

Risk and protective factors for self-harm in secure mental health hospitals: a systematic
review

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To appear in Journal of Aggression Conflict and Peace. Accepted 13th November 2023

DOI 10.1108/JACPR-10-2023-0837

Abstract

Purpose - The current review focuses on how risk and protective factors for self-harm in secure mental health hospitals are captured in the literature.

Design/methodology/approach - Fifty-seven articles were included in a systematic review, drawn from an initial 1,119 articles, post duplicate removal. Databases included Psycinfo, Psycarticles, Psycnet, Web of Science and EBSCO host. A thematic analysis was employed, which included a meta-ethnographic approach for considering qualitative papers.

Findings – There was a clear focus on risk factors, with eight identified (in order of occurrence); 1.) Raised emotional reactivity and poor emotion regulation, 2.) Poor mental health, 3.) Traumatic experiences, 4.) Personality disorder diagnosis and associated traits, 5.) Increased use of outward aggression – dual harm, 6.) Constraints of a secure environment and lack of control, 7.) Previous self-harm and suicide attempts, and 8.) Hopelessness. Protective factors featured less, resulting in only three themes emerging (in order of occurrence); 1.) Positive social support and communication, 2.) Positive coping skills, and 3.) Hope/positive outlook.

Research implications – This includes a proposal to move focus away from ‘risk’ factors, to incorporate ‘needs’, in terms of individual and environmental factors. There is also a need for more attention to focus on developing high quality research in this area.

Keywords: Self-harm; Forensic mental health; Forensic hospitals; Risk factors; Protective factors

Introduction

Self-harm is perhaps best defined as self-directed harm that includes physical acts, such as cutting, strangulation, burning and the consumption of harmful substances and/or inedible objects, to name but a few. Such behaviour is a recognised area of concern among patients detained in conditions of security. The prevalence of self-harm in secure services is notably high, with 61% of patients in high secure settings reported to engage in such behaviours (Mannion, 2009). However, it can be difficult to establish the true prevalence of self-harm in secure services, as this can occur in a private space, where staff become aware only if the individual seeks care for the injuries caused (Suyemoto, 1998; Mental Health Foundation, 2006). Thus, in most cases, the reported prevalence is likely an underestimate. The self-harm that occurs in secure services is, however, described as more severe and occurring more frequently, in comparison to the community (Bland et al., 1999; Sarkar & Beely, 2011). In the community, low-lethality self-harm is more common, such as non-fatal cutting and self-poisoning (Runeson et al., 2010).

In addition to a high prevalence of self-harm, the prevalence of suicide within secure units has been noted as an area of concern. For example, between 1972 and 1996 there were 14 suicides within one high secure hospital in Scotland (Ramsay et al., 2001) and between 1972 and 2000 there were 78 suicides reported across the three high secure hospitals in England and 140 following discharge. Men reportedly presented with a seven-fold increase in suicide risk, with women a 40-fold increased risk in high secure services compared to the general population (Jones et al., 2011). The increased risk of suicide in secure services could be a result of the high lethality of the self-harm performed (Sarkar & Beely, 2011), further aggravated by the severity of patient presentation in relation to severe mental illness and/or personality disorder.

Previous self-harm is also noted to be a common pre-existing risk factor and accepted as a particularly reliable predictor of the future occurrence or maintenance of self-harm (Larkin et al., 2014). However, utilising this as the main predictor of future self-harm might be erroneous, as there are likely several risk factors working collectively, which underpin the behaviour. Thus, simply using the previous occurrence of self-harm as a predictor fails to account for underlying causal factors. For example, individual characteristics, such as impulsivity and problem-solving skills, may contribute to the likelihood of self-harm (Larkin et al., 2014), including complexity of pre-determined factors, such as raised levels of substance misuse and an absence of social support (Ribeiro et al., 2015). Thus, those entering secure services present with several vulnerabilities. Furthermore, of those committing suicide in a high secure hospital, many presented with a history of self-harm and often had a diagnosis of treatment-resistant schizophrenia (Ramsay et al., 2001). This points to a complex constellation of factors linked to self-harm in such populations.

Several of the risk factors for self-harm identified in the literature have been found across various populations, though some may be of particular interest within secure services. For example, childhood abuse, prior self-harm and emotional dysregulation have been linked to self-harm in adult, adolescent and student populations, and in psychiatric populations (Adrian et al., 2011; Fox et al., 2015; Glenn & Klonsky, 2011; Gratz & Chapman, 2007; Stagaki et al., 2022). However, in prison settings, isolation has been noted as a particular factor most highly correlated with self-harm (Favril et al., 2020). This finding may also apply to secure mental health services, as there is clear potential for being similarly isolated, such as when placed in seclusion. Furthermore, in secure services, it has been noted that individuals may act aggressively at the start of their detention, as a result of feelings of anger whereas later self-harm may emerge due to feelings of hopelessness (Daffern & Howells, 2009). Therefore, it appears that there is a link between aggression, hopelessness, and self-harm in

forensic samples, highlighting further the process of adjusting to being in secure care.

Engaging in both self-harm and outward aggression is also not uncommon and is referred to as *dual-harming* and is arguably elevated in secure services (Selenius et al., 2016). This may represent a specific factor associated with secure services.

Thus, there is an acceptance that self-harming behaviours is elevated in secure settings. This raises the importance of services being able to capture risk and protective factors simultaneously, to define what is meant by these, and to thoroughly identify what is the most pressing issue for the client rather than focusing on ‘high’ or ‘low’ risk (Fonseca-Pedrero et al., 2022; National Institute for Health and Care Excellence, 2022). Connected to this, there has been a lack of research focusing on protective factors for self-harm (Fliege et al., 2009), especially in secure services, particularly in terms of what these comprise and whether factors can be truly protective for all. This is surprising when it is accepted that assessing risk (for outward aggression) is more predictive when risk *and* protective factors are considered in conjunction (e.g., de Vries Robbé & Willis, 2017; Rennie & Dolan, 2010).

There has been some focus on protective factors and self-harm in the general population, though this is also sparse. For example, a systematic review focusing on self-harm and cyberbullying noted that only one third of articles investigated protective factors (Dorol-Beauroy-Eustache & Mishara, 2021). Those reviewed found that life satisfaction, family and school satisfaction protected against self-harm (Dorol-Beauroy-Eustache & Mishara, 2021; Janiri et al., 2020), as did positive peer relationships (Neufeld et al., 2015; O’Reilly et al., 2022). Evidently, further investigation of protective factors in this area is warranted.

Gaining a better understanding of the factors associated with self-harm in secure (forensic) mental health hospitals can provide an improved framework for risk management and inform individual care plans. To date, there have been no systematic reviews focusing on

risk and protective factors for self-harm in such services. Consequently, the current research will address this area by focused on suicidal and non-suicidal self-harm (since the presence of suicidal intent often can be ambiguous, Sheehy et al., 2019), in secure forensic mental health services. It expects to find a dominance of risk factors in the literature, as opposed to protective factors.

Method and analysis

The systematic review was conducted using PRISMA guidelines (Prisma, 2009), including identification of studies, screening and quality assessment, as follows:

Search strategy

Searches of Psycinfo, Psycarticles, Psycnet, Web of Science and EBSCO host were conducted. The following search terms were used: “Forensic” OR “secure service” OR “forensic psychiatric” OR “secure mental health” OR “secure” AND “self-harm” OR “self-injury” OR “self-harm*” OR “self-injur*” OR “NSSI” OR “self-destruct*” AND “risk” OR “protective” OR “factor” OR “facilitate*” OR “inhibit*”. Manual searching of reference lists were completed to identify further relevant articles.

Inclusion and exclusion criteria

Empirical articles including systematic reviews and both quantitative and qualitative designs, were included, restricted to the English language, that included the search terms. Excluded articles did not focus on risk or protective factors or comprised populations outside of secure mental health hospitals. No time limit was placed on the search.

Eligibility screening

Article titles and abstracts were screened to investigate whether they fulfilled the inclusion criteria. A random sample 10% ($n=16$) of articles were assessed by an independent researcher to assess for full text inclusion eligibility. Interrater reliability was assessed using Cohen’s Kappa, resulting in a score of .88 ($p<.05$; good agreement).

Quality assessment

Three quality assessment measures were utilised to assess risk of bias in the articles. For quantitative studies, the Joanne Briggs Institute Critical Appraisal Tool (JBI; Moola et al., 2017) was utilised. This is an eight-item appraisal tool, with items being rated as *yes*, *no*, or *unclear*. For qualitative studies, the Critical Appraisal Skills Programme (CASP, 2021) was utilised. This is a 10-item appraisal tool, with items rated as *yes*, *can't tell*, or *no*. For mixed methods the Mixed Methods Appraisal Tool (Hong et al., 2018) was utilised. This is a 15-item appraisal tool rated as *yes*, *no*, or *can't tell* (see Table 1). A random sample 10% ($n=6$) of articles were assessed by an independent researcher. Interrater reliability was calculated by Cohen's Kappa, resulting in a score of 1.00 ($p<.05$; very good agreement).

Data extraction and analysis

For qualitative studies, meta-ethnography was utilised. This is an interpretive method, with the aims of critically examining perceptions of a phenomena, systematically comparing views to make conclusions across cases, and synthesising studies (Noblit & Hare, 1988). In accordance with the guidelines, the following steps were undertaken; getting started; deciding what is relevant; reading studies; extracting concepts; and determining how the studies are related (Noblit & Hare, 1988). This was then thematically analysed, following Braun and Clarke's (2006) guidelines by becoming familiar with the data by re-reading the papers to develop codes from within which patterns are observed and themes determined. The themes were refined, and agreement was achieved through discussions among authors.

Included articles

Screening of articles followed the steps put forth by Varker et al. (2015). Firstly, excluding articles based on title and abstract; secondly, determining whether the full texts met the inclusion criteria; thirdly, assessing inter-rater reliability and completing quality assessment; and lastly, data extraction. Of the 2,560 articles initially identified, 1,441 duplicates were

removed, leaving 1,119 articles for assessment. Following title and abstract screening, a further 1,065 articles were removed due to not meeting the inclusion criteria, leaving 51 articles for in-depth screening. Six additional articles were added after reference list review, resulting in a total of 57 articles for inclusion (see Figure 1).

Results

Study characteristics

There was a total of 8,824 individuals included, with 6,495 male, 1,945 female, one transgender, and 383 unknown. Most articles were from Europe ($n=46$), with the UK being the most common ($n=35$). There were 12 articles from non-European countries: The US ($n=7$), China ($n=3$), Ghana ($n=1$), and Australia ($n=1$). Six hundred and four individuals resided in low secure units, 673 in medium secure, 1,886 in high secure, 155 in locked wards, and 5,401 unspecified. The prevalence of self-harm ranged from 6.8 to 100% (see Table 2). Quality assessments resulted in 44 articles receiving a rating of low, 11 articles scoring medium and two articles receiving a rating of high risk of bias. These ratings, coupled with study design, are presented Table 1.

Analysis of themes

The analysis yielded eight superordinate themes linked to reported risk factors for increased self-harming behaviour. These are as follows, presented in order of frequency of occurrence in the literature:

Theme 1: Raised emotional reactivity and poor emotion regulation (19 articles, 33%)

Several articles identified that self-harm was utilised to regulate emotions (Gallagher & Sheldon, 2010; Jeglic et al., 2005; Laporte et al., 2021a; Laporte et al., 2021b; Parkes & Freshwater, 2012; Sandy, 2013), including to release tension (Himber, 1994; Šendula-JengiĆ et al., 2004) and distress (Baker et al., 2013; Long et al., 2012; Shaw & Sandy, 2016). In relation to this, individuals who self-harmed were more likely to report negative internal

experiences (Beasley, 1999; Brown & Beail, 2009) and low self-worth (Dake et al., 2022).

The theme comprised three subordinate themes:

Subordinate theme 1: Impulsivity

Individuals who had difficulties controlling their impulses were noted to be more likely to engage in self-harm (Abidin et al., 2013; Laporte et al., 2021a; Laporte et al., 2021b; O'Shea et al., 2014; Stinson & Gonsalves, 2013). In some instances, impulsivity was also associated with a history of suicide attempts (Stinson & Gonsalves, 2013).

Subordinate theme 2: Feelings of anger

For some, self-harm occurred when individuals felt angry (Gallagher & Sheldon, 2010; Jeglic et al., 2005; Mannion, 2009; Selenius & Strand, 2017), as there were difficulties managing the anger (Hill et al., 2014). In some cases, the anger was directed at others (Liebling et al., 1997), but would later become self-directed, which resulted in self-harm (Parkes & Freshwater, 2012).

Subordinate theme 3: Feelings of guilt and shame

Individuals were noted to utilise self-harm due to feelings of guilt (Mannion, 2009), and this was also voiced by staff members. Individuals expressed guilt for the behaviours they had engaged in, which they perceived as wrong (Sandy, 2013). This resulted in individuals utilising self-harm as a means of self-punishment (Himber, 1994; Laporte et al., 2021b; Mannion, 2009). Some also felt shameful about having engaged in self-harm previously (Himber, 1994).

Theme 2: Poor mental health (18 articles, 32%)

In a third of papers, researchers noted correlations between the presence of psychopathology or symptoms of psychiatric illness and self-harm. Anxiety, depression, or other mood disorders were the most common mental health challenges associated with an increased risk of self-harm (Huang et al., 2022; Jelic et al., 2005; Kappes et al., 2021; Liebling et al., 1997;

Putniņš, 1995; Stinson & Gonzalves, 2013; Zhong et al., 2019). Mood disorder symptomology included significant emotional dysregulation, potentially taking the form of depressive, manic, angry, or anxious feelings. Substance misuse was also associated with self-harm (Brown et al., 2019; Putniņš, 1995).

Schizophrenia diagnoses or hallucinations were also common among the sampled populations (Baker et al., 2013; Brown et al., 2019; Parkes & Freshwater, 2012; Rogers et al., 2011; Selenius & Strand, 2017). Command hallucinations, wherein a person may experience voices telling them to engage in violence toward themselves or others, were present in some cases and could provide a clear explanation for occurrences of self-harm when present (Rogers et al., 2011; Selenius & Strand, 2017). However, in the majority of articles where psychotic symptoms were a focus, the relationship with self-harm was described as purely correlational (Baker et al., 2013; Brown et al., 2019; Parkes & Freshwater, 2012).

Finally, rather than including a distinct category of mental illness, some of the included studies involved participants who were broadly identified as having a history of mental health problems (Uppal & McMurrin, 2009) or substance use issues (Brown et al., 2019; Putniņš, 1995), or were rated as such using clinical measures. Assessments included the HCR-20 (i.e., major mental disorder category; substance use category; Campbell & Beech, 2008) or S-RAMM-C (i.e., psychological symptoms; Abidin et al., 2013). Across all such articles, a significant relationship between the global measure of mental health and incidences of self-harm was observed. Though causal relationships were generally not supported by the research designs reviewed, findings suggest that a variety of mental health challenges could be considered risk factors for self-harm.

Theme 3: Traumatic experiences (17 articles, 30%)

Just under one third of the studies indicated that past traumatic experiences had an impact on self-harm prevalence, with a wide range of experiences identified as increasing risk. The

most studied experiences were childhood sexual, physical, or emotional abuse (Bland et al., 1999; Brown & Beail; 2009; Dake et al., 2022; Holden et al., 2022; Huang et al., 2022; Liebling et al., 1997; McReynolds et al., 2017; Parkes & Freshwater, 2012; Stinson et al., 2021). Two research groups found a relationship between the disruption of early caregiver relationships and frequency of self-harm (Hill et al., 2014; Huang et al., 2022), while another two groups suggested that parental addiction may have an influence (Šendula-Jengiđ et al., 2004; Stinson et al., 2021). Some researchers defined traumatic childhood experiences more broadly, reporting of a variety of incident types within their sample group (Baker et al., 2013; Beasley, 1999; Karatzias et al., 2019). Bullying (Liebling et al., 1997; Mannion, 2009), being involved in legal proceedings (Mannion, 2009), and teen pregnancy (Campbell & Beech, 2018), were categorised by some authors as potentially traumatic and found to be significantly associated with self-harm. Finally, some researchers included incidents that occurred beyond childhood, such as assault (Mannion, 2009; McReynolds et al., 2017) and past or ongoing trauma more generally (Dake et al., 2022). These post-childhood traumas were found to be associated with self-harm.

Theme 4: Personality disorder diagnosis and associated traits (14 articles, 25 %)

There were various personality disorders identified as being associated with self-harm. The most common was borderline personality disorder (Nijman et al., 2005; Šendula-Jengiđ et al., 2004; Stinson & Gonsalves, 2013; Stinson et al., 2021; Wilkins & Warner, 2001). Borderline personality disorder was also associated with an increased risk of suicide attempts (Stinson & Gonsalves, 2013). Further, receiving a diagnosis of a personality disorder in general was associated with an increased risk of self-harm (Beasley, 1999, Campbell & Beech, 2018; Girardi et al., 2021; O'Shea et al., 2014; Selenius et al., 2016), as well as being involved in more incidents of self-harm compared to those without a diagnosis of personality disorder (Girardi et al., 2021). Psychopathy was also associated with self-harm (Swinton et al., 1998),

as well as traits of psychopathy, such as grandiose and manipulative/coercive interpersonal style and glib presentation (Daffern et al., 2010; Das et al., 2007; Vernham et al., 2015).

Theme 5: Increased use of outward aggression – Dual harm (12 articles, 21%)

Approximately a fifth of articles identified that those who engaged in self-harm also engaged in aggression directed at others and objects, termed *dual harm* (Hillbrand et al., 1994; Nijman et al., 2005; Selenius & Strand, 2017; Šendula-Jengić et al., 2004; Verstegen et al., 2020; Webb et al., 2022). It was noted that this was especially the case for those who repeatedly engaged in self-harm, with the aggression they displayed more severe than for those who did not self-harm (Hillbrand et al., 1996; O’Shea et al., 2014). Long et al. (2012) noted that those who were transferred from prison to a secure hospital also displayed elevated levels of aggression to others, during the first six months following transfer. Selenius et al., (2016) identified that those individuals who initiated self-harm when in secure services were more likely to be dual harmers. Previous engagement in aggression (Daffern & Howell, 2009) and those with violent attitudes or ideation (Campbell & Beech, 2018) were found to be at higher risk of self-harm.

Theme 6: Constraints of a secure environment and lack of control (11 articles, 19%)

There were various factors deemed important in the secure environment that increased the risk of self-harm. For example, waiting for things (Selenius & Strand, 2017), use of restraints and penal measures (Šendula-Jengić et al., 2004; Webb et al., 2022), and not having access to preferred items or substances, such as nicotine (Zhong et al., 2019). Further factors included being locked in (Liebling et al., 1997), and isolation (Challinor et al., 2021). It was proposed by staff and patients that self-harm was used to regain a sense of control in a restrictive environment where they had little autonomy (Baker et al., 2013; Brown & Beail, 2009; Sandy, 2013; Shaw & Sandy, 2016). Some individuals reported they self-harmed because they felt they had no control over their emotions (Baker et al., 2013). Notably, Hillbrand et al.

(1996) found that those who repeatedly self-harmed required longer stays within the hospital; given the potential interaction between the environment and risk of self-harm, this could result in a self-perpetuating cycle.

Theme 7: Previous self-harm and suicide attempts (seven articles, 12%)

As had been reported in previous studies, the literature indicated that individuals who had a history of self-harm were more likely to continue to engage in such behaviour (Abidin et al., 2013; Hillbrand et al., 1994). Further, *capacity* was noted to contribute to a future risk of self-harm by patients and was described as being developed through repeated exposure to the behaviour (Caton et al., 2021). That is, individuals enhance their capacity for a behaviour through repeatedly performing it – in this case, by self-harming. Individuals who had engaged in self-harm were also more likely to have attempted suicide in the past (Laporte et al., 2021b; McReynolds et al., 2017), to have experienced suicidal ideation (Jeglic et al., 2005), and/or to presented with an increased risk of suicide (Guo et al., 2021).

Theme 8: Hopelessness (six articles, 10.5%)

Individuals who scored high on hopelessness measures or expressed hopelessness had increased rates of self-harm (Gray et al., 2003; Dake et al., 2022; Jeglic et al., 2005; Mannion, 2009; Selenius & Strand, 2017). Daffern and Howell (2009) identified that hopelessness was more prominent in the latter half of the hospital stay, whereas anger was more prominent in the earlier stages. This suggested that as time passed individuals experienced more hopelessness, which increased the engagement in self-harm. Consistent with this was the finding from staff members, who noted that individuals who engaged in self-harm expressed hopelessness (Shaw & Sandy, 2016).

Protective factors, namely those thought to reduce the risk of self-harm, were noted in 11 articles (19%) and comprised the following three themes, in order of frequency of occurrence):

Theme 1: Positive social support and communication (eight articles, 14%)

Social support and communication (Baker et al., 2013; Liebling et al., 1997; Selenius & Strand, 2017), having access to more patients on the ward (Hardie, 1999), having children/contact with own children (Parkes & Freshwater, 2012; Stinson et al., 2021) and feeling valued (Caton et al., 2021) were all important aspects of this theme.

Theme 2: Positive coping skills (seven articles, 12%)

This comprised distraction techniques (Brown & Beail, 2009), such as walking (Liebling et al., 1997), playing games (Selenius & Strand, 2017) and engaging in leisure activities (Abidin et al., 2013; Baker et al., 2013). Problem-focused coping was found in one study to increase following therapy, which in turn reduced incidents of self-harm (Long et al., 2010).

Theme 3: Hope/positive outlook (three articles, 5%)

This focused on having a future positive outlook (Liebling et al., 1997; Parkes & Freshwater, 2012; Selenius & Strand, 2017), best defined as hopefulness towards the future.

Discussion

The review yielded eight risk factors, with the most frequently occurring focused on individual factors, namely raised *emotional reactivity and poor emotion regulation, poor mental health, traumatic experiences and personality disorder diagnosis and associated traits*. Remaining risk factors were characterised by evidence for *outward aggression* (dual harm), *prior self-harming behaviour* and factors that were more environmentally driven, namely *constraints of the secure environment and lack of control*, coupled with *hopelessness*. The latter is arguably best captured here as an environmental factor since it is a likely feature of placement in such a setting. By contrast, protective factors were less frequently captured in

the literature and comparatively limited, comprising *positive social support and communication, positive coping skills* and *hope/positive outlook*. Evidence for the latter suggests that ‘hopelessness’ falls across a continuum, presenting as a risk factor at one end (i.e., hopelessness) and as a protective factor at the other (i.e., hopefulness). This perhaps serves to also highlight the complexities in determining what is meant by a protective factor since the assumption here is that such factors fall along a continuum, when in fact the relationship may be more individualised. For example, what may present as a protective factor for one individual may be present as a risk for another. Take ‘hopefulness’ as one example – it could be speculated that for some this may in fact increase following a decision to self-harm and represent a means of confirming autonomy and control. In this sense it would represent a marker for risk. Ultimately what is being suggested here is that ‘protective’ factors, like ‘risk’ factors may be individualised and part of a broader array of responding. They may not therefore act in isolation. How such factors can be best defined is perhaps a direction for future research to consider.

Indeed, what was clearly absent from the literature was any consideration of *how* risk and protective factors interact to impact on the risk for self-harm. Rather, it would appear the literature focuses less on the mechanisms by how risk emerges (e.g.. interactions) and more on the cumulative/additive impacts of risk factors. This has perhaps represented a core reason as to why protective factors have been neglected, arguably because focus has been on the identification and, ultimately, mitigation of risk. Nevertheless, the frequent presence of multiple risk factors among forensic patients demonstrating self-harm behaviour indicates that moderating and mediating relationships are likely and that future research should perhaps concern itself more with the interaction between risk and protective factors and the *mechanism(s)* by which risk aggravates and/or mitigates.

This is not to negate the importance of considering individual factors, since a patient ‘profile’ is likely to be of value during clinical handovers and when capturing core information that could be of relevance. Thus, the review demonstrated dominating evidence for individual factors, which could be broken down into those that are amenable to change and those that are more static. In relation to this, individual factors were dominated by those that could be open to increased change through therapeutic intervention, such as those connected to *emotional reactivity and poor emotion regulation, poor mental health and traumatic experiences*. Taking the first theme, anger, guilt and impulsivity were all identified as key elements. It would be useful to consider how these alter across time in that anger has been identified as important in the act of self-harm and often present at the start of detainment in secure services (Daffern & Howells, 2009), with self-harming behaviour used to channel or release anger (Liebling et al., 1997; Parkes & Freshwater, 2012). Guilt, however, also appears and can be at the start of the process but also a maintaining emotional factor (Mannion, 2009; Sandy, 2013) if an individual feels guilt about their self-harming and/or are finding the act of self-harm negatively reinforcing by temporarily removing feeling of guilt. Guilt can, of course, be connected to past actions (e.g., offending), where self-harm is used to punish oneself (Himber, 1994; Laporte et al., 2021b; Mannion, 2009; Power et al., 2016; Snow, 2002), but in the current review it would appear that guilt was also associating with separation from close others, suggesting therefore that the social connection (protective) factor may be of particular importance. Regardless, this begins to demonstrate the potential complexity of emotions and the acceptance and regulation of these. Coupled with this, evidence for trauma responding is acknowledged (Lohner & Konrad, 2007) and it may well be that the emotions emerging (e.g., anger, guilt) resonate with past adverse experiences, which are not processed and thus are being brought into present awareness, causing distress. Underpinning this may be challenges with impulsivity, ultimately driven by

a failure to inhibit (Abidin et al., 2013; Laporte et al., 2021a; Laporte et al., 2021b; O’Shea et al., 2014; Stinson & Gonsalves, 2013) and serving therefore to promote behavioural actions, including self-harming *and* outward aggression. They may share the same function and, in doing so, explain the presence of the *dual harm* theme.

This begins to demonstrate the interplay between risk factors, noting that it is not just the accumulation of factors, but how they are potentially interacting that becomes important. A further layer of complication with a forensic mental health population are the challenges with mental health, which can prove a barrier to effective coping, emotional regulation and inhibition control. Ultimately these factors – emotions, impulsivity, trauma and mental health – are amenable to therapeutic intervention providing that patient responsivity is met. In addition, the goals of emotional acceptance and regulation are likely shared across several treatment modalities that are skills-focused (e.g., Dialectical Behaviour Therapy, Cognitive Behavioural Therapy), or that focused on emotional acceptance/processing (e.g., trauma interventions). This would extend to those presenting with personality disorder/traits, which represented a further risk factor. Again, the shared aspects of emotional regulation, adverse life experiences and impulsivity are salient here, with the *personality disorder/trait risk factor* pointing to a higher dosage of treatment and more boundaried engagement; thus treatment responsivity factors may differ for the self-harming patient whose presentation is dominated by personality challenges to the patient whose presentation is characterised more by poor mental health, whilst equally accepting comorbidity could be an issue. The current review is therefore pointing towards a *treatment pathway approach* to managing self-harming behaviour in a forensic mental health population that accounts for these factors.

Of particular importance, and identified in the review, is a role for the environment. Intervention and management of self-harming behaviour cannot occur in a vacuum. The clients are managing additional risk factors of *constraints of the secure environment and lack*

of control, coupled with *hopelessness*. The latter can be aligned with the protective factor of hope/positive outlook, with increased efforts on seeking ways of restoring hope and also offsetting a factor that commonly underpins hopelessness, namely a low mood. Hopelessness is clearly identified therefore as a core factor of relevance (Liebling et al., 1997; Parkes & Freshwater, 2012; Selenius & Strand, 2017; Shaw & Sandy, 2016). The fact it appears as a risk and protective factor (hopelessness/hopeful) suggests it is pivotal. Addressing hope for the future could be achieved via though purposefulness restoration and raised autonomy, which equally corresponds with the *constraints of the environment factor*, suggesting a need to focus on the psychological impact of this. Indeed, looking to the protective factors of *positive social support and communication* and *positive coping skills* may be a useful means of securing this since both capture the need for social contact and engagement in meaningful activities. Both are known to offset feelings of low mood (with this commonly captured as a mental health element of significance: Huang et al., 2022; Jelic et al., 2005; Kappes et al., 2021; Liebling et al., 1997; Putniņš, 1995; Stinson & Gonzalves, 2013; Zhong et al., 2019) and to provide a sense of purpose. Essentially, what is being suggested is that the protective factors identified in the current review are integrated as ‘off-set’ factors to broadly corresponding risk factors, to raise the positive management of self-harming behaviour and assisting with a greater formulation of what could be absent for a patient that needs to be restored either through environmental change, therapeutic intervention, increased social connections and/or by means of raising autonomy and a sense of purpose. However, equally, we are acknowledging that the definition of protective factors needs some further consideration and how these feature at an individual level as not all may be protective per se.

Limitations and conclusions

The present review acknowledges the limitations taken in the approach and also with the quality of some of the literature reviewed, which places obvious constraints on what can be

reliably drawn from the findings. The scope was limited to a specific population and thus generalisability of findings is not assured. Equally, the review investigated self-harm regardless of the presence or intensity of suicidal ideation. There is, undoubtedly, more diversity in the variable of 'self-harm' than we have captured here and this is fully recognised. In addition, what is presented as a 'risk' or 'protective' factor can be nothing more than a proposed factor, an associate/correlate at most, unless determined by longitudinal inquiry. Indeed, this directs to another core limitation, noted earlier, and which equally reflects a finding in itself, namely the quality of some included studies. The need for more empirically enhanced and longitudinal work so that 'risk' and 'protective' factors can be defined and their contribution to self-harm more clearly indicated via a more detailed and careful analysis of the potential variables is indicated.

Regardless, the current review is presented as a potential starting point for consideration of these issues. The review argues for a greater understanding and capturing of protective factors, however defined, and an understanding of which risk factors can be managed/absolved and how to achieve this, coupled with a monitoring of the more static risk factors that are not subject to change but are part of the historical individual fabric of a patient. Thus, there could perhaps be a refocusing of the literature and clinical practice away from sole consideration of 'risk' factors to 'need' factors. The latter is suggestive more of areas that require intervention and are amenable to this, with these arguably separated further into 'individual need' and 'environmental need' factors. Indeed, we would argue that 'risk' factors represent unchangeable aspects of a patient that are correlated with an increased risk of self-harming (e.g., such as prior history of self-harm and/or past outward aggression/dual harm); 'need' factors would reflect those requiring change. The current review would place the following themes in the 'individual need' factors - *emotional reactivity and poor emotion regulation; poor mental health; traumatic experiences; personality disorder diagnosis and*

associated traits and positive coping skills. In the ‘environmental need’ element would appear *constraints of the secure environment and lack of control; hopelessness; positive social support and communication and hope/positive outlook.* This would appear importance since the management of self-harm in a forensic mental health setting would, through a change in language, become more shared and not predicated solely on the patient ceasing/managing their behaviour. This may represent an important positive shift in the understanding of self-harm, responsibility for the behaviour and identification of how individuals can best be supported.

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Table 1*Summary and Quality Assessment of Articles Included in the Review*

	Country	Reported study type	Sample size	Key findings (Risk/Protective factors)	Quality assessment tool and risk of bias rating using CASP (Critical Appraisal Skills Programme), JBI (Joanne Briggs Institute Critical Appraisal Tool) or MMAT (Mixed Methods Appraisal Tool)
Abidin et al. (2013)	Ireland	Cohort	98	<i>Risk factors:</i> Unresponsiveness to treatment, lack of insight, age at first violent incident, impulsivity, relationship instability, previous self-harm, serious of self-harm, problem solving and mental health difficulties increased risk. <i>Protective factors:</i> Empathy, self-control, medication adherence, leisure activities, and coping abilities	JBI Low
Baker et al. (2013)	UK	Qualitative	5	<i>Risk factors:</i> History of traumatic experiences, difficulties with coping abilities, mental health difficulties, alienation, observing others self-harm, difficulties regulation emotions and lack of control. <i>Protective factors:</i> Social support and meaningful activities	CASP Low
Beasley (1999)	UK	Cross-sectional	28	<i>Risk factors:</i> Personality disorder, childhood traumatic experiences and negative internal experiences	JBI Low
Bland et al. (1999)	UK	Cross-sectional	87	<i>Risk factors:</i> Childhood sexual abuse	JBI Medium

Brown & Beail (2009)	UK	Qualitative	9	<i>Risk factors:</i> Traumatic experiences, negative emotions, history of childhood abuse, and lack of control	CASP Low
Brown et al. (2019)	UK	Cross-sectional	432	<i>Risk factors:</i> History of substance misuse and diagnosis of schizophrenia	JBI Low
Campbell & Beech (2018)	UK	Cohort	89	<i>Risk factors:</i> Personality disorder, major mental disorder, violent ideation/attitudes, low self-esteem, and pregnancy at young age were associated with self-harm. <i>Protective factors:</i> history of prostitution	JBI Low
Caton et al. (2021)	UK	Qualitative	176 (76 patients)	<i>Risk factors:</i> Positive belief in the affective value of self-harm was associated with self-harm, whereas feeling valued acted as a buffer for self-harm	CASP Low
Challinor et al (2021)	UK	Retrospective	118	<i>Risk factors:</i> Isolation, changes to care delivery, and the impact of the covid pandemic	JBI Medium
Daffern & Howells (2009)	UK	Cross-sectional	41	<i>Risk factors:</i> Being at the latter half of hospitalisation and previous engagement in aggression	JBI Low
Daffern et al. (2010)	UK	Cross-sectional	39	<i>Risk factors:</i> Coercive interpersonal style	JBI Low
Dake et al. (2022)	Ghana	Qualitative	9	<i>Risk factors:</i> Hopelessness, low self-worth, religious/supernatural causes, childhood abuse/trauma, and unmet interpersonal needs	CASP Low
Das et al. (2007)	The Netherlands	Prospective	147	<i>Risk factors:</i> Manipulative, glib and grandiose interpersonal style	JBI Low
Esan et al. (2014)	UK	Cross-sectional	138	<i>Risk factors:</i> Intellectual disability and/or autism spectrum disorder diagnosis	JBI Low
Gallagher & Sheldon (2010)	UK	Cross-sectional	29	<i>Risk factors:</i> Dissociation, sensation seeking, interpersonal influence, control, affect	JBI Low

Girardi et al. (2021)	UK	Retrospective	415	regulation, self-punishment, anger and mental illness symptoms <i>Risk factors:</i> High risk at admission, personality disorder and young age	JBI Medium
Gray et al. (2003)	UK	Prospective	34	<i>Risk factors:</i> Hopelessness	JBI Low
Greenwood et al. (2022)	UK	Mixed methods	121	<i>Risk factors:</i> Those who reported to have better sleep quality. <i>Protective factors:</i> Poor perceived sleep quality.	MMAT Low
Guo et al. (2021)	China	Cross-sectional	408	<i>Risk factors:</i> Previous self-harm, problems with work ability, young age, severe mental disorder, and depression/anxiety factors were associated with self-harm. Insight was noted to be protective against self-harm.	JBI Low
Hardie (1999)	UK	Cross-sectional	64	<i>Risk and protective factor:</i> Patient density - if there were more patients on a ward there could a reduction in self-harm incidents.	JBI Medium
Hawley & Maden (2003)	UK	Retrospective and prospective	113	<i>Risk factors:</i> Head injury	JBI Low
Hill et al. (2014)	UK	Cross-sectional	30	<i>Risk factors:</i> Anger management, childhood abuse, and early caregiver disruption	JBI Low
Hillbrand et al. (1994)	US	Retrospective	103	<i>Risk factors:</i> Previous self-harm and aggression towards others and objects	JBI Low
Hillbrand et al. (1996)	US	Cross-sectional	100	<i>Risk factor:</i> Dual harm	JBI Medium
Himber (1994)	US	Qualitative	8	<i>Risk factors:</i> Dissociation, emotional dysregulation, communication of pain, self-esteem, self-punishment, reaching a certain level of blood flow, positive experience of self-harm	CASP Medium

Holden et al. (2022)	UK	Cross-sectional	66	<i>Risk factor:</i> Experience of childhood abuse	JBI Low
Huang et al. (2022)	China	Cross-sectional	423	<i>Risk factors:</i> Childhood abuse, traumatic experiences and mood disorder associated with self-harm and other-directed aggression	JBI Low
Jeglic et al. (2005)	US	Qualitative	4	<i>Risk factors:</i> Hopelessness, suicidal ideation, negative mood states, emotional dysregulation, escape a negative situation, depression, auditory hallucinations, anger, and manipulative behaviours	CASP High
Kappes et al. (2021)	Switzerland	Retrospective	356	<i>Risk factors:</i> Depression, anxiety, hospitalisation, schizophrenia diagnosis, severe psychiatric symptoms, and young age of psychotic symptoms	JBI Low
Karatzias et al. (2019)	UK	Cross-sectional	422	<i>Risk factors:</i> Childhood adversity	JBI Low
Laporte et al. (2021a)	Sweden	Cross-sectional	98	<i>Risk factors:</i> Emotional dysregulation, controlling impulses and difficulties with goal directed behaviour	JBI Low
Laporte et al. (2021b)	Sweden	Cross-sectional	98	<i>Risk factors:</i> Communicating distress, neurodevelopmental disorder, conduct disorder, impulse control, and emotional dysregulation	JBI Low
Liebling et al. (1997)	UK	Qualitative	40	<i>Risk factors:</i> Childhood abuse and traumatic experiences, current detainment, negative emotions, lack of control and leaving school were associated. <i>Protective factors:</i> Talking to others, thinking of someone they cared for, focusing on the future, and engaging in distraction techniques	CASP Medium

Long et al. (2012)	UK	Cross-sectional	34	<i>Risk factors:</i> Transfer from prison and difficulties with stress, safety, and substance misuse	JBI Low
Long et al. (2010)	UK	Pre-test post-test	44	<i>Protective factors:</i> Engaging in a DBT adapted intervention reduced self-harm and anxiety, and increased coping abilities	JBI Medium
Mannion (2009)	UK	Retrospective	57	<i>Risk factors:</i> Being bullied, frustration, self-punishment and guilt, hopelessness, anger, and anxiety about legal case	JBI Medium
McReynolds et al. (2017)	US	Cross-sectional	358	<i>Risk factors:</i> Past suicide attempts, traumatic experiences, and young age	JBI Low
Nijman & á Campo (2005)	The Netherlands	Cross-sectional	149	<i>Risk factors:</i> Borderline personality disorder and young age	JBI Low
O'Shea et al. (2014)	UK	Prospective cohort	504	<i>Risk factors:</i> Personality disorder, impulsivity and difficulties with stress and coping. More likely to engage in dual harm	JBI Low
Parkes & Freshwater (2012)	UK	Qualitative	11	<i>Risk factors:</i> Anger, childhood abuse, negative emotions, communicating distress, emotional dysregulation and auditory hallucinations. <i>Protective factors:</i> Positive outlook on the future, medication compliance, therapy and re-establishing contact with family members	CASP Low
Putniņš (1995)	Australia	Cross-sectional	216	<i>Risk factors:</i> Substance use and negative mood	JBI Medium
Rogers et al. (2011)	UK	Retrospective	110	<i>Risk factors:</i> Command hallucinations and lack of paranoid delusions	JBI Low
Sandy (2013)	UK	Qualitative	25	<i>Risk factors:</i> Emotional dysregulation, self-punishment, secure environment, lack of control, and communicating distress	CASP Low

Selenius et al. (2016)	Sweden	Cross-sectional	130	<i>Risk factors:</i> Hospitalisation, personality disorder and ADHD	JBI Low
Selenius & Strand (2017)	Sweden	Qualitative	13	<i>Risk factors:</i> Waiting for things in the secure setting, violent ideation, aggression to others, feeling a compulsion to self-harm and negative emotions. <i>Protective factors:</i> Talking to others to reduce negative emotions, using distraction techniques, and thinking about the future	CASP Low
Šendula-Jengiđ et al. (2004)	Croatia	Cross-sectional	65	<i>Risk factors:</i> Traumatic experiences during childhood (parental addiction), aggression to others, borderline personality disorder, and previous imprisonment	JBI High
Shaw & Sandy (2016)	UK	Qualitative	80	<i>Risk factors:</i> Residing in a secure environment, hopelessness, and distress	CASP Low
Stinson & Gonsalves (2013)	US	Cross-sectional	1184	<i>Risk factors:</i> Mood disorder, borderline personality disorder, impulse control disorder and have committed a sex offence	JBI Low
Stinson et al. (2021)	US	Retrospective	182	<i>Risk factors:</i> Traumatic experiences during childhood (parental substance abuse) and borderline personality disorder. <i>Protective factors:</i> Having biological children	JBI Low
Swinton et al. (1998)	UK	Cross-sectional	80	<i>Risk factors:</i> Psychopathic disorder and young age	JBI Low
Uppal & McMurrin (2009)	UK	Cross-sectional	325	<i>Risk factors:</i> Mental illness and learning disability	JBI Low
Vernham et al. (2015)	UK	Retrospective	204	<i>Risk factor:</i> Coercive interpersonal style	JBI Low
Verstegen et al. (2020)	The Netherlands	Cross-sectional	614	<i>Risk factor:</i> Being aggressive to others	JBI Low

Webb et al. (2022)	UK	Retrospective	34	<i>Risk factors:</i> Physical aggression and being restrained. <i>Protective factors:</i> More developmental disorder diagnoses	JBI Low
Wilkins & Warner (2001)	UK	Cross-sectional	16	Borderline personality disorder	JBI Low
Wilkinson & Beryl (2021)	UK	Mixed methods	15	<i>Protective factor:</i> Sensory approach reduced distress and was utilised to manage self-harm	MMAT Medium
Zhong et al., (2019)	China	Qualitative	21	<i>Risk factors:</i> Low mood, depression, and residing in a secure environment	CASP Low

Figure 1

Study chart depicting the systematic review process, adhering to PRISMA

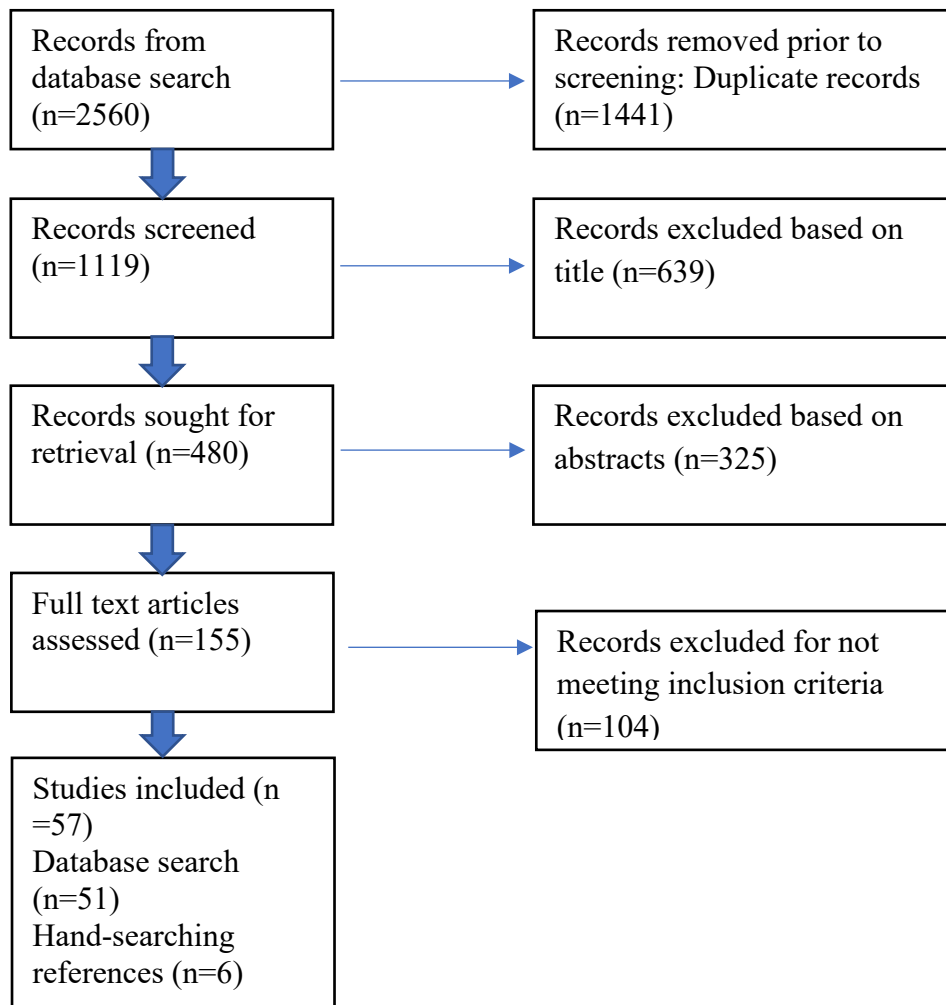


Table 2
Demographic Information Details

	Country	Sample size	Sex	Age in years (<i>M</i>)	Level of security	Self-harm prevalence	Diagnosis
Abidin et al. (2013)	Ireland	98	6 female, 94 male	M40.45	Unknown	7%	Schizophrenia 69%, schizoaffective 16%, bipolar 7%, recurrent depressive disorder 5%, intellectual disability/learning disability 3%
Baker et al. (2013)	UK	5	Female	Unknown	Medium	100%	Borderline personality disorder 100%
Beasley (1999)	UK	28	15 female, 13 male	M29.07	Unknown	20.37%	Personality disorder 14, mental disorder 13, learning disability 1
Bland et al. (1999)	UK	87	Female	M39.24	High	84%	Psychopathy 29%, mental illness 63%, both 8%. Personality disorder 56%, paranoid schizophrenia 46%, affective disorder 13%, schizoaffective disorder 13%
Brown & Beail (2009)	UK	9	4 Female, 5 male	Unknown	Unknown	Unknown	Unknown
Brown et al. (2019)	UK	432	39 female, 392 male, 1 transgender	M44.47	High 32.9%, medium 13.2%, low/open 36.8%, unknown 17.1%	71.8%	Schizophrenia 70.4%, schizoaffective 7.8%, bipolar 5.8%, dissocial personality disorder 2.3%, emotional unstable personality disorder 2.3%, mixed personality disorder 1.2%, psychosis 2.3%, acquired brain injury 1.4%, other 6.5%
Campbell & Beech (2018)	UK	89	Female	M34.88	Locked wards 6.7%, medium	60.67%	Personality disorder 37, schizophrenia 34, substance misuse disorder 7, mood disorder 4, eating disorder 3, PTSD 2, OCD 1, conduct disorder 1

					35.96%, low 57.3%		
Caton et al. (2021)	UK	176 (76 patients)	Male	Patients M38	High	90%	Unknown
Challinor et al (2021)	UK	118	Male	Unknown	High	Unknown	Unknown
Daffern & Howells (2009)	UK	41	Male	M34.05	High	48.78	Unknown
Daffern et al. (2010)	UK	39	Male	M37.95	High	20.51%	Personality disorder
Dake et al. (2022)	Ghana	9	5 Female, 4 male	Range 26-48	Unknown	100%	Unknown
Das et al. (2007)	The Netherlands	147	Male	Institution 1 M16.7, institution 2 M15.4	Unknown	6.80%	Unknown
Esan et al. (2014)	UK	138 (autism spectrum disorder n42, non-autism spectrum disorder n96)	29 female, 109 male	Autism spectrum disorder M30.1, non-autism spectrum disorder M30.6	Unknown	80.43%	Psychosis 27, bipolar, 15, depressive disorders 22, harmful use or dependence on substances 39, personality disorder (flamboyant) 77, dissocial personality disorder 68, emotionally unstable personality disorder 38, epilepsy 21.
Gallagher & Sheldon (2010)	UK	29	Male	M32.9	High secure	100%	Antisocial personality disorder 89%, borderline personality disorder 61%, paranoid personality disorder 36%, antisocial and borderline personality disorder 54%

Girardi et al. (2021)	UK	415	Female	Received enhanced support M31.3, no enhanced support M45.2	Specialist locked, low and medium secure	28.4%	Organic mental disorder 48; mental and behavioural disorders owing to substance use 6; schizophrenia, schizotypal and delusional disorders 96; mood disorders 22; neurotic, stress-related and somatoform disorders 7; behavioural syndromes associated with physiological disturbances and physical factors 7; disorders of adult personality and behaviour 219; behavioural and emotional disorders with onset usually occurring in childhood and adolescence 2; mental retardation 1; disorders of psychological development 7
Gray et al. (2003)	UK	34	Male (76.5%) Female (23.5%)	M33	Medium secure	52.9%	Paranoid schizophrenia 44.1%, depression 23.5%, personality disorder 14.7%, other (bipolar affective disorder, neurosis, organic disorder) 17.6%.
Greenwood et al. (2022)	UK	121	Male	Unknown	High secure	Unknown	Paranoid schizophrenia and borderline/antisocial personality disorder; schizophrenia; schizoaffective disorder; bipolar affective disorder; unspecified non-organic psychosis; personality disorder
Guo et al. (2021)	China	408	Male (73.8%)	M44.3	Unknown	20.6%	Schizophrenia 91.2%
Hardie (1999)	UK	64	Unknown	Unknown	Admission and intensive care unit	48%	Unknown

Hawley & Maden (2003)	UK	113	Male (82.3%)	M35.6	Medium secure	60-61%	Psychosis/schizophrenia 84; mood disorder 10; personality disorder 18; learning disability 4; substance misuse 3; organic disorder 3; other 1.
Hill et al. (2014)	UK	30	Female	M16.41	Medium secure	100%	Psychotic disorder 5; bipolar affective disorder 1; depression 2; conduct disorder 1; mixed disorder of conduct and emotions 21
Hillbrand et al. (1994)	US	103	Male	Self-harm M29.9% No-self-harm M34	High secure	51%	Schizophrenia 35; alcohol or substance abuse/dependence 62
Hillbrand et al. (1996)	US	100	Male	Repeated self-harm M30, single act of self-harm M37.4	High secure	53%	Schizophrenic disorders 17; affective disorders 13; personality disorders 6; alcohol/substance abuse/dependence 1(4%), delusional disorders 4; mental retardation 7; psychotic disorders NOS 2; other 2
Himber (1994)	US	8	Female	Unknown	Unknown	100%	Unknown
Holden et al. (2022)	UK	66	Female	M38.4	Medium secure	54.5%	Schizophrenia, schizotypal and delusional disorders 57; mood (affective) disorders 4; disorders of adult personality and behaviour 5; comorbid personality disorder 20; alcohol misuse 25; drug misuse 34
Huang et al. (2022)	China	423	Male (90.5%) Female (9.5%)	M34.24	Unknown	17.5%	Non-psychiatry 69; schizophrenia spectrum disorders 237; mood disorders 37; substance related disorders 36; other 44

Jeglic et al. (2005)	US	4	Male 75% Female 25%	M30.5	High secure	100%	major depressive disorder 1; borderline personality features 1; depression 1
Kappes et al. (2021)	Switzerland	356	Male 91.6%	M34.1	Unknown	24.4%	Schizophrenia spectrum disorder 291
Karatzias et al. (2019)	UK	422	Male 91%	M41.47	Low, medium, high secure, rehab units, intensive psychiatric care units	75%	Schizophrenia 303; alcohol harm 1; drug harm 1; drug dependence 1; drug withdrawal 4; schizotypal 1; delusional disorder 4; acute transient psychotic disorder 1; drug psychosis 1; schizoaffective disorder 34; unspecified non-organic psychosis 4; manic episode 1; bipolar affective disorder 25; depressive episode 2; recurrent depressive disorder 1; PTSD 2; antisocial personality disorder 10; emotionally unstable personality disorder 10; mixed personality disorder 5; ADHD 2; other 6; unknown 3
Laporte et al. (2021a)	Sweden	98	Male 86.7%	M34.9	High secure	68.4%	Neurodevelopmental disorders n46; schizophrenia spectrum and other psychotic disorders 69; bipolar and related disorders 24; anxiety disorders 28; obsessive-compulsive and related disorders 7; trauma and stressor-related disorders 18; disruptive, impulse-control and conduct disorders 17; Substance-related and addictive disorders 63; personality disorders 42; paraphilic disorders 2; other mental disorders 10
Laporte et al. (2021b)	Sweden	98	Male	M34.9	High secure	68.4%	Neurodevelopmental disorders 46; schizophrenia spectrum and other psychotic disorders 69; bipolar and related disorders 24; anxiety disorders 28; obsessive-compulsive and related disorders 7; trauma and stressor-related disorders 18; disruptive,

Liebling et al. (1997)	UK	40	Female	Range 22-46	High secure	100%	impulse-control and conduct disorders 17; Substance-related and addictive disorders 63; personality disorders 42; paraphilic disorders 2; other mental disorders 10
Long et al. (2012)	UK	34	Female	M31.7	Medium secure	91%	Personality disorder 67%; mental illness 21%; learning disabilities 7%
Long et al. (2010)	UK	44	Female	M31.7	Medium secure	Unknown	Personality disorder 26; schizophrenia 8
Mannion (2009)	UK	57	Male	M34.86	Unknown	61.4%	Personality disorder 31; schizophrenia/schizoaffective disorder 10; bipolar/depressive disorder 3
McReynolds et al. (2017)	US	358	Female 32.4%	M17.3	Unknown	25.7%	Personality disorders: cluster B only 25; cluster A and B 6; cluster A and C 1; cluster B and C 3; no definite diagnosis 6
Nijman & á Campo (2005)	The Netherlands	149	Male and female	M35.8	Locked admission ward	26%	PTSD 9; major depressive disorder 22; conduct disorder 73; substance use disorder 99
O'Shea et al. (2014)	UK	504	Male 69% Female 31%	M39.79	Low secure 75.2% Medium secure 24.8%	13.5%	Unknown
Parkes & Freshwater (2012)	UK	11	Female	M35.34	Medium secure 36% High secure 64%	100%	Schizophrenia 220; personality disorder 72; co-morbid schizophrenia and personality disorder 42; developmental disorder 33; organic disorder 32; other/multiple diagnoses 105
							Paranoid psychosis/mixed personality disorder 1; schizophrenia 1; borderline personality disorder 2; borderline personality disorder/depression/anxiety disorder 1; mental illness (psychosis) 1; personality disorder/mental illness 2; antisocial

Putniņš (1995)	Australia	216	Male 85.1%	M16	Unknown	34.4%	personality disorder (psychopathic) 2; mental illness (schizophrenia) 1 Unknown
Rogers et al. (2011)	UK	110	Male 88 Female 22	Unknown	Medium secure	18%	Schizophrenia 80; mood disorder 16; borderline personality disorder 8; antisocial personality disorder 2, other 4 Unknown
Sandy (2013)	UK	25	Unknown	Unknown	Unknown	Unknown	Unknown
Selenius et al. (2016)	Sweden	130	Female	M33	High secure	88%	Schizophrenia and other psychotic disorders 32; mood disorder 12; personality disorder 77; substance related disorders 40; ADHD 24; pervasive developmental disorders 13 Mild mental retardation 1; pervasive developmental disorder 4; ADHD 4; oppositional defiant disorder 1; poly substance-related dependence 2; schizophrenia 2; schizoaffective disorder 1; bipolar disorder 1; anxiety disorder 1; dissociative disorder 1; impulse control disorder NOS 1; borderline personality disorder 2; personality disorder NOS 2 Self-destructive behaviour: personality disorder 53.84%, borderline personality disorder 30.77%, antisocial personality disorder 15.38%. Attempted suicide: psychosis 80.95%, paranoid schizophrenia 61.9%. No suicidal behaviour: paranoid schizophrenia 61.9%
Selenius & Strand (2017)	Sweden	13	Female	Unknown	High secure	77%	
Šendula-Jengiđ et al. (2004)	Croatia	65	Unknown	Range 21-60+	Unknown	52%	

Shaw & Sandy (2016)	UK	80	Female and male	M29	Low and medium secure	Unknown	Unknown
Stinson & Gonsalves (2013)	US	1184	Male	M40.4	Low, medium, and high security	27% sex offenders, 18% non-sex offenders	Mood disorder 595; anxiety disorder 117; psychotic disorder 726; impulse control disorder 115; paraphilia 67; antisocial personality disorder 418; borderline personality disorder 68; other cluster B personality disorder 31; other personality disorder 95; cognitive disorder 363
Stinson et al. (2021)	US	182	Male 81%	M32.5	Unknown	65.4%	Psychotic disorder 109; intellectual disability/cognitive developmental disorders 105; mood disorder 83; impulse control disorder 41; antisocial personality disorder 38; PTSD 24; borderline personality disorder 20; ADHD 18; anxiety disorder 16; paraphilic disorder 12; other personality disorder 35
Swinton et al. (1998)	UK	80	Female	M33.1	High secure	69%	Psychopathic disorder 39; mental illness 30; mental impairment 4; combined categories 7
Uppal & McMurrin (2009)	UK	325	Male 86.4% Female 13.6%	Unknown	High secure	30.9%	Unknown
Vernham et al. (2015)	UK	204	Male	M41.53	High secure	9.80%	Paranoid schizophrenia or delusional disorder 48%, personality disorder 28.5%
Verstegen et al. (2020)	The Netherlands	614	Male 85% Female 15%	M39.6 no violence M37.9 any physical violence	Unknown	Unknown	No violence (483): antisocial personality disorder 20.3%, borderline personality disorder 9.1%, schizophrenia spectrum disorder 53.1%, intellectual disability 17.1%. Any physical violence (132): antisocial personality disorder 20.6%, borderline

Webb et al. (2022)	UK	34	Male 76.5% Female 23.5%	M15.5	Low secure 11.7% Medium secure 44.1% High secure 55.9%	Unknown	personality disorder 18.3%, schizophrenia spectrum disorder 58%, intellectual disability 17.6% Mild intellectual disability 22; borderline intellectual disability 2; moderate intellectual disability 7; other DD diagnosis 3
Wilkins & Warner (2001)	UK	16	Female	Unknown	High secure	Unknown	Borderline personality disorder 16
Wilkinson & Beryl (2021)	UK	15	Female	M39.6	High secure	Unknown	Emotionally unstable personality disorder 80%, schizoaffective disorder 13.3%, complex PTSD 6.6%
Zhong et al., (2019)	China	21	Male 90.4% Female 9.6%	M45	Unknown	Unknown	Schizophrenia 100%
