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SYSTEMATIC REVIEW OPEN ACCESS

"Suicide Risk Among Physicians in the USA: A Systematic Narrative Review of Incidence, Risk Factors, and Prevention Strategies"

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ABSTRACT

Physician suicide is a significant public health problem, as previous research shows physicians are at increased risk of dying by suicide compared to the general population. We aim to focus on the recent trends in physician suicide death rates, risk factors and preventive measures related to physicians in the US. We adhered to the PRISMA guidelines for systematic reviews. A search of PubMed, Embase, and PsycINFO resulted in 5139 records. We included 5 studies that provide a sex-specific examination of physician suicide death rates, related risk factors, or preventive measures. We used the Newcastle-Ottawa Scale for quality assessment and employed a thematic approach to interpret data. Our qualitative analysis revealed that female physicians have an elevated risk of suicide in comparison to their female non-physician counterparts, whereas male physicians exhibit lower risk relative to male non-physicians. Our findings show that male risk factors for suicide include job and legal stressors, while females were affected by mental health issues. Depression was a direct contributor to suicidal thoughts, while burnout was indirectly involved. Distinguishing between burnout and depression is essential for the implementation of successful preventative methods. Future research must investigate intersectional elements, as well as longitudinal post-pandemic trends, to inform the formulation of fair policy. These findings underscore the critical need for supportive workplace conditions to mitigate suicide risk among physicians. Enhancing awareness of the stigma associated with mental health care access and prioritizing support networks are crucial measures for cultivating a culture of psychological well-being within the medical profession.

1 | Introduction

A career in medicine has been linked to a greater risk of dying by suicide (Rotenstein et al. 2016; Brazeau et al. 2014; Dyrbye et al. 2008; Schernhammer and Colditz 2004; Frank 2000; Depression 2025) Long work hours, the burden of frequently making life-or-death decisions, caring for patients, burdensome changes to the health care system, a lack of autonomy, and more time spent on computers than with patients are just a few of the enormous stresses that come with being a doctor, although it can be a very fulfilling profession (Zhou et al. 2020; Yates 2020) One out of every 16 active physicians reports having suicidal thoughts to some extent (Shanafelt 2011). Health care workers are thought to be more likely to die by suicide than the

general population due to their demanding jobs, their avoidance of mental health services out of fear of stigma, and their easier access to drugs that can be used to end their lives (Pereira-Lima et al. 2019; University of California San Diego Health et al. 2018; Physician Suicide: A Call to Action—PubMed Internet 2025)

Previous research on physician suicide has yielded inconclusive findings regarding gender differences. According to a 2007–2018 study, male and female physicians had comparable suicide death rates to those of the general community (Davis et al. 2021). According to another study, there was no discernible variation in overall suicide rates between 2012 and 2016, although some data indicated that female doctors might be at greater risk of dying by suicide (Ye et al. 2021). However, according to the most recent study, female physicians had a higher suicide rate than female nonphysicians (Makhija et al. 2025).

Several factors contribute to suicide risk among physicians. Depression and work-related stress can combine to increase suicidal thoughts, lower job satisfaction, and create role conflicts (Schwenk et al. 2008). The World Health Organization has identified burnout as an occupational syndrome (International Classification of Diseases ICD Internet 2025), and in the past, the experience of doctors in epidemic proportions (Embriaco et al. 2007) has also been linked to depression and suicide in doctors and doctors-in-training (Dyrbye et al. 2008; Shanafelt 2011; Lheureux et al. 2016) Despite the findings of a recent meta-analysis indicating that burnout and depression are distinct conceptions, there is still debate regarding whether they are distinct constructions or gradations of the same underlying condition, which may be exacerbated by the complexity of these correlations (Bianchi 2020; Koutsimani et al. 2019)

A comprehensive meta-analysis on this subject was previously published, (Duarte et al. 2020) but essential data from studies published within the last 5 years were missing. Our systematic study evaluated the prevalence of physician suicide, risk factors, and prevention strategies by using recently available data from studies published between 2020 and 2025. We aim to review recent literature to provide targeted interventions and policy suggestions that can reduce the incidence of physician suicide by synthesizing the body of existing knowledge and emphasizing essential risk factors. It is necessary to address these issues to provide a destigmatized and more supportive environment for health care professionals, ultimately benefiting physicians and patients.

2 | Methods

This systematic review used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 criteria. The research protocol (CRD420251014754) was prospectively registered with PROSPERO.

2.1 | Screening

We conducted a thorough search on three online databases: Embase, PsycINFO, and PubMed. The search encompassed research articles released from 2020 to February 2025 to identify current patterns in physician suicide in the U.S. The following keywords were utilized: (((Suicide) OR (Suicidal ideation) OR (Self-harm)) AND ((Physicians) OR (doctors))); a thorough research strategy is provided in the supplementary file. We manually checked the publications' reference lists for any relevant studies. Articles were vetted for relevancy by two independent reviewers using predetermined eligibility criteria. Articles that satisfied the preliminary requirements were subjected to a full-text examination for ultimate inclusion.

2.2 | Eligibility Criteria

The inclusion criteria focused on physician suicide in the United States, sex-specific analysis of suicide risk factors, and cohort, case-control, cross-sectional, and retrospective studies. In contrast, only those studies conducted outside the United States, systematic reviews, meta-analyses, and opinion pieces (used for background information only) were excluded. The reviewers consulted with each other for any discrepancies.

2.3 | Data Extraction

We used a customized Microsoft excel sheet to extract relevant data from each included study. The study features such as authors, year, population, sample size, time frame, and data source were extracted, along with the outcomes such as suicide incidence rates, risk variables, suicide methods, and preventive measures was among the data gathered.

2.4 | Quality Assessment

We evaluated the quality of the included studies by using the Newcastle–Ottawa Scale (NOS), which assesses three key domains: 1. Representation of the exposed cohort, choice of the nonexposed cohort, and ascertainment of exposure. 2. Confounding factors such as age, sex, speciality, and mental health history were controlled. 3. Assessment of outcome, follow-up duration, and adequacy of follow-up. Studies with 7–9 points were rated high quality, those with 4–6 points were rated moderate quality, and those with <4 points were rated low quality and were excluded from the synthesis.

2.5 | Data Synthesis

We qualitatively and thematically analyzed the included studies to produce a narrative synthesis (Thomas and Harden 2008). A deductive approach was employed, guided by predefined themes from the literature on occupational stress, mental health problems, and obstacles to reaching treatment. A preliminary synthesis was first undertaken by one member of the research team, and the identified categories were subsequently cross-checked and discussed with another member. The researchers met to discuss any disagreements that arose, and any differences in opinion were resolved through consensus. No ethics approval was required for this review.

2.6 | Outcome Measures

The primary outcome of interest was the incidence of physician suicide, which was assessed through measures including incidence rate ratios (IRRs), standardized mortality ratios (SMRs), and odds ratios (ORs), which were used to compare male and female physicians with their nonphysician counterparts. ORs represent the multiplicative change in odds of the outcome occurring with exposure to a risk factor and do not directly indicate changes in probability. The secondary outcomes included identified risk factors, such as mental health diagnoses and legal stressors, as well as methods of suicide, including firearms and poisoning, with an analysis differentiated by sex. Methods of suicide were analyzed as percentages of total suicides, categorized by sex when applicable. We also used descriptive methods to report outcomes when appropriate.

3 | Results

3.1 | Study Selection

The systematic review followed PRISMA guidelines to identify relevant studies (Figure 1). A total of 5139 records were retrieved from PubMed ($n = 3014$), Embase ($n = 1720$), and PsycINFO ($n = 405$). After removing duplicates ($n = 797$) and records flagged as ineligible by automation tools or filters ($n = 2728$; e.g., non-English studies, nonhuman subjects), 1614 records underwent title/abstract screening. Of these, 1012 were excluded for not assessing suicide incidence. Full-text retrieval was attempted for 602 articles, 27 of which were unavailable, leaving 575 for eligibility assessment. After excluding 569 articles (reviews: $n = 325$; wrong study design: $n = 51$; conference abstracts: $n = 28$; case reports/editorials: $n = 57$; wrong population: $n = 109$), five studies met the inclusion criteria (Table 1).

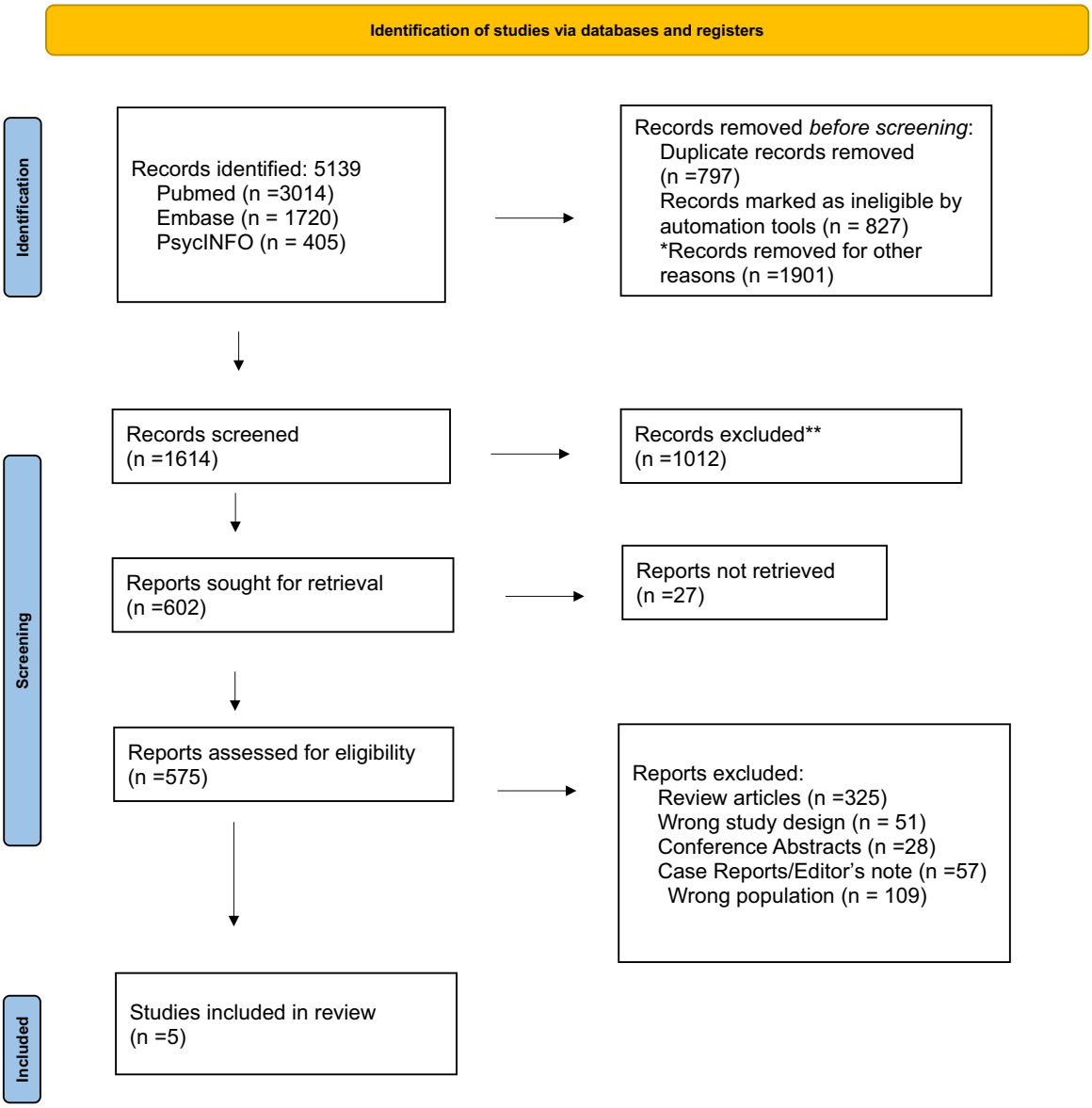

FIGURE 1 | PRISMA flow diagram. *Records removed using filter for English-language studies and human subjects. **Records not assessing suicide incidence.

TABLE 1 | Baseline characteristics and limitations of the included studies.

Study (year)	Study design	Population	Total sample size (suicides)	Male *n* (%)	Female *n* (%)	Time frame	Data source	Key variables assessed	Limitations
Makhija et al. (2025)	Retrospective cohort	Physicians versus General Population	Physicians: 448 GP: 97,467	Physicians: 354 (79%) GP: 76,697 (79%)	Physicians: 94 (21%) GP: 20,770 (21%)	2017–2021	NVDRS	Suicide incidence, risk factors, methods	Post-pandemic focus but limited to 2021 data; general population comparator
Ji et al. (2020)	Retrospective cohort	Physicians, Surgeons, Dentists versus GP	HCPs: 767 GP: 169,263	HCPs: 675 (88%) GP: 131,509 (78%)	HCPs: 92 (12%) GP: 37,696 (22%)	2003–2016	NVDRS	Demographics, risk factors, prevention	Mixed HCP categories (not physicians only); older data
Ye et al. (2021)	Retrospective cohort	Physicians versus nonphysicians	Physicians: 498 NP: 74,420	Physicians: 403 (81%) NP: 57,188 (77%)	Physicians: 95 (19%) NP: 17,232 (23%)	2012–2016	NVDRS	Gender disparities, methods, stressors	No control for specialty or mental health confounders; pre-COVID
Gold et al. (2022)	Retrospective cohort	Physicians	357	307 (86%)	50 (14%)	2010–2015	NVDRS	Annual suicide estimates, SMR, risk factors	Small female sample; SMR analysis may mask gender-specific risks
Menon et al. (2020)	Cross-sectional survey	Physicians (risk of suicidal ideation only)	1354 surveyed 75 cases[a]	32 (43%)	42 (57%)	2018–2019	AMA Masterfile	Burnout, depression, workplace factors	Self-reported ideation; no mortality data; potential response bias

Abbreviations: GP = general population, HCPs = health care professionals, NP = nonphysicians, NVDRS = National Violent Death Reporting System, SMR = standardized mortality ratio.
[a]Menon et al. (2020) reported cases of suicidal ideation among surveyed physicians who did not complete suicide.

3.2 | Baseline Characteristics

The five studies in this review demonstrated significant variability regarding study design (retrospective cohort vs. cross-sectional), population (e.g., physicians only vs. physicians and dentists), data sources (e.g., NVDRS, AMA Masterfile), timeframes (2010–2021), and outcome reporting (e.g., SMR, IRR, and OR). The variability presented obstacles to direct comparison or meta-analysis. We used a structured thematic approach to synthesize common trends and outcome variations. The heterogeneity reflects the complexity of physician suicide, a multifactorial issue influenced by demographic, systemic, and temporal variables. Details on the primary predictor and outcome variables assessed in each of the five included studies are presented in Table 1, including the outcomes measured and key variables assessed.

3.3 | Risk of Bias Assessment

Three of the selected studies, Makhija et al. (2025), Ye et al. (2021), and Menon et al. (2020), demonstrated robust methods with total scores of 9, 9, and 8, respectively. Menon et al. (2020) achieved a selection score of 3 out of 4, potentially attributable to their dependence on self-report survey data, which could lead to recall bias. Ji et al. (2020) and Gold et al. (2022) obtained scores of 7/9, which was attributed mainly to issues in comparability (Ji et al. 1/2 for inadequate control of confounders such as mental health history) and outcome assessment (Gold et al. 2/3 for limited follow-up durations). Ji et al. (2020) presented a moderate comparability score that indicates potential residual confounding, necessitating caution in the interpretation of risk factor estimates. Overall, we included studies that scored high to moderate on the NOS of risk of bias assessment. A summary of the NOS risk of bias assessment is given in Table 2.

3.4 | Gender Disparities in Suicide Incidence

The suicide death rates among female doctors were consistently higher than those among female nonphysicians. Makhija et al (Makhija et al. 2025). reported that male physicians had a 16% lower risk and incidence rate ratio (IRR: 0.84) than male nonphysicians did from 2017 to 2021, whereas female physicians had a 53% higher risk than female nonphysicians did (IRR: 1.53). Similarly, Ye et al (Ye et al. 2021). reported that the male-to-female ratio among physicians was 2:1, whereas it was 4:1 in the general population, indicating that female physician suicides far outnumbered those of nonphysicians. Gold et al (Gold et al. 2022). reported that female physicians were disproportionately at higher risk than male physicians were, although SMRs for physicians as a whole did not differ from those for nonphysicians. Menon et al. reported that the risk of suicidal ideation among male physicians was 4.2% and that among female physicians was 7.3%. Compared with male non-surgeons, female non-surgeons were 39% less likely to have a suicide (OR = 0.61, 95% CI 0.48–0.79), according to Ji et al. Table 3 provides key details.

3.5 | Gender-Specific Risk Factors

Male Physicians: Stressors related to the workplace and the law were prevalent; job difficulties (adjusted OR: 2.66) and legal

TABLE 2 | Newcastle–Ottawa Scale (NOS) assessment for the included studies.

Study	Year	Selection (Max 4)	Comparability (Max 2)	Outcome/ exposure (Max 3)	Total score (max 9)	Quality rating
Makhija et al.	2025	4	2	3	9	High
Ji et al.	2020	4	1	2	7	Moderate
Menon et al.	2020	3	2	3	8	High
Ye et al.	2021	4	2	3	9	High
Gold et al.	2021	3	2	2	7	Moderate

TABLE 3 | Gender-specific suicide/suicidal ideation incidence rates.

Study (year)	Population	Male physicians/non-male physicians	Female physicians/non-female physicians
Makhija et al. (2025)	Physicians	IRR: 0.84 (lower risk)	IRR: 1.53 (higher risk)
Ye et al. (2021)	Physicians	No significant difference	OR: 0.86 (CI: 0.57–1.28)
Gold et al. (2022)	Physicians	SMR: No difference	Higher risk versus male physicians
Menon et al. (2020)[a]	Physicians	4.2% prevalence of suicidal ideation	7.3% prevalence of suicidal ideation
Ji et al. (2020)[b]	Nonsurgeon Physicians	84% Suicides	15% Suicides

Abbreviations: AMA, American Medical Association; NVDRS, National Violent Death Reporting System; RR, incidence rate ratio; SMR, standardized mortality ratio.
[a]Menon et al did not compare physicians versus nonphysicians;
[b]Ji et al. also did not compare physicians versus nonphysicians, and these suicides were reported out of 785 total suicides among nonSurgeon physicians.

concerns (adjusted OR: 1.40) were associated with 2.66 times and 1.40 times the odds of dying by suicide, respectively (Makhija et al. 2025). Older age, marital status, and stress at work are associated with increased risk.

Female Physicians: Depressed mood (adjusted OR: 1.35), documented mental illness, antidepressant use (Makhija et al. 2025; Ye et al. 2021) and work-related stressors (e.g., workload, harassment) were the most common mental health vulnerabilities in females (Ji et al. 2020).

3.6 | Burnout Verses Depression Association

According to Menon et al. depression exhibited a robust correlation with suicidal thoughts, with physicians having 3.02 times the odds of reporting suicidal thoughts compared to those without depression (OR: 3.02; 95% CI: 2.30–3.95), but exhaustion became a nonsignificant factor after adjusting for depression (OR: 0.85; 95% CI: 0.63–1.17). Compared with their male counterparts, female physicians had burnout rates that were 17% greater. However, male physicians presented elevated suicide rates, indicating that burnout presents differently across genders. Women are more likely to report fatigue and depression. Men are less inclined to seek assistance, resulting in elevated rates of completed suicides, as indicated by Je et al.

3.7 | Suicide Methods

The means of suicide varied significantly by sex. Female physicians were more likely to use poison (24%–85%) or sharp tools whereas male physicians were more likely to utilize weapons (48%–54%). These trends remained consistent across studies, highlighting the importance of access to lethal weapons unique to a profession (Makhija et al. 2025).

3.8 | Preventive Strategies

For males, peer support programs address work and legal pressures and restrict access to firearms (Makhija et al. 2025). Females limit the availability of harmful substances, promote early mental health care, and eradicate the stigma associated with seeking help (Ye et al. 2021). Systemic changes to lessen racial inequities in mental health care, workplace harassment, and burnout (Menon et al. 2020; Ji et al. 2020) Supporting Table 1 presents key gander-based preventive strategies.

4 | Discussion

The findings of this systematic study demonstrate that significant sex-specific risk factors play a role in physician suicide in the United States. Our analysis revealed that the suicide rate among female doctors was significantly higher than that among male doctors. This result is in line with previous research showing that female medical professionals are more likely to experience burnout, stress at work, and mental health problems. Additionally, research suggests that while male physicians may experience similar work-related stressors, their coping mechanisms and access to mental health care may differ, thereby impacting their risk of suicide. Our study's results on pre-suicide characteristics aligned with those of previous studies that indicated higher odds of depression, mental health conditions, and job challenges among physicians who took their own lives (Ye et al. 2021).

Cohort studies conducted in the United States from 2007−2018 utilizing the NVDRS revealed that the suicide rates among male and female physicians were similar to those of the general population (Davis et al. 2021; Ye et al. 2021) The 2019 National Death Index Records and the 2008 American Community Survey were linked in another study, which also indicated no increased incidence of suicide among physicians in general (Olfson et al. 2023). Overall, and for most years, there were no significant differences between the sexes in age-adjusted SMR estimates for US physician suicides from 2010--2015, with the exception of a significantly lower result for female physicians in 2015 (Gold et al. 2022). Our results, which are based on the most recent data available, show that male physicians have a lower risk of suicide than male nonphysicians do, whereas female physicians have a higher risk than female nonphysicians do. The reason why female doctors, like female nurses, are more likely to die by suicide cannot be inferred from these data. It is impossible to deny that being a woman in the medical field may have unidentified risk factors for suicide. Underappreciation for comparable efforts and accomplishments, unequal compensation and advancement prospects, increased household duties that result in an unbalanced work-life schedule, and the possibility of sexual harassment are all potential causes (Roberts 2020; Han et al. 2024). These results highlight the critical need for customized suicide prevention initiatives to address gender-specific stressors and obstacles to mental health care in the medical field.

Burnout is typically characterized as exhaustion resulting from extended exposure to work-related issues (Guseva Canu et al. 2021). In contrast, depression is defined as a clinical disorder, with the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) categorizing depressive disorders into six subtypes, such as major depressive disorder and persistent depressive disorder. The core features of sadness, anhedonia, and somatic disruptions are consistent; however, the manual recognizes the heterogeneity in their presentation. Both burnout and depression share overlapping symptoms that make it difficult to reach a diagnosis.

The risk of suicide is significantly increased by mental health conditions, including substance abuse and depression (Gold et al. 2013). In addition, burnout and stress at work are important variables that lead to physician suicide. According to studies, doctors who are very burned out are more prone to consider suicide, and female doctors are especially at risk because of their greater work–life imbalance and mental stress (Menon et al. 2020). Furthermore, legal and work-related concerns are important risk factors that disproportionately affect male physicians. This may help explain the sex variations in suicide techniques (Ji et al. 2020). According to a recent study, physicians' suicidal thoughts were linked to burnout before but not following the adjustment for depression, whereas suicidal

TABLE 4 | Gender-specific risk factors.

Study (year)	Risk factors for male physicians	Risk factors for female physicians
Makhija et al. (2025)	Lower risk overall; job/legal problems	Higher risk overall; depressed mood, mental health issues
Ji et al. (2020)	Older age, married status, job problems	General: Lower risk if unmarried; higher risk if Asian/Pacific Islander
Ye et al. (2021)	No significant risk difference	Work-related stressors, mental health diagnoses
Gold et al. (2022)	Older age, married status	Female gender itself as a risk factor

thoughts were linked to depression following the adjustment for burnout (Menon et al. 2020). Serious medical morbidity is linked to depression, whereas burnout and suicidal thoughts are either indirectly related to the degree of burnout associated with depression or the outcome of confounding effects associated with comorbid depression (Dyrbye et al. 2008; Shanafelt 2011; Casey et al. 2006) It is important to draw clear distinctions between burnout and depression to help in preventive measures. These findings underscore the necessity of institutional interventions and better mental health assistance.

The Lorna Breen Act and the Lorna Breen Foundation were developed as a result of social pressure following publicly disclosed physician deaths in 2020 and 2021 despite the lack of the US data. The foundation's heartfelt testimonies of personal loss served as a catalyst for change. This nonprofit has called for the elimination of intrusive questions from licensing and credentialing exams in an effort to destigmatize help-seeking behaviors (Moutier et al. 2021; Sindhu and Adashi 2022) In addition, the US Centers for Disease Control and Prevention, the American Hospital Association, and the Surgeon General have all made recommendations for workplace reform and called for action to reduce the risk of suicide (Preventing suicide in the health care workforce depends on all of us, 2023-09-14-preventing-suicide-health-care-workforce-depends-all-us).

This systematic review has several notable strengths. First, it focuses exclusively on physicians in the US, ensuring a highly precise evaluation of occupational stressors, mental health conditions, and systemic barriers unique to physicians. Second, all included studies utilized national datasets, such as the National Violent Death Reporting System (NVDRS) and the AMA Physician Masterfile, ensuring the use of high-quality, large-scale, and standardized data sources that increase the reliability of the findings. Third, the review addresses a significant gap in previous studies where burnout and depression were frequently confused by methodically differentiating between the two. Understanding this distinction is essential for determining whether untreated depression or burnout is the main cause of suicide. Fourth, a systematic identification of important risk variables, occupational impediments, suicide techniques, and preventative initiatives was made possible by the development of a structured thematic coding framework for the analysis of qualitative data. Finally, by synthesizing risk factors and relevant interventions, this study offers policymakers, health care organizations, and mental health professionals a practical insight to increase efforts to prevent physician suicide (Table 4).

Despite these valuable insights, this systematic review has several limitations. First, the reliance on studies conducted primarily in the United States may limit the generalizability of findings to other health care systems with different stressors and support structures. This review identified notable gender-based disparities; however, the lack of data on nonbinary gender identities constrains the inclusivity of the current analysis. Furthermore, subsequent research should implement a more intersectional framework that examines the interactions among race, ethnicity, medical specialty, and geographic location. These factors can affect occupational stress, the availability of mental health services, stigma, and overall suicide risk. Physicians from underrepresented racial backgrounds may encounter distinct obstacles and prejudices, but specific specialties, such as emergency medicine or surgery, may entail elevated professional hazards. Lastly, data independence may be limited because a number of studies included used the NVDRS with overlapping years. Nonetheless, each study focused on unique risk variables and outcomes, which supported its inclusion in our review. Addressing these factors is essential for formulating equitable, data-driven, and culturally attuned suicide prevention initiatives within the medical field.

This synthesis underscores the urgency of gender-specific interventions to mitigate physician suicide, particularly for female physicians facing intersecting occupational and mental health challenges. Future research should prioritize longitudinal post-pandemic data and intersectional analyses of race, gender, and occupational subgroups.

5 | Conclusion

This systematic review highlights the pressing issue of physician suicide, particularly among female physicians, who face increased risk due to increased burnout, work-related stress, and mental health challenges. The findings emphasize the necessity of gender-specific suicide prevention programs, improved access to mental health support, and workplace policies that mitigate occupational stressors. While significant progress has been made in identifying risk factors, further research is needed to explore intersectional influences such as race, socioeconomic status, and medical specialty. Addressing these disparities through institutional and policy-level interventions is crucial in fostering a healthier and more supportive work environment for physicians.

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Ethics Statement

The authors have nothing to report.

Consent

All the authors have consented to publish this Meta-Analysis.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The article/Supporting Material contains the original contributions made during the investigation. All data synthesized during this project will be provided on request to the corresponding authors. The corresponding authors can be contacted with any additional questions.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.
Table 5: Key gender-specific findings. **Table 6:** Gender-based preventive strategies.