

Suicide Screening Tools for use in Incarcerated Offenders: A Systematic Review

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Background

Self-inflicted deaths (SIDs) in the English and Welsh prison estate¹ have recently been declared as the highest in over a decade; current data demonstrates that 119 SIDs occurred in England and Wales in 2016; representing , an increase of 32% from the previous year (Ministry of Justice, 2017). England and Wales are not unique in this respect and epidemiological studies show that suicide rates in the prison population are greater than that of the general population (Fazel et al., 2011). In European countries, the prison suicide rate is approximately 7 times higher than in the community. (World Health Organisation, 2014). Prison suicide rates in North America are also increasing. Government data shows that self-inflicted deaths increased 9% between 2012 and 2013 and account for over a third of deaths in correctional institutes (Noonan & Ginder, 2013). Although self-inflicted deaths in Australian prisons have decreased in recent years, they are still higher than those at liberty (Willis et al. 2016) as are suicides in Canadian institutes (Sapers, 2011).

Self-harming, or self-injurious behaviours (SIB) also present a challenge for prisons. Case-control data demonstrate the self-harm rate in English and Welsh prisoners are 5-6% in males and 20-24% of females respectively (Hawton et al., 2014). These behaviours can occur for a number of reasons including; as an attempt to influence the environment, emotional regulation, or as a response to the symptoms of mental illness (Jeglic, Vanderhoff & Donovan, 2005). . They have however been identified as a risk factor for suicide in prison; albeit with a comparatively low absolute risk (Hawton et al, 2014). Whilst suicide risk is regarded as generally heightened during the early stages of custody (Crighton, 2006; Dahle, Lohner & Norbert, 2005) previous self-harm can be predictive of suicidal ideation for new prisoners (Slade & Edelmann, 2014)

In England and Wales, recent priorities outlined in agreements made between the National Offender Management Service (NOMS), Public Health England, and NHS England (2015) indicate a commitment to further improving the approach to managing prisoners at risk of both self-harm and suicide

¹ In this paper the term 'prison estate' refers to all institutes used to incarcerate both remand and sentenced offenders.

), Given that early identification of suicidal prisoners is considered important to reduce deaths (Blaauw et al, 2001) the use of risk screening tools seems an obvious consideration. However, to date, this approach has proved controversial and met with, at best, limited success (Perry & Olason, 2009).

Whilst there are clearly defined and well established tools at predicting risk in prison for assessing violence (e.g. HCR-20) and antisocial (e.g. PCL-R) behaviours (Singh, Grann & Fazel, 2011) as well as sexual offending (e.g. Risk Matrix 2000; Thornton et al, 2003) by contrast, screening tools for suicide risk are not so widely standardised or abundant (Perry et al, 2010). Generally forensic risk assessments can be separated into two types- actuarial and clinical assessments, and are the subject of significant debate surrounding which is of superior value (Sjöstedt & Grann, 2002). Clinical risk assessment of suicidality refers to basic questions to guide the end result of management and treatment decisions, whereas actuarial assessments frequently implement historical data and static variables which can overlook current acute presentations (Bryan & Rudd, 2006).

Significant increases in prison populations in multiple jurisdictions have occurred in recent times with prison over-crowding now apparent across the majority of western and non-western countries (Warmley, 2005; Albrecht, 2011). In the UK, prison overcrowding has become the norm since 1994 (Prison Reform Trust, 2014). Likewise, in North America, the population of both males and females in jails and prisons has risen exponentially from 15.4% to 30.4% during 2010-2013 alone. This unprecedented growth has resulted in significant pressures on reception screening processes for suicide risk. Some researchers have categorised prisoner suicide risk factors into four broad, yet distinct categories- demographic factors; clinical factors, psychosocial factors and institutional factors (Barker, Kølves, & De Leo, 2014). The heterogeneity of these risk determinants, along with the pressure of increasing populations, poses significant challenges for adequate risk identification in new prisoners being received into custody.

A range of additional barriers to effective prison suicide risk screening processes have been identified: prisoners frequently not wishing to expose vulnerabilities or not trusting prison staff (Durcan, 2008), restricted time with each prisoner (Steadman et al., 2005), variance in the skills of the risk assessor (Daigle, Labelle, & Côté, 2006), and detainees of different cultures or ethnic minorities potentially perceiving questions differently (Gonzales, Henke & Hart, 2005). Additionally, inmates may only come to the attention of mental health professionals after an overt gesture has been made to self-injure (Blasko, Jeglic & Malkin, 2008). Suicide screening tools may be inappropriate for use in settings other than those which they were designed for but have nonetheless been implemented prior to any additional validation (Boudreaux & Horowitz, 2014; Perry et al, 2010). Likewise, In England and Wales a healthcare reception screening tool for use in primary care in both male and female prisons was developed, yet figures for

sensitivity and specificity rates pertaining to suicide risk were unavailable (Grubin, Carson & Parsons, 2002). An evaluation study found many institutions to be using an untested but modified version of the tool (Shaw et al, 2008).

Whether or not an individual's risk can be identified successfully and appropriate measures applied is a key issue for suicide and self-harm prevention in prisoners (Hawton et al, 2014). However, identifying the risk of suicide is a complete undertaking, with no single scale or combination of scales being able to replicate the benefits of individual psychiatric assessment. (Cochrane-Brink, Lofchy & Sakinofsky, 2000). Some argue that suicide screening can be of little utility as it is costly and reliant on the inaccurate belief that risk can be accurately identified and treated (Towl & Walker, 2015; Walker & Towl, 2016). However, the large numbers of individuals who are at especially high risk of suicide are over-represented in the prison estate (Konrad, Welke, & Opitz-Welke, 2012). This may yet prove to be a decisive factor in establishing the utility of suicide risk screening for prisoners. Ultimately suicide screening in the prison environment will fulfil its purpose if it enables the limited number of professional staff available to focus more precisely on 'at risk' individuals (Dahle, Lohner & Norbert, 2005).

Suicide Terminology

It is important to distinguish between the terms 'suicide' and 'self-inflicted deaths' in custody. Self-inflicted deaths differ from suicides in prison as they may not only include suicide but may also refer to individuals who have taken their lives irrespective of intent (MoJ, 2015). This definition includes accidental deaths where the death is a result of the person's own actions (MoJ, 2016).

All deaths in custody in England and Wales are subject to investigations by police and a coroner's inquest, and a verdict is given whereby NOMS classify the deaths according to the *apparent* cause (MoJ, 2016) This is problematic in two respects. Firstly, defining the base rate of suicide in prisons is difficult when records are unlikely to encompass the rate of all true suicides that have occurred. Secondly, instruments which are used to predict suicide or self-harm risk in prison and are based on self-inflicted deaths may not have accurate sensitivity and specificity and are limited in their accuracy for identifying those who are true risks.

Systematic Reviews of Suicide Screening Tools

A manual search of systematic reviews examining suicide screening tools in adult offenders revealed only one paper. Perry et al (2010) assessed the validity of suicide and self-harm screening tools in adult offenders in studies between 1980 and 2004 with an inclusion criterion of a suicide or self-harming

behaviour screening tool; a mean sample age of <35 years; a population of offenders in the criminal justice system, and a statistical test of reliability or validity. Four different screening tools were located in the literature including the author's own. Data extraction was aided by the Standards for Reporting Diagnostic Accuracy (STARD; Bossuyt et al, 2003) yet screening is not strictly a diagnostic procedure and may prove problematic for accurate critical appraisal of screening tests. Moreover, no distinction was made between self-harm and suicidal behaviours within the review. The act of deliberate self-harm can represent different functions to suicide such as acting as an emotion regulator (Gratz, 2003), or a reaction to emotional pain (Skegg, 2005). Therefore, the need to recognise these two behaviours as distinctive is vital in advancing targeted screening measures.

The applicability of Perry et al's (2010) systematic review is also limited by the decision to only include participants with a mean age of <35 years. Recent research indicates that the ageing prisoner population is growing (Howse, 2011) and psychiatric illnesses have been shown to be one of the most common major illnesses in male prisoners over 60 (Fazel et al, 2001) particularly with elevated rates of depression in ageing prisoners (Murdoch, Morris & Holmes, 2008).

Aims

The primary aim of this study was to provide an updated review which systematically examines the literature of suicide screening tools that have been implemented or validated in an adult prisoner population according to preferred reporting items for systematic reviews and meta-analysis (PRISMA; Moher et al, 2009). This review intends to widen the knowledge base around prison suicide screening tools and contribute to the discussion about the means of reducing prisoner suicide.

Method

Eligibility Criteria

For inclusion in the review studies were required to meet the following standards:

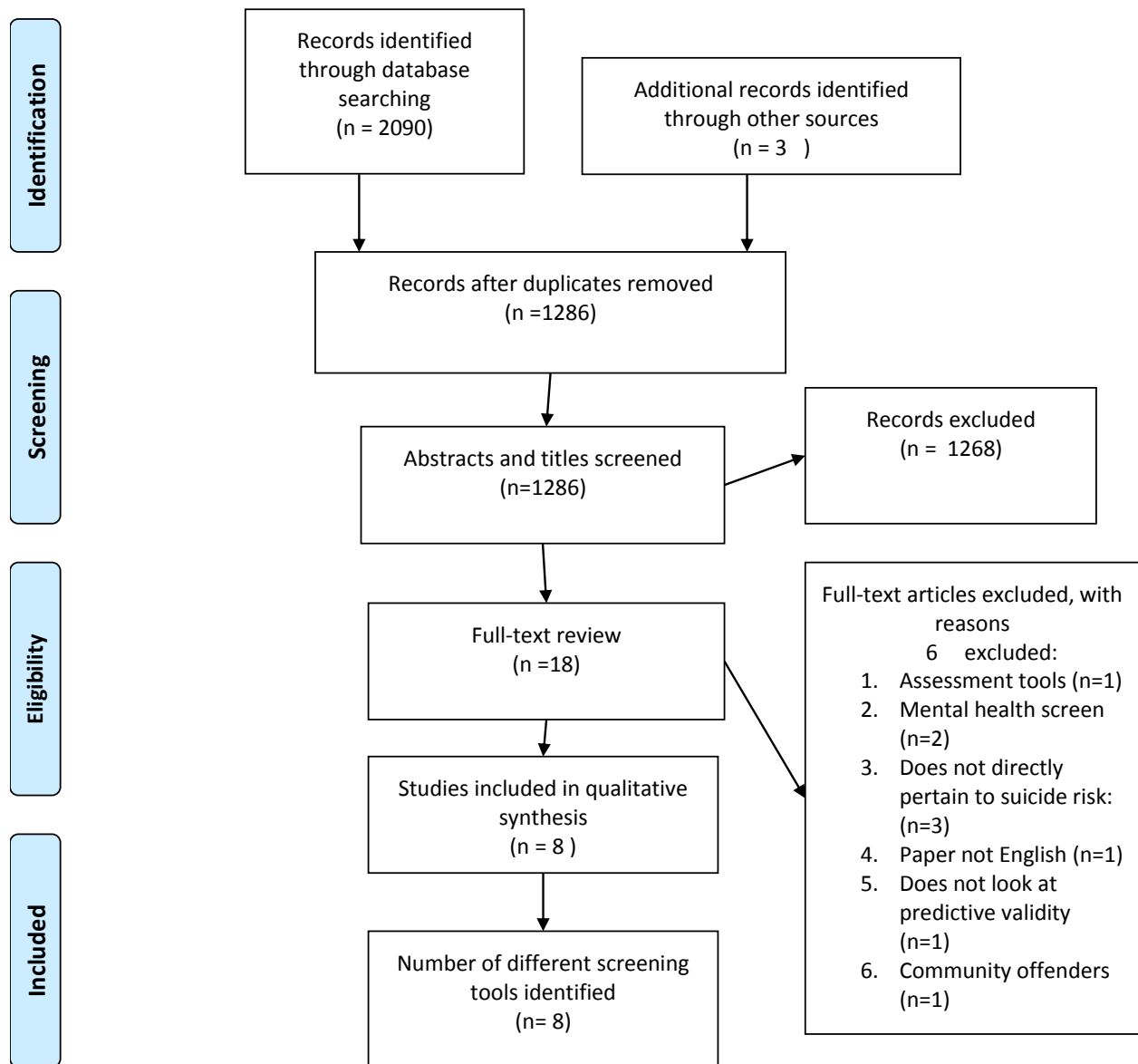
- The screening instrument solely intended to identify prisoners deemed to be at risk of suicide
- A study population of adult prisoners aged 18 years and older
- Included studies were required to be published between January 2000 and February 2016

The study population included those over the age of 18 years to ensure the possibility of extracting the greatest number of scales, where jurisdictions may include this as a young offender/adult. No mean population age was chosen as it was thought that this could exclude studies which may have encompassed a wider age range.

Search Methods

We conducted a systematic literature search within multiple databases using the terms ‘suicide’, ‘suicid*’ ‘prison’, ‘prison*’, ‘correctional’, ‘jail’ ‘screening’ and ‘screen*’, ‘assess*’ and ‘tool’. Synonyms for these terms were located using the thesaurus linked to each database to identify articles that may include additional information under different terms. The different variants for these terms were added together using the ‘OR’ operand then merged together using the ‘AND’ command Figure 1 displays the articles identified in each database:

Fig 1: PRISMA flow diagram to identify extracted studies



As Figure 1 displays, 2090 articles were located from the initial search, but multiple results were omitted from the output as they did not fit the criteria. Articles were predominately sourced from PsycInfo and Medline. Grey literature was searched non-systematically from governmental publications and websites such as National Offender Management Service and NICE, Department of Health, though this yielded no results. However, Canada's correctional service website² generated one paper for inclusion in the review. The Cochrane Database, PROSPERO and the Campbell Collaboration were searched for registered systematic reviews pertaining to screening tools among offenders-this yielded one study but it was excluded as it concerned young offenders only (Perry & Marandos, 2009). Reference lists of all relevant publications were also scanned.

Results

A total of 8 screening tools which sought to validate suicide screening were identified in the literature, as represented by Figure 1. As with Perry et al (2010) a meta-analysis was not performed due to a lack of homogeneity. A narrative synthesis was prompted by recommendations from Popay et al's (2006) guidance on systematic reviews.

The screening tools that were identified are highlighted in Table 1:

² <http://www.csc-scc.gc.ca/index-eng.shtml>

Table 1: Summary of Different Suicide Screening Tools Identified

Author(s) of Study	Tool Used/ Piloted	Country	Prison Specific?	Suicide/ Self-harm Specific?
Wichmann et al (2000)	Suicide Potential Scale (or Suicide Risk Assessment Scale)	Canada	Yes	Yes
Blaauw et al., (2001)	Dutch Suicide Screening Tool	Netherlands	Yes	Yes
Dahle et al (2005)	Dutch Suicide Screening Tool (optimised)	Berlin	Yes	Yes
Mills & Kroner (2005)	Depression, Hopelessness and Suicide Screening Form (DHS)	Canada	Yes	No
Daigle, Labelle, & Côté (2006).	Suicide Risk Assessment Scale (SRAS)	Canada	No	Yes
Perry & Olason (2008).	Self-harm concerns about offenders in prison environment tool (SCOPE)	United Kingdom	Yes	Yes
Frottier et al., (2009)	Viennese for Suicidality in Correctional Institutions (VISCI)	Austria	Yes	Yes
Naud and Daigle (2010)	Suicide Probability Scale (SPS)	Canada	No	Yes
Total Number of Screening Tools	8			

Table 1 highlights that there is a deficiency of suicide specific screening tools which are applicable and validated solely for the UK prison population. Table 2 highlights the study characteristics of the screening tools identified.

Table 1: Characteristics of Suicide Screening Tools

Tool	Author(s)	n	Age	Sex	Study Design	Study Setting	Time after reception when administered	Domains Assessed	Outcome	Reliability	Validity
Suicide Potential Scale (or Suicide Risk Assessment Scale)	Wichman et al (2000)	76 cases, 76 Comparison	Cases: Range 18-50 (M = 23.88, SD 5.46); Comparison: 18-49 (M = 23.9, SD = 5.46)	Male 100%	Prospective matched comparison	Federal prisons in Canada	Administered on reception	Substance use, psychological/psychiatric intervention; previous suicide attempt; recent stressors; suicide ideation; current depression	Suicide attempt (in fact Serious self-harm)	Internal Consistency Cronbach's alpha .77- .81	Discriminant validity: Attempts vs non attempters (F (1,149) = 26.66, p = 0.001; r ² = .17) Revised 5 items: False positive rate = 14%; False negative rate = 20%
Dutch screening tool	Blaauw et al. (2001)	95 suicides; 22 interviews		Both male and female	Retrospective cohort	Prison in the Netherlands	Not administered – records review	drug use, no fixed address, mental health disorders, suicide attempts, Age 40 +	Completed suicide *SID?	Not recorded	Not validated against behaviour. Regression identified factor weighting only.
Dutch screening tool	Dahle, Lohner & Konrad (2005)	60 (30 cases, 30 control)	Range 21-64 M = 33.72 SD= 9.18	Male 100%	Retrospective cohort	Pre-trial detention setting: Berlin, Germany	Not administered, records review	As above	Completed suicide * SID?	Not recorded	Blaauw Original Tool: AUC: .854 (CI: .754-.955) Sensitivity: 83% Specificity: 77% PPP/NPP: 78% / 82% Modified Tool (scoring differences with original tool): AUC: .88 Sensitivity: 70%; Specificity: 93%; PPP: 64%; NPP: 82%
Depression Hopelessness and Suicide Screening Form (DHS)	Mills & Kroner (2005)	232 sentenced only (M = 66 months SD = 62)	19-66 M = 36.5, SD = 11.0	Male 100%	Retrospective	Medium Secure Institution Canada	Intake < 1 day (n = 159) Or pre-parole (N = 113)	Depression, hopelessness, suicidal behaviour	Previous suicide attempt (in fact serious self-harm)	Corrected item-correlation Depression scale .39-.65; Alpha internal consistency = .87. Hopelessness scale correlation range .24-.63; Alpha = .75	Correlations between Basic Personality Inventory and DHS scales ranged between .60-.97 Significant Correlation between self-reported suicide attempt and DHS total score .24 (p <.05). No significant correlation with file recorded previous suicide attempt .13.

Table 1: Qualitative assessment of studies implementing suicide screening tools in prisons

Assessed Domains:	Wichmann et al (2000)	Blaauw et al (2001)	Dahle et al (2005)	Mills & Kroner (2005)	Daigle, Labelle, & Côté (2006).	Perry & Olason (2008).	Frottier et al, (2009)	Naud and Daigle (2010)
Sample size	<100	>300	<100	>200	>600	>1000	>100	>1000
Prospective study	Yes	-	-	-	-	-	-	Yes
Screening test must be completed in person	Yes (officer rated)	Partially	Partially	Yes (self-report)	Yes (officer rated)	Yes (self-report)	Yes - interview	Yes (self-report)
Cause of death determined as suicide or SID	-	Yes	-	-	-	-	Yes	Yes
Sensitivity and specificity calculated/ predictive values	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes
Screening tool validated on both female and males	-	Unspecified	-	-	-	Yes	Yes	-
Measures dynamic risk	Yes	Partially (suicide ideation only)	Partially (suicide ideation only)	Yes	Yes	Yes	Partially (suicide ideation only)	Partially (suicide ideation only)
Predominately actuarial tool	No	Yes	Yes	No	No	No	Yes	Yes

Results

SRAS. The Suicide Risk Assessment scale was found to be more effective at predicating risk than individual psychiatric assessment. The study matched 731 Canadian male suicide attempts with non-attempters (Wichmann, Serin & Motiuk, 2000). Results found that internal consistency and discriminant validity to be sufficient (Cronbach's alpha .77- .81; attempts vs non-attempters ($F(1,149) = 26.66, p = 0.001; r^2=.17$). Sensitivity and specificity was classified as 86% and 80% respectively. A limitation was that the prospective matched comparison was generated from an automated database and no interviews were conducted face-to-face so it was unclear how acceptable the tool is when used with prisoners. A further validation study of the SRAS found it was better at predicting risk than other similar scales and suggested that due to the short nature of the tool (9 items) it was not necessary to have high specificity to ensure positive cases were not excluded (Daigle, Labelle, & Côté, 2006). Where risk predication was found to be more effective than clinical judgement, the scale could be of great benefit when risk needs to be identified with limited resources and time.

SPS. The second scale identified, the Suicide Probability Scale (SPS) (Cull & McGill, 1988 cited in Naud & Daigle, 2010) was validated in a male prisoner population by Naud & Daigle (2010). Although this tool was not originally devised for a prisoner population, predictive validity was achieved through screening a large sample of prisoners and comparing their results against their suicidal behaviour over the next 10

years. Predictive capacity for Area Under the Curve Analysis of the scale varied acceptably from .64 to .69. The authors suggest that the Suicide Probability Scale can be used confidently to assist with first screenings in prison. However, the tool was found to take 20 minutes to administer which is arguably too lengthy to be implemented in busy first night reception centres but could hypothetically be used for comprehensive secondary screenings. Universal measures such as the SRAS and SPS have only been evaluated in limited jurisdictions or using relatively small sample sizes. Further testing is warranted given the differences in risk prevalence and where criminogenic and environmental factors are not accounted for.

DHS. The Depression, Hopelessness and Suicide Scale (DHS; Mills & Kroner, 2005; 2010) was devised specifically for use among Canadian inmates. Unlike other scales that lack an underlying premise, the DHS is based on the theory that depression and hopelessness can be predictive of potential self-harm and suicide. The DHS is a 39 item measure in a true/false format which was found to have adequate internal consistency ($\alpha = 0.87$), factor structure, and construct validity. It was devised to predict suicide risk to a similar degree compared with participants who had completed a psychological risk assessment. There was significant correlation between self-reported suicide attempt and DHS total score (.24, $p < 0.05$). However, given that certain prison experiences and situations may increase suicidal behaviour such as being victimized (Rivlin et al, 2013b); issues with

prisoners and staff (Marzano et al., 2011a), or a higher likelihood of being on remand (Marzano et al., 2011b) the measure may have benefitted from the inclusion of specific items pertaining to the prison environment. Furthermore, Martin et al (2014) suggested that the 12 ‘critical items’ of the DHS which regards all items as ‘equally’ critical can yield unnecessary false negatives.

Additionally, sensitivity or specificity values are unavailable for this tool, denoting uncertainty as to how many false positives and false negatives it could yield.

Prison Specific Suicide Screening Tools

Dutch Suicide Screening. Blaauw et al., (2001) designed a prison based screening tool in the Netherlands to assess those at risk of suicide in prison, and provide clear guidelines on what action to take when a prisoner screens over a certain threshold. Blaauw et al (2001) suggest if scoring past a particular threshold a prisoner should be referred immediately to a psychiatrist, psychologist or psychiatric nurse. The tool produced a sensitivity of 95% of prisoners at risk of suicide. The measure consists of 8 items and is scored based on the statistical correlation with participants’ suicidal ideation. Items include risk factors such as being age 40 years or older, no fixed address prior to confinement, history of drug abuse, and questions regarding previous suicide attempts and ideations.

A study which sought to validate and optimize this measure was able to produce a sensitivity and specificity of 70% and 93% respectively without reducing the reliability of the tool (Dahle, Lohner & Norbert, 2005). The authors identify that the

Dutch tool does not record individual suicidality *per se* but instead identifies specific groups with elevated base suicide rates compared to those found in other detainees. Their study sought to validate the Dutch tool within a German prison population and to eliminate clinical items so the tool could be more easily administered by prison staff. The 30 suicides that were identified by Dahle, Lohner and Norbert (2005) found that 53% of prisoners on remand who were included in the study and completed suicide died within four days of entering custody. Therefore, as Blaauw et al. (2001) screened inmates within 1 week of reception rather than immediately at reception it is argued that their method could fail to identify a significant number of those who go on to complete suicide. Where Dahle and colleagues’ modified tool scores higher on specificity (16% increase from the original Dutch tool), a 13% reduction in sensitivity (83% to 70%) means that clinicians would have to make a decision whether inclusion of higher false positives or higher false negatives was most detrimental to the effectiveness of the tool.

VISCI. The Viennese Instrument for Suicidality in Correctional Institutions (VISCI) was developed to address the issue that existing screening instruments were aimed primarily for use by psychiatrically qualified professionals and were based on the exclusive analysis of suicide cases (Frottier et al., 2009). The VISCI, which is intended to improve identification and management of suicidal inmates, does not have to be administered by a health professional. Risk

parameters include prior offences, number of previous incarcerations, working status, psychiatric diagnosis/intervention, substance use and dependence, as well as suicidal ideation. The sensitivity and specificity of the VISCI were tested using the files of 55 Austrian inmate suicides and 110 controls. Results find that the VISCI discriminates well between those who have completed suicide and those who have not; there is a statistically significant difference of VISCI scores between sentenced offenders who had completed suicide ($n=25$, mean VISCI \pm SEM: 4.75 ± 0.56) and non-suicides ($n=50$, 1.7 ± 0.21 , t -test $p < 0.0001$). The authors submit that the cut-off value is dependent on which preventive resources are available. They also found that the VISCI may aid in directing professional attention to prisoners who have the highest need. However, the study was limited by the fact that the VISCI was not administered by interview but instead by using information available from existing records, meaning that the data may not have been intended for research purposes and therefore certain factors may be uncertain. Ideally screening tools should be validated prospectively and not solely through retrospective records.

SCOPE. One study partially remedied the UK's shortage of suicide screening tools- the suicide and self-harm concerns about offenders in prison environment tool (SCOPE) as developed by Perry and Olason (2009) was implemented and partly validated with prisoners. This study was useful as it validated prospective risk of suicide and self-harm behaviour in both male and female offenders. A 28-item measure assessed

susceptibility to risk of suicide and non-fatal self-harm behaviour in young adult male and female offenders.

Results showed that the SCOPE was able to discriminate between individuals at risk and those with no known history of self-harm/attempted suicide. Whilst internal consistency was found to be moderate (Pearsons' $r = .441$) internal reliability of the items were more promising ($\alpha = .83$). Moreover, the authors acknowledge that the original items of the tool were generated from a small sample of individuals ($n=22$) with a limited age range of 16-22. This could be problematic when translating the tool into a population with adult offenders as it is based on a younger sample who may present a different constellation of issues. Additionally, it is contended that 28 self-report items on separate Likert scales would be time consuming in busy reception environments and more difficult to implement with staff who are not familiar with such scales. The scale itself comprises six responses and forces respondents to choose a non-neutral response as there is no 'neither agree nor disagree' response. This could potentially compel participants into presenting as either more or less at risk of harm than they actually are. Practitioners may need to be mindful of patient acceptability when applying Likert scales in these situations. . Given the limitations of self-report inventories, questionnaires requiring simple, yes/no answers administered by a professional may prove better.

Discussion

SIDs/Suicide Discrepancy

Of the screening tools identified it was, on the whole, difficult to ascertain whether some authors measured true suicide rates or self-inflicted deaths. For instance, the Dutch screening tool (Blaauw et al, 2001) utilised records from penal institutions and hospitals where suicides occurred. However, it is unclear whether these were classified as self-inflicted deaths or suicides, which has previously been identified as problematic in this population type. Although it has been described as ‘conventional’ for suicide studies to include open verdicts (Shaw et al, 2004), this convention allows for the dilution of precise rates of self-inflicted deaths which do not account for intent; a crucial aspect when determining or predicting suicidal behaviour. Overall, the combination of imprecise retrospective outcome measures and the lack of establishment of intent, casts doubt as to how accurate these tools really are in predicting suicidal behaviours. None of the tools identified here appear to make this vital distinction. Any further research would benefit by acknowledging the discrepancies between self-inflicted deaths and suicides in prison.

Actuarial vs Clinical Assessment

Certain tools identified here can be classified as actuarial, in that they predict risk, but yet may not predict clinically identified risk outcomes. These include the SRAS (Daigle, Labelle, & Côté, 2006; Wichmann, Serin & Motiuk, 2000) and the SCOPE (Perry & Olason, 2009). Conversely, the Dutch screening tool (Blaauw et al, 2001) was

derived from statistical analysis to predict suicide risk. This tool purports to be actuarial but its authors recommend that users scoring 24 or more on the instrument, and who are considered to be ‘high risk’, are referred to mental health services for a diagnostic interview without indications on the content of the assessment or the imminence of risk.

The overrepresentation of actuarial tools in this review is problematic. Many screening tools are founded upon a restricted range of risk factors (Crighton & Towl, 2008). Whilst it is not always possible to include all risk factors for a given outcome, the omission of certain risk factors may result in reduced accuracy. With the exception of the SCOPE all of the tools selected for this review used relatively small sample sizes limiting the generalisability of their findings. An important aspect of preventing suicide and successful risk management is the development of suitable care pathways and referrals resulting from any clinical needs identified from reception (Humber et al, 2010). The potential subjectivity of clinical judgement could be considered unreliable when it pertains to suicide risk, so actuarial assessments are more likely to produce more valid results (Suicide Prevention Taskforce, 2002). Suicide risk screening tools should account for these factors when deciding whether to implement actuarial or clinical approaches.

In attempting to predict suicidal behaviours in prison, actuarial assessment may be best for capturing static risk groups, whilst clinical needs assessments may be more suited to informing

dynamic risk assessments over a longer term. It has been suggested that rating scales with total scores can potentially distract professionals from gathering immediately relevant information (Correia, 2000). Accordingly, any prospective suicide screening tool may benefit from comprising actuarial risk assessment at reception with positively scoring cases then undergoing a clinical needs assessment.

Sensitivity & Specificity

Given that suicide is a relatively rare phenomenon in both outpatient settings (Bryan & Rudd, 2006) and in prison (Perry et al, 2010); a lack of specificity is not a fundamental issue when vulnerable populations are involved, especially in the case of short checklists such as the SRAS (Daigle, Labelle & Côté, 2006). In other words, detection of the true negative rate is not as critical as being able to detect the true positive rate in tests for suicide risk. Arguably, it is of more utility to have higher false positives so that more individuals are less likely to be excluded from a suicide screening test. Yet this practice could result in a higher burden on both mental health and clinical resources, something which is already over-stretched within the prison estate (Prison Reform Trust, 2009).

Given the consequences of failure to detect suicide risk there is a need to develop further measures to increase sensitivity without reducing specificity. Problematically there is an inverse relationship between the sensitivity and specificity which alters as the cut-point changes (Warner, 2004). In addition, screening tests generally

endeavour to be inclusive so that higher sensitivity allows for a greater proportion of all potential cases to be identified and then assessed further (Warner, 2004).

Prospective vs Retrospective methodology

Another common theme identified was the use of retrospective methodologies throughout the majority of the extracted studies. Out of all identified studies a total of 6 were retrospective. This has potentially negative implications for the quality of the data and the applicability when using it in vivo because it has not been truly tested on the population it intends to measure. This is problematic as records may not hold accurate data on the population they are assessing and the failure to compare such measures against true participants may prevent latent issues from arising.

Gender Specific Suicide Screening Tools

Despite the fact that suicide amongst female prisoners is disproportionately high compared to community rates (Shaw et al, 2004) this review finds that relatively little attention has been paid to the implementation of female specific suicide screening tools in prisons. Only 3 tools, the VISCI, Dutch Screening tool and the SCOPE included women in the studies and no eligible tools focused exclusively on women. A recent study of in female prisoners demonstrated that those who have been involved in near-lethal self-harm were more likely to be on remand, to have been in custody 30 days or less, had contact with mental health professionals, to have received

psychiatric treatment, and to have experienced adverse life events (Marzano et al., 2011b). Specific male and female instruments may be necessary for accurate risk identification.

Limitations

It is important to acknowledge this review is limited by the quality of the research papers available and the methodology chosen within this review. Over half of the tools identified are retrospective studies; as such a major limitation is the inability of the researcher to interview those who have attempted suicide or self-harmed (Rivlin et al, 2013a). Further, there were some study characteristics which could not be located in some of the papers such as age (Blaauw et al, 2001; Frottier et al, 2009); time after reception when administered (Dahle, Lohner & Norbert, 2005; Frottier et al, 2009); and validity and reliability statistics across all 11 studies excluding two (Mills & Kroner, 2005; Perry & Olason, 2009). As a result, it is difficult to present a full picture of how effective the screening tools are without inclusion of this data.

In addition, the quality and nature of the review was influenced by the subjectivity and experience of the reviewers themselves, and thus will have had an impact on the research herein. The inability to perform a meta-analysis due to heterogeneity meant that data could not be pooled from the search and statistically verified. Thus, conclusions cannot be accurately drawn as to which is the most statistically sound tool to use. Furthermore, the review was constrained by the

fact the search was conducted in English, which may have reduced the number of articles available to synthesise. Studies with a null result and suffering from publication bias, could potentially reduce the number of results obtainable for discussion. Likewise, unpublished reports validating tools within specific establishments; such as part of a service evaluation, were not found. Lastly the intrinsic limitations of this review, stemming in large measure from the small numbers of studies to draw upon, add weight to the notion that prison suicide screening tool methodologies are on the whole obscure, imprecise, and largely in conflict.

Conclusion

The review supports the opinions of previous authors (Towl & Walker, 2015; Walker & Towl, 2016), that at present there are few screening tools which should be considered for use in prisons. However, this is based on the scarcity of robust and effective tools which are available. The one(s) showing the most promise in ease of implementation and prediction of completed suicide are the Suicide Risk Assessment Scale (Wichmann, Serin & Motiuk, 2000) and the Depression, Hopelessness and Suicide Screening Form (DHS; Mills & Kroner 2005). However, even the better tools at risk prediction (e.g. Dutch tool and VISCI) have only one or, at most, two small studies to confirm their validity and, importantly, almost no prospective studies confirming their utility in identifying future acts of harm. Other limitations of these tools include: that tools utilised in the community do not reflect

prison specific aspects (e.g. Daigle, Labelle, & Côté, 2006; Naud & Daigle, 2010;); contain potentially defective or unclear question items (e.g. Mills & Kroner, 2005; Perry & Olason, 2009); take too long to administer to be practical at prison reception (e.g. Naud & Daigle, 2010); are administered too long after entry into prison to be confirmed for use at reception (e.g. Blaauw et al, 2001); have small or insufficient sample sizes (e.g. Daigle, Labelle, & Côté, 2006; Frottier et al., 2009); or are not administered face-to-face with patients which removes current presentational indicators from inclusion (Frottier et al., 2009; Perry & Olason, 2009).

Current screening processes for suicide risk in prisons, both in the UK and internationally have not been adequately validated. Furthermore, this review has demonstrated a distinct paucity of research into prison suicide screening tools across English-speaking countries with only fragmentary instruments in use within these jurisdictions. It is contended that many of these screening tools lack sufficient sensitivity to detect a high proportion of those at risk. As such the generalisability of these tools across multiple jurisdictions is unproven.

We suggest that the lack of uniformity in suicide screening procedures across the wider UK prison estate combined with the failure to open correct risk management documents for significant numbers of those who go on to complete suicide (Hayes et al, 2014; Ministry of Justice, 2015), indicates the need for review of the current system with consideration being given to the value of

incorporating separate actuarial risk assessment and clinical needs tools into reception processes.

Implications for Future Research

Given the continued high rates of suicide in prisons in England and Wales, and internationally the development of an effective and practical prison suicide screening tool would be welcome indeed. An actuarial tool that enables reliable, accurate identification of risk with a high degree of sensitivity could enable the channelling of high-risk prisoners into appropriate healthcare pathways and facilitate the development of robust interventions to prevent avoidable loss of life. A sensitive and accurate tool relative to each jurisdiction and population type is thus required.

There are a number of implications for future research and practice that emerge from this review. The facilitation of a transparent and well managed process to adhere to when prisoners screen positive is required.

The content of the screening measures must be appropriate for the prison environment and the demographic on which they are used. Questions should be as objective and factual as possible so both clinician and patient are able to comprehend them with ease. Additionally, responses should be concise instead of featuring Likert scales or multiple responses which may delay busy reception centres. Any potential suicide screening tool should be capable of being merged with existing reception screening processes. In our view many of the tools examined in this study do not meet this requirement. Where current

screening tools have been validated on small samples in a variety of different settings and populations, the development of new tools will require data from sufficient sample sizes to ensure they are sufficiently generalizable.

While screening tools should never be considered a substitution for clinical practice they could potentially contribute to raising the awareness of risk where overt clinical factors may not be present. This may contribute to the appropriate use of protocols for risk management that otherwise might not have been considered.

Ultimately, for any screening tool to be effective at reducing suicide rates, much will depend on the nurturing of cohesive and productive working relationships amongst different prison staffing groups so that the identified risk of suicide is communicated effectively (Slade & Forrester, 2015). Given that no single suicide prevention measure can be expected to be successful in isolation, efforts should also focus on the treatment and management of psychosocial and psychiatric difficulties of prisoners, along with changes to the prison environment and regime (Marzano et al, 2016).

Some researchers have questioned whether prisoner suicide screening can ever be effective or beneficial. This review demonstrates that whilst there is indeed a lack of existing evidence to support the use of screening tools for suicide in prisons, clear evidence to the contrary is also lacking. Given that suicide is such a significant cause of preventable death in custody, and a major global public health issue, the need for further

research into new and improved screening measures is critical to answer such a complex question once and for all.

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