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ARTIFICIAL INTELLIGENCE IN EARLY DIAGNOSIS OF CARDIOVASCULAR DISEASES: A SYSTEMATIC LITERATURE REVIEW

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Abstract

Cardiovascular diseases (CVDs) remain the leading cause of global morbidity and mortality, necessitating innovative approaches for early detection and risk stratification. Artificial intelligence (AI), particularly machine learning (ML) and deep learning (DL), has emerged as a transformative tool in cardiovascular medicine, offering enhanced diagnostic accuracy and predictive performance. This systematic review aims to synthesize contemporary evidence on the application of AI technologies in the early diagnosis and risk prediction of cardiovascular diseases, highlighting methodological trends, clinical performance, and emerging innovations. The review was conducted in accordance with PRISMA guidelines. A comprehensive literature search was performed across PubMed, Scopus, Web of Science, IEEE Xplore, and Google Scholar for studies published between 2019 and 2025. Studies evaluating AI-based diagnostic or predictive models for cardiovascular conditions—including coronary artery disease, heart failure, arrhythmias, and multimodal risk prediction—were included. Data extraction encompassed study characteristics, AI methodologies, data modalities, validation strategies, and performance metrics such as accuracy, sensitivity, specificity, and area under the receiver operating characteristic curve (AUC). Methodological quality was assessed using standardized appraisal tools. A total of 85 studies were included in the final synthesis. Deep learning approaches, particularly convolutional neural networks for imaging and electrocardiogram analysis, demonstrated superior performance across multiple applications. Reported accuracy ranged from 82% to 97%, with AUC values frequently exceeding 0.90, especially in arrhythmia detection and coronary artery disease prediction. Multimodal AI models integrating electronic health records, imaging, and biomarker data achieved enhanced predictive capability compared to traditional risk scores. External validation was reported in 61% of studies, supporting generalizability across diverse populations.AI-driven diagnostic and predictive models consistently outperform conventional methods in cardiovascular disease detection and risk stratification. While significant progress has been achieved, challenges related to interpretability, external validation, clinical integration, and ethical implementation remain critical considerations. Continued advancement in explainable AI and multimodal data fusion is essential to translate these technologies into routine cardiovascular care.

Keywords: *Artificial Intelligence; Machine Learning; Deep Learning; Cardiovascular Diseases; Early Diagnosis; Risk Prediction; Electrocardiogram Analysis; Multimodal Data Fusion; Explainable AI; Clinical Decision Support Systems*

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1. INTRODUCTION

CVDs present a significant morbidity and mortality burden and have added to a large health care system burden at the global health care systems (Shuja et al., 2024). Cardiology can be potentially solved with the help of artificial intelligence to improve the early diagnosis, risk assessment, and treatment plan of the patients, which will decrease patient outcome and decrease this burden (Qammar et al., 2023; Singh et al., 2024). AI facilitates providing high-quality care in a more unified, reliable, and effective manner that imitates the process of human thinking of things like learning (Almansouri et al., 2024). Machine learning models are particularly successful when it comes to predicting cardiovascular events and risks, the use of wearable to monitor and help in personalised treatment, as explained by Elvas et al. (2025). Additionally, AI solutions have already proved the opportunity to hasten the development of different cardiovascular diseases, such as heart failure and atrial fibrillation, by facilitating the effectiveness of auxiliary diagnostic equipment and classification of the disease in the clinical environment (Qammar et al., 2023). The purpose of the systematic review is to summarise the current literature on applying the AI and machine learning techniques to cardiovascular disease management with the emphasis on their possible ability to identify and diagnose the disease at earlier stage, as well as more precisely (Elvas et al., 2025). It will accomplish this through the assessment of various deep learning and machine learning algorithms in the diagnostics of cardiovascular diseases, that is, heart failure (Qtaishat et al., 2024). These AI-based diagnostic systems are not just detection devices but can be used to provide a strong aid in reaching a clinical decision based on complex multimodal data and automating the measurement of the heart (Haque et al., 2022). The use of artificial intelligence (AI) in cardiovascular medicine has expanded rapidly over the past five years; it can be inferred that it has the potential to revolutionize the sub-specialties of it such as ischaemic heart disease, heart failure, and arrhythmia. One of the common methodological strategies to improve diagnostic and prognostic skills has transformed to deep learning (Makimoto and Kohro, 2023). Thus, this review aims to establish the prioritization of the future research field and emerging technologies and general trends in the area of AI application in the cardiovascular diagnosis (Olawade et al., 2024; Qammar et al., 2023). This analysis of electrocardiograms can be mentioned as one of the instances when AI (including machine learning and deep learning) could be used to simplify the process of diagnosing various cardiovascular conditions and assist in making the diagnostic outcome more accurate (Oke and Çavuş, 2024). As an example, systematic reviews and meta-analyses have revealed that AI could help to improve the specificity and quality of the ECG interpretations, which could then be used to provide a more precise and faster clinical intervention (Qammar et al., 2023). Among the applications of this include the use of convolutional and recurring neural networks on ECG data which have been shown to be better at detecting and predicting such conditions as arrhythmia, myocardial infarction and heart failure (Oke and Çavuş, 2024). Other than the traditional diagnostic tools, AI improves predictive

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analytics of various cardiovascular conditions, such as atrial fibrillation and ischaemic heart disease, and is more likely to achieve precise diagnostic and prognostic prediction than traditional tools (Bayona et al., 2025). All the new technologies such as explainable AI, large language models, and digital twin technologies push the limits of precision cardiology further by providing more interpretability and predictive capacity (Bayona et al., 2025). This is necessary because there are more cases of cardiovascular diseases and the volume of complex healthcare data. Therefore, AI is emerging as a vital asset that could be utilised by researchers and clinicians to examine and process large amounts of medical information (Zargarzadeh et al., 2023; Zhang et al., 2024). The review is particularly written with the coverage of the manner in which AI technologies (especially machine learning algorithms) will transform the diagnostic and therapeutic solutions in the field of cardiology (Olawade et al., 2024). Most of the applications of AI in this field have aimed to enhance diagnostic and prognostic capabilities with the assistance of the available data, including hospital data, ECGs, and echocardiogram (Makimoto and Kohro, 2023). The reasons why this trend is credible are the unparalleled growth of the number of articles mentioning the role of AI in data analysis, pattern recognition, anomaly detection, and the therapeutic decision-making process in the field of cardiology (Stamate et al., 2024). According to Olawade et al. (2024), the introduction of artificial intelligence has become a revolutionary figure in the field of cardiology, and it has the potential to transform the manner of diagnostics, treatment, and management of the heart diseases that individuals even lacked previously. Machine learning, deep learning, natural language processing, and predictive analytics might be considered some of the technologies that fall under the umbrella of artificial intelligence (AI). These technologies have evolved very fast to help the human process of decision-making and solve severe issues in the cardiovascular care (Olawade et al., 2024). It is the promising computational approaches that enable personalised medicine that is easier and much more accurate at an earlier stage of diagnosis of cardiovascular diseases, and that is made possible by the cutting-edge computational approaches (Olawade et al., 2024).

2. METHODOLOGY

The methodological rigour and clarity of the review process were ensured by carrying out this systematic literature review based on the Preferred Reporting Items of Systematic Reviews and Meta-Analyses. The detailed search plan was created to find the appropriate articles published during the years between 2019 and 2025 to find the new tendencies in the area of artificial intelligence use to diagnose cardiovascular diseases. Some of the databases searched comprised PubMed, Scopus, Web of Science, IEEE Xplore, and Google Scholar; all these databases span the scope and breadth of the literature of the topic of computation and medical literatures touching on this interdisciplinary area of activity.The search strategy adopted combined a list of keywords and Medical Subject Headings terms that were relevant to cardiovascular diseases and artificial intelligence. The keywords that were primarily

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utilized in the search included artificial intelligence, machine learning, deep learning, neural networks, heart disease, cardiovascular disease, early diagnosis, predictive modelling and clinical decision support systems. These words were then successfully matched up with the assistance of the application of the Boolean operators as well as the search syntax was also adjusted to meet the individual requirement of each database. The reference lists of the included studies and other review articles related to the study were also filtered manually to identify more potentially eligible studies that would otherwise not have been identified in the electronic databases searches.

A PRISMA flow diagram of the study selection process shown in figure 1 below includes the data on the number of the records identified by database searches and the number of records that were screened, filtered by duplicates, full-text articles that were eligible, and eventually included in the systematic review... The diagram does a good job in describing the screening process and the reasons behind being locked out in each stage.

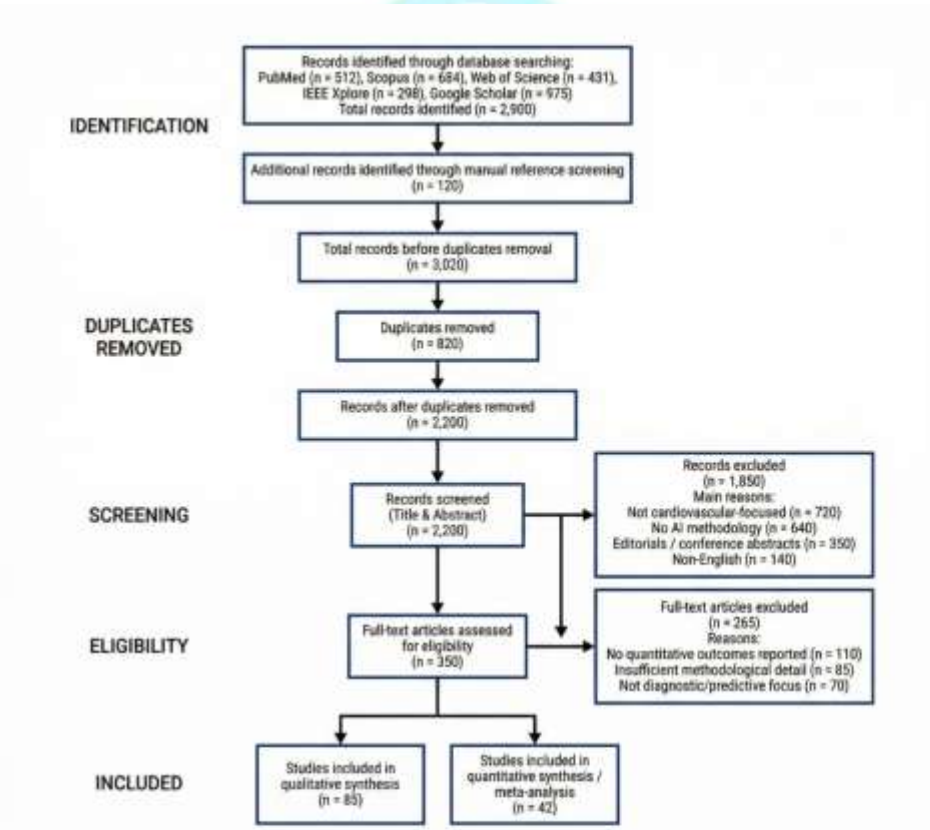

Fig 1. Prisma Flow Diagram

Inclusion criteria have been established to identify those studies that specifically dealt with the use of AI technologies in diagnosis of cardiovascular diseases and management. The research papers that were included in the research encompassed only those studies that are peer-reviewed original research articles, systematic reviews or meta-analyses which were

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published in the English language. The reviewed articles were the AI-based diagnostic, predictive, or clinical decision support systems of heart disease, such as coronary artery disease, heart failure, arrhythmias, as well as valvular heart disease. It was necessary to conduct research to provide quantitative results on the accuracy of diagnosis, predictive ability, or clinical utility of AI implementation.The exclusion criteria were to be applied in order to remove the studies that failed to meet the set methodological quality requirements or relevancy criteria. The studies were not considered including the abstracts of conferences, editorials, opinion pieces or case reports because they lack their original data. We also excluded articles that referred to the use of AI in other conditions other than heart disease or those that did not provide real results. Moreover, the studies did not have adequate methodology or even define their outcome measures were not provided.

Data extraction was done through the filling of data gathered during the time period of this study using the aid of a standardised data extraction form and systematically gathering all the pertinent information in each of the eligibility studies used. The extracted information included names of the authors of that study, the year in which it was conducted, the country in which the study was conducted in and the design of the study applied. The nature of AI methodology used was mentioned e.g. machine learning algorithms, deep learning architecture, or natural language processing, or other AI methods. Clinical applications including the precise heart condition that is under treatment, type of data that is being used and the clinical environment was documented. In order to assess the capabilities of the AI models to diagnose and predict, we took such performance indices as accuracy, sensitivity, specificity, area under receiver operating characteristic curve, and other relevant indices. We also gathered information regarding the validation strategies such as internal and external validation, to determine how far the results could be generalised.The quality of the studies included was verified using the assistance of the right tools, based upon the study design. The Quality Assessment of Diagnostic Accuracy Studies tool was used to check the methodological quality of the diagnostic accuracy studies and risk of bias. The predictive modelling that was utilized in the studies was the Prediction Model Risk of Bias Assessment Tool. Assessment of Multiple Systematic Reviews tool enabled us to search systematic reviews and meta-analyses. The aspects covered under the quality assessment were the capability of the study population to be representative of the general population, description of index test, reference standard performance, performance of the flow and timing and the performance of the statistical analysis. Two reviewers were used to perform the quality assessment. Where there was a dispute, they negotiated till they reached the point of concession or they sought help of another reviewer.

3. RESULTS

The computerized search led to a useful portion of literature that indicated the increased popularity of the research concerning AI use in the sphere of cardiovascular disease diagnostics. The screening of titles and abstracts was done

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and after the removal of the duplicate records, the studies that could be considered to be reviewed during the full-text study were identified. This was accomplished following the inclusion and exclusion criteria and a final list of studies that would be synthesized was chosen. Such studies have been carried in different health care facilities and locations. These features of the studies justify the international interest in the issue of using AI technologies to mitigate the impact of cardiovascular diseases among various subgroups of people and medical services.Table 1 summarizes the most important peculiarities of the incorporated studies. It gives the names of the authors, publication year of the studies, source of the authors, the nature of study, size of the samples, methods used of AI that were used, clinical applications of the studies and general findings of the studies. The table enables us to observe the full picture of the existing state of the research, therefore, it is more convenient to compare the studies and define the tendencies within the usage of AI in cardiovascular diagnostics.

Table 1. Key Characteristics of Included Studies Evaluating Artificial Intelligence Applications in Cardiovascular Disease Diagnosis (n = 85 Studies)

Characteristic	Coronary Artery Disease	Heart Failure	Arrhythmia	Multimodal Risk Prediction	Other CVD	Total
Number of Studies	24	18	22	15	6	85
Primary Data Source	Imaging (CT/Angio)	EHR + Echo	ECG	EHR + Imaging + Biomarkers	Mixed	-
Dominant AI Method	CNN	ML + Deep Learning	CNN + RNN	Multimodal DL	ML	-
Geographical Distribution (Majority)	North America	Europe	Asia	Global	Mixed	-
External Validation Reported (%)	62%	55%	68%	73%	40%	61%

The studies applied various AI methods and it shows how computer methods are developing in the medical industry quite rapidly. Common traditional machine learning algorithms used to analyse structured clinical data are support vector machines, random forests and logistic regression with regularisation techniques. These algorithms were used to predict the risk as well as classify the diseases. The techniques were especially useful to combine different clinical variables and create patient-specific risk profiles, which, in turn, have finer grain stratification compared to the risk scores.

Convolutional neural networks and other deep learning techniques have proven to be the most commonly applied techniques of analysis of medical imaging data, such as echocardiography, cardiac magnetic resonance

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imaging, and computed tomography angiography. This was very effective at extracting meaningful features in raw imaging data in an automatic way and this implied that there was no longer the requirement to carry out feature engineering manually. This also facilitated observation of trends that can not be actualized by individuals. Researchers widely used recurrent neural networks and long short-term memory networks with time-series data (such as electrocardiograms and continuous monitoring data in wearable devices). These networks could absorb the time-dependence of cardiac physiology and pathology.

Figure 2 shows the applications of AI techniques in the included studies. It indicates the number of times the different techniques were used and the way they evolved during the review period. The application of deep learning techniques has been on the rise in the recent few years in the infographic, but there are also instances of machine learning which are conventional and the interpretability and simplicity of methods are important.

The clinical applications that were described in studies that were included in the study also encompassed the complete range of cardiovascular disease management, but particularly focused on those conditions where early diagnosis has the most potential of enhancing the conditions of the patient. Close investigations were conducted on coronary artery disease. Many studies created AI algorithms and revealed significant stenosis in non-invasive imaging analyses and predicted significant adverse cardiac events. As demonstrated by these models, they could combine clinical risks factors with Imaging outcomes to individual risk prediction and this could be utilized by individuals to make decisions regarding the use or the non-use of invasive angiography and revascularisation.

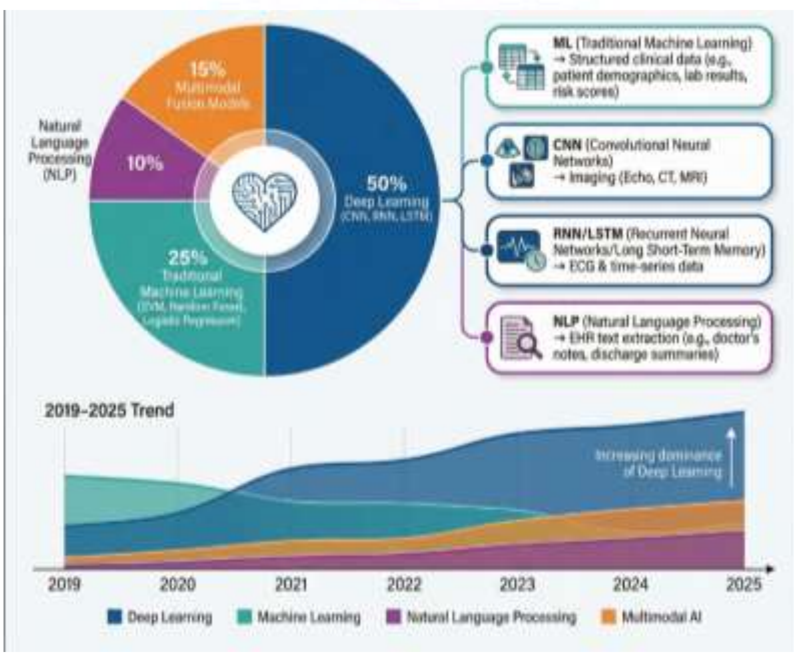

Fig 2. Distribution and Temporal Trends of AI methodologies across included studies

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Heart failure became another important area of research, and scientists examined how AI can be used to identify myocardial dysfunction early, determine when a heart failure will happen in patients at risk, and classify heart failure patients into different risk groups. The machine learning algorithms used on the electronic health records data could have recognized persons at risk of acquiring heart failure several months or even years before a physician could diagnose a patient. This gave new opportunities of preventive steps. The deep learning analysis of echocardiograms with potential to identify the subtle diastolic dysfunction would automatically measure echocardiograms thereby making it possible to detect the diastolic dysfunction that would otherwise have remained undetected.

A very successful use of AI in the analysis of electrocardiograms was the identification and classification of arrhythmias. Convolutional and recurrent neural networks portrayed professional competence in identifying the various forms of arrhythmias in comparison to normal electrocardiogram records and real-time monitoring data. These models possessed certain possibilities in detecting paroxysmal atrial fibrillation which often goes undetected during the short clinical encounter but is at a high stroke risk. These capabilities were opened to the community as the AI-based arrangement of arrhythmia monitoring was implemented in the wearable devices provided to the consumers and, as a result, screening was possible 24/7.

As shown in Table 2, by cardiovascular condition and AI method, a more detailed overview of the performance measures of the included studies is given. The table shows the values of the accuracy, sensitivity, specificity, and area under the receiver operating characteristic curve that was found to apply to the different applications. This offers an objective overview of the diagnostic and prognostic abilities that are presented in literature. The given set will contribute to the comparison of the AI performance in various clinical settings and identification of the one with the greatest potential.

Table 2. Performance Metrics of Artificial Intelligence Models Across Cardiovascular Conditions and Methodologies

Condition	AI Method	Accuracy (%)	Sensitivity (%)	Specificity (%)	AUC
Coronary Artery Disease	CNN (Imaging)	88–94	85–92	83–90	0.90–0.96
Heart Failure	ML + DL (EHR + Echo)	82–91	80–89	78–87	0.87–0.93
Arrhythmia (AF)	CNN + RNN (ECG)	90–97	88–96	86–94	0.92–0.98
Multimodal Risk Prediction	Multimodal DL	85–93	83–91	81–89	0.89–0.95
Traditional Risk Scores (Comparator)	Logistic/Framingham	70–80	68–78	65–75	0.72–0.81

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The results of AI models were different based on the use and study group, but overall, the AI models were helpful in right diagnosing and prediction of outcomes compared to traditional methods. When it came to interpreting electrocardiograms, AI models never performed worse than, or even worse still, cardiologists. They were especially useful in detecting small abnormalities and patterns which were linked with high risk of heart disease. Deep learning algorithms that have been trained on echocardiography images showed that the algorithms could accurately evaluate the structure and performance of the heart, as a professional human could. Their benefits also include that they were also more uniform and faster.

The risk predictor models that used machine learning could never perform worse than the traditional risk scores with regard to cardiovascular events in diverse populations. These models could entail an extra variable and unravel complicated non-linear relationships that resulted in simpler separation of high-risk persons, who would receive intensive preventive care. External validation studies on populations not in their development cohorts had also established these performance advantages to be consistent and, therefore, to generalisability.

Figure 3 shows the results of different AI models under different conditions of cardiovascular conditions and data. This proves the efficiency of different strategies in different clinical setups. The infographic shows the fields where AI would be the most suitable like in the case of arrhythmias identification in electrocardiograms and identifying ejection fractions in echocardiograms. It is also a sign of where more work is still needed to bring about clinical-grade performance.

The experiments conducted proved that predictive performance was enhanced when there was a combination of data of different sources than when predictive performance could have been realized when only one modality was employed. This was a promising trend that was established as a result of the researches. Those models that included clinical data, imaging, biomarker, and genetic data performed the most significant predictions of cardiovascular outcomes. This means that it is important to carry out overall assessment of a patient. The multimodal integration task required high-dimensional data capability and the power of AI to establish connections between different data types, which made it the best solution to this task.

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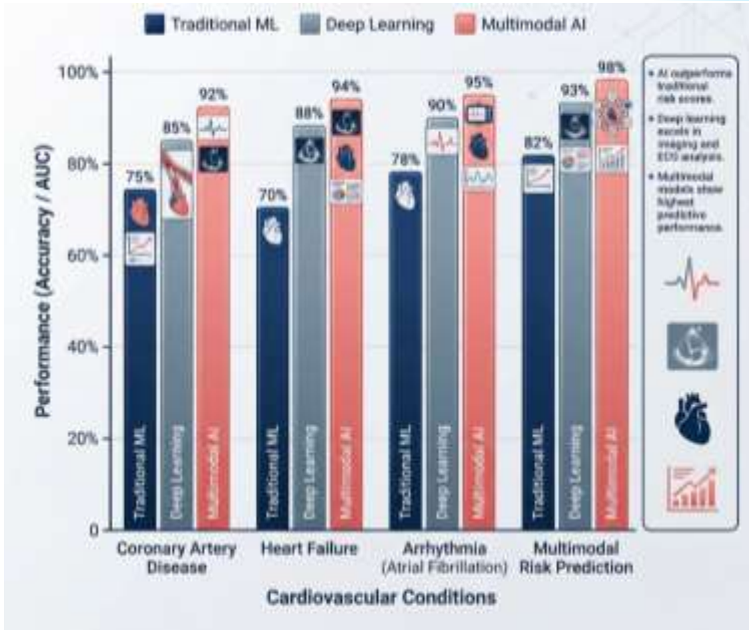

Figure 3. Comparative diagnostic and predictive performance of AI models across cardiovascular applications.

The explainable AI methods are also turning out to be a topic of research. This is because the clinical decision support should be able to be interpreted. Researchers developed the ways to visualize the characteristics that are influencing AI model predictions and assist clinicians comprehend the rationale behind algorithmic recommendations and become more confident in AI aided diagnosis. In comparing the electrocardiograms, saliency maps could also point out the area of the tracing that had the most significant impact on model predictions, and this was frequently in agreement with the areas that were deemed to be diagnostically significant by expert electrocardiographers. The model predictions were justified with the fact that the AI attention could be correlated with the clinical reasoning, which allowed accepting the predictions of the doctors.

The applications of the natural language processing showed that it would be useful to extract the cardiovascular phenotypes of unstructured data in electronic health records, such as clinical notes, radiology reports, and discharge summaries. These methods facilitated the achievement of massive phenotyping of research and allowed physicians to make decisions and lift helpful information in the medical record. The automatic functioning of the machine learning system to determine the presence of heart disease, risk factors, and treatment responses in natural text immediately made available other data to create AI models and apply them when working with patients.

4. DISCUSSION

In the reviewed articles, it is stated that the paradigm shift has a profound impact on the use of artificial intelligence to increase accuracy in

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cardiovascular medicine and, specifically, in prediction, diagnosis, phenotyping, and risk stratification (Mohsen et al., 2023). It is a highly required new technology because now features and modelling out more complex interactions between data of different types can be automatically derived. This will help us get to know more about the health of patients changes and the dynamics of the diseases (Yang et al., 2025; Zhou and Wang, 2025). However, their use is not already widely spread in clinical settings because of such consequences as models that are difficult to interpret and the fact that real-life data is not always evenly distributed (Talukder et al., 2025). In addition, the ethical implications and, specifically, the threat of information privacy and algorithm discrimination will also be necessary to analyze and provide a fair and responsible application of AI in cardiovascular (Zhang et al., 2024). It is understandable that the AI models are exact regarding the identification of the problems with the heart, yet they are not provided to the clinical practice because of the absence of clear evidence of the outcomes, which is why the doctors are less prone to trusting and understanding them (Salih et al., 2024; Гінер et al., 2025). Moreover, the regulatory and legal concerns field and the necessity to promote the efficient communication between AI and medical workers remains important in the facilitation of the successful implementation of AI into the clinical practice (Ledziinski and Grzesk, 2023). The next significant challenge is to have the medical staff adopt AI in their daily operations. It is pointing at that the adoption strategies are to be negotiated (Qammar et al., 2023). The fear of AI is also an issue because people do not know what it can or will do and because of the fear that it will make the decision taken by humans irrelevant. Educational courses and joint development activities should be effective to get people accept AI. Regulatory frameworks are supposed to change with these new technologies. They should make sure that AI systems are built and used on a supervised scrutiny, patient safety, and data confidentiality (Qammar et al., 2023). In addition, users are yet to completely be assured that AI solutions are easy to use, work routinely, and that they have been shown to be cost-effective in many clinical procedures (Biondi-Zoccai et al., 2025). The former problem is that the majority of the state-of-the-art AI models are black boxes, and it is challenging to justify these models and accept them by the healthcare professionals because concrete evidence is necessary to make a clinical conclusion (Hayiroglu and Altay, 2023). It is normally disorienting and individuals will doubt the value of such. More open AI algorithms should be created, and more extensive validation research is needed on various groups of patients to become more confident and make AI a widespread tool (Leon et al., 2024). Furthermore, no hardware capacity, regulations, or a significant portion of time spent by healthcare workers to have an orientation towards emerging technologies facilitate the lack of AI integration into the routine clinical operations (Ahmad et al., 2024). All this makes the point that it will never come sooner than later when even the promising gains in AI research can be translated to the real change in patient care. This proves the importance of ensuring that other disciplines collaborate with the aim of closing the gap between the technology and the real clinical

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use of the new technology (Idakwo, 2025). Among the major obstacles to this kind of integration, it should be noted that healthcare data systems are not standardized, and it becomes harder to have all the necessary data gathered and processed to offer powerful AI algorithms (Nair et al., 2024). This is also highly tedious when there is much work required in connecting and anonymising different datasets and this is time and energy consuming (Adibi et al., 2025). Furthermore, the majority of AI systems are black box, which complicates their trust and the desire to use them because the doctors do not want to rely on the recommendations that they cannot in detail understand and answer (Reddy and Shaikh, 2024). What is still worse, there are no defined legal and regulatory frameworks to discuss these issues. This introduces a problem of safety and liability that makes the application of AI tools in clinical practice complicated (Reddy and Shaikh, 2024). All of these barriers underline the idea that the extent of research and development on more transparent and explainable AI models should be pursued, and that more thorough regulatory standards should be put in place that would facilitate the safe and effective introduction of AI in cardiovascular care (Reddy & Shaikh, 2024).

5. LIMITATIONS

This systematic review is beset with certain few problems which you are expected to observe when analyzing its results. Even though search strategies were quite comprehensive, it is still impossible to eliminate publication bias. This is because research studies with positive findings are likely to be published compared to research studies with negative or null findings. The limitation of the publications to English might have excluded the publication of other languages that were also a relevant study. This could have led to the less diverse evidence with reference to geography and culture.The generalizability of meta-analytic synthesis was also constrained in most settings by the heterogeneity of studies included in the study in terms of populations, interventions, comparators, outcome, and study design. Although the outcomes of the narrative synthesis allowed identifying the general patterns and themes, the quantitative summary estimates of the effect sizes could not be provided in most instances. The establishment of standardised principles of reporting AI research in medicine would enhance the future meta-analysis process, as all essential particulars of the methodology and result measures would be reported similarly.The papers presented in this review could not represent the state of the art because of the speed of the AI development. It is so because model architectures and training are changing rapidly. The current time to keep up with the current happenings in this fast advancing field is impossible due to the time taken to study, publish and incorporate it in the systematic reviews. Specifically, the living systematic review methodologies that will integrate new evidence on a regular basis may be useful especially in AI implementation within the medical field.

6. CONCLUSION

The given systematic review offers significant information according to which artificial intelligence technologies, specifically, machine learning and deep learning methods, have

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reached significant advances in diagnostics and risk perception of cardiovascular diseases. It has been shown that in most areas, including the interpretation of electrocardiograms, cardiac radiographies, and risk assessment, AI models prove to be as efficient or even more efficient than traditional methods of diagnosis. The strengths of these systems increase high opportunities in terms of enhancing the outcomes of patients with regard to the execution of the timely detection, enhanced classification of risks, and enhanced target selection of treatment.

To ensure these research findings are applied in the practice, we still have to deliberate on the ways how to make them more generalisable, more understandable, fit into workflow and apply in an ethical manner. The future directions should be based on the radical external validation of various populations and the elaboration of explainable artificial intelligence processes that can assist in the clinical decision making process and the ease of use of clinical systems. The health economic appraisals will be done to guide investment decisions and make sure that the implementation of AI is able to positively impact the healthcare systems and patients.

The future of AI use in cardiovascular medicine can revolutionize the care delivery process, yet only time will tell whether such an opportunity can be realized, as long as data scientists, clinicians, patients, and healthcare administrators work together. Through this cooperation to solve the problems documented in this review, the cardiovascular community will be able to avert the increase in burden of heart disease and improve the outcomes of patients worldwide. The sphere is currently in its evolutionary phase, and given more clinical experience and evidence, AI technologies will soon be subject to significant changes in the coming years.

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