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Original Research Paper

Occupational Health

OCCUPATIONAL MORTALITY AND MORBIDITY IN COMMERCIAL DRIVERS: A SYSTEMATIC REVIEW OF GLOBAL TRENDS

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ABSTRACT Driving trucks and other vehicles for work comes with several health risks, including higher rates of illness and death linked to sitting for long periods, stress, exposure to the environment, poor sleep, and a greater chance of traffic accidents. This systematic review examines global trends in illness and death among commercial drivers by looking at research from epidemiology, clinical studies, and occupational health. The review will focus on peer-reviewed studies about heart disease, metabolic problems, mental health issues, infectious diseases, work injuries, and deaths from crashes. Current evidence shows that commercial drivers have higher rates of high blood pressure, heart disease, sleep problems, substance abuse, and work-related deaths compared to the general population. Factors like long hours, weak enforcement of regulations, and limited access to healthcare make these problems worse. The situation is even more serious in low- and middle-income countries, where safety systems for truck drivers are less developed.

KEYWORDS : commercial drivers, occupational morbidity, mortality, systematic review, road safety, cardiovascular disease.

INTRODUCTION

Commercial drivers are crucial to logistics, public transportation, and supply chain systems. Their job comes with many health risks. These risks cause illness and death among commercial drivers. Studies show that commercial drivers face health problems like prolonged sitting, disrupted sleep patterns from shift work, stress, exposure to vehicle emissions, and a higher risk of traffic accidents (1,2).

Commercial drivers spend a lot of time sitting and often work long hours. They also face stress and are exposed to vehicle emissions. Many do not have access to preventive healthcare or regular check-ups. This makes their job more hazardous.

The transport industry employs millions of drivers worldwide. They drive trucks, buses, taxis, and freight vehicles. Research shows commercial drivers have rates of heart disease, metabolic syndrome, musculoskeletal disorders, mental health issues, and job-related injuries. They are also at risk of sudden cardiac death and fatal road traffic incidents (3). This review aims to gather existing information on health risks and mortality rates among drivers worldwide. It seeks to identify regional patterns and assess the strengths and weaknesses of current research.

Commercial driving is a risky job. The dangers come from both the work itself and outside factors. Researchers Netterstrøm and Juel found that commercial driving can be very stressful, and this stress can lead to heart problems for drivers, such as bus drivers. Their research showed that job-related stress can harm the heart.

Other researchers have also found that commercial drivers are more likely to have high blood pressure. Other studies show that commercial drivers are more likely to be overweight and face other health issues. This is true for drivers in many regions. Many commercial drivers also struggle with sleep because they often work at night and have irregular schedules. Not getting enough sleep can lead to problems like sleep apnea, which raises the risk of accidents. Researchers such as Hayano and Lee found that sleep deprivation increases the risk of accidents among commercial drivers. Sometimes, drivers can become seriously ill while driving, such as having a heart attack, which can be fatal. They drive to different places. This is what happened to some drivers in Nigeria who got malaria. Commercial drivers can also get sick from diseases like COVID-19 because they travel a lot and do not always have access to healthcare.

One of the main dangers of commercial driving is the risk of dying in a car accident. Studies show that commercial drivers are more likely to be seriously injured or killed in crashes than people who do not drive for a living. Truck drivers are especially at risk when they collide with cars.

METHODOLOGY OF THE LITERATURE REVIEW

Study Design

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 Statement. The review aimed to synthesize published evidence on occupational morbidity and mortality among commercial drivers worldwide. Owing to substantial heterogeneity in study designs, populations, exposure definitions, and reported outcomes, a quantitative meta-analysis was not considered appropriate. Therefore, findings were synthesized using a structured narrative approach (4,5).

Data Sources

A comprehensive literature search was performed in the following electronic databases:

- PubMed/MEDLINE
- Scopus
- Web of Science
- Google Scholar (for supplementary screening)

The search covered studies published from database inception until June 2026. Additionally, the reference lists of all eligible studies were manually screened to identify further relevant publications –(68).

Search Strategy and Keywords

The literature search was developed using Medical Subject Headings (MeSH) and free-text keywords related to commercial driving and occupational health outcomes.

The primary search strategy included the following Boolean combinations:
("commercial drivers" OR "truck drivers" OR "bus drivers" OR "professional drivers")
AND
("occupational mortality" OR mortality OR morbidity OR "occupational disease")
AND
("cardiovascular disease" OR hypertension OR obesity OR "metabolic syndrome" OR "mental health" OR depression OR anxiety OR "sleep disorders" OR fatigue OR injuries OR crashes OR accidents OR "infectious diseases")

The search strategy was adapted for each database according to its indexing requirements (9,10).

Eligibility Criteria

Inclusion Criteria

Studies were included if they:

- were published in peer-reviewed journals;
- investigated commercial or professional drivers, including truck, bus, freight, taxi, or long-haul drivers;
- reported occupational morbidity, mortality, or both;
- used observational study designs (cross-sectional, cohort, or case-control), systematic reviews, or meta-analyses;
- were published in English; and
- provided sufficient methodological information and outcome data. (11,12)

Exclusion Criteria

Studies were excluded if they:

- focused exclusively on private or non-commercial drivers;
- were editorials, conference abstracts, letters, or opinion articles;
- lacked relevant occupational health outcomes;
- contained duplicate datasets; or
- had insufficient methodological quality for inclusio . (13)

Study Selection (PRISMA Flow Implementation)

All records identified through database searching were exported into reference management software, and duplicate records were removed before screening.

Two-stage screening was performed:

Stage 1

Titles and abstracts were independently screened against the predefined eligibility criteria.

Stage 2

- Full-text articles were assessed independently for final inclusion.
- Any disagreements during study selection were resolved through discussion and consensus.
- The study selection process followed the PRISMA 2020 recommendations. (14).

Data Extraction

We used a standardized data-extraction framework to maintain consistency. The variables we collected were:

- Author(s), year, and country
- Study design and sample characteristics
- Type of commercial driver (e.g., bus, truck, long-haul)
- Exposure variables (e.g., shift work, workload, behavioral risks)
- Health outcomes (e.g., cardiovascular disease, injuries, infectious diseases, mortality)
- Key findings and reported associations

This method enabled systematic comparison of studies (15,16).

Risk of Bias and Quality Assessment

We assessed methodological quality and risk of bias using validated tools that matched each study design.

- For cohort and case-control studies, we used the Newcastle–Ottawa Scale (NOS).
- For cross-sectional studies, we applied the Joanna Briggs Institute (JBI) checklist.

We identified common limitations, including reliance on self-reported data, reliance on mostly cross-sectional designs, inadequate control for confounders, and too few studies from LMIC populations (17,18). Still, the consistent findings across studies suggest that the observed associations are robust.

Data Synthesis

We used a thematic synthesis approach to bring together findings from different studies. The evidence was grouped into six main areas:

1. Cardiovascular diseases
2. Metabolic disorders
3. Mental health conditions
4. Sleep and fatigue-related disorders
5. Infectious diseases
6. Occupational injuries and mortality

We compared results across studies to identify patterns and regional differences in occupational health risks (19,20).

RESULTS

Study Selection

A total of 867 records were identified through database searching. After removing 145 duplicate records, 722 records were screened by title and abstract. Following the exclusion of 631 records, 91 full-text articles were assessed for eligibility. Of these, 67 articles were excluded, resulting in 24 studies included in the qualitative synthesis (Figure 1).

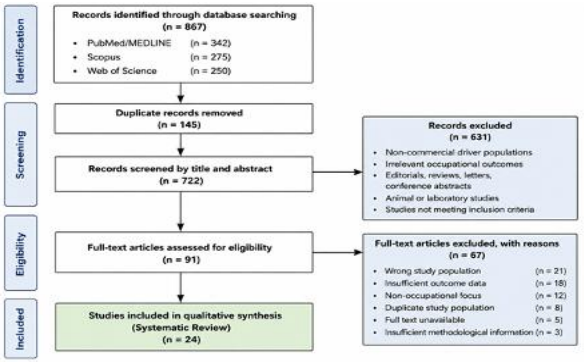

Figure 1. PRISMA 2020 flow diagram illustrating the study selection process for the systematic review of occupational mortality and morbidity among commercial drivers.

3.2 Characteristics of Included Studies

The 24 included studies were published between 1984 and 2025 and represented research conducted across North America, Europe, Asia, Africa, and Australia. Most studies employed cross-sectional or cohort designs and evaluated occupational health outcomes among commercial truck, bus, and long-haul drivers. The principal health outcomes investigated included cardiovascular disease, metabolic disorders, sleep disturbances, mental health conditions, occupational injuries, infectious diseases, and mortality. Detailed characteristics of the included studies are presented in Table 1.

Table 1. Characteristics of Studies Included in the Systematic Review

Author (Year)	Country	Study Design	Study Population	Sample Size	Main Outcome(s)
Balarajan & McDowall (1988)	United Kingdom	Cohort study	Professional drivers	13,686	Mortality patterns among professional drivers
Glass et al. (2025)	Australia	Cohort study	Coal mine workers (comparative occup ational mortality)	30,842	Occupational mortality comparison
Kerwin (1984)	Canada	Case report/Review	Commercial drivers	NA	Sudden death while driving
Lalla-Edward et al. (2016)	Sub-Saharan Africa	Systematic review & meta-analysis	Truck drivers	83 studies	Healthcare access and infectious diseases

Rudisill et al. (2019)	United States	Cross-sectional study	Occupational drivers	33,782 collisions	Occupational motor vehicle collisions
Erhabor et al. (2012)	Nigeria	Cross-sectional study	Long-distance truck drivers	400	Malaria prevalence
Lee et al. (2023)	Australia	Health economic modeling	Truck drivers	National estimates	Health and economic burden
Margan & Fikfak (2022)	Slovenia	Cohort study	Professional drivers	10,150	Mortality, cancer incidence, disability
Lee et al. (2017)	South Korea	Cross-sectional study	Bus drivers	304	Sleepiness and shift work
Wei et al. (2021)	Taiwan	Cross-sectional study	Truck drivers	526	Driving bbehaviorand personality
Yosef (2020)	Ethiopia	Cross-sectional study	Cross-country truck drivers	422	Chronic non-communicable diseases
Lakshman et al. (2014)	India	Cross-sectional study	Bus drivers	179	Hypertension prevalence
Aitken et al. (2022)	South Africa	Retrospective study	Bus drivers	266	Cardiovascular risk factors
Song et al. (2023)	China	Injury severity analysis	Truck-car crashes	National crash database (≈30,000+ crashes)	Crash severity
Motegi et al. (2022)	Japan	Cross-sectional study	Truck drivers	328 compensated cases	Mental disorders related to overwork
Lemke et al. (2020)	United States	Commentary/Publ ic Health	Truck drivers	NA	COVID-19 syndemic
Netterstrøm & Juel (1988)	Denmark	Cohort study	Urban bus drivers	1,387	Ischemic heart disease
Hayano et al. (2013)	Japan	Cross-sectional study	Transport workers	1,309	Sleep-disordered breathing
Yadav et al. (2019)	Nepal	Cross-sectional study	Long-route bus drivers	250	Alcohol use
Hitosugi et al. (2012)	Japan	Retrospective study	Commercial drivers	606	Sudden illness while driving
Donkor et al. (2018)	Ghana	Cross-sectional study	Commercial drivers	427	Mobile phone use
Davis et al. (1987)	United States	Occupational injury analysis	Female workers	National data	Fatal occupational injuries
Chen et al. (2015)	United States	National survey	Long-haul truck drivers	1,670	Seat belt use
Rogers et al. (2022)	United States	Cross-sectional study	Long-haul truck drivers	1,624	Colorectal cancer prevalence

Risk of Bias Assessment

The overall methodological quality of the included studies was moderate to high. Cohort studies generally demonstrated a lower risk of bias than cross-sectional studies because of stronger study designs and more comprehensive adjustment for confounding variables. The most frequently identified methodological limitations included reliance on self-reported health outcomes and occupational exposures, limited longitudinal follow-up, inadequate adjustment for potential confounders, and heterogeneity in outcome definitions across studies. Overall, the available evidence consistently supported an increased burden of occupational morbidity and mortality among commercial drivers despite these methodological limitations.

Cardiovascular Diseases

Cardiovascular disease (CVD) is the main cause of death among commercial drivers. Research shows that high blood pressure and heart disease are common in this group (12,21). Job stress, long hours of sitting, and unhealthy diets all add to these health risks.

Metabolic Disorders

Obesity and metabolic syndrome are common among drivers because of sitting for long periods and irregular eating habits. (15) found that bus drivers in South Africa often have several heart disease risk factors at once. New research also suggests possible links between job exposures and cancer risk among drivers(22).

Mental Health and Psychosocial Stress

(17) reported that drivers in Japan often suffer from mental health problems related to overwork. Stress, tiredness, and feeling isolated can lead to depression and anxiety.

Sleep Disorders and Fatigue

Not getting enough sleep is a key factor in crash risk found that bus drivers who work shifts are more likely to feel sleepy. (23) showed that ECG-based tools can help screen for sleep-related breathing problems.

Infectious Diseases

In low- and middle-income countries, drivers are still at risk for infectious diseases. (6)found that malaria is common among Nigerian drivers, and the effects of COVID-19 have been seen worldwide (19).

Occupational Injuries and Road traffic accidents

Are a leading cause of death for drivers. (16) looked at what makes truck-car crashes more severe. (5) found that professional drivers are involved in more crashes than non-professional drivers.

Table 2. Summary of Health Outcomes Among Commercial Drivers

Domain	Key Findings	Representative Study
Cardiovascular disease	High prevalence of hypertension and IHD	Lakshman et al., 2014
Metabolic disorders	Increased obesity and metabolic syndrome	Aitken et al., 2022
Mental health	Overwork-related psychiatric conditions	Motegi et al., 2022

Sleep disorders	Shift work-related sleepiness	Lee et al., 2017
Infectious diseases	The malaria and COVID-19 syndemic	Erhabor et al., 2012; Lemke et al., 2020
Injuries	High crash fatality rates	Song et al., 2023

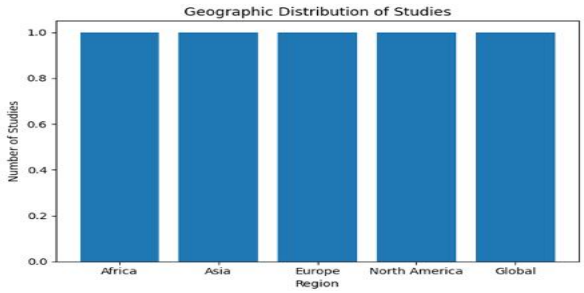

Figure 2. Geographic Distribution of Included Studies

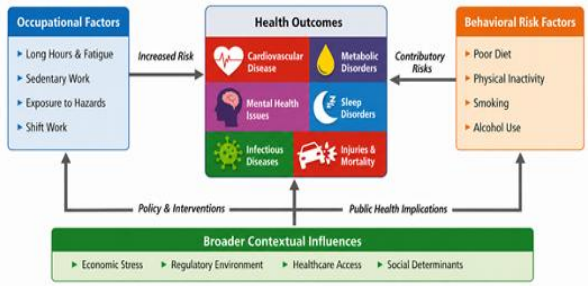

Figure 3. Conceptual Framework of Occupational Mortality and Morbidity in Commercial Drivers

The framework illustrates the relationships between occupational exposures (e.g., prolonged driving, shift work, sedentary behavior, and hazardous environments), behavioral risk factors, intermediate health effects, and major health outcomes including cardiovascular disease, metabolic disorders, mental health conditions, sleep disorders, infectious diseases, and occupational injuries. Broader contextual influences such as healthcare access, regulatory policies, and socioeconomic factors modify these relationships.

Exposure factors can lead to certain behaviors, which in turn can cause changes in the body and eventually affect health.

- Working long hours can make people tired, leading to sleep problems and increasing the risk of accidents.
- Sitting for long periods at work can lead to weight gain, which may cause high blood pressure and heart disease.
- High levels of stress can upset hormone balance and may contribute to mental health problems.
- Exposure to certain environments can increase the risk of infections, which may lead to contagious diseases.

DISCUSSION

Interpretation of Main Findings

This systematic review demonstrates that commercial drivers experience a consistently elevated burden of occupational morbidity and mortality across diverse geographic regions. Cardiovascular disease, metabolic disorders, sleep disturbances, mental health conditions, infectious diseases, and occupational injuries emerged as the principal health concerns. Although the included studies varied considerably in design, population characteristics, and outcome assessment, the overall findings were remarkably consistent, indicating that prolonged driving hours, sedentary work, psychosocial stress, fatigue, and inadequate access to preventive healthcare are common determinants of poor health outcomes. These findings reinforce the need for comprehensive occupational health strategies that integrate medical surveillance, fatigue management, road safety policies, and workplace health promotion to reduce disease burden and improve transportation safety.

Critical Synthesis of Study Quality and Cross-Study Comparisons

Research on occupational mortality and illness among commercial drivers shows significant differences in methods, which affect how we interpret and compare results. These differences are not just about study design; they also reveal patterns in how risks are defined, measured, and reported across different settings.

Most studies rely on cross-sectional designs, especially in low- and middle-income countries(11,12). These studies often find high rates of heart and metabolic risks, but they cannot show cause and effect over time. In contrast, cohort studies from wealthier countries offer stronger evidence that work factors like long sitting, shift work, and stress are linked to long-term illness and death (8,21). This difference suggests that places with the highest health burdens often have weaker research methods.

Another important issue is how exposures and outcomes are measured. Many studies use self-reported data on fatigue, workload, and risky behaviors, which can lead to misclassification of risks (10),(24). Studies that use objective measures, such as ECG tests for sleep problems or official death records, show stronger and more reliable links to poor health outcomes (23,25). This difference suggests that self-reported studies may understate or overstate risks, underscoring the need for standardized, objective methods to measure exposures.

Geographic differences make it harder to compare studies. Research from low- and middle-income countries often focuses on infectious diseases and lack of healthcare, like malaria among truck drivers (6). In contrast, studies from wealthier countries mostly look at chronic diseases, mental health, and injuries (5,16). These differences are due to variations in health systems, monitoring, and regulations. Global reviews (19) show that these risks often overlap, especially among long-haul drivers, suggesting that research should not be separated by disease type.

Another important finding is about work-related injuries and deaths from crashes. Large studies using official records show that commercial drivers have more severe injuries and higher death rates than other drivers (5,16). Smaller studies often examine behaviors such as phone use or drinking (24,26), yielding detailed but less widely applicable results. Together, these findings suggest that both personal behaviors and broader factors, such as road quality and law enforcement, affect risk.

Importantly, despite differences in study quality, most research finds similar results. Heart disease, metabolic problems, sleep issues, and injuries are common health problems for commercial drivers everywhere (15). This agreement across studies suggests these risks are a real part of the job, not just a byproduct of how studies are conducted—national health interventions, limiting the translation of epidemiological findings into evidence-based policy (4). Moreover, the near absence of gender-disaggregated analyses further restricts the applicability of findings to an increasingly diverse workforce.

In summary, there is a paradox in the research: even though study methods have limits, like too many cross-sectional studies, measurement errors, and regional bias, the results are still consistent. This shows a strong link between commercial driving and higher health risks. To move forward, research needs to use more long-term studies, standardized

methods for measuring risks, and better global tracking systems to understand the many factors affecting drivers' health fully.

Gaps in the Literature

Although research on occupational mortality and illness among commercial drivers is increasing, important gaps remain. These gaps limit how deeply we understand the issues, how widely findings apply, and how useful the evidence is in practice.

- One major limitation is the lack of long-term studies of drivers' health. Most research uses cross-sectional designs, which makes it hard to see how job exposures lead to disease. As a result, we cannot clearly demonstrate how chronic conditions such as heart disease and metabolic disorders develop (12). Long-term studies are needed to see the effects of ongoing exposure and to understand better how health risks develop in this group.
- Another important gap is that few studies include female commercial drivers. Most research focuses on men, partly because of the workforce makeup and partly due to research bias. Without enough data separated by gender, it is hard to understand the different risks, exposures, and health outcomes for men and women. This limits the ability to create fair and inclusive health policies (15,27).
- Mental health is still not well included in occupational safety and health research for drivers. New studies show that stress, fatigue, and overwork can lead to mental health problems among drivers (17). Still, these issues are often underreported or seen as less important than physical health risks. This narrow focus misses how mental health, driving performance, and injury risk affect each other. More complete and multidisciplinary research is needed.
- There are also gaps in research from low- and middle-income regions, especially in Africa and South Asia. While some studies examine infectious and non-communicable diseases in these areas (4,6), overall, there are fewer studies, and many lack robust methods compared to those from high-income countries. This imbalance makes it hard to apply global findings and to understand local occupational risks.
- Finally, there is a clear lack of research testing how well prevention strategies work. While many studies have identified key risk factors, few have tested specific interventions such as workplace health programs, fatigue management, or new policies (28). This gap makes it harder to turn research into real-world solutions.
- Overall, these gaps show the need for stronger, more inclusive, and action-focused research to move the field forward and support evidence-based health strategies for commercial drivers.

Clinical, Policy, and Systems-Level Implications

The evidence in this review indicates an urgent need to develop and implement integrated occupational health surveillance systems for commercial drivers. These systems should be part of regular licensing and recertification to help spot and monitor high-risk health conditions early. Key steps include making cardiovascular risk screening, sleep-related disorder checks, and mental health evaluations standard parts of driver fitness assessments. Research supports these actions, showing that drivers have higher rates of hypertension and cardiometabolic risk (12) and that sleepiness and shiftwork are strongly linked to unsafe driving (9).

On the policy side, it is important to strengthen the rules governing drivers' working conditions. This means setting clear limits on driving hours, ensuring rest-period rules are followed, and improving oversight to reduce fatigue-related risks. At the same time, transport and labor policies should make sure all commercial drivers, especially those working long distances or across borders, have fair access to preventive and primary healthcare.

Transport companies should set up clear health promotion programs for their drivers. These programs should include a range of wellness activities that address key risks, such as managing fatigue, improving nutrition, and encouraging regular exercise. Together, these steps support occupational health goals and are likely to lower illness and death rates while making roads safer for everyone.

Recommendations for Future Research

Future research needs to fill ongoing gaps in methods and evidence in occupational health for commercial drivers. The following areas should be prioritized:

- First, well-designed prospective cohort studies are needed to show how occupational exposures like driving hours, shift patterns, and stress affect health outcomes such as heart disease, mental health issues, and mortality.
- Second, it is important to develop and use standardized ways to measure exposures in occupational driving. Consistent metrics for driving intensity, fatigue, rest breaks, and overall workload would make it easier to compare results across different studies.
- Third, future studies should use more digital health tools, such as wearable sensors, in-vehicle telematics, and fatigue detection systems. These technologies allow real-time tracking of physical strain, driving habits, and risk patterns in real-world settings(28)
- Fourth, it is important to test the effectiveness of different interventions rigorously. Studies should examine how changes in regulations, fatigue management, wellness programs, and in-vehicle safety technologies affect illness, death rates, and crash outcomes. Sensitive occupational health research remains markedly underdeveloped. Future studies should explicitly examine sex-specific risk profiles, occupational exposures, and health outcomes among female commercial drivers to address existing disparities and inform inclusive policy development.

CONCLUSION

The reviewed literature shows that commercial drivers are consistently at high risk for illness and early death in many countries. Cardiovascular diseases, such as hypertension and ischemic heart disease, are common among drivers and are closely linked to job stress and lifestyle challenges. Sleep problems and fatigue also play a major role in poor health and crash risk, especially for those working long hours or night shifts (9).

The literature further highlights the significant contribution of acute medical events, including sudden illness and driver fatalities, to occupational road traffic crashes. These risks are compounded by behavioral factors such as alcohol use, mobile phone distraction, and low sleep. Studies also show that sudden medical events, like illness or driver deaths, play a big role in road crashes at work. Risks increase when drivers use alcohol, get distracted by phones, or do not wear seatbelts. Long-distance and cross-border drivers also face higher risks for infectious diseases, breathing problems, and cancer (29,30). Largely pronounced in low- and middle-income country settings, where regulatory enforcement and occupational health infrastructure remain limited (11).

In summary, commercial driver health is a complex safety and public health issue. To address it, we need stronger regulations, workplace prevention programs, and health checks as part of licensing. Moving forward, more long-term studies and standard ways to measure job risks will help

guide better policies and targeted solutions.

DECLARATIONS

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Author Contributions: Supreet Khare conceived the study, designed the review methodology, performed the literature review, analyzed the evidence, interpreted the findings, and wrote and approved the final manuscript.

Ethics Approval: Not applicable. This study is a systematic review of previously published literature.

Consent to Participate: Not applicable.

Consent for Publication: Not applicable.

Data Availability: All data analyzed during this study are included within the published literature cited in this review.

Use of Generative Artificial Intelligence

Generative artificial intelligence tools were used to assist with language refinement, manuscript organization, and editorial improvements. All literature selection, interpretation of evidence, scientific conclusions, and final manuscript content were reviewed, verified, and approved by the author, who accepts full responsibility for the integrity and accuracy of the work.

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