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The role of nursing and pharmacy teams in prehospital emergency care for acute cardiovascular events: Review

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***Abstract*---Background**: Cardiovascular disease (CVD) remains a leading cause of morbidity and mortality worldwide, particularly in rural areas. Despite advancements in medical management, rural populations face significant disparities in the prevention and treatment of acute cardiovascular events, such as acute coronary syndromes (ACS). **Methods**: This narrative review synthesizes current literature on the roles of nursing and pharmacy teams in prehospital emergency care for acute cardiovascular events in rural settings. A targeted literature search was conducted using PubMed and Google Scholar, focusing on rural-urban disparities in cardiovascular care, risk factor management, and healthcare access. **Results**: The review highlights critical gaps in the availability of specialized healthcare services and the under-treatment of cardiovascular patients in rural regions. Factors contributing to these disparities include

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socioeconomic challenges, lower health literacy, and limited access to healthcare resources. Innovative strategies, such as the integration of telehealth and interprofessional collaboration among nursing and pharmacy teams, are shown to improve patient outcomes. Effective prehospital interventions can significantly reduce delays in treatment, ultimately enhancing survival rates for acute cardiovascular events. **Conclusion**: Addressing the healthcare disparities faced by rural populations requires a multidisciplinary approach that includes enhanced training and support for nursing and pharmacy teams. Implementing evidence-based strategies tailored to the unique challenges of rural settings can lead to improved management of CVD and better health outcomes for patients. Continuous efforts from healthcare professionals, policymakers, and communities are essential to bridge the gap in cardiovascular care.

***Keywords*---**Cardiovascular disease, Rural Health, Nursing, Pharmacy, Acute coronary syndromes.

1. Introduction

Cardiovascular disease (CVD) refers to a group of disorders affecting the heart and blood arteries. It is a significant contributor to morbidity and mortality worldwide, exacerbating disparities in health outcomes between affluent and impoverished populations [1,2]. In high-income nations, there has been a significant decline in mortality from cardiovascular disease (CVD) during recent decades, while CVD continues to be a primary cause of death [3,4]. Decreased mortality rates are ascribed to various factors, including public health initiatives (such as enhanced nutrition and decreased smoking prevalence), medical management (notably for hypertension and dyslipidaemias via the advancement and adoption of potent pharmacotherapies), and procedural interventions encompassing coronary revascularization (coronary artery bypass grafting or stenting) [5].

Rural clinicians and hospitals must acknowledge the paramount importance of reducing cardiac ischemia and the risk of potentially lethal arrhythmias in the management of acute cardiovascular events, while the prevention and medical management of established cardiovascular risk factors or diseases can be effectively conducted in rural environments. It is increasingly acknowledged that reducing the duration of cardiac muscle ischemia mitigates damage to the heart muscle and thereby diminishes the risk of long-term complications, including impaired ejection fraction and heart failure [6].

This review exemplifies a narrative review, offering a comprehensive overview of a topic beneficial for newcomers to the field. It examines the overarching difficulties of managing cardiovascular disease in rural areas of high-income nations. Understanding the facilitators and challenges to cardiovascular disease prevention and management in well-resourced nations may improve the implementation of beneficial methods in low- and middle-income countries.

Rural areas are defined as geographic regions situated outside metropolitan centers, characterized by a low population density [7]. Classification methods for rural areas vary by nation. Nonetheless, all nations will have heightened difficulties in providing the necessary treatment for addressing acute cardiovascular disease as distance increases. Countries may exhibit variations between rural and urban regions regarding the discrepancy in disease incidence and availability of suitable primary, medical, and surgical treatment for cardiovascular disease (CVD). Significant discrepancies occur between rural and distant regions throughout major nations. There are likely to be deficiencies in the availability and coverage of health data in rural and distant regions, as well as in information accessible at the local level [8].

2. Methods

A narrative review offers a contemporary summary of concerns and evidence about a particular healthcare subject, presenting both benefits and limitations compared to systematic evidence-based reviews [6,7]. We concentrated on matters about the prevention and therapy of coronary heart disease, specifically with acute coronary syndromes (ACS), in rural regions of affluent nations. The authors' expertise in cardiovascular disease, acute coronary syndrome (ACS) management, and rural health disparities was enhanced through targeted literature searches on PubMed and Google Scholar, concentrating on rural-urban disparities in the prevention, diagnosis, and management of ACS and cardiovascular disease, as well as rural secondary prevention and cardiac rehabilitation.

3. The Prevalence of Cardiovascular Disease in Rural Regions

The health of a population may be assessed using several indicators that represent mortality, morbidity, general well-being, lifestyle behaviors, and other health-related risk factors [8]. Nevertheless, several health disorders exhibit a health disparity in rural regions, which is equally applicable to cardiovascular illnesses. Eberhard and colleagues discovered that in the United States, the death rate from heart disease was greatest in the South, with a 25% increase in rural regions compared to Southern suburban people [8-10]. Additional research indicates comparable disparities, with consistently elevated coronary heart disease rates in rural Appalachia, despite general declines in cardiovascular illness, and a significant prevalence of chronic heart disease among female inhabitants in rural areas.

People residing in rural and distant regions have a greater prevalence of cardiovascular disease (CVD) risk factors, elevated rates of CVD-related hospitalizations, and a higher likelihood of mortality from CVD compared to their urban counterparts. The greater the distance a person resides from a metropolitan center, the higher their risk of hospitalization and mortality due to cardiovascular disease [11]. The burden of cardiovascular disease (CVD) mostly affects lower socioeconomic groups, Indigenous populations, those from varied cultural backgrounds, and residents of rural and isolated areas. It is important to emphasize that rurality, gender, and race interact intricately, influencing both the prevalence of disease and access to treatment for those with cardiac conditions.

Analysis conducted in Western Australia revealed the disproportionate prevalence of myocardial infarction (MI) among Indigenous individuals, notably at younger ages and in women [12]. This research indicated that geographical deprivation does not uniformly correlate with an increased disease burden, as several variables interact to create a complicated connection between myocardial infarction incidence and sex, age, Indigenous status, and residency [13]. Research done in New South Wales (NSW) highlighted the significance of contextual factors on differences in myocardial infarction (MI) rates, as well as mortality and procedures after admission for acute myocardial infarction (AMI) [14]. Socio-economic disparities and rural disadvantage at the local level may partially account for the considerable difference in AMI rates across different regions [15].

4. Cardiovascular Disease Management

It is essential to mitigate known risk factors to prevent or treat cardiovascular disease (CVD). Conventional risk factor treatment emphasizes the following elements for both primary and secondary prevention: smoking cessation, hypertension and hypercholesterolemia control, proper diet, obesity reduction, and physical activity. There is a growing recognition that behavioral and biological strategies for prevention are insufficient and that the social determinants of health significantly influence the capacity of marginalized individuals to adhere to recommendations for managing risk factors [16]. Social and historical variables are increasingly acknowledged as determinants of health and the acceptance of medical advice and treatments.

Individuals in rural and remote regions may encounter greater challenges in accessing and adhering to preventive advice, often possessing lower educational attainment, diminished health literacy, increased food insecurity, and facing higher costs or limited access to nutritious foods [17-20]. Smoking prevalence is elevated in rural regions and among individuals facing stress or mental health issues, whereas the use of smoking cessation programs is decreased among rural inhabitants [21-23]. The rural region has a recognized increased incidence of risk variables, including alcohol usage and obesity rates [24]. Alston and colleagues reported that one-third of the excess cardiovascular disease (CVD) deaths among rural residents were attributable to risk factors and that approximately 1461 CVD deaths could be postponed annually, thereby decreasing the rural-urban mortality disparity by 38.2%, if rural people exhibited the same risk factor levels as their metropolitan counterparts [25].

Rural regions often have a deficiency in health workers, along with diminished health infrastructure and elevated healthcare delivery expenses [26]. Rural patients, on average, consult their general practitioner 1–2 times less annually than other patients [27]. Moreover, studies indicate that there is significant under-treatment of individuals at high risk of cardiovascular disease by general practitioners. Rural patients get fewer prescriptions for essential drugs for cardiovascular disease, including beta blockers, ACE inhibitors, statins, and warfarin, compared to other patients, although experience a comparable or greater disease burden than those in metropolitan regions [28, 29]. Nonetheless, intricate connections between ethnicity and income also affect health-related risk behaviors pertinent to cardiovascular disease prevention [30].

Reflecting on the increasing state of knowledge is crucial while addressing acute cardiac presentations in rural regions. Timely arrival to the hospital is crucial, since arrhythmias may arise at any moment. Sudden cardiac death after a myocardial infarction (MI) happens due to ventricular fibrillation (VF), an arrhythmia characterized by a fast and unpredictable heart rhythm that prevents effective blood circulation, leading to rapid loss of consciousness and death. Persistent ischemia of cardiac muscle due to obstructions in coronary arteries will lead to impaired cardiac function and output. Coronary reperfusion with thrombolysis or angioplasty during the first 12 hours may reduce the mortality rate by 50%, but the advantage diminishes significantly with treatment delays [31].

Patients have delays in accessing the remote health institution, perhaps due to transportation challenges, both to the first health service and subsequently for transfer via specialized transport to a center equipped for imaging and revascularization treatments. Measures have been used in healthcare environments to accelerate therapies that preserve heart muscle by facilitating transfers to facilities where decisive procedures may optimize the reperfusion of injured myocardium. Nonetheless, delays occurring before individuals seek medical assistance are far more difficult to rectify.

Numerous factors contribute to patient delays, including inadequate symptom recognition, frequently in the context of co-morbidities; insufficient importance assigned to symptoms amid competing demands and life challenges; gender-related responsibilities; sociocultural priorities; cultural and communication discrepancies with healthcare services; and the ramifications of symptom response. Rural locations have extra issues related to the time required to access medical facilities and the shortage of appropriate transportation choices. The distance in distant regions poses significant obstacles in minimizing delays, and climatic variables may greatly affect this [32,33].

Initiatives to minimize patient wait have included educational and mass media approaches to enhance public awareness. Nevertheless, while these initiatives may enhance the identification of heart attack symptoms in patients, they have not succeeded in reducing pre-hospital delays. Consequently, it is currently advised that forthcoming efforts should mitigate mental and behavioral barriers to action and concentrate on those at the greatest risk, particularly those in rural areas [31].

In distant regions, a patient's first healthcare access may be a facility without a regularly present physician, necessitating prompt evaluation and triage, sometimes requiring transport by road or air in an ambulance accompanied by a healthcare professional. Nonetheless, rural hospitals, although having seasoned physicians, often lack the infrastructure for coronary artery revascularization treatments. Following stabilization, patients may be moved to bigger metropolitan centers for cardiac catheterization, which facilitates diagnostic imaging of coronary arteries and subsequent revascularization treatments. Compliance with clinical guidelines and recommended diagnostic and treatment protocols in hospitals can enhance patient outcomes; therefore, regions in the developed world are expected to implement ACS models of care (guidelines) to ensure that

treatment and referral pathways are suitable and consider local conditions and treatment accessibility [34].

Cardiac arrest is highly curable with cardiopulmonary resuscitation (CPR) and defibrillation, necessitating the presence of qualified individuals and prompt access to a defibrillator. The Chain of Survival concept was established over 30 years ago to emphasize a sequence of interdependent, time-sensitive interventions in which bystanders play a crucial role by initiating an ambulance call, administering lifesaving first aid (CPR), and, when feasible, utilizing an automated external defibrillator (AED) during out-of-hospital cardiac arrest. Immediate intervention by bystanders may provide critical time before EMS paramedics arrive with definitive treatment. During this interval, bystander CPR significantly increases the likelihood of survival, more than doubling the chances. Variations exist in rates, interventions, and survival outcomes across various areas. The training of emergency ambulance call responders may enhance bystander contributions to survival.

5. Labor Force Challenges

The significant problem of recruiting and retaining healthcare personnel is a pressing concern for several rural and isolated regions [35]. The maldistribution of the health workforce is a challenge for both emerging and industrialized nations, and it has shown characteristics of a "wicked" problem, resisting effective treatments [36]. A consequence includes not just staff shortages but also worker turnover, which leads to diminished expertise in health and medicine, a lack of awareness of the local environment, and less continuity of service [37-40]. Nurses are an essential element of the healthcare profession, especially in rural regions, and they play a significant role in several facets of cardiovascular disease prevention and therapy. Pharmacists, allied health professionals, and Indigenous health professionals significantly contribute to systems transformation to enhance patient support [32,41-45].

Rural patients with cardiovascular disease (CVD) have had inadequate access to specialized treatment since local experts cannot be sustained in areas with insufficient clinical caseloads to develop and retain necessary clinical skills. Consequently, regional centers will lack resident specialized expertise until they attain a sufficient scale to warrant the establishment of such resources. Possessing the necessary facilities to fully use their practice scope and adhere to yearly procedural skill maintenance guidelines are crucial factors, as is the need for assistance from other highly trained members of the multidisciplinary care team [46].

The workforce shortfall has further repercussions for the knowledge required to support the education and training of practitioners and to ensure they remain informed about developing technology and evidence-based best practices in treatment. Access to continuing education via local programs might mitigate professional isolation for rural practitioners, presumably fostering interprofessional collaboration and enhancing retention in remote environments [47]. The availability of high-quality material on the internet and the use of webinars have transformed the realm of professional development [48-50]. Such

connection is often accessible in affluent nations, yet attendance and remaining informed may pose challenges for time-constrained rural practitioners. Distance supervision and professional assistance are beneficial in educating rural practitioners, while there are few reports of programs specifically focused on cardiovascular care.

The therapy of acute cardiovascular disease often involves care guided by clinical pathways that integrate choices derived from clinical and investigative results. Clinicians do not consistently provide the care they believe they provide or want to provide. This underscores the need to examine the actual providers of care. Audits of clinical practices and results in remote hospitals, accompanied by feedback to clinicians and management, may effectively engage them in enhancing care and systems improvement [34,51]. General practitioners and their practice teams play a crucial role in enhancing patient management, particularly in primary health care after an acute coronary event, where education and integration of care with hospitals significantly improve evidence-based treatments [52]. Peer support programs may enhance patient competencies in chronic illness self-management and provide social support, especially via a mix of in-person and virtual sessions [53].

6. Obstacles in Healthcare Quality in Rural Hospitals

Inadequate health care is seen in both urban and rural hospitals. This may arise due to publicized mishaps or systematic evaluations of performance and discrepancies across hospitals. Significant attention has been directed towards the disparities in care between rural and urban hospitals in the United States, acknowledging that smaller rural hospitals typically possess fewer resources and less funding compared to larger urban hospitals, as highlighted in the Institute of Medicine reports on the quality of healthcare in the United States [40,54]. Acute myocardial infarction and heart failure are prevalent clinical diseases often examined in studies of service discrepancies between metropolitan acute care facilities and rural critical access hospitals. Rural hospitals often exhibit higher readmission rates; nonetheless, care has been advised about the use of fines for poor performance [55].

Apparent discrepancies may stem from deviations from evidence-based treatment guidelines during the acute period and inadequacies in care during discharge and follow-up. Nonetheless, data indicates that disparities in treatment extend beyond clinical assessments of need [34,48,56,57], underscoring the need for well-structured care pathways and the monitoring of practice standards to promote alterations in care systems and professional conduct [58]. Despite ongoing attempts to emphasize inequities and enhance treatment quality, especially for institutions catering to populations with significant health disparities, others contend that establishing a national standard for healthcare quality is an unachievable objective [32]. This argument illustrates the varying range and kind of care offered in metropolitan areas, emphasizing that quality standards must be pragmatic, beneficial, and economically viable for their intended implementation [59].

7. Opportunities to Address Challenges Related to Managing Cardiovascular Disease in Rural Regions

Every element of the preventive and treatment continuum presents distinct hurdles, making it arduous to address the differences in outcomes after an acute coronary event for patients residing in rural locations compared to those in metropolitan settings. Enhanced communication and care integration is often recognized as essential for better care [60-62]. These primarily depend on clinicians guaranteeing that care systems assist individual patients across primary, secondary, and tertiary care interfaces, acknowledging that the average rural patient encounters more care interfaces than their urban counterparts, frequently with diminished social support during care discussions. Efforts must include strategies to ensure primary care professionals are informed about their patient's conditions and comprehend and concur with the planned treatment strategy. This will enhance the uniformity of information and care assistance. The contributions of various health professionals to patient care and support are recognized, especially in rural regions, where doctors, nurses, physiotherapists, dieticians, diabetes educators, pharmacists, and others collaborate in multidisciplinary team management and support. Enhancing health education in non-clinical environments, such as community centers, may augment comprehension, facilitate access to social support, and promote prevention and treatment [63,64].

A recent comprehensive evaluation of clinical trials examining the efficacy of treatments aimed at enhancing cardiovascular healthcare in rural regions revealed eighteen research, all undertaken in high-income nations [65]. The five studies focused on therapies addressing MI were predicated on organizational modifications, as previously noted, and sought to minimize treatment duration and lower death rates. The assessed interventions comprised mobile coronary care units, the establishment of a new emergency department in a rural hospital, a novel protocol for the immediate transfer of patients for PCI, and the implementation of an AMI clinical pathway that includes thrombolytic administration in rural emergency departments. Although educational interventions enhance knowledge and self-care, and organizational interventions may refine healthcare systems, their effects on mortality and other significant health outcomes have yet to be determined [66].

There is a growing comprehension of the elements contributing to suboptimal results, accompanied by investment in various developing technologies to tackle issues faced by patients and healthcare providers. Telehealth and mHealth provide avenues for using external knowledge to assist in the diagnosis and treatment of a problem. The technology must operate well and be user-friendly to be regarded as an approved technique, providing advantages for both the patient and healthcare workers. Telehealth has shown efficacy for rural practitioners managing acute situations, including remote expert interpretation of ECG traces, remote prescription, and guidance on and monitoring of therapy. This necessitates sufficient investment in emergency telehealth services. Telehealth has been identified as an effective resource for healthcare professionals, offering nurses a chance for education and assistance [67].

Obstacles to the use of telehealth for continuous management mostly stem from financing and payment structures, despite telemedicine's ability to provide easier access to specialized expertise. Over time, services will improve due to continuous quality enhancement initiatives and occasional investigations into care failures, leading to reviews and subsequent changes. Technology has provided new potential for the delivery of care, especially via remote sensing and monitoring. Individuals with the desire and resources for self-management have several possibilities to enhance their understanding of their illness and maintain control, especially when components of their treatment are accessible inside their residences. Nonetheless, it remains uncertain if these advancements will mitigate the gaps in outcomes between rural and urban populations.

8. Conclusions

Disparities in cardiovascular disease incidence and outcomes persist among individuals residing in rural regions. This study has synthesized research about many challenges affecting doctors in the management of patients with acute myocardial infarction in rural settings and in enhancing their emergency and follow-up treatment. Rural doctors must respond promptly to provide the best patient outcomes, considering the urgency of the acute therapy of ACS. Innovative technology and quality enhancement methodologies may provide increased access to prompt diagnosis and specialized treatment. Strategies to alleviate the burden of cardiovascular disease in rural regions must include primary preventive methods, with enhancements in the diagnosis and treatment of acute conditions and post-discharge care. Connections between primary and hospital-based care are likely to be more significant in a rural setting. The concerns are complex and need continuous assistance from governments, policymakers, and health experts, including input from consumers and caregivers.

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دور فرق التمريض والصيدلة في الرعاية الطارئة ما قبل المستشفى للأحداث القلبية الحادة: مراجعة

الملخص

الخلفية :تعد أمراض القلب والأوعية الدموية (CVD) من الأسباب الرئيسية للاعتلال والوفاة في جميع أنحاء العالم، خاصة في المناطق الريفية. على الرغم من التقدم في الإدارة الطبية، فإن السكان الريفيين يواجهون تفاوتات كبيرة في الوقاية من وعلاج الأحداث القلبية الحادة، مثل المتلازمات القلبية الحادة.(ACS)

الطرق :تستعرض هذه المراجعة الأدبية الدور الحالي لفرق التمريض والصيدلة في الرعاية الطارئة ما قبل المستشفى للأحداث القلبية الحادة في المناطق الريفية. تم إجراء بحث أدبي مستهدف باستخدام قواعد بيانات مثل PubMed و Google Scholar، مع التركيز على التفاوتات بين المناطق الريفية والحضرية في الرعاية القلبية، وإدارة عوامل الخطر، والوصول إلى الرعاية الصحية.

النتائج :تبرز المراجعة الفجوات الحرجة في توفر الخدمات الصحية المتخصصة وعلاج المرضى القلبيين في المناطق الريفية. تشمل العوامل التي تساهم في هذه التفاوتات التحديات الاجتماعية والاقتصادية، وانخفاض مستوى المعرفة الصحية، والحد من الوصول إلى الموارد الصحية. وتظهر الاستراتيجيات المبتكرة، مثل دمج الرعاية الصحية عن بُعد والتعاون بين فرق التمريض والصيدلة، أنها تحسن نتائج المرضى. يمكن أن تسهم التدخلات الفعّالة ما قبل المستشفى في تقليل تأخيرات العلاج، مما يعزز بشكل كبير معدلات البقاء على قيد الحياة للأحداث القلبية الحادة.

الخلاصة :يتطلب معالجة التفاوتات الصحية التي يواجهها السكان الريفيون نهجًا متعدد التخصصات يشمل تدريبًا ودعمًا محسنًا لفرق التمريض والصيدلة. إن تنفيذ استراتيجيات قائمة على الأدلة تتناسب مع التحديات الفريدة في المناطق الريفية يمكن أن يؤدي إلى تحسين إدارة أمراض القلب والأوعية الدموية وتحقيق نتائج صحية أفضل للمرضى. إن الجهود المستمرة من المهنيين الصحيين وصانعي السياسات والمجتمعات ضرورية لسد الفجوة في الرعاية القلبية.

الكلمات المفتاحية :أمراض القلب والأوعية الدموية، الصحة الريفية، التمريض، الصيدلة، المتلازمات القلبية الحادة.