



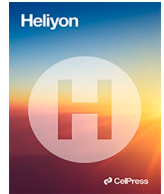
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Systematic review and meta-analysis

Suicidal behaviour among the university students in the UK: A systematic review

Russell Kabir^{a,*}, Haniya Zehra Syed^a, Divya Vinnakota^b, Sharon Okello^a, Sharon Shivuli Isigi^a, Sajna Kizhackanaly Abdul Kareem^a, Ali Davod Parsa^a, S.M. Yasir Arafat^c

^a School of Allied Health, Faculty of Health, Medicine and Social Care, Anglia Ruskin University, Chelmsford, Essex, UK

^b Faculty of Health Sciences and Wellbeing, University of Sunderland, London, UK

^c Department of Psychiatry, Enam Medical College & Hospital, Savar, Dhaka, Bangladesh



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ABSTRACT

Introduction: Identifying risk factors would help consider suicide prevention in any specific population. We aimed to assess suicidal behaviour among university students in the UK.

Methods: An extensive keyword search was conducted through PubMed, Cochrane, CINHAL Plus, PubMed Central, Web of Science, Trip database, and Science Direct, following the PRISMA guidelines to identify different publications. The search strategy for the literature review was based on the Population Exposure Outcome framework. Critical appraisal utilised the CASP tool for cohort studies and the AXIS tool for cross-sectional studies, resulting in 14 included studies. A narrative synthesis was performed.

Results: Postgraduate and undergraduate students used different suicidal methods such as poisoning, jumping, hanging, drowning, and suffocating, with jumping most preferred by male students. The predisposing factors of suicide among university students included: mental health problems (depression, psychological stress, psychosis, mania, neuroticism, financial anxiety, imperfect parents' connection with students), sexual orientation with risk of suicide among non-heterosexual students due to lowered self-esteem from feeling disregarded, disrespected and insufficient attention from the surrounding. Suicidal behaviour was high among unmarried students, male and unemployed female students, and students with childhood experiences such as physical abuse, family violence, emotional abuse, neglect, and physical punishment—gender, with females seeking more services from general hospitals with more suicide attempts in older females. High risk was also noted in males, with increased risk in white students compared to black students.

Conclusion: The review highlighted that students with previous mental health problems, a history of experiencing sexual abuse in childhood, bad relationships with their mother, disrespect and disregard in the community due to sexual identity are the major contributing factors for suicide among university students in the UK.

* Corresponding author. School of Allied Health, Faculty of Health, Medicine and Social Care, Anglia Ruskin University, Chelmsford, Essex, CM11SQ, UK.

E-mail address: russell.kabir@aru.ac.uk (R. Kabir).

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1. Introduction

The suicide rate for higher education students in England and Wales in the 12 months that culminated in July 2017 was 4.7 deaths per 100,000 students or 95 suicides; this is higher than in many of the earlier years studied, though the small numbers per year make it challenging to detect statistically significant differences. According to a recent report, more university students in England and Wales have recently attempted suicide [1]. Nevertheless, a study indicates that the rate of suicide is lower among students than in the general population of similar ages [2]. Since these categories are likely to be overrepresented in university populations, the lower rates may reflect the well-known decreased risk of suicide among those from wealthy families, those with greater levels of education, and those without significant mental illness [3]. Few studies have examined the academic and institution-specific risk factors for suicide among college students, and published case series frequently contain a limited number of cases without comparable risk factor data from the larger student body. According to a psychological autopsy study of 10 UK university students who died by suicide between 2000 and 2005, their transitional experiences had been a significant contributing factor in half of the deaths, and they had reported having academic difficulties in the other half [4].

Male students, those receiving fellowships or other financial aid, and those with academic problems were more likely than other university students to die by suicide. Suspension of studies, repeating a year, and course change were three factors that were particularly highly connected to risk; 18 students (48.6 %) who died by suicide had at least one of these factors recorded, compared with a prevalence of less than 5 % in the larger student population [2].

Drug or alcohol abuse, personal life difficulties such as relationship break-up or bereavement, prior self-harm or suicide attempts, and previous or current contacts with secondary care mental health services were additional factors that seemed to be related to risk, but for which there were no reliable comparison data. The public is aware of these risk factors for suicide [5].

Few researchers have examined the relationship between academic challenges and university students' risk of suicide. According to data from Japan, students in their final years of study who had to repeat a year or take an academic leave of absence were more likely to die by suicide [6]. Recent research on suicides among young people in England (National Confidential Inquiry into Suicide and Homicide [NCISH]) found that alcohol abuse (23 %), drug abuse (23 %), social isolation (27 %), and a diagnosis of mental illness (47 %) were common antecedents of suicide [7].

According to estimates, 17 % of student suicide deaths in England and Wales involve those who have recently or currently used NHS psychiatric services [1]. This result is consistent with Japanese data showing 16 % of students having a mental diagnosis (Uchida & Uchida, 2017) and American data showing that only about 25 % of student suicides involved customers of counselling services [2]. The fact that we could only estimate lifetime contacts rather than recent encounters may account for the higher figure in our study (41 %). It's noteworthy that, whereas over a third (38 %) of suicide fatalities in the NCISH study had evidence of some contact with mental health services, just 12 % of suicide deaths in the study had evidence of connection with college/university support services [8].

Students who died by suicide were three times more likely to have an affective disorder than nonstudents. Bipolar affective disorder and unipolar depression are both considered affective disorders. According to Harris and Barraclough (1997), depression is strongly linked to a higher risk of suicide [9]. For women with depression and in the first three months after receiving an initial diagnosis of depression, this risk is incredibly high.

Compared to nonstudents, students were more likely to have a recent history of mental illness (12 months). This can signify that they are still in the early stages of their mental illness. Improving the availability and acceptance of primary care support services for students may also have the additional benefit of promoting early referral to mental health services and, consequently, earlier intervention [4].

Students are less likely to live alone, which is commonly believed to increase the risk of self-harm and suicide [10]. This is partly because many students live in shared student houses or residence halls, where others may surround them but still feel emotionally alone and unsupported. For instance, the fact that a student is technically living with others could mislead clinicians about the security of their patients. It is unknown how student suicide affects United Kingdom (UK) Higher Education Institutions (HEIs), and staff members' experiences are also unknown. It is unknown if staff members have postvention requirements following a student suicide. No evidence-based context-specific postvention support is currently provided to staff employees inside UK HEIs. Public health initiatives are focused on preventing teen suicide at universities and high schools. There is evidence of a clustering of suicide deaths in similar ways, with hanging and suffocation standard methods [10]. Hence it is essential to obtain all available evidence to understand the magnitude of the problem among the student bodies in the UK, this will also provide the healthcare authorities with the university workforce to plan and devise prevention programs for suicide among the university students. The aim of this review was to focus on exploring the risk factors of suicide among university students in the United Kingdom, different methods used to die by suicide, the difference in suicidal rates based on age and gender and periods of high suicidal rates.

2. Methods

- Study design

The systematic review included the primary research studies, which produced either quantitative and/or qualitative results.

- Search strategy

An initial literature review was done through PubMed, Cochrane, CINAHL Plus, PubMed Central, Web of Science, Trip database,

and Science Direct. Studies available online were also collected from Google Scholar. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for systematic reviews, a comprehensive search of the published literature was conducted to identify different publications. The literature was limited to searches in the UK, between 2002 and 2022 and was carried out on other databases to avoid missing key studies and minimise bias. The search strategy for this systematic review is based on the PECOS framework (see Table 1). It is an evidence-based practice strategy that guides clinicians to reframe clinical questions to be “answerable” – in other words, to divide a clinical question into parts that can be used to search the literature, read a paper (appraise the literature), or design a research study. It is an effective strategy to obtain focused results when searching the literature.

Boolean operators ‘AND’ ‘OR’ were used to get more focused and productive results. The MeSH browser was used for indexing articles. The keywords were ‘Suicide, suicide ideation, students or university students, United Kingdom, England, Scotland, Northern Ireland and Great Britain’. After collecting all the studies, the search strategy is concluded by eliminating all the irrelevant studies, specifically through exclusion criteria, and removing duplicates by revising the title and abstract.

The following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines are followed.

2.1. Study selection

Before applying the inclusion and exclusion criteria, duplicated papers were eliminated using the RefWorks tool and manually examined to ensure no bias was caused by duplication. Following the removal of the duplicate articles, 1616 publications were identified in the literature search (see Fig. 1).

The inclusion and exclusion criteria are listed in Table 2.

2.1.1. Critical appraisal

A critical evaluation of each was conducted to assess the methodological strengths, limitations, research validity, reliability of the results, and biases present in all 14 studies (see Table 3). A variety of approaches for evaluation were used to assess the studies. Cross-sectional studies Table 4 were assessed using the Assessment tool for Cross-Sectional Studies (AXIS), developed especially for evaluating this kind of design. The effectiveness of cohort studies was assessed using the Critical Appraisal Skills Programme (CASP) methodology.

2.2. Data extraction & analysis

To extract the data, Microsoft Excel was used. The collected data included the article’s in-text citation, aim, study design, sample size, results, and limitations. A narrative synthesis was conducted [25]; meta-analysis was not possible due to the heterogeneity of included studies. The narrative synthesis was performed by clustering the potential risk factors for suicidal behaviours. The following clusters were formed.

3. Results

3.1. Characteristics of the study

The demographic characteristics of the study included age, gender, sexual orientation, status, and degree of study. The study included fourteen papers on major studies conducted in the United Kingdom of Northern Ireland, England, Scotland, and Wales. Undergraduate and postgraduate students were recruited as target samples of the study. Both heterosexual (straight) and LGBTQ male and female students participated in the review. The study participants were recruited through emails and sampling methods, including stratified random, quota, convenience, and snowball sampling. Both full and part-time students were also considered. The marriage status of students was not biased as both single students, married, divorced, widowed, or separated were allowed to participate in the study (See Tables 5 and 6).

3.2. Background factors

It was indicated that suicide was higher in males than females, with increased risk in white students compared to black students [1]. They also reported that suicidal behaviour risk is higher among undergraduate and postgraduate students. However, suicide score indicates that male students present high suicidal thoughts than women [17]. In one of the research findings, 84.4 % of male

Table 1
PECOS framework.

Population (P)	University students
Exposure (E)	University/family/sexual orientation/Gender.
Comparator (C)	None
Outcome (O)	Suicide, Suicidal behaviour, Suicide attempts
Study (S)	Cross-sectional, Cohort, Case-Control

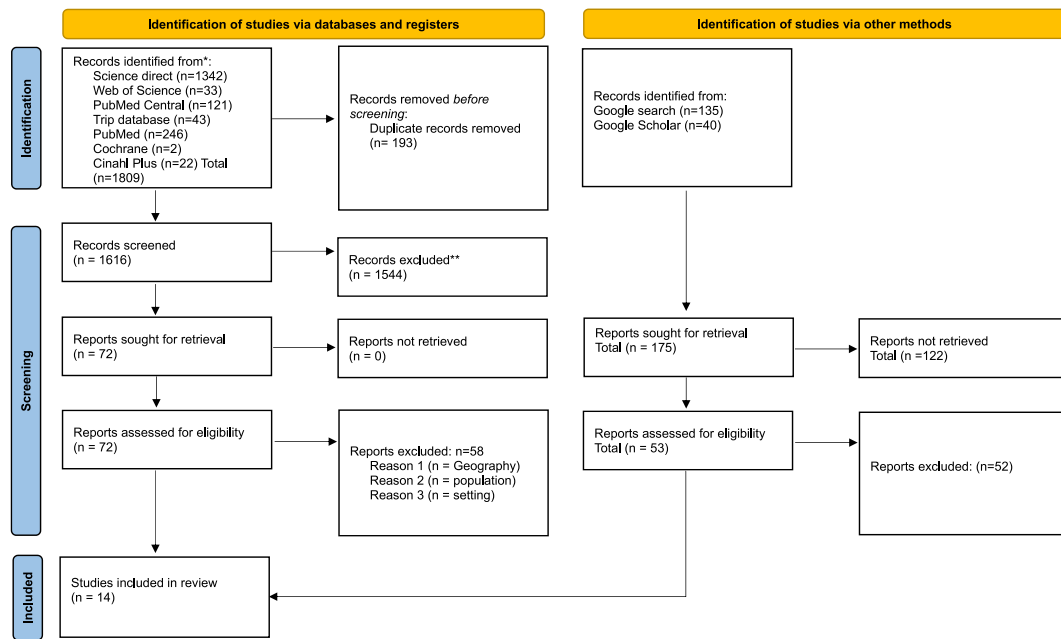


Fig. 1. Prisma flowchart [11].

Table 2
Inclusion and exclusion criteria.

Inclusion	Exclusion
<ul style="list-style-type: none"> • Primary research studies • English Language papers • 2002–2022 time span • Original studies • Peer-reviewed studies • Full text articles • Articles covering “Suicide, suicide ideation, suicide attempt, students or university students, United Kingdom, and Great Britain.” • University students • From United Kingdom 	<ul style="list-style-type: none"> • Systematic reviews • Not in English language • Reviews and editorials • Grey literature • Articles published before 2002 • Articles not covering “Suicide, suicide ideation, students or university students, United Kingdom, and Great Britain” • Participants other than university students. • Countries other than United Kingdom

undergraduate students died by suicide compared to most post-graduate female students who died from suicide [24]. Suicidal behaviours were also noted in students studying Arts subjects with a significant gender difference [24]. Suicide rates incidences increased with age; however, findings recorded that only females above 25 committed suicide [1,24]. Students with adverse childhood experiences such as physical abuse, family violence, emotional abuse, neglect and physical punishment were classified as highly risky as they presented suicidal thoughts [16]. Financial stress and poor relationship with either one of the parents were significantly correlated with mood, with handy students seeking help from the university support system and mental health professionals likely to report suicidal thoughts [15]. Alcohol dependence was also significantly associated with an increased likelihood of suicidal behaviour among students [16]. It was noted that non-married students were twice likely to have suicidal plans and four times to have drug dependency and self-harm [14].

3.3. Mental health issues

The research by Akram et al. (2020) revealed that students at more risk of suicide were likely to report increased depressive symptoms, psychological stress, psychosis, and lower mania symptoms [12]. Moreover, the average positive correlation of neuroticism was majorly in men, with little positive correlation in females [17]. According to the research by O’Neill et al. (2018), students with a history of sexual abuse experience as a child had a moderate or high likelihood of committing suicide. Male and female students with non-heterosexual orientation status had a high likelihood of suicidal behaviours and self-harm [16]. Presumably, non-heterosexual students endured major depressive episodes and planned to attempt suicide. It was noted that students above twenty-one were twice as likely to have suicide attempts and major depressive symptoms [14]. Gnan et al. (2019) found that sexual abuse and experience of violence are major risk factors for attempting suicide among transgender students [20]. Horgan et al. (2018) reported that the students who received mental health support from internet chat groups, mental health professionals and university support services

Table 3
Critical Appraisal Cross-sectional studies.

Introduction Study	Was the aim/objective of the study clear?	Was the study design appropriate for stated aim?	Was the sample size justified?	Was the target/reference population clearly defined? (Is it clear who the research was about?)	Was the sample frame taken from an appropriate population so that it closely represents the target/reference population under investigation?	Was the selection process likely to select subject/participants representative of the target/reference population under investigation?	Methods				
							Were measures undertaken to address and categorise non-responders?	Were the risk factor and outcome variables measured appropriately to the aim of study?	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?	Is it clear what was used to determine statistical significance and/or precision estimates? (e.g., P-values, confidence intervals)	Were the methods (including statistical methods) sufficiently described to enable them to be repeated?
Akram et al., 2020 (12)	+	+/-	+	+	+	+	-	+	+	+	+
Taylor et al., 2018 (13)	+	+	+	+	+	+	+	+	+	+	+
Ward et al., 2022 (14)	+	+	+	+	+	+	+	+	+	+	+
Horgan et al., 2018 (15)	+	+	+	+	+	+	+	+	+	+	+
O'Neill et al., 2018 (16)	+	+	+	+	+	+/-	-	+	+	+	+
Stewart et al., 2008 [17]	+	+	+	+	+	-	+	+	+	+	+
McManus & Gunnell, 2020 (18)	+/-	+	+	+	+	-	+	+	-	+	+
Dhingra et al., 2019 (19)	+	+	+	+	+	+	-	+	+	+	+
Gnan et al., 2019 (20)	+	+/-	+	+	+	+/-	-	+	+/-	+	+
Gunnell et al., 2020 (1)	+	+	+	+	+	+	+	+	+	+	+
Dhingra et al., 2015 (21)	+	+/-	+	+	+	+	-	+	+	+	+
Results							Discussion		Other		
Study	Were the basic data adequately described?	Does the response rate raise concerns about non-response Bias?	If appropriate, was information about non-responders described?	Were the results internally consistent?	Were the results presented for all the analyses described in the methods?	Were the authors discussion and conclusions justified by the results?	Were the limitations of the study discussed?	Were there any funding sources or conflicts of interest that may affect the authors interpretation of results?	Was ethical approval or consent of participants attained?		
Akram et al., 2020 (12)	+	-	+	+	+	+	+	-	+		
Taylor et al., 2018 (13)	+	-	+	+	+	+	+	-	+		
Ward et al., 2022 (14)	+	-	+	+	+	+	+	+/-	+		

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Table 3 (continued)

Results						Discussion		Other	
Study	Were the basic data adequately described?	Does the response rate raise concerns about non-response Bias?	If appropriate, was information about non-responders described?	Were the results internally consistent?	Were the results presented for all the analyses described in the methods?	Were the authors discussion and conclusions justified by the results?	Were the limitations of the study discussed?	Were there any funding sources or conflicts of interest that may affect the authors interpretation of results?	Was ethical approval or consent of participants attained?
Horgan et al., 2018 (15)	+	+/-	+	+/-	+	+	+	-	+
O'Neill et al., 2018 (16)	+	+	-	+	+	+	+	-	+
Stewart et al., 2008 (17)	+	+/-	+	+	+	+	+	-	-
McManus & Gunnell, 2020 (18)	+/-	-	-	+	+	+/-	+	-	+
Dhingra et al., 2019 (19)	+	-	-	+	+	+	+	-	+
Gnan et al., 2019 (20)	+	-	-	+	+	+	+	+/-	+
Gunnell et al., 2020 (1)	+	-	+	+	+	+	+	-	+
Dhingra et al., 2015 (21)	+	-	-	+	+	+	+	-	+

Table 4
Critical Appraisal for Cohort Studies using CASP Tool.

Cohort study		Section A: Are the results valid?								Section B: What are the results?				
Study	Did study address a clearly focussed issue?	Was the cohort recruited in an acceptable way?	Was the exposure accurately measured to minimise bias?	Was the outcome accurately measured to minimise bias?	Have the authors identified all important confounding factors?	Have they taken account of the confounding factors in the design and/or analysis?	Was the follow up of subjects complete enough?	Was follow up of subjects long enough?	What are the results study?	How precise are the results?	Did you believe the results?	Can the results be applied to the local population?	Do the results of this study fit with other available evidence?	What are the implications of the study for practice?
McLafferty et al., 2021 [22]	+	+	+	+	+	-	+	+	+	+/-	+	-	+	+
Etherson et al., 2022 [23]	+	-	+/-	-	+/-	+/-	-	-	+/-	+/-	+/-	+/-	+	+
Hawton et al., 2012 [24]	+/-	+	+	+/-	+	-	+	+	+	+	+	-	+/-	+

Table 5
Summary of the included studies.

Study	Aim	Sample size	Study design	Key findings	Limitation	Conclusion
Akram et al. (2020) (12)	To establish the suicide ideation prevalence among British university students and investigate the correlation between suicide and mental health difficulties.	1650	Cross-sectional	Based on logistic regression analysis, students with high suicide risk reported high signs of depression, psychosis, psychological stress, and lower mania. 10.8 % of students made suicide attempts while 20 % of students had deliberate suicide based on an examination of the whole sample. In the past year. 42.2 % of students had envisaged suicide, 25 % shared their thoughts while 5 % had possibilities of attempting suicide in the future.	Lack of homogeneous sample. Limited ability to draw conclusions based on causal relationships and self-selection bias among students.	Suicide prevention interventions aligned with NICE should be made available to all university learners ideating suicidal thoughts.
Dhingra et al. (2015) (21)	Examine factors associated with having suicidal thoughts verses suicidal attempts.	1288	Cross sectional study	Tests done by ANOVA revealed that suicide ideation and attempts significantly varied from the control group on various measures including depression, anxiety, thwarted belongingness, goal reengagement, perceived burdensomeness, entrapment, defeat, and brooding rumination.	The study sample was based on retrospective self-report, and the intentional and motivational factors were not exhausted. About 80 % of the recruited sample who self-reported suicide attempts were female students preventing group analysis by gender. The generalizability was reduced by the fact that participants were majorly students.	Findings exhibit results theoretical basis that can be used for progressive examination of suicide ideation factors and featuring embracing treatments and interventions conveying suicidal factors in the intentional and motivational phases.
Dhingra et al. (2019) (19)	To acknowledge how persons progress from suicide ideation to an attempt to die by suicide by testing a sample of university students through empirically testing the Three Step Theory.	665	Cohort	24 % of participants reported at least one suicide attempt, and 72.4 % reported a history of lifetime suicidal thoughts.	Retrospective self-report analysis, which may have included forgetting or reporting biases.	
Etherson et al. (2022) (23)	To give a strong longitudinal test on the perfectionism social disconnection model that encompass depressive symptoms and suicide ideations as result and mattering and anti-mattering as moderators.	181	Longitudinal study	The collateral effect of self-oriented perfectionism on depression through mattering and anti-mattering was insignificant. Self-oriented suicide on suicidal ideation through mattering and anti-mattering was insignificant. Through mattering, depressive symptoms was substantial on the socially prescribed perfectionism.	Presence of bias due to self-report measures and variability was suppressed when sample showed low mean levels in suicide ideation and depressive symptoms. The sample only included white British undergraduates, which reduced generalizability. Based on the research and theory, specific patterns were used to test for relationships.	The longitudinal designs to investigate the perfectionism social disconnection model should include anti-mattering through advocacy.
Gnan et al. (2019) [20]	To identify robust general and LGBTQ-specific risk factors associated with current mental health problems, access to mental health services, self-harm, and suicide risk in LGBTQ students in the UK.	1948	Cross sectional study	Based on the results, social support was notably associated with self-harm and suicide risk. Age 16 and above posed a risk factor for mental health services usage on those having self-harm and current mental health problems. Having LGBTQ	The results were not generalizable to whole population as the recruitment only targeted a few samples causing ascertained bias among the study sample.	Preventive interventions should consider that LGBTQ students have distinct experiences that may add risk of suicide, self-harm, and mental health problems. LGBTQ vulnerable subgroups should not

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Table 5 (continued)

Study	Aim	Sample size	Study design	Key findings	Limitation	Conclusion
Gunnell et al. (2020) (1)	Explore trends in the events and characteristics of suicide of university students in England and Wales in academic track 2000/01–2016/17.	1330	Cross sectional study	friends exhibited a risk factor accessing mental health services. Compared to other ethnic groups, suicide was found to have lower risks in postgraduate, undergraduate and black students. Exam pressures and challenges of back-to-school studies posed high risk of suicide. 8.2 % of students suicide rates was caused by jumping. Based on analysis, the leading cause of deaths for students who left university were poisoning, jumping, drowning, and hanging.	There was no complete socio demographic breakdown of the population sample and absence of stratified age in both male and female students. Due to lack of mental health service contact information, relevant deaths were missed during the linkage and deaths underestimated during coroner's inquest.	be overlooked but treated with due attention.
Hawton et al. (2012) (24)	Give information regarding suicide and deliberate self-harm in university students for 30 years.	650	Longitudinal study	Students died by suicide through hanging and suffocation. This was rampant in half of female students. Male students dominated jumping from heights and administering drug overdose. Cyanide was used however unpopular between female and male students.	Hospital presentation may have biased sample of students. The at-risk university students were not included in the study while psychiatric nurses were underreporting psychiatric disorders during assessment.	
Horgan et al., 2018 (15)	Inspect the high rates of depression and suicide ideation between 220 undergraduate year one students in Ireland.	2350	Cross sectional study	High depressive symptoms were noted in first year students having poor relationships with their parents. Strong positive significant relationship was established midst of suicide ideation scores with high depressive symptoms due to emotional stress in university students who looked for help from university support system and mental health professionals.	Sample was dominated by females and Caucasian therefore reducing the generalizability. Research did not find out the university students mental health status before joining university.	
McLafferty et al. (2021) [22]	To do comparison between anxiety symptoms, depression, and suicidal behavior among university students in Ireland.	1947	Longitudinal study	In year 1 and 2, depression increased by over 10 % while 26.1 % of university students had depression disorders due to social isolation and stress.	Study sample was underrepresented by the population under study. There was lack of generalizability being that samples came for Northern Ireland and Republic of Ireland only and the measure used for depression and anxiety symptoms did not look back into the lifetime disorders but instead captured symptoms two weeks before the study.	Findings indicated that students are vulnerable groups in dire need of support during the pandemic.
McManus & Gunnell, (2020) [18]	Report adult psychiatric morbidity survey data analysis for 2000,2007 and 2014 in 16–24-year-old university students	103 in 2004 106 in 2007 122 in 2014		Mental disorder was common among students and non-students. Prevalence of an attempted suicide was	Small study sample size ranging from 103 to 122. Sample study was underrepresented as only 16–24-year-olds students were included. There was	

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Table 5 (continued)

Study	Aim	Sample size	Study design	Key findings	Limitation	Conclusion
	and non-students in England.			lower in students in 2014 than in non-students.	high risk of positive false reporting as mental health outcomes were investigated on three different periods with different outcomes.	
O'Neill et al. (2018) [16]	To inspect childhood adversities and mental health disorders as determinant of suicidal behavior and self-harm.	739	Cross sectional study	31 % of male and female students affirmed suicide ideation with 1 of 5 students having a previous plan of suicide within one year before survey. Among general population or sample of students who affirmed suicide ideation, 12.1 % disclosed having a suicidal plan while 4.3 % made suicide attempt.	Cross sectional study did not imply causality. Low generalizability of the sample	Mental health stigma remains a problem for vulnerable students, and learning institutions must seek interventions to address the problems through digital or online avenues.
Stewart et al. (2008) [17]	To analyze psychometrics and personality correlates of self-disclosure of suicide ideation in a sample of youths using multiple measures to assess state and trait factors.	2000	Cross sectional study	Male students scored greater than women on suicidal ideation. The association between personality, suicidal thoughts and moods was the same between females and males though there were few differences. Psychoticism had average correlation in women with no significant association in men. Suicidal thoughts positively correlated with depressed mood and anxiety while happiness was negatively compatible.	Selection bias from the study sample	
Taylor et al. (2018) [13]	Explore correlation between lesbians' gays, bisexuals' status and self-harm forms in UK student sample and explore psychological mediators' explanation to the association.	707	Cross sectional study	17.8 % participants reported suicide attempts with only 42.5 % of non-suicidal self-injury. Self-harm associated self-esteem significantly. The study indicated poor model fit when both anxiety and depression were added.	Small number in subgroup reduced the ability to look at the sexual orientation distinctions. Self-esteem significantly associated suicide attempt.	
Ward et al. (2022) [14]	To investigate any variation of mental health issues, suicidal behaviors, and behaviors for seeking health among students at university in Northern Ireland and Republic of Ireland.	6679	Cross sectional study	Suicidal ideation had the highest prevalence rates of 28 % followed by 15 % major depressive episode and 14.3 % suicidal plans. Republic of Ireland had significant depressive episode of 19.3 % in students, 36.4 % had suicide ideation, 23.3 % planned suicide, 10.7 % attempted suicide and 20.2 % contemplated suicide compared to Northern Ireland.		

Table 6
Background information of students.

References	Age Range/mean age of the sample	Undergraduate/postgraduate students	Area/region of the study in the UK
Akram et al., 2020	20.88 ± 4.53/18-56	Undergraduate and postgraduate	Six UK universities
Dhingra et al., 2015	24.29 ± 8.30/18-63	Not mentioned	Three UK universities
Dhingra et al., 2019	24.2 ± 8.11/17-67	Not mentioned	Two UK universities
Etherson et al., 2022	20.34 ± 3.25	Undergraduates	UK
Gnan et al., 2019	20.3 ± 1.9/16-25	University/HE students	UK
Gunnell et al., 2020	18–82	Undergraduate and postgraduate students	England and Wales
Hawton et al., 2012	18–25	Not mentioned	England
Horgan et al., 2018	18–24	First year undergraduate students	South of Ireland
McLafferty et al., 2021	Average age 21	First year undergraduate students	Republic of Ireland/Northern Ireland
McManus & Gunnell, 2020	16–24	Not mentioned	England
O'Neill et al., 2018	20.69 ± 5.313/18-49	Not mentioned	Northern Ireland
Stewart et al., 2008	Over 17 years	Undergraduate and postgraduate students	Edinburgh
Taylor et al., 2018	23.05 ± 7.15	Not mentioned	UK universities
Ward et al., 2022	21.67 ± 6.608/18-65	Undergraduate students	Northern Ireland and Republic of Ireland

have shown a higher risk of suicidal behaviour [15]. Dhingra, Klonsky and Tapola (2019) identified that psychological pain and hopelessness correlate with suicidal behaviour among students [19]. Men with high emotionality are more prone to suicidal thoughts and Sexual minority statuses increased the possibility of self-harm and suicidal behaviour, with students aged 21 years and above more likely to have attempted suicide [16,17]. Also not feeling accepted where they live is another important predictor of a suicidal tendency among LGBTQ students [20].

3.4. Suicidal methods

Suicide behaviour encompasses all actions intending to harm oneself [26]. Both postgraduate and undergraduate students used suicidal methods such as poisoning, jumping, hanging, and drowning. Based on statistical evidence of the suicidal methods used by students, it revealed that the magnitude difference was low but high in jumping [1]. This was supported by the statement by highlighting that the methods of suicide among students were done through suffocation, hanging, and jumping from heights which male students mostly preferred [24]. In another analysis 169 deaths that were associated with leaving the university happened through poisoning and hanging [1]. Similarly, (Dhingra, Boduszek and O'Connor, 2015) research reveals that compared to the outcome of suicide ideation and suicide attempts, the findings indicate that suicidal attempts varied significantly from enactors group on volitional variables such as friend imitation, fearless about death and family imitation [21]. According to a study there was a suicidal pattern noted in students as the highest number of deaths were recorded in the January semester and lower in July and September, with seasonal differences in undergraduate and postgraduate students [1].

4. Discussion

The review has identified a variety of risk factors for suicidal behaviours among university students in the UK. The review also highlighted different suicidal techniques used by students are -consumption of poisoning, jumping, hanging, drowning and suffocating. Male students are more prevalent in using the jumping method. Among the mental health problems, associated factors include depression, psychological stress, psychosis, lower mania, neuroticism, financial anxiety, and imperfect parents' connection with students. The risk factors of sexual orientation towards suicide are non-heterosexual students due to their low self-esteem, feelings like disrespect and less attention from surroundings. Male and female students who are not employed, unmarried, and experienced physical abuse, family violence, emotional abuse, neglect, and physical punishment are more likely to have suicidal ideation than other students. Males were found to be at high risk, and white students were at a higher risk than black students.

Based on data from the Office of National Statistics in UK, suicidal rates have increased in students in England and Wales in the recent years [1]. Many studies have reported suicide associated with mental health problems such as depression and anxiety [13,14,20,23]. Research findings have indicated that suicide is higher among students than in the general population and white students had high risk of dying by suicide as compared to black students [1]. Male students were likely to present high suicide risks than females [1,17]. Different research studies illustrate that most students developing mental health problems reported high psychological stress, psychosis and symptoms of depression [12]. Few research studies reported that there is a particular period on student academic calendar whereby students become more vulnerable to suicide ideation and attempts such as January as compared to July and September [1]. Moreover, students taking Arts related courses reported high suicidal thoughts and behaviors [24].

Similarly, a study conducted in 1995 found that student deaths were distributed evenly over the academic year [4]. Students committing suicide worried a lot about their academic achievement and most deaths were reported during summer holidays and a few weeks before returning to the university and the transitional periods across students' academic calendar exposed students to become more vulnerable to suicidal behaviours [4]. Different suicidal methods were used by undergraduates and postgraduate students such as jumping, hanging, poisoning, and drowning [1]. However, hanging and jumping were mostly preferred by male student [24].

5. Strengths and limitations

To the best of the authors' knowledge, this paper is the first systematic review of the factors associated with suicide among university students in the UK. To reduce bias, the critical appraisal was conducted twice. This systematic review only included peer-reviewed articles as they present higher-quality research and minimise bias. Due to the review being restricted to English-language studies, there is a chance of linguistic and geographic bias. Recent articles may also be missed as the articles that are only available in partial text are excluded.

6. Conclusion

The review highlighted that student with previous mental health problems, a history of experiencing sexual abuse in childhood, bad relationships with their mother, disrespect and disregard in the community due to sexual identity are the major contributing factors for suicide among university students in the UK. Mental health problems portray huge risks to learners, especially university students. The number of students deliberating suicide are reported to have depression, anxieties, self-harm, suicide ideation, stress, psychosis or even childhood adversities. Based on the rising suicide deaths among undergraduate and postgraduate students, suicide prevention interventions should be implemented for easier access in all learning institutions. Suicide policy under mental health acts should be enacted and reinforced so that all students needing psychological mental health services acquire maximum potential usage. Stigma among LGBTQ students should be addressed to avoid victimization. All male and female undergraduate and postgraduate students presenting psychiatric disorders should be highly considered and future research studies should focus on suicidal preventative measures among this vulnerable population.

Data availability statement

No data was used for the research described in the article.

CRediT authorship contribution statement

Russell Kabir: Writing – review & editing, Writing – original draft, Supervision, Software, Methodology, Investigation, Formal analysis, Conceptualization. **Haniya Zehra Syed:** Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization. **Divya Vinnakota:** Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization. **Sharon Okello:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis. **Sharon Shivuli Isigi:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis. **Sajna Kizhakanaly Abdul Kareem:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis. **Ali Davod Parsa:** Writing – review & editing, Writing – original draft, Supervision, Investigation, Formal analysis. **S.M. Yasir Arafat:** Writing – review & editing, Writing – original draft, Supervision, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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