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SYSTEMATIC REVIEW ARTICLE

A Systematic Review of Systematic Reviews Exploring the Factors Related to Child and Adolescent Self-Harm

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Abstract: Background: In recent years, the rates of young people presenting with self-harming have increased dramatically, with self-harm being a predictor of suicide. Despite evidence suggesting that self-harm is common in young people and that hospital admissions are increasing, research exploring the reasons behind young people's motivations is not easily accessed. Systematic reviews have explored this from a range of perspectives, but none have drawn all this literature together.

Methods: A systematic review of systematic reviews was conducted in accordance with PRISMA guidelines. Seven databases were searched using a peer reviewed search strategy, with a focus on the factors of child and adolescent self-harming. All English language articles, published between 2008 and 2021, were considered, and screened against inclusion criteria. References of included articles were also searched for eligible articles.

Results: Twenty-two systematic reviews were included after screening against eligibility criteria. Narrative synthesis identified eight themes for motivation or reasons for self-harming: identity and subcultures, peer influences, educational stressors, mental ill health, cognitive and neuropsychological factors, trauma and attachment, internet influences and social media.

Conclusion: Reasons for self-harming in adolescents are complex and multifactorial. Many studies focus on single causes or associations with self-harm rather than open-mindedly exploring a range of factors or the interactions between them. This leaves gaps in the research where hypothetical reasons for self-harm have not been systematically explored. The themes identified here could help in the clinical assessment process and guide future research in this area, including the development of potential differentiated prevention and treatment approaches.

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1. INTRODUCTION

Suicide is the second most common cause of death amongst young people aged 5-19 years in

the UK (Office for National Statistics, 2015) and the second most common cause globally for people aged 15-29 (World Health Organization, 2016). A history of self-harm (including self-poisoning or self-injury regardless of intent) is one key risk factor for suicide in adolescents (Hawton & Harris, 2007). Over half of adolescent

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and young adult suicides (aged under 20 years) in the UK occurred in those who had previously self-harmed (National Confidential Inquiry into Suicide and Homicide by People with Mental Illness, 2017).

There has been extensive research over the past three decades into self-harming behaviours which has resulted in a number of different but overlapping definitions. To avoid ambiguity in this review the term self-harm shall refer to all self-harming acts, regardless of suicidal intent, unless otherwise specified. Self-harm has a complex relationship with completed suicide, research indicates that methods with low lethality, such as cutting, are sometimes used by young people to manage suicidal ideation (Brown *et al.*, 2002, Boynton & Auerbach 2004, Brown & Kimball 2013). Conversely, research has also indicated that many who self-harm are often ambivalent about the risk of death to themselves (Kapur *et al.* 2013, Orlando *et al.* 2015, Wilkinson *et al.* 2018) and the act of self-harm can desensitise the person to self-inflicted pain, leading to more lethal methods to be considered (Klonsky *et al.* 2013).

Adolescence is associated with increased rates of self-harm (Hawton *et al.*, 2003; Fliege, 2009; Meltzer *et al.*, 2001; Nock, 2010) with an international prevalence estimated at 18% (Muehlenkamp *et al.*, 2012). There is evidence to suggest that adolescent self-harm is increasing in the UK (Social Care Institute for Excellence, 2005; Public Health England, 2017) and other western (Madge *et al.*, 2008) and developing countries (Eddleston, 2000). An increasing number of young people are being admitted to hospitals (Health and Social Care Information Centre, 2014) and to child mental health units (House of Commons, 2014) following self-harm in the UK. Excluding Emergency department attendance, admissions increased by 36% due to self-harm between 2012 and 2019 (Public Health England, 2020). This occurs at a time when mental health problems, most common emotional disorders, are increasing in adolescents (Wright *et al.*, 2020).

A previous systematic review of risk factors based on population studies has been carried out (Evans *et al.*, 2004). There are also numerous other studies and reviews that explore single or themed motivations from young people to self-harm, but these are not considered together. For example, systematic reviews may separately consider the influence of the internet, social media, school, or peer influences but do not consider these in combination. A systematic review of systematic reviews is a methodology that enables these to be brought together. Updating and furthering our understanding of these factors is imperative to guide the development of societal and health responses and interventions (Wright *et al.*, 2013), given the multiplicity of areas that these could be targeted. Such areas could include prevention (Robinson *et al.*, 2011), reduction of stigma (Naylor *et al.*, 2009), promotion of resilience, self-efficacy and coping strategies (Mikolajczak *et al.*, 2009; Reisner *et al.*, 2014), interventions for depression (Middleton *et al.*, 2005), psychosocial interventions (Corcoran *et al.*, 2011), emergency care (Newton *et al.*, 2010), and cultural interventions (Cervantes *et al.*, 2014).

A number of previous systematic reviews have explored motivations and aetiology of self-harm in young people. This systematic review brings together and synthesises these to create a comprehensive understanding of the reasons young people give for self-harm, and to identify research gaps to help inform the development of future research and interventions within this area.

2. METHODS

2.1. Search Strategy

The review included systematic reviews focussed on the factors related to adolescent self-harming. Embase, CINAHL, PubMed, MEDLINE, PsycINFO, PubMed, and Web of Science were searched for eligible studies between 1st January 2008 to 12th February 2021. The database searches took place on 12th February 2021. This systematic review followed the Preferred Reporting Items for Systematic Reviews

and Meta-Analysis (Moher, 2009). Terms such as ‘self-harm’, ‘self-injury’, ‘adolescent’ and ‘child’ were included as search terms. The full search strategy is included as Appendix 1.

2.2. Selection Criteria

Retrieved articles were initially screened by title and abstract by two independent reviewers. After this screening, the full text of potentially eligible articles was obtained and assessed for eligibility by two independent reviewers. Disagreements were resolved by discussion and by a third independent reviewer. The reference lists of the included articles identified were also searched. A protocol for this review was registered with the PROSPERO registry (https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42019136541).

To be included in the review, the record had to meet the following criteria:

- Be published between January 2008 and February 2021 (to capture recent trends).
- Study design: A systematic review.
- Explore reasons, motivations and influential factors related to young people self-harming (‘self-harm’ referring to all self-harming acts, regardless of suicidal intent).
- Report data focussing on children and adolescents (aged 18 or below)*.
- Written in English.

*(Studies reporting for wider age ranges were included if the data was separated for those aged 18 years or below).

2.3. Data Extraction, Quality Assessment and Analysis

The AMSTAR2 (Shea *et al.*, 2017) was used to critically appraise the included studies. Guidelines set out by Hartling and colleagues (2012) that included outlining clear objectives, using explicit methods to identify systematic reviews, collecting and synthesising data were followed. A bespoke

data extraction form was used, which included developing a preliminary synthesis exploring relationships in the data and assessing for the robustness of synthesis by comparing it to existing knowledge and literature, discussed later in this paper. Data extraction was completed by two independent reviewers. After data extraction, a thematic list was created by the research team. Narrative synthesis (Popay *et al.*, 2006) was conducted because of the heterogeneity of methodologies employed.

3. RESULTS

In total, the database search yielded 17,263 articles, of which 7,649 duplicates were removed (Fig. 1).

Twenty-two systematic reviews focussing on the reasons for adolescent self-harming were eligible for inclusion. The AMSTAR2 rating for each study was determined by summing up all yes answers (yes=1) for each checklist point. If a study met the criteria for both sections when a checklist point was split into two halves, only one yes was counted. AMSTAR2 ratings of included studies ranged between 3 and 14, with a mean score of 8.8 (Tables 1 and 2), meaning that on average, the included studies only met 8 of the criteria listed in the checklist.

3.1. Summary of Included Studies

All twenty-two studies focused on the potential influences of adolescent self-harm. These included four systematic reviews (Marchant *et al.*, 2017; Daine *et al.*, 2013; John *et al.*, 2018; Memon *et al.*, 2018) exploring the relationship between internet use (including general internet use, social media, internet addiction, forums, blogs, self-harming and cyberbullying). Five explored the relationship between psychopathology and self-harm (Meszaros *et al.*, 2017, McHugh *et al.*, 2019; Gillies *et al.*, 2018; Witt *et al.*, 2019; Norman *et al.*, 2020). Four focused on school and peer influences (Evans & Hurrell, 2016; Epstein *et al.*, 2020; Karanikola *et al.*, 2018; Heerde & Hemphill., 2019). Three examined identity and alternative subcultures

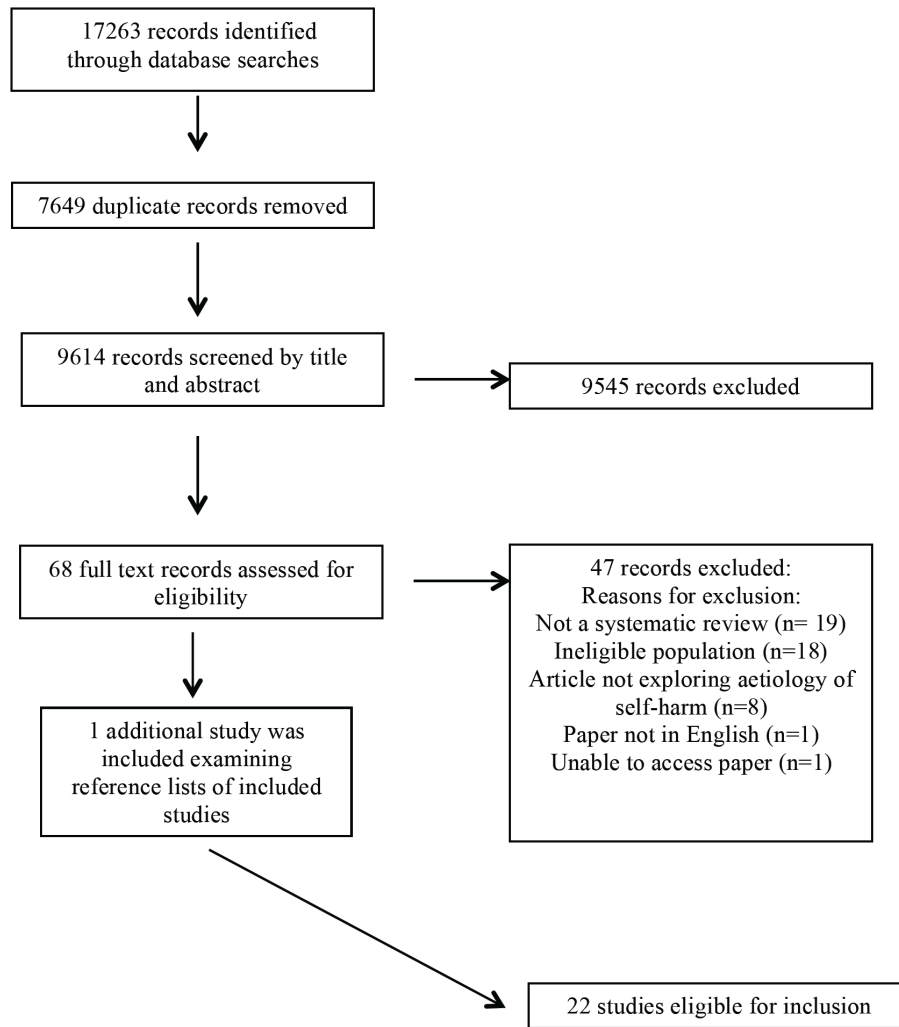


Fig. (1). PRISMA diagram.

Table 1. Summary of included reviews.

Review	Study Focus	Number of Included Studies	Sample Size	Setting	AMSTAR 2 Rating	Outcomes Reported
Aggarwal <i>et al.</i> , (2017)	Youth Self-harm in low and middle income countries.	27	55,794	Setting: School/community setting (n=16), Hospital based (n=11). Countries of setting: Turkey (n=14), China (n=4), India (n=4). Albania (n=1) Lithuania (n=1), Pakistan (n=1), Seychelles (n=1), Zambia (n=1).	8	Prevalence of self-harm. Form of self-harm. Risk and protective factors. Family, peer and school related factors.

(Table 1) contd....

Review	Study Focus	Number of Included Studies	Sample Size	Setting	AMSTAR 2 Rating	Outcomes Reported
Bozzini <i>et al.</i> , (2021)	Factors associated with risk behaviours in adolescence.	Qualitative synthesis (n=249)	Not reported	Countries of setting: US (n=112), UK (n=37), Australia (n=24), South America (n=8). Other studies were conducted in Canada, Malaysia, Finland, Sweden, Denmark, Germany, Taiwan, Korea, China, South Africa, Tunisia, and Mauritius. Four studies were multicentre, three of which were conducted in Europe.	11	Distal Risk Factors. Proximal Risk Factors. Risk factor behaviour and associated factors; substance use, depression, violence/aggression, sexual behaviour and two or more risk behaviours.
Cheek <i>et al.</i> , (2020)	To examine research on the relationship between events characterised by low relational evaluation and SITBs.	56	14,967	Children and adolescents from community settings, clinical settings and secondary schools.	7	Popularity and NSSI. Parental rejection and NSSI, Relation of PV and NSSI PV and NSSI. Relational victimisation is alone associated with increased NSSI.
Daine <i>et al.</i> , (2013)	The relationship between internet use and self-harm and suicide.	16 articles reporting 14 studies	27,335	Countries of setting: USA (n=6) UK/Ireland (n=2) Korea (n=1) Germany (n=1) Israel (n=1) New Zealand (n=1) China (n=1) Japan (n=1).	9	Limited use of validated outcome measures. Position influences measures (n=7). Involvement/connection. Support (e.g. with stress). Coping. Negative influences (n=5). Normalisation self-harm. Technique or concealment advice on self-harm. Seeking self-harm or suicide partner. Possible increase in distress. Exposure to bullying, harassment or trolling.
Epstein <i>et al.</i> , (2020)	School absenteeism as a risk factor for self harm in children and adolescents.	Narrative synthesis (n=32), Meta analysis (n=9).	1,428,160	Countries of setting: Swaziland (n=1), Ghana (n=1), US (n=11), Iceland (n=1), Malaysia (n=1), China (n=3), France (n=2), Mongolia (n=1) Canada (n=1), European Countries (n=1), Germany (n=1), Turkey (n=1), New Zealand (n=1), Norway (n=1), Asian Countries (n=1), India (n=1), Benin (n=1), Peru (n=1), Republic of Seychelles (n=1).	13	School absenteeism, Suicidal ideation, Self-harm.

(Table 1) contd....

Review	Study Focus	Number of Included Studies	Sample Size	Setting	AMSTAR 2 Rating	Outcomes Reported
Evans & Hurrell (2016)	The role of schools in children and young people's self-harm and suicide.	6 articles reporting 5 studies	86	Setting: Primary schools (n=1) Secondary schools (n=5) Countries of setting: UK (n=5), Hong Kong (n=1).	6	Self-harm ignored and under supported, Labelling of Self-harm as 'bad behaviour', Negative impact of teachers not talking to self-harming students, The pressure to perform: teacher, parent and peer expectations of academic achievement, Tensions and negotiation within peer relationships, Bullying and initiation within the school setting, The prevalence paradox.
Gillies <i>et al.</i> , (2019)	Prevalence and characteristics of self-harming in children and young people.	261 publications reported 172 sets of data from 144 population based studies.	597,548	Countries of setting: Sweden (n=3), Italy (n=2), New Zealand (n=2), Turkey (n=2), China (n=2), Germany (n=3), USA (n=15), Canada (n=3), Austria (n=2), Belgium (n=8), Scotland (n=3), UK (n=4), Ireland (n=5), Poland (n=2), Australia (n=7), Mexico (n=2), Hungary (n=2), Norway (n=4).	10	Prevalence of self-harm, types of self-harm, age. Frequency, seeking help, reasons, suicidal behaviours, assessment criteria, risk of bias. Reasons, suicidal behaviours.
Hartley <i>et al.</i> , (2018).	Reactive aggression and suicide related behaviours.	7	4,693	Countries of setting: US (n=4), Belgium (n=1), Switzerland, (n=1), Province of Quebec (n=1).	3	Reactive aggression in relation to suicide related behaviours, suicide, suicide ideation and non fata suicide attempt, Impulse aggression and suicide attempt, Overt aggression and suicide ideation, Impulse aggression and suicide, Reactive aggression and suicide related behaviours.
Heerde & Hemphill (2019)	Bullying and its association to deliberate self-harm.	27	156,284	Countries of setting: US (n=9), Canada (n=1), Sweden (n=2), the Netherlands (n=1), China (n=2), Japan (n=1), Portugal (n=1), Australia (n=1), European nations (n=3), New Zealand (n=1), UK (n=4), Italy, Netherlands and US (n=1).	11	Bullying and deliberate self-harm; Cyberbullying perpetration and victimisation, Traditional bullying perpetration, Traditional bullying victimisation, Cyberbullying victimisation, Co-occurring traditional and cyber bullying perpetration and victimisation, Moderator variables.
Hughes <i>et al.</i> , (2018)	The association between alternative subcultures and the risk of self-harm and suicide.	10	6,458	Countries of setting: UK (n=2); Canada (n=2); USA (n=5); Australia (n=1); Germany (n=1); country not detailed (n=1).	6	Alternative subculture affiliation, Music preference, Qualitative analysis of Emo social media use, Self-identifying with an alternative subculture.

(Table 1) contd....

Review	Study Focus	Number of Included Studies	Sample Size	Setting	AMSTAR 2 Rating	Outcomes Reported
John <i>et al.</i> , (2018)	Self-harm, suicidal behaviours and cyber bullying in children and young people.	Qualitative 33 articles reporting 26 studies. Quantitative 23 articles reporting 21 studies.	156,384	Countries of setting: US (n=19), Canada (n=7), Belgium (n=1), the Netherlands (n=1), Taiwan (n=1), Hong Kong (n=1), South Korea (n=1), Australia (n=1), European nations (n=1).	14	Cyber victimisation and self harm, Cyber victimisation and suicidal behaviours, Cyber victimisation and suicide attempt, Cyber victimisation and suicide ideation, Cyber bullying perpetration and suicidal behaviours, Cyber bullying perpetration and suicide ideation.
Karanikola (2018)	The relationship between school bullying and self-harm.	22	205,805	Setting: Community (n=22).	9	Prospective association between NSSI and school bullying victimisation. Cross-sectional association between NSSI and school bullying victimisation. Prospective association between deliberate self-harm and school bullying victimisation. Cross-sectional association between deliberate self-harm and school bullying victimisation. Mediating factors of depressive symptoms for deliberate self-harm, non-suicidal self-injury and school bullying.
Lim <i>et al.</i> , (2019)	Global lifetime and 12-month prevalence of suicidal behaviour, deliberate self-harm and non-suicidal self-injury in children and adolescents.	66	686,672	China (n=5), United Kingdom (n=7), United States (n=12), Australia (n=4), New Zealand (n=4), Poland (n=3), India (n=3), Turkey (n=3), Belgium (n=3), Mexico (n=4), Hong Kong (n=6), South Korea (n=3), Norway (n=3), Canada (n=3), Germany (n=2), Brazil (n=2), Italy (n=2), Taiwan (n=2), Japan (n=2), Jamaica (n=1), Mongolian (n=1), Ghana (n=1), Bangladesh (n=1), Various European countries (n=1), Spain (n=1), France (n=1), Palestine (n=1), Italy, Netherlands, United States (n=1), Lithuania (n=1), Finland (n=1), Vietnam (n=1), South America (n=1), Lebanon (n=1), Australia/Belgium/England/Hungary/Ireland/The Netherlands/Norway (n=1), Denmark (n=1), Iran (n=1), Nigeria (n=1), Switzerland (n=1), Guyana (n=1), Indonesia (n=1), South Africa (n=1), Chile (n=1), Sweden (n=1).	10	Suicide attempt defined, Suicide plan defined, Suicidal defined, Non-suicidal self-injury defined, Deliberate self-harm defined The 12-month and lifetime prevalence of suicide attempts, suicide plans, suicide ideation, non-suicidal self-injury, and deliberate self-harm.

(Table 1) contd....

Review	Study Focus	Number of Included Studies	Sample Size	Setting	AMSTAR 2 Rating	Outcomes Reported
Liu <i>et al.</i> , (2018)	The relationship between childhood maltreatment and self-harming behaviour.	71	114,128*	Countries of setting: not reported.	8	Childhood maltreatment and NSSI; Childhood maltreatment subtypes and NSSI; Childhood maltreatment and severity of NSSI.
Mann <i>et al.</i> , (2018)	Self Injurious thought and behaviours in gender-diverse children and young people.	7	1,424	Countries of Setting: UK (n=7). Clinical (n=4) Community (n=3).	8	Gender diverse young people and rates of self-injurious thoughts and behaviours.
Marchant <i>et al.</i> , (2017)	The relationship between internet use, self-harm and suicidal behaviour in young people.	51 articles reporting 46 studies.	192,950	Countries of setting: Australia(n=2); Canada (n=5); Korea (n=3), New Zealand (n=2); China (n=1), Israel (n=1); Northern Ireland (n=1); South Africa (n=1); Taiwan(n=1); Turkey (n=1); UK (n=9); USA (n=10); Sweden (n=2); Japan (n=3); Germany (n=1). Country not detailed (n=3).	10	General internet use, Internet addiction, Online intervention / treatment, Social Media, Forums, Website with suicide / self-harm content, Video / image sharing; Blogs.
McHugh (2019)	The relationship of self-harm and impulsivity and the multiple facets of impulsivity.	18	2,493	Setting: Community (n=7), Schools: (n=2), Inpatient: (n=4), Outpatient (n=4) Population: (n=1).	9	Neurocognitive measures of impulsivity in controls and those who self-harm or suicidal behaviours in young people. Impulsivity having multiple facets.
Memon <i>et al.</i> , (2018)	The role of online social networking through various social media platforms on deliberate self-harm and suicidality in adolescents.	9	1,976	4 cross sectional studies participants from school settings and clinical settings and 4 studies analysed content from online social networking sites. Countries of setting: Canada (n=1), Taiwan (n=1), USA (n=3).	5	Social networking sites contribute to increased exposure to and engagement in self-harm behaviour as users tend to emulate self-injurious behaviours from self-harm videos or are encouraged by others, thus normalising self-harming behaviour.
Meszaros <i>et al.</i> , (2017)	Self-harming and externalising pathology.	35 (prospective study n=8, cross-sectional study n=23, retrospective study n=2, case-control study n=1, birth cohort study n=1).	65,711	Setting: prisoner population (n=3), male offenders unit (n=1), inpatient unit (n=5), psychotherapy group (n=2) drug/alcohol unit (n=2), ADHD population (n=5), outpatients (n=3), normal population (n=14) Countries of setting Hungary (n=1), UK (n=2), USA (n=15), Israel (n=1), Spain (n=1), Italy (n=3), Taiwan (n=1), Finland (n=2), Japan (n=1), Australia (n=2), Germany (n=1), Canada (n=1), Turkey (n=2), Hong Kong (n=1), New Zealand (n=1).	4	Associations between self-injury and suicide; externalising psychopathology, Associations between NSSI and ADHD, Associations between NSSI and Conduct Disorder, Prevalence rates, odds ratios or other associations between externalising pathology and self-injury, Oppositional defiant disorder (ODD) and self-injurious behaviours, Alcohol abuse and self-injury, Terminology and definitions of self-injurious behaviour, Association between Externalising and internalising disorders and NSSI.

(Table 1) contd....

Review	Study Focus	Number of Included Studies	Sample Size	Setting	AMSTAR 2 Rating	Outcomes Reported
Norman <i>et al.</i> , (2020)	Self-harm and alexithymia, including subcomponents.	Qualitative synthesis (n=31). Meta-analysis (n=27).	11,751	Children and adolescents from School, clinical and community settings. Countries: USA (n=5), Canada (n=3), Switzerland (n=2), UK (n=4), Italy (n=5), Turkey (n=1), New Zealand (n=2), Australia (n=2), Taiwan (n=2), France (n=1), Finland (n=1), South Korea (n=1), Germany (n=1), Iran (n=1), Belgium (n=1).	12	Alexithymia is significantly higher in people who have engaged in self-harm.
Witt <i>et al.</i> , (2019)	The association of population attributable risk of factors and repetition of self-harm.	17	10,726	Countries of setting: USA (n=4), UK (n=4), Australia (n=3), Europe (n=1), France (n=1), Norway (n=1), Switzerland (n=1), Not reported (n=2).	10	Historical factors associated to repetition of self-harm in young people. Clinical and psychiatric factors associated to repetition of self-harm in young people.
Woo <i>et al.</i> , (2020)	Attachment and NSSI and SA in child and adolescent population.	22		Children and adolescents from School, clinical and community settings. Countries: Belgium (n=4), Italy (n=3), New Zealand (n=1), UK (n=2), China (n=2), South Korea (n=1), USA (n=5), Germany (n=2), Turkey (n=1), Australia (n=1), Sweden (n=1).	10	Attachment anxiety and NSSI, NSSI associated with lower attachment security.

Note: *This figure includes articles that have overlapped study sample.

Table 2. AMSTAR 2 rating.

Reference/Question Number	1	2	3	4	5	6	7	8	9a	9b	10	11a	11b	12	13	14	15	16	Total
Aggarwal <i>et al.</i> , (2017)	Y	N	Y	Y	Y	N	N	Y	N/A	Y	Y	N/A	N/A	N/A	N	N	N/A	Y	8
Bozzini <i>et al.</i> , (2021)	Y	Y	Y	Y	Y	Y	N	Y	N/A	Y	Y	N/A	N/A	N/A	Y	N	N/A	Y	11
Cheek <i>et al.</i> , (2020)	Y	N	N	Y	Y	N	N	Y	N/A	N	Y	N/A	Y	N	N	N	N	Y	7
Daine <i>et al.</i> , (2013)	Y	N	Y	Y	Y	Y	N	Y	N/A	Y	N	N/A	N/A	N/A	Y	N	N	Y	9
Epstein <i>et al.</i> , (2020)	Y	Y	N	Y	Y	Y	N	Y	N/A	Y	Y	N/A	Y	Y	N	Y	Y	Y	13
Evans & Hurrell (2016)	N	Y	N	Y	Y	Y	Y	PY	N/A	N	N	N/A	N/A	N/A	N	N	N/A	Y	6
Gillies <i>et al.</i> , (2019)	Y	N	N	PY	Y	Y	N	Y	N/A	Y	Y	N/A	Y	N	Y	Y	N	Y	10
Hartley <i>et al.</i> , (2018)	N	N	N	PY	N	N	N	Y	N	N	N	N/A	Y	N	N	N	N	N	3

(Table 2) contd....

Reference/Question Number	1	2	3	4	5	6	7	8	9a	9b	10	11a	11b	12	13	14	15	16	Total
Heerde & Hemphill (2018)	Y	N	Y	Y	Y	Y	N	Y	N/A	N	Y	N/A	Y	N	N	Y	Y	Y	11
Hughes et al., (2018)	N	Y	Y	Y	Y	N	Y	PY	N/A	PY	N	N/A	N/A	N/A	Y	N	N/A	N	6
John et al., (2018)	Y	Y	N	Y	Y	Y	N	Y	N/A	Y	Y	N/A	Y	Y	Y	Y	Y	Y	14
Karanikola et al., (2018)	Y	N	N	Y	Y	Y	N	Y	N/A	Y	Y	N/A	N/A	N/A	Y	N	N/A	Y	9
Lim et al., (2019)	Y	N	N	Y	Y	Y	N	Y	N/A	N	Y	N/A	Y	N	N	Y	Y	Y	10
Liu et al., (2018)	Y	N	N	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	Y	N	N/A	Y	8
Mann et al., (2018)	Y	N	N	Y	Y	Y	N	Y	N	N	Y	N/A	N/A	N/A	N	Y	N/A	Y	8
Marchant et al., (2017)	Y	Y	Y	Y	Y	Y	N	Y	N/A	N	N	N/A	N/A	N/A	Y	Y	N/A	Y	10
McHugh et al., (2019)	Y	Y	N	Y	N	N	N	Y	N/A	Y	Y	N/A	Y	N	N	Y	Y	N	9
Memon et al., (2018)	Y	N	N	Y	N	N	N	Y	N	N	Y	N/A	N/A	N/A	N	N	N/A	Y	5
Meszaros et al., (2017)	Y	Y	N	PY	Y	N	N	PY	N	N	N	N/A	N/A	N/A	N	N	N/A	Y	4
Norman et al., (2020)	Y	Y	N	Y	Y	N	N	Y	N/A	Y	Y	N/A	Y	N	Y	Y	Y	Y	12
Witt et al., (2019)	Y	N	N	Y	Y	Y	N	Y	N/A	Y	Y	N/A	Y	N	N	Y	N	Y	10
Woo et al., (2020)	Y	Y	N	Y	Y	N	N	Y	N/A	Y	Y	N/A	N/A	N/A	Y	Y	N/A	Y	10

Key: Y = yes, PY = partial yes, N = No, N/A = not applicable

AMSTAR2 checklist

- Did the research questions and inclusion criteria for the review include the components of PICO?
- Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?
- Did the review authors explain their selection of the study designs for inclusion in the review?
- Did the review authors use a comprehensive literature search strategy?
- Did the review authors perform study selection in duplicate?
- Did the review authors perform data extraction in duplicate?
- Did the review authors provide a list of excluded studies and justify the exclusions?
- Did the review authors describe the included studies in adequate detail?
- 9a. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review? RCT STUDIES ONLY
- 9b. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review? NSRI STUDIES ONLY
10. Did the review authors report on the sources of funding for the studies included in the review?
- 11a. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results? RCTs ONLY
- 11b. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results? NSRIs ONLY
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?
13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?

(Hughes et al., 2018; Aggarwal et al., 2017; Mann et al., 2018). Three explored the relationship between childhood maltreatment and non-suicidal self-injurious behaviour (Liu et al., 2018; Cheek et al., 2020) and attachment (Woo et al., 2020) and three identified risk behaviours, aggression and lifetime behaviours and the associations to self-harm behaviours (Bozzini et al 2021; Hartley et al., 2018; Lim et al., 2019). Twelve of the included records included community populations (Bozzini et al., 2021; Cheek et al., 2020; Dain et al., 2013; Evans & Hurrell, 2016; Gillies et al., 2018; Heerde & Hemphill, 2019; Lim et al., 2019; Hughes et al., 2018; John et al., 2018; Karanikola

et al., 2018; Marchant et al., 2017; Memon et al., 2018), one included only clinical populations (Witt et al., 2019), and nine included both clinical and community populations (Aggarwal et al., 2017; Epstein et al., 2020; Hartley et al., 2018; Liu et al., 2018; Mann et al., 2018; McHugh et al., 2019; Meszaros et al., 2017; Norman et al., 2020; Woo et al., 2020).

Narrative synthesis was employed to bring themes together (Nevard et al., 2020). This adopts an approach to the exploration of the findings of the included studies that enables a methodologically sound discursive integration of the findings that can give a meaningful narrative

for those seeking improved understanding. Themes included:

- Identity and subculture
- Peer influences
- Educational stresses
- Mental ill health
- Cognitive and neuropsychological factors
- Trauma and attachment
- Internet influences
- Social media

The themes are presented with this identified evidence and are then discussed in light of the wider literature.

3.2. Identity and Subcultures

Aggarwal and colleagues (2017) concluded youth self-harm in low and middle-income countries is comparable to high-income countries.

Two studies included in the Hughes review (Young *et al.*, 2006; 2014) suggested that those who self-identified with an alternative subculture were three times more likely to endorse self-harm (OR=3.49–14.16), carry out self-harm (OR=3.56–3.92) or have suicidal thoughts (OR=3.41), and around six times the odds of having attempted suicide (OR=5.96). The Hughes review also reported that adolescents who affiliated with an alternative subculture had an increased risk of self-harm (OR=5.14; 3.58, 7.36) across a three-year period (Bowes *et al.*, 2015). Two studies reported conflicting findings; one (Young *et al.*, 2006) where those who only identified with the ‘Goth’ alternative subculture were more likely to report self-harming, whereas another (O’Connor, 2014) reported that only those identifying as an ‘Emo’ were more likely to self-harm. Sample sizes in some of the studies were small or with low numbers in subcultural groups (some lower than 10% of the total sample size; Hughes *et al.*, 2018). Another limitation is that subcultures evolve and change or may be very different in different localities and so this literature should be

treated with caution. It does, however raise the issue of self-harm potentially becoming associated with some subcultural groups in some places/times.

The Hughes review (2018) also suggested that certain music preferences have in some studies, been associated with increased self-harming. Positive correlations were found when exploring the relationship of heavy metal fans with self-harming, suicidal ideation ($r=.24$, Burge *et al.*, 2002; $r=.21$, Lester & Whipple, 1996), and suicide attempts ($r=.13-.26$, Lacourse *et al.*, 2001). However, when confounders (*e.g.* substance abuse) are accounted for, one study reported no link between music preference and self-harming (Lacourse *et al.*, 2001).

One review focused on gender diverse children and young people (Mann *et al.*, 2018) and reported that 18% of gender diverse children have engaged in self-injurious behaviours and 13% had a history of overdose, although these samples may overlap (Di Ceglie *et al.*, 2002; Skagerberg *et al.*, 2013; Holt *et al.*, 2014). Differences were also found between assigned genders, with assigned females reporting significantly more self-harm at 46% than assigned males at 25.9% (Holt *et al.*, 2014), similar to findings of 33% of assigned females reporting self-harm, and 16% of assigned males (Skagerberg *et al.*, 2013). Confounding factors are likely to be important including for example bullying and life adversity (discussed later).

Lim and colleagues (2019) review explored multiple factors for lifetime prevalence and 12 month prevalence of non-suicidal self-injury (NSSI) and deliberate self-harm, and found NSSI and deliberate self-harm to be higher in a school attending group to a non-attending group.

3.3. Peer Influences

Aggarwal and colleagues (2017) review suggested protective factors against self-harm including peer relationships (Wan *et al.*, 2011).

The review by Cheek and colleagues (2020) examined the relationship between social

rejection, popularity, peer victimisation and self-harm. The review suggests that there is an association between various indicators of low relational evaluation and self-injurious thoughts and behaviours (SITBs). Heilbron and Prinstein (2010) found that NSSI engagement was associated with higher levels of peer preference and low popularity. In addition, four studies in the review found a relationship between popularity and suicidal ideation (Heilbron & Prinstein 2010; Meza, Owens & Hinshaw 2016; Okada & Bierman 2015; Wyman *et al.*, 2019). Three studies also found an association between popularity and suicidal behaviour (Meza *et al.*, 2016; Prinstein *et al.*, 2001; Wyman *et al.*, 2019.)

One review (Gandhi *et al.*, 2016) examined the relationship between peer attachment and self-harm; 5 of the 6 included studies reported a positive relationship. The NSSI groups reported lower levels of attachment to their best friend ($t(44) = 4.36, d = 1.19$) (Santangelo *et al.*, 2017), lower levels of peer relations ($t = -2.56, p < 0.01$) (Lee, 2016) and higher levels of peer alienation ($r = 0.28, p < 0.001$).

Eight studies included in the review (Cheek *et al.*, 2020) found a relationship between social rejection and self-injurious thoughts and behaviours. Cheek and colleagues (2020) demonstrated some support for the relationship between acute rejection and suicide attempts; these findings are supported by Nock and colleagues (2009) who found an association between acute rejection and NSSI.

Two studies included in the Evans and Hurrell (2016) review focused on peer relationships and bullying within schools being a contributing factor to self-harming (McAndrew & Warne, 2014; Simm, 2008). Additionally, Karanikola and colleagues (2018) review confirmed a positive association of school bullying with deliberate self-harm and NSSI. Heerde & Hemphill (2019) review indicated significant associations between bullying perpetration (OR 1.81, 95% CI [1.33, 2.47], $p < .0001$) and victimisation (OR 2.34, 95% CI [1.89, 2.89], $p < .0001$) with deliberate self-harm.

3.4. Educational Stressors

One study in the Evans and Hurrell review (Mak *et al.*, 2011) draws attention to the possibility that adolescents may attempt suicide due to disappointing academic performance. Mak and colleagues also reported how examination anxiety is positively associated with suicidal ideation and depression, and how students have committed suicide due to disappointing academic performance. The Epstein review (2020) suggested an association of school absenteeism and self-harm with a 37% increase in self-harm, with seven studies reporting the association to be statistically significant (Cheng *et al.*, 2009). Aggarwal and colleagues (2017) review suggested positive protective factors for self-harm are a positive school experience (Shek & Yu, 2012) and better family functioning (Law & Shek, 2013; Shek & Yu, 2012).

Evans and Hurrell (2016) aimed to identify the mechanisms through which schools influence self-harming and suicidal behaviours, and identified that in many places self-harming prevention is not prioritised in the school curriculum, despite students needing support and wanting the topic to be part of the curriculum (Coombes *et al.*, 2013). Two studies included in the Evans and Hurrell review (Coombes *et al.*, 2013; Simm *et al.*, 2008) found that some schools were not discussing the issue of self-harm or how to access support, with teachers not picking up on or supporting individuals when discussing self-harm. Possible explanations offered included lack of school resources, self-harm being labelled as 'bad behaviour', potential anxiety about 'making things worse' or poor management structures. Simm (2008) suggested that educational professionals do not feel competent to intervene when self-harm is evident and are therefore worried about offering support.

3.5. Mental Ill Health

The review identified mental ill health as identified in research as diagnosis of mental illness. A number of diagnostic groups were identified that were described as increasing rates

of self-harm. Four studies included in the Mezsaros review (Chou *et al.*, 2014; Backsai *et al.*, 2012; Hinshaw *et al.*, 2012; Hurtig *et al.*, 2012) found that those diagnosed with ADHD are more likely to self-harm than those without a diagnosis. Hurtig and colleagues (2012) reported prevalence rates of self-harm and ADHD; 69% of the ADHD group reported self-harming compared to 32% in a control group. These figures are supported by Hinshaw and colleagues (2012), who reported ADHD and self-harm prevalence rates of 50.6% for those with combined type ADHD, 28.9% for those with inattentive type ADHD, and 19% in a control group. The more severe the ADHD, the more prevalent the self-harming (Mezsaros *et al.*, 2017).

Oppositional Defiant Disorder (ODD) and conduct disorder were thought to be associated with self-harm (Cerutti *et al.*, 2011; Crowell *et al.*, 2012; Guertin *et al.*, 2001; Nock *et al.*, 2006) identified in the Mezsaros (2017) review. For example, one included paper (Nock *et al.*, 2006) found the presence of ODD was 44.9% in the 100% self-harming sample in their study.

Gatta and colleagues (2016) examined neuropsychiatric inpatients who engaged in self-harming and found significantly higher scores on externalising problems than in the control group ($Z=6.42$; $p<0.05$ and $Z=4.57$; $p<0.05$, respectively).

Another review focused on modifiable risk factors and protective risk factors linked to repeating self-harming in young people within clinical mental health services (Witt *et al.*, 2019). The review concluded risk factors from seventeen studies for repeating self-harming and included diagnosis of any mood disorder (OR 2.16, 95% CI 1.09–4.29; PAR 42.2%, 95% CI 5.3–67.4%) and personality disorder (OR 2.54, 95% CI 1.71–3.78; PAR 16.3%, 95% CI 8.2–25.9%). More generally, DeVille and colleagues (2020) reported internalising (*e.g.* anxiety, depression, withdrawal, somatic complaints) and externalising problems were significantly more common in children who engaged in self-harming.

It has been suggested that young people self-harm for many reasons, one being an attempt to

alleviate negative emotions like low mood, anxiety and emotional distress (Samari *et al.*, 2020), summarising that clinical groups engaging in self-harm are more likely to have psychological problems of internalising, externalising, depression and anxiety in comparison to controls. Gillies and colleagues (2018) found that common reasons for self-harm included “desires to obtain relief from feeling or thoughts” and to “punish oneself”. Raffagnato and colleagues (2020) reported 74% of patients engaging in self-harm had clinically relevant scores for internalising problems, such as anxiety and depression in comparison to 41.2% in the control group; additionally, 22.8% of patients had a borderline score for somatic symptoms and 18.1% scored within the clinical range, in comparison to the control group with 90.5% having no somatic symptoms.

3.6. Cognitive and Neuropsychological Factors

From this theme, impulsivity was a strong subtheme. One study examining the prevalence of self-harming and impulse-control problems, found that high impulsivity is associated with self-harming ($X^2=9.27$; $p=0.001$; Carli *et al.*, 2010), and frequency and severity of self-harming (frequency: OR: 1.37 (CI 95%: 1.32–1.42; $p<0.01$; severity: OR: 1.12 (CI 95%: 1.08–1.17; $p<0.01$). McHugh and colleagues (2019) explored the association of multiple facets of impulsivity and self-harm or suicide and concluded young people self-harming or engaging in suicidal behaviours were significantly more impulsive (SMD = 0.19, 95% CI = 0.10–0.28, $p < 0.000$, PI = 0.0934–0.29). More specifically, impulsive decision-making and inhibitory control deficits were significantly related with suicidal behaviours and self-harm, with deficits in inhibitory control having a greater effect size (SMD 0.21, $p = 0.002$, 95% CI (0.08–0.34), PI = 0.06–0.35) than impulsive decision-making. Liu and colleagues (2018) concluded neurocognitive measures of impulsivity have a medium to large effect size association with self-harm and suicidal behaviours.

Hartley and colleagues (2018) explored the association of reactive aggression and suicide

related behaviours, including suicide, nonfatal suicide attempt, and suicide ideation, from the seven studies included in their review, a statistically significant association was shown with results from the meta-analysis indicating a consistent, medium-sized association ($k = 7$; $N = 4,693$; $r_{bar} = .25$).

One systematic review explored the relationship between self-harm and alexithymia, which defined alexithymia as a 'deficit in emotion processing' (Norman *et al.*, 2020). This could mean individuals have difficulty in identifying and communicating their emotions. Of the 27 studies included in the review, eight examined participants in a school setting, with seven studies reporting a significant positive relationship between self-harm and alexithymia (Garisch & Wilson, 2010; Gatta *et al.*, 2016; Howe-Martin *et al.*, 2012; Laukkanen *et al.*, 2013; Lee, 2016; Lin *et al.*, 2017), and all four clinical adolescent samples reported similar findings (Cerutti *et al.*, 2014; Gatta *et al.*, 2016; Lambert & de Man, 2007; Lütke *et al.*, 2016).

3.7. Trauma and Attachment

Four studies in the Cheek and colleagues (2020) review suggest that parental rejection is significantly associated with suicidal ideation (OR 3.91; 95% CI = 2.75–5.58), $p < .001$, (Fotti *et al.*, 2006; Herba *et al.*, 2008; Pariseau *et al.*, 2019; Reyes *et al.*, 2015). Three studies found a relationship between parental rejection and suicide attempts and two studies state there is a relationship between parental rejection and NSSI. Aggarwal and colleagues (2017) suggested that family relationships were important for mediating the risk of self-harm, with importance on strained family relationships, divorced parents, new partners and childhood abuse (Law & Shek, 2013; Shek & Yu, 2012). One review (Liu *et al.*, 2018) reported that childhood maltreatment (and maltreatment subtypes) are associated with self-harm (OR 3.42, 95% CI 2.74–4.26) with the link being stronger in community populations in comparison to clinical and at risk samples. However, Liu and colleagues (2018) review did not find evidence that childhood emotional

neglect is clearly associated with self-harm. One review focused on distal and proximal risk factors (Bozzini *et al.*, 2021). With distal risk factors being identified as; shyness at age 6, child abuse or neglect in early childhood, low birth weight, number/frequency of real and/or perceived physical issues, prematurity and internalising problems were reported to be a risk factors for depressive symptoms at age 11. Proximal risk for self-injury was reported to be linked to involvement in violence at age 14.

The review by Woo and colleagues (2020) examined the relationship between attachment and self-harming behaviours. 21 out of the 22 studies included found a positive association between insecure attachment patterns and self-harm in children and adolescents. Three studies in the review measured attachment anxiety and all found an association with self-harm ($\beta = 0.28$), $p = 0.031$, Cassels *et al.*, 2019; $F(1,1714) = 71.69$, $p < 0.001$, Tatnell *et al.*, 2014; and $t(2465) = 15.01$, 95% CI=5.25-6.83, $p < 0.001$, Tatnell *et al.*, 2017). Ten studies in the review found self-harm to be associated with lower attachment security. Self-harm was found to be associated with poorer maternal and paternal bonding; lifetime self-harm was associated with maternal alienation (Lee *et al.*, 2016; Gandhi *et al.*, 2016; Jiang *et al.*, 2017; Santangelo *et al.*, 2017; Victor *et al.*, 2019; Wang *et al.*, 2019).

3.8. Internet Influences

The Marchant (2017) and Daine (2013) reviews examined internet use and its impact on self-injurious behaviours, including general internet use, websites with self-harm related content, video and image sharing, forums, blogs and online interventions. John and colleagues (2018) review suggested that cyberbullying is associated with an increased risk of self-harm by 2.35 times, and suicide by 2.75 for victims (Fu *et al.*, 2014; Herbert *et al.*, 2016; Roh *et al.*, 2015). Similarly, Daine's (2013) review suggested an association between cyberbullying and self-harm, and also attempted suicide rates increased for victims and online bullies (1.9 and 1.5 times, respectively) (Hinduja & Patchin, 2010; Hay &

Meldrum, 2010). The Heerde & Hemphill (2019) review noted cyber-bullying victimisation (OR 3.55, 95% CI [2.71, 4.65], $p < .0001$) and the co-occurrence of traditional and cyber-bullying victimisation (OR 3.39, 95% CI [1.56, 7.37], $p = .002$) were also associated with self-harm.

Several studies identified positive or mixed influences of general internet use on self-injurious behaviour, including accessing information for self-help (Carew *et al.*, 2014). One study (Kim, 2012) found a significant association between mental health status and internet use in adolescents ($p < 0.001$). Kim (2012) found that heavy internet users described more suicidal ideation (26.4% boys and 43.3% girls) than non-internet users (16.7% boys and 25.8% girls).

Several included studies found that adolescents accessing information about self-harm and suicide online had higher rates of self-harm, either through selection bias or related to the normalising and reinforcing of self-harm (Lewis & Baker, 2011). There was also evidence suggesting that online information contributed to a suicide cluster (Robertson *et al.*, 2012). Similarly most studies in the Marchant (2017) and Daine (2013) reviews reported some evidence that the internet may normalise or encourage self-harm, but some also commented that some websites helped to reduce self-harm.

Marchant (2017) and Daine (2013) also examined online forums in relation to self-harming. A number of forums included in the reviews had the potential for harmful information to be shared, encouraging suicide plans or giving advice about concealment and self-harm techniques. Daine and colleagues (2013) reported that 9.1% of posts analysed in one study (Whitlock *et al.*, 2006) contained information on how to conceal self-harming, and in another (Eichenberg, 2008) reported that 18% of the study's forum users were seeking a self-harm or suicide partner. However, McDermott and colleagues (2013) concluded that forums can engage groups vulnerable to self-harm (such as LGBTQ+) who found it easier to seek help in this way rather than through more traditional means.

Four studies (Lewis *et al.*, 2011; Lewis, 2012; Grzanka, 2014; Sternudd, 2012) focused on video sharing websites (*e.g.* YouTube). Lewis (2012) reported that sharing experiences is a strong motivator for the viewers of these videos. The studies concluded that these videos often included graphic images (found in 64% of videos in Lewis *et al.*, 2011) which, for some, had a triggering effect. Others suggested that this could be used as an alternative to self-harm.

Internet addiction was studied separately from general internet use by Marchant and colleagues (2017) by identifying research that specifically referred to internet preoccupation or addiction or pathological internet use. Seven studies (Kaess *et al.*, 2014; Kim *et al.*, 2006; Lam *et al.*, 2009; Lin *et al.*, 2014; Park *et al.*, 2013; Aktepe *et al.*, 2013; Messiah *et al.*, 2011) were included and all found a significant relationship between internet addiction and self-harm in adolescents. A positive correlation between internet addiction and suicidal ideation was reported by Kim and colleagues (internet addicted population: $r = 0.448$, $p < 0.001$; possible addicted population $r = 0.147$, $p < 0.001$; non-addicted population: $r = 0.111$, $p = 0.001$). This is further supported by Lam and colleagues (2009) who reported an association between moderate or severe internet addiction and self-harming (adjusted OR 2.0, 95% CI 1.1–3.7).

On the positive side the Marchant review identified six studies (Hetrick *et al.*, 2014, 2015; Mar *et al.*, 2014; Saulsberry *et al.*, 2013; Barton *et al.*, 2013; Whitlock *et al.*, 2013) reviewing the use of online interventions (such as online CBT or providing an online monitoring tool for young people with low mood) to reduce self-harm episodes in young people. One study (Saulsberry *et al.*, 2013) conducted a randomised controlled trial (RCT) of a primary care internet-based intervention concluding that it reduced depressive symptoms in adolescents (depression and self-harm ideation decreased from 14.5% at baseline to 4.8% at 1 year follow-up). The Marchant review concluded that these interventions being online made them easily accessible to young people.

3.9. Social Media

The Marchant (2017) and Daine (2013) reviews examined the impact of social media use on adolescent self-harm. Four studies in the Marchant review focused on social media platforms (such as Facebook or Twitter), with both positive and negative influences (Zdanow & Wright, 2012; Cash *et al.*, 2013; Belfort *et al.*, 2012; Sueki, 2015) including help seeking and reinforcement of self-harm. Sueki (2015) found a significant relationship between tweeting suicidal thoughts (such as 'want to die') and suicidal ideation (OR = 2.53, 95% CI 1.61–3.99). Sueki (2015) also found that tweeting comments such as 'want to commit suicide' were significantly related to history of self-harm (OR = 1.87, 95% CI 1.03–3.41). O'Connor (2014) found that one-in-eight girls and one-in-four boys felt that social media and internet use influenced their self-harming. A review by Sedgwick and colleagues (2019) focused on internet and social media use patterns suggesting that exposure can strengthen negative behaviours and thoughts; that may be as a result of the internet having accessible information of detriment to vulnerable young people. The negative implications of social media showed themes of self-loathing and loneliness, and detrimental accounts which increase the availability of harmful means are linked to depression, suicide and self-harm.

Results from the systematic review by Memom and colleagues (2018) suggest that utilising online social networking websites could lead to exposure to self-harming behaviours due to users promoting self-harm online. It was also suggested that more time spent on social networking sites led to higher psychological distress.

Four studies included in the Memom review found video content that attempt to normalise and sensationalise self-harming behaviours (Lewis *et al.*, 2011; Cavazos-Rehg *et al.*, 2017; Cash *et al.*, 2013; Miguel *et al.*, 2017). Some respondents from the qualitative study by Radovic and colleagues (2017), also reported that they had encountered content like self-harm and disordered eating on social networking platforms.

Further, four cross-sectional studies included in the Memom review found that regular use of social networking could encourage self-harm and suicidal ideation (Sampas-Kanjinga & Lewis, 2015; Dunlop *et al.*, 2011; Tseng & Yang 2015; Zhu *et al.*, 2016).

4. DISCUSSION

This review synthesises published systematic reviews exploring factors that are proposed as contributing to young people engaging in self-harm. The review highlights multiple factors that contribute to young people self-harming such as mental health, internet influences and early life trauma.

It is instructive to discuss the themes that have emerged in relation to the wider related literature not included in this review. We also consider some of the research gaps where further investigation would be helpful.

4.1. Identity and Subculture

Beyond our review findings, previous authors have also suggested that adolescents who identify with certain subcultures such as 'Goth' (Young *et al.*, 2006) or 'Emo' (Definis-Gojanovic *et al.*, 2009) are at greater risk of self-harm than their peers who identify with other social groups, even after adjustments for other risk factors (Bowes *et al.*, 2015). Despite the reference to particular groups, however, teen culture varies over time and generations and may lead to the making of unhelpful assumptions about specifically named subcultures (or associations with musical preferences) (Bennett, 1999). Perhaps of more relevance, self-harming may have a social and communicative function linked with 'in-group' influences (Young *et al.*, 2014). 73% of adolescent girls and 57% of adolescent boys who self-harm also have a friend who engages in self-harm (Hargus *et al.*, 2009).

Other authors have suggested that across the lifespan, ethnic differences in self-harming within the UK are evidenced, suggesting black females are most likely to self-harm and Asian males least

likely (Al-Sharifi *et al.*, 2015). However the real picture is likely to be more complicated. The impact of ethnicity and rates of self-harm across three UK cities was explored by Cooper and colleagues (2010) who looked at context as well as ethnicity. They found that young South Asians were more likely to self-harm in Oxford where their ethnicity comprised a smaller proportion of the total population. These kinds of associations require further research.

Youth populations such as lesbian, gay and bisexual (LGB) individuals are reported to be more likely to self-harm than their non-LGB counterparts (King *et al.*, 2008). Unfortunately, homophobic attitudes are still commonly experienced and discrimination faced by youths identifying as LGB or transgender may lead to the elevated risk of self-harm (Almeida *et al.*, 2009). Services such as the NSPCC have seen a large increase in the number of sessions focusing on gender identity and sexuality, increasing by 47% over one year and 115% related to transgenderism (NSPCC, 2016). Peterson and colleagues (2017) reported that over 25% of transgender youth had a history of at least one suicide attempt, and 41.8% reported a history of self-injurious behaviour.

4.2. Peer Influences

Our review suggested that peer relationships played a role in self-harm behaviours. Young people who self-harm appear to be more likely to have friends who self-harm (Evans, 2004; McMahon, 2012; O'Connor *et al.*, 2014). Interviews with students and staff found examples of students who were self-harming due to being unhappy with their friendships in schools, feeling stressed because of relationships or feeling unable to speak out about being bullied. In 75% of cases in one study young people tell someone else about their self-harm (Madge *et al.*, 2008). This is usually most likely to be peers (Michelmores & Hindley, 2012; Rowe *et al.*, 2014).

The strongest associations with negative school perceptions and self-harm in the Evans and Hurrell (2016) review was the experience of bullying. Victimisation by peers appears to be a

prevalent problem in the UK, with 22% of young people reporting being bullied in 2018 (Ditch the Label, 2018). Experiences of bullying are associated with low self-esteem, loneliness, depression (Hawker *et al.*, 2000) and self-harming (Hawton *et al.*, 2012; McMahon, 2012; O'Connor *et al.*, 2014; Fisher *et al.*, 2012; Hawton *et al.*, 2002). Preventive interventions include school bullying policies that prevent it, identifying and supporting children vulnerable to bullying (Fisher *et al.*, 2012) and family interventions (Hay *et al.*, 2010).

Studies in the review by Cheek and colleagues (2020) found associations between self-harm and social rejection, popularity and peer victimisation. Peer victimisation is also discussed by Vergara and colleagues (2019) who found that this was a factor associated with NSSI within their sample of 223 adolescents recruited from an inpatient unit. There are however some findings that suggest that in some circumstances self-harm can increase popularity and reputation in young people (Heilbron & Prinstein, 2010) reinforcing it in some social groups.

4.3. Educational Stressors

This review found evidence for academic pressure as a potential cause of self-harm (Young *et al.*, 2007; Evans & Hurrell, 2016), which is supported by wider research. Klemra and colleagues (2017) found that positive experiences in school were associated with reduced likelihood of self-harming. West and Sweeting (2003) suggested that the effect of exam stress had increased for adolescents (particularly teenage girls) over a 12 year period, causing an increase in psychological distress. Young Minds (2015) and the NSPCC (2015) have both suggested that increased examination stress and academic stressors, alongside fears regarding future employability, are related to increases in self-harm.

Not enjoying school and feeling that teachers failed to address misbehaviour have been associated with increased self-harming in adolescents (Kidger *et al.*, 2015). Doyle (2015)

found many adolescents stated they would not seek help for mental distress and self-harming because they felt that they could manage it themselves. This could represent a preference for self-reliance, which creates a barrier to schools and mental health services being able to respond appropriately (Gulliver *et al.*, 2010). If mental distress and self-harming are not being reported to schools, it may cause a vicious cycle where schools do not prioritise supporting these students and students continue to feel there is no benefit to them in reporting self-harming urges or behaviours. Some authors advocate more proactive engagement with young people about stressors, coping and self-harm (Simm *et al.*, 2010).

4.4. Self-Harming Linked To Mental Ill Health

Whilst the commonly quoted association between self-harm and mental health conditions is depression and mood problems related psychiatric disorders (Fliege, 2009; Hawton *et al.*, 2012; Heerde, 2015) our review of reviews uncovered relatively little recent work discussing depression and anxiety in its association with self-harm. Other associations found in the wider literature are post-traumatic stress disorder (Krysinka & Lester, 2010), bipolar disorder (Hauser *et al.*, 2013), anxiety and alcohol misuse (Hawton *et al.*, 2013). Obsessional traits or disorders are also likely to be important in some young people (Palombini *et al.*, 2021) but this was often only discussed in passing in papers we reviewed. Another meta-analysis (Bentley *et al.*, 2015) that included studies using adult and adolescent participants, found that emotional disorders increased the risk of self-harm with the strongest associations being between post-traumatic stress disorder, panic disorder and self-harming. Hopelessness is a cardinal symptom of depression and associated with an increased risk of suicide (Klonsky, May & Saffer, 2016), however, its relationship with self-harm is somewhat more complex. Young people engaging in NSSI have been found to be more hopeful than those attempting suicide (Hamza, Stewart, & Willoughby, 2012).

Over the last 25 years, there has been a 70% increase in 16-24 year olds suffering from depression or anxiety in the UK (Royal Society for Public Health, 2017) which could partially explain an increase in self-harming and this is supported by recent evidence of increases in mental health problems in the UK (Wright *et al.*, 2020; Creswell *et al.*, 2021). Referrals to English CAMHS increased by 64% between 2013-2015 (Frith, 2016) and referral rates grew five times faster than CAMHS workforce provision (Mental Health Taskforce, 2016). The significant burden posed by increased demand on services combined with inadequate funding in recent years identified by the NHS Five Year Forward View (NHS England, 2014), has made it difficult to ensure young people are able to access help. These factors are likely to have contributed to difficulties in providing preventative strategies, responsive provision, and interventions for those who are at risk of self-harm due to mental ill health.

4.5. Cognitive and Neuropsychological Factors

The evidence from our review also supports problems related to cognitive and neuropsychological functioning and including how young people cope with mental health disorders. Hawton and colleagues (2013) found impulsivity is a commonly proposed mechanism (Carli, 2010; Rodham *et al.*, 2004; Guendelman *et al.*, 2016) especially when present alongside low mood in adolescents (Lockwood *et al.*, 2017).

A Norwegian national youth survey (Huang & Mossige, 2015) reported that some young people with challenging lives and who struggle to manage difficult emotions may be more likely to engage in self-harm. Others have proposed an individual's coping resources is associated with self-harm in the context of poor management of negative emotions (Laye-Gindhu, 2005; Gratz, 2003). Personality traits such as self-compassion and self-forgiveness have been associated with lower self-harm and suicidal behaviours, as well as weakening the relationship between self-harm and negative life events (Cleare *et al.*, 2019). 'Resilience', the term often used in these

situations, is however a complex term with multiple meanings, used in different ways (some pejorative and some constructive), which we do not intend to explore in this review. Further clarification of both the nomenclature and the contribution of such factors is needed in future research.

Results from the Norman and colleagues (2020) review suggest that alexithymia is significantly higher in people who have engaged in self-harm. They found larger effect sizes in adolescent samples compared with adult samples. This raises the interesting prospect that adolescence is a time of vulnerability for self-harm with young people tending to have higher alexithymia scores as they develop more sophisticated emotional awareness abilities (Griffin *et al.*, 2018; Morgan *et al.*, 2017) at the same time as much greater interpersonal challenges are occurring.

4.6. Trauma and Attachment

Cruz and colleagues (2015) found that adolescents reporting higher levels of parental rejection were more likely to engage in NSSI. A report by the NSPCC found that children who were severely maltreated were 4.6 times more likely to have thoughts of self-harm than those who were not (Radford *et al.*, 2011). Looked after children are between 4-5 times more likely to self-harm in adulthood (Ford *et al.*, 2007). Studies across the years report strong links between childhood sexual abuse and later self-harming in adults (Boudewyn *et al.*, 1995; Gratz *et al.*, 2003; O'Connor *et al.*, 2014; Van der Kolk *et al.*, 1991). However, some authors have suggested that putative early childhood risk factors for self-harm such as sexual abuse, physical abuse, neglect, separation/loss of a caregiver are generally inconclusive and contradictory (Gratz *et al.*, 2003). This is because much of the quoted research is conducted retrospectively in adult populations and there are often multiple, inter-related risk factors. Never-the-less, a meta-analysis indicated that the risk of self-injurious behaviour was related to the psychiatric consequences of abuse, suggesting treatment and

support to be crucial (Klonsky, 2008). The number of children under a Child Protection Plan in the UK has increased in recent years (NSPCC, 2015) making this an important area for research and prevention.

4.7. Internet Influences and Social Media

Our review suggests that internet influences can be positive and negative in their impact on young people who engage in self-injurious behaviour (Marchant *et al.*, 2017; Daine *et al.*, 2013). O'Connor and colleagues (2014) suggested that the internet or social media explicitly influenced self-harm in 20% of adolescents. The proposed mechanisms for this include the normalising of self-harm (Daine *et al.*, 2013), inadvertent reinforcement and glamorisation or encouragement of self-harm (Guerra, 2013). The internet can increase exposure to self-harm or suicide related material in vulnerable young people (Daine *et al.*, 2013).

How social media is used and who young people are in contact with appear to be important. One systematic review (Marino *et al.*, 2018) found a correlation between mental distress in young people and excessive time on Facebook. Peer victimisation *via* social media has increased in recent years with a potential association between cyber-bullying and self-harm (Hinduja, 2010; Hay, 2010). Surveys found that there was a rise in help-seeking phone calls due to cyber-bullying between 2012 and 2013 (NSPCC, 2015), and cyberbullying remains one of the top three reasons why people contact the NSPCC (2016).

Body dissatisfaction has also been linked to the promotion of unrealistic 'ideal' body images (Muehlenkamp & Brausch, 2012). A systematic review by Hielscher and colleagues (2019) found increased levels of body dissatisfaction are reported in those who engaged in self-harming, in comparison to control groups; with many studies concluding significant links between disturbed body image and self-harm (n = 25; 78.1%).

A review by Memom and colleagues (2018) suggests that online social networking is sometimes used by self-harming youth to

communicate feelings to others and to seek social support. It was found that social networking sites can sometimes contribute to an increase in exposure to self-harming behaviours and viewers may aim to emulate such behaviours and adopt self-harming practices as shown in these videos (Mitchell & Ybarra, 2007). However, research has shown benefits to young people from social media networking, such as enhancing communication (Ito *et al.*, 2008) and connectivity with friends (O’Keeffe *et al.*, 2011).

4.8. Limitations

An issue with systematic reviews is that they only enable consolidation of existing evidence. Some previously implicated factors do not appear prominently in our results. For example, family factors such as the association between parental self-harm and adolescent deliberate self-harm (Mars, 2014) do not emerge from our review or the suggestion that poor family support and impaired family communication may have a role to play (Webb, 2002; Adrian *et al.*, 2011; Baetens *et al.*, 2013; Brent *et al.*, 2013). Another family-related factor suggests that many young people often do not go to family members for support (Michelmores & Hindley, 2012; Rowe *et al.*, 2014) with positive supportive interactions between adolescents and their parents acting as protective factors for self-harm (Klemera & colleagues, 2017). Despite this, a recent large RCT of a family therapy intervention for young people who self-harmed on more than one occasion showed no general improvement over care as usual (Wright-Hughes, 2017).

Wider economic conditions have not featured in our review even though there is some evidence that this may play a role. Adult unemployment or economic recession is associated with adult suicide rates (Barr *et al.*, 2012; Chang *et al.*, 2013) and self-harm (Corcoran *et al.*, 2015; Hawton *et al.*, 2016) with some suggestion internationally that economic recession is also associated with child and adolescent mental health problems (Kolaitis, 2015; Fernandez-Rivas *et al.*, 2013). Further research in the UK is necessary regarding the relationship between economic

factors and increases in self-harm in young people.

Although systematic reviews consolidate a large number of research results, much of the primary research in our review was qualitative with small sample sizes and therefore, a cause and effect relationship is not possible to establish.

Meta-analyses could not be conducted due to the heterogeneity of methodologies and reported outcomes. Long term follow-up data were not available for most of the studies analysed in the included reviews. Due to the nature of the studies included in the reviews, many made little or no attempt to differentiate the effects by gender, socioeconomic class or age, and confounders were often not considered.

Access to means of self-harming was also not considered in this review, however, this has had a significant impact on the lethality of suicide attempts, particularly those overdosing on paracetamol (Gunnell *et al.* 1997, Johnson & Coyne-Beasley, 2009). Policy decision by countries on pesticides, fire arms and access to drugs will impact the population levels of suicide but it is unlikely to impact self-harm which is of low lethality, such as cutting (Sarchiapone *et al.* 2011).

It is probable that some of the possible factors involved in self-harming are changing and therefore research conducted may lose its applicability over time. This is particularly pertinent for research into social media and subcultural associations. For example, young people’s preferences for different social media sites change quickly over time (*e.g.*, moving from Facebook and Twitter to platforms such as TiKTok and Snapchat (Richter, 2019) as do subcultural and musical tastes.

As stated previously, many studies (including those reported in this review) focus on sole reasons or associations with self-harm and self-injurious behaviour. The current review has attempted to bring together these different factors by exploring previous systematic reviews and included further aetiological causes presented in the wider literature. Although there is sparse

evidence exploring the interaction of factors leading to self-harm in children and adolescents, the current review is limited by not focusing on these interactions. One recent study which focused on young adults and associated risk factors of self-harming behaviour in young adults found an interaction between socioeconomic status and sick leave, with the highest risk subgroups being those with low education and no sick leave (OR 13.33, 95% CI 11.66-15.23) and high education and sick leave (OR 18.87, 95% CI 17.41-24.21; Lunde *et al.*, 2021). A further study (Grendas *et al.*, 2019) found an interaction between low psychological functioning and childhood sexual abuse increased the likelihood of self-harming behaviour.

CONCLUSION

In the UK, the incidence of self-harm in young people has increased by around 60-70% since 2007 (Morgan *et al.*, 2017). It is clear from our review that this is a complex picture with multiple factors interacting. These themes found in this review lend support to Nock (2010)'s theoretical construct of self-harm with a mix of distal factors such as abuse, poor attachment in early childhood and biological vulnerability such as alexithymia found alongside proximal factors such as school and peer stressors. Although recent research has moved towards emotional regulation models of self-harm (Hasking, Whitlock, Voon, & Rose, 2017), this review indicated there continues to be evidence to suggest social learning plays a role, in peer interactions, social media and culture contributing to this.

At present, there is no definitive evidence to support any specific treatment intervention for self-harm alone (Ougrin, 2012). Preventive interventions require a stronger evidence base (Robinson *et al.*, 2013) including more intervention studies tailored to the widely differing associated causes of self-harm (Wright *et al.*, 2013). As shown in this review, research does not currently provide clear exposition of the associations of self-harm in young people. Formulation of policy cannot, therefore, depend

on the evidence presented here. There are multiple associations which require further exploration and consideration to develop preventative policies. Where tentative suggestions are possible, we recognise the importance of peers and family in this issue and suggest that a good starting place for prevention of self-harm may be school, the internet and social media alongside family, with improved resources for emotional well-being in schools, as well as CAMHS provision at locality and specialist level.

FUTURE RESEARCH

This review gives a clear direction for future research that can inform future policy. It lays out a range of potential factors that should be explored together rather than studies focussing on individual factors in isolation. This review highlights some significant gaps in our knowledge of the associated and aetiological factors for self-harm particularly relating to the impact of attachment and trauma, the role of deprivation and inequalities. Although there is now a growing body of qualitative evidence there is a need to move to firstly gathering systematic evidence from birth cohort studies using a range of associated factors and then embedding within those cohorts' preventive and intervention studies including RCTs using available systematic reviews including this one, and reviews on prevalence (Muehlenkamp *et al.*, 2012) and interventions (Robinson *et al.*, 2013; Caezar *et al.*, 2016; Brent *et al.*, 2013). This would build a clearer picture of the emerging patterns of self-harm, service use and the experiences of young people, as well as a clearer route map to more promising preventive strategies and interventions.

LIST OF ABBREVIATIONS

ADHD = Attention deficit hyperactivity disorder
 AMSTAR2 = A MeaSurement Tool to Assess systematic Reviews 2

CAMHS = Child and adolescent mental health service
 CI = Confidence interval
 LGBTQ+ = Lesbian, gay, bisexual, transgender, queer +
 NSPCC = National Society for the Prevention of Cruelty to Children
 NSSI = Non-suicidal self-injury
 ODD = Oppositional Defiant Disorder
 OR = Odds ratio
 PAR = Population attributable risk
 PV = Peer Victimization
 RCT = Randomised controlled trial
 SITBs = Self-injurious thoughts and behaviours
 SMD = Standardised mean difference
 UK = United Kingdom

CONSENT FOR PUBLICATION

Not applicable.

STANDARDS OF REPORTING

PRISMA guidelines and methodology were followed.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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SUPPLEMENTARY MATERIAL

PRISMA checklist is available as supplementary material on the publisher’s website along with the published article.

Appendix 1 – Search strategy.

1	Overdose*/
2	Self-injury* OR self-injury* behaviour*
3	Self-mutilation/
4	Suicide
5	Suicidal ideation/
6	Harm OR cut* OR inflict* OR injury* OR mutilate* OR poison* OR damage* OR destruct*
7	(suicide* NOT (assisted suicide))
8	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7
9	Adolescent* OR young person OR young people OR child* OR teen* OR juvenile
10	Systematic OR systematic review*
11	8 AND 9 AND 10

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