related harm in military populations.

A Standardised Measure for Military Populations

Screening and assessment for gambling problems was widely advocated, for military populations broadly [15, 46, 48, 50, 52, 68, 71, 72], or specific sub-populations thought to be at a higher risk [15, 41, 45, 49, 73]. Despite this, there was no apparent consensus as to the most effective measure for the screening of gambling harm. This is perhaps unsurprising given that there is no consensus on the best screening measure for gambling harms in general due to methodological quality [74] and despite the PGSI being considered the international gold standard [75]. Five of the articles reported that further development of standardised screening and assessment tools for military populations was warranted [18, 48, 71, 73, 76]. Given that none of the measures were validated with a military population, and that the sensitivity and specificity of measures are likely to vary according to sub-population [77], this suggests a potential research gap. This notwithstanding, validation may be difficult to achieve due to relatively low numbers of people reporting problems with gambling, as found by Kraus et al.

[73] when assessing the reliability and other psychometric properties of other screens such as the BBGS.

Two of the reviewed articles advocated for the use or development of measures consistent with the GD criteria of DSM-5 rather than the earlier DSM-IV [13, 34]. Stinchfield et al. [24] reported there was a lower threshold for the diagnosis to be made with the more recent DSM-5, and that there was an associated increase its accuracy, although the Otto et al. [74] systematic review suggests the opposite. There have also been measures developed more recently, such as the Gambling Disorder Identification Test (GDIT) [78] where cut-off scores were established with reference to DSM-5 criteria. However, measures derived from clinical instruments should not be used outside of this specific scope as they may have limited application for prevention and public health efforts aimed at in low and moderate risk gambling, particularly when estimating prevalence levels [77, 79].

Both Cowlishaw et al. [12] and Metcalf et al. [80] observed that the PGSI is not a comprehensive measure of all known gambling behaviours and resulting harms, and does not assess the types, or structural features, of gambling [81] or aspects of the environment that might be linked with gambling-related harm. This observation could also be applied to the other measures used in this review. It may be that a battery of standardised measures that can assess various aspects of gambling could be used with military populations. It may also be that a composite measure could be developed which synthesises multiple measures into one comprehensive, validated measure, covering the spectrum of gambling types, harms and environmental drivers of developing gambling problems in Armed Forces populations, as advocated by Caler et al. [82], for gambling more generally. These possibilities warrant further attention.

Optimal Cut-Off Thresholds

Another potentially important research gap to consider when validating measures for military populations is the optimal cut-off limit for screening tools. These threshold cut-offs are the scores that determine category or group membership of individuals. Relatedly, McFarlane et al. [83] suggested that threshold cut-off levels on measures of psychological distress should be lowered when applied to military populations because of the lower likelihood of disclosure [71], and social desirability bias, with separate cut-offs for screening and for epidemiological purposes.

There is also an argument to raise cut-off levels, as has been suggested with the Alcohol Use Disorders Identification Test– Consumption (AUDIT-C), when used with some populations, such as serving military personnel [84]. The recommended conventional cut-off points for AUDIT-C to indicate 'unhealthy' alcohol use are ≥4 for men and ≥3 for women [85]. Duffy et al. [84] found that this would lead to extremely inflated prevalence rates of 'hazardous' and harmful drinking in the serving military population and suggested that optimal cutoffs would be ≥6/7 for male military personnel and ≥5/6 for females– warranting further research. It is of note that a UK Ministry of Defence initiative that introduced alcohol screening into routine dental appointments for all UK Armed Forces personnel used a cut-off of ≥5 for AUDIT-C [86], consistent with Office for Health Improvement & Disparities guidance [87]. Indeed, some [88] have argued that AUDIT cutoffs may require adjustment according to cultural drinking standards, as well as national drinking guidelines. Likewise, it may be useful to consider cultural standards and national guidelines in any further refinement of gambling assessments. Recently, guidelines have been developed to reduce people's risk of experiencing gambling-related harms. The Lower Risk Gambling Guidelines (LRGG) [89, 90] recommend that people: (a) do not gamble more than 1% of their household income per month; (b) do not gamble more than four days per month; and (c) do not gamble more than two types of games regularly. Young et al. [89] suggested that the LRGG guidelines could be adjusted for populations known to be at an increased risk of experiencing gambling-related harms, such as, we contend, military populations.

Combinations of Assessment Modes

Several studies suggested that a means of improving the accuracy of data in future research could involve a mixed economy of measures. These may include self-report measures alongside clinical interviews, behavioural or lab-based assessments for gambling or risk-taking more broadly, and corroboration of data with family members [10, 15, 40, 41, 47, 91, 92]. Other studies recommended a combination of gambling measures if a more comprehensive assessment of gambling problems is required [43, 45, 93]. As described above, research that develops a gold standard protocol for assessing gambling in military populations may be useful.

Consideration of Other Factors

As stated above, several studies suggested that a range of factors could be linked with gambling in military personnel, such as military history, features of military life (e.g. deployments and transitioning out of the military), social/family support and stressors, prior history of trauma, and co-morbidities such as PTSD [9, 43, 89]. Stefanovics et al. [92] suggested that the 'functional difficulties' experienced by veterans at risk of, or experiencing, problems with gambling could inform screening and assessment efforts. This

could either be in the targeting of screening efforts towards more 'high risk' subpopulations, or by informing the development of future assessment measures to ensure relevance.

Discussion

This systematic review aimed to identify the tools currently used to screen for gambling behaviour and gambling-related harm in military populations, evaluate the psychometric properties of the most commonly utilised measures, and conduct a gap analysis to highlight methodological limitations in the existing literature. The review identified 28 distinct screening and assessment tools used internationally; however, most instruments were originally designed for the general population and lacked validation specifically within military contexts. Stage Two of the review evaluated psychometric evidence regarding reliability, specificity, and sensitivity for the six most frequently used tools (PGSI, SOGS, BBGS, GRCS, MAGS, and NODS-CLiP), identifying inconsistent or mixed psychometric evidence across general population studies; however, critically, none of the scales have been comprehensively validated for military personnel or veterans. These findings highlight significant gaps concerning population-specific measures, underscore potential methodological limitations regarding the reliability and accuracy of gambling screens within military contexts, and have important implications for clinical practice.

Population-Specific Measures

Military populations are widely recognised as a distinct demographic often described as 'hard-to-reach' due to their unique occupational and psychosocial circumstances [12, 13, 18]. These groups face elevated risks of experiencing mental health difficulties, including common mental disorders and post-traumatic stress disorder (PTSD), arising from experiences such as combat-related trauma, operational stress, and challenges associated with reintegrating into civilian life [12, 18]. Consequently, military personnel may develop gambling behaviours and associated harms in ways distinct from those observed in the general population, potentially using gambling as a coping mechanism to manage trauma or stress [7]. Despite recognition of these unique factors, the current review identified no gambling-related harm assessment tools specifically tailored to military populations. Given this gap, there is a pressing need for the development of a population-specific measure that can accurately reflect military experiences and contexts. Such a tool could address critical aspects such as the impact of gambling on operational effectiveness and military discipline [18].

The lack of tailored screening instruments is a notable shortcoming of current assessment approaches, particularly brief ones, considering the practical constraints and cultural sensitivities inherent in military settings. Existing tools may inadequately capture critical dimensions of gambling behaviours specific to military and veteran experiences, thereby limiting their effectiveness in accurately detecting gambling-related harm within these populations [12]. Items that explicitly explore relationships between gambling and unique military experiences, impacts on operational duties, and specific gambling behaviours prevalent among service personnel would enhance the nuance and utility of these screening and assessment measures [13].

Moreover, the review underscores the necessity of addressing co-occurring difficulties when developing gambling assessment instruments for military and veteran populations. Studies consistently report high prevalence rates of conditions such as PTSD [39, 90–92], substance misuse [31, 35, 36, 45, 66, 77, 87], sexual trauma and risky sexual behaviours [35, 37, 64], and domestic violence [13]. The intersection of gambling-related harm with these comorbid conditions further highlights the need for assessment tools that adopt a holistic approach. Such comprehensive measures would facilitate a more integrated understanding of the complex support and treatment needs of military personnel experiencing gambling-related difficulties.

Reliability, Specificity and Sensitivity of Gambling Screens

When compared to the diagnostic abilities of clinical interviews, the majority of the scales maintained high specificity and sensitivity, suggesting that they have low rates of false positives and false negatives respectively when identifying gambling disorder at a clinical level [61– [63, 65]. Low sensitivity was reported by MAGS (34%) [63] suggesting a high false negative rate when compared to diagnostic interview of clinical gambling disorder. Hence, in this case, MAGS may not be suited in identifying individuals who need intervention or treatment at not just the clinical level, but also those experiencing gambling-related harms at a sub-clinical level. While the BBGS maintained high sensitivity compared to the diagnostic ability of a semi-structured telephone interview (99.9%), it reported poor specificity (14.1%) with the standard cut-off of endorsement of one symptom, suggesting a high false positive rate [65]. This may apply unnecessary pressure on services if used as the sole screening tool, however, it could be argued that this is better than missing someone that may require treatment, and more precise diagnostic tools could be applied after a respondent is admitted to a support service [65].

Some of the articles selected in the review used the PGSI as the comparator for diagnostic ability [20, 58], positing that PGSI is widely used in numerous community settings, is able to identify harmful gambling from sub-diagnostic to severe levels and remains the "gold standard epidemiological tool for estimating the prevalence of problem gambling internationally" [20]. Articles in the second stage of this review discussing PGSI were interested in the psychometric properties of the scale [53, 55, 57], suggesting that the diagnostic ability of the scale could be enhanced by changing the cutoffs to better fit the population being examined. Indeed, one paper that was identified for the review, but removed to it not reporting pertinent metrics, discussed the applicability of PGSI in older adults, with differential item functioning identifying significantly different item endorsement rates as a function of age, suggesting that specific items lack applicability to different groups [53]. Given the review's findings, PGSI category cutoffs should be reviewed in military specific populations to ensure specificity and sensitivity are maintained with respect to diagnostic ability. Further adaptation of the PGSI for military-specific populations could provide additional enhancement of the diagnostic ability of this popular measure.

Implications for Practice

Practitioners engaged in the care of military populations must be acutely aware of the inherent limitations in the current screening and assessment tools for gambling-related harm. It is likely that the use of online delivery methods in recent years have increased accessibility and reduced participant burden, however this is rarely commented upon. Qualitative data collected by Goodyear-Smith et al. [42] indicated that while most veterans found online platforms useful in reducing time burden and increasing receptivity to share, some individuals did comment that older veterans or those with limited technological skills may have experienced challenges. Historically, clinical interviews have facilitated the efficient and relevant gathering of information. However, recent changes in healthcare delivery systems have introduced external constraints on these interviews, necessitating the collection of detailed and often extensive information within a brief timeframe [94]. Consequently, self-reported screening tools are frequently substituted to alleviate the time burden associated with structured clinical interviews.

The generic nature of these tools, which are typically designed for the general population, means they may not fully capture the unique experiences and challenges that are distinctive to military and veteran groups [13, 18]. The absence of population-specific measures is a significant gap, suggesting that reliance on a single tool may lead to an incomplete or inaccurate assessment of gambling-related harm. This highlights the necessity for practitioners to employ a combination of screening and assessment tools, ideally tailored or adapted to better align with the specific contexts and experiences of military life. By doing so, practitioners can achieve a more comprehensive understanding of the extent and nature of gambling-related harm within these populations, thereby enabling more targeted and effective interventions [12, 20].

Moreover, there is a need for continued research and interdisciplinary collaboration. Developing and validating tools specifically designed for military and veteran populations requires the efforts of researchers, clinicians, and those with lived experience. Such collaboration is essential to ensure that the tools not only reflect the distinctive experiences of these populations but are also sensitive to the broader context in which gambling-related harm occurs. For instance, tools should include items that assess the interplay between gambling and military-specific factors such as deployment-related stress, PTSD, and the transition to civilian life [43, 95]. Additionally, these tools should consider the co-occurrence of other mental health and behavioural issues, including substance misuse, depression, and anxiety which may exacerbate gambling-related harm [39, 92]. By addressing these factors, practitioners can better identify individuals at risk and provide more holistic and tailored interventions, ultimately leading to improved outcomes for this vulnerable population.

Furthermore, practitioners may have to adapt their approaches based on emerging evidence and the evolving needs of military populations. This may involve not only the use of improved screening and assessment tools but also the integration of novel therapeutic approaches that are responsive to the specific challenges faced by these groups. For example, trauma-informed care, which acknowledges the pervasive impact of trauma and seeks to create a supportive and empathetic environment, may be particularly beneficial in addressing gambling-related harm in those with a history of military service [41, 96]. The integration of such approaches into practice, coupled with the use of validated, population-specific screening and assessment tools, can enhance the effectiveness of interventions and ensure that practitioners are equipped to meet the complex needs of military and veteran populations.

Conclusions

Effective, population-specific screening and assessment tools are imperative for the accurate identification of excessive gambling behaviour, and treatment of experiences of gambling-related harm in currently serving personnel, and in veterans and, should be prioritised in future research.

Additionally, researchers should explore the potential for integrating existing and new tools into broader assessment frameworks that consider the full spectrum of mental health and behavioural needs among military populations. By doing so, the tools can provide a more comprehensive assessment, guiding practitioners in the delivery of holistic, person-centred care that addresses not only gambling-related harm but also the underlying issues that may contribute to or exacerbate these difficulties [41, 92].

Key References

- ** Dighton G, Wood K, Armour C, Fossey M, Hogan L, Kitchiner N, Larcombe J, Rogers RD, Dymond S. Gambling problems among United Kingdom armed forces veterans: Associations with gambling motivation and posttraumatic stress disorder. International Gambling Studies. 2023 Jan 2;23(1):35–56. https://doi.org/10.1080/14459795.2022.2063923

  This study is the largest prevalence survey of gambling related harm among UK veterans, and an age- and sex-matched comparison group, and found high rates of problematic gambling motivated by escape/avoidance and the presence of PTSD symptoms.

- * Grubbs JB, Chapman H, Milner LA, Floyd CG, Kraus SW. Comorbid psychiatric diagnoses and gaming preferences in US armed forces veterans receiving inpatient treatment for gambling disorder. Addictive Behaviours. 2023 Dec 1; 147:107840. https://doi.org/10.1016/j.addbeh.2023.107840

  This study showed that US veterans preferred strategic gambling, as opposed to non-strategic gambling, and were more likely to be younger, male, and less likely to have PTSD.

- * Jones M, Champion H, Dighton G, Larcombe J, Fossey M, Dymond S. Demographic characteristics, gambling engagement, mental health, and associations with harmful gambling risk among UK Armed Forces serving personnel. BMJ Mil Health. 2024 Jun 18. https://doi.org/10.1136/military-2024-002726.

  A large sample of serving personnel from all three branches of service of the UK armed forces revealed almost one-quarter had experienced some form of gambling related harm.

- ** Pritchard A, Dymond S. Gambling problems and associated harms in United Kingdom Royal Air Force personnel. Addictive Behaviours. 2022 Mar 1; 126:107200. https://doi.org/10.1016/j.addbeh.2021.107200.

  Over 2000 serving members of the Royal Air Force completed a survey which found that the likelihood of any gambling problem (PGSI ≥ 1) was associated with age (18–24 years old), male gender, and having a non-commissioned rank.

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Data Availability No datasets were generated or analysed during the current study.

Declarations

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