#### BRIDGING THE GAP IN CARDIOVASCULAR DISEASE PREVENTION: EVALUATING FAMILY PHYSICIANS' KNOWLEDGE AND APPLICATION OF GUIDELINES IN PRIMARY CARE

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## Abstract

**Background:** Cardiovascular disease (CVD) remains a leading cause of morbidity and mortality worldwide, necessitating effective preventive strategies within primary care settings. Family physicians (FPs) play a crucial role in promoting heart-healthy lifestyles, yet their adherence to clinical guidelines varies. Understanding the factors influencing FPs' knowledge and application of CVD prevention strategies is essential for improving patient outcomes.

**Methods:** A cross-sectional study was conducted among 200 family physicians working in primary healthcare settings. A structured questionnaire was distributed via email, assessing physicians' knowledge and application of CVD prevention guidelines. Data analysis included descriptive statistics, t-tests, ANOVA, and multiple linear regression to identify key determinants affecting physicians' knowledge levels.

**Results:** The study revealed that only 14.2% of FPs achieved an acceptable knowledge score ( $\geq$ 70%), while 48.7% met the threshold for guideline application. European CVD prevention guidelines were the most frequently used (67.3%). Significant barriers to guideline adherence included insufficient knowledge (62.8%) and inadequate counselling skills (37.9%). Female physicians, senior practitioners, and those following national guidelines demonstrated higher adherence to prevention strategies. Multiple regression analysis explained 28% of the variance in knowledge scores and 35% in application scores.

**Conclusion:** Despite the recognized role of FPs in CVD prevention, significant gaps exist in their knowledge and application of evidence-based guidelines. Targeted training programs, improved access to educational

resources, and enhanced risk assessment models are needed to strengthen preventive care. Future research should explore patient engagement strategies and the integration of behavioural interventions in primary care.

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#### Introduction

Effectively organizing widespread cardiovascular disease (CVD) prevention remains a significant challenge, with primary care playing a crucial role in promoting healthier lifestyles within communities [1], [2]. Family physicians (FPs) serve as key providers of preventive healthcare, yet numerous studies highlight various obstacles they encounter in this responsibility. It is essential to recognize that an FP's role extends beyond direct patient care, encompassing broader public health responsibilities as well [3].

For primary care to meet these expectations, preventive strategies and treatments must be evidence-based, accessible to all eligible individuals, and delivered at reasonable costs. In 2016, an updated version of the European Guidelines on Cardiovascular Prevention was introduced, offering practical tools to enhance communication about cardiovascular risk. These guidelines are designed to be applicable across different populations, regardless of their initial risk levels [4].

A particularly complex aspect of CVD prevention is decision-making regarding the use of preventive medications. This process involves balancing the longterm benefits of risk reduction against the immediate risks posed by adverse drug reactions, especially in individuals with declining health and reduced life expectancy [5]. In qualitative research, FPs reported feeling pressured by clinical guidelines to prescribe preventive medications, even when they were concerned that the potential negative effects of polypharmacy and medication side effects might outweigh the anticipated future benefits [6].

In many healthcare systems, cardiovascular preventive care is delivered through a combination of family physicians and cardiologists working in both public and private medical institutions. Preventive care guidelines, primarily developed by the European Society of Cardiology, serve as a foundation for national adaptation and implementation within healthcare services [7].

This study aims to examine the factors influencing FPs' knowledge and practical application of cardiovascular disease prevention guidelines in primary healthcare settings.

### Methods

This study employed a cross-sectional design, targeting 200 family physicians (FPs) working in primary healthcare settings. A structured questionnaire was distributed via email in three waves between April and November 2019, ensuring the collection of 300 completed responses. Since all eligible physicians within the primary care system were surveyed without employing random sampling, no sample size calculation was required.

The study adhered to international bioethics standards and followed ethical guidelines recommended by the appropriate health regulatory bodies [8]. Approval for the study was obtained from a relevant ethics committee. Participation was entirely voluntary, and respondents were informed that they could decline or withdraw at any stage without providing a reason or facing any consequences. Confidentiality of the participants' data was strictly maintained. Verbal consent was obtained from all participants before data collection.

The research instrument was a self-administered questionnaire developed by the authors through an extensive review of literature, expert consultations, and established guidelines on cardiovascular disease (CVD) prevention practices. The questionnaire underwent a multi-phase validation process before its final version was distributed.

The first validation phase involved face validation by three consultant physicians specializing in cardiovascular prevention. Based on their feedback, necessary modifications were made, and the process was repeated until full approval from the experts was achieved.

The second validation phase included a test-retest reliability assessment. A preliminary version of the questionnaire was distributed to a sample of 30 physicians from outpatient clinics who were not part of the final study. Two weeks later, the same physicians completed the questionnaire again. Agreement between responses was evaluated using intraclass correlation. Any item showing agreement below 75% was considered for exclusion [8]. However, all items met the acceptable threshold, so no questions were removed from the final version.

The questionnaire utilized a scoring system with two question formats. The first type consisted of multiple-choice questions with a single correct answer, scored in a binary manner (1 point for a correct response and 0 points for an incorrect one). The second type included questions with multiple acceptable answers, each graded on a scaled scoring system. The most appropriate

response received the highest score, while the least appropriate received the lowest. For example, in a five-option question, the best response received 5 points, the second-best received 4, and so forth, with the least appropriate answer receiving 1 point.

The maximum possible score for assessing physicians' knowledge of CVD prevention was 15 points, while the maximum score for evaluating the application of prevention strategies was 25 points. A minimum acceptable score of 70% was set as the threshold for competency.

Sociodemographic characteristics of the participants were analyzed alongside their knowledge and application scores. A one-sample t-test was conducted to compare scores against the predefined minimum threshold. To examine differences between groups within a variable—such as male versus female physicians—a two-sample independent t-test was applied. For variables with three or more categories, such as job title, a one-way analysis of variance (ANOVA) was used. Multiple linear regression analysis was performed to identify key determinants influencing physicians' knowledge levels.

No patients or members of the public were involved in formulating the research questions, determining outcome measures, or contributing to study design, recruitment, or implementation. Similarly, they were not consulted regarding data interpretation or reporting. The study findings will be disseminated through academic presentations and professional discussions rather than direct communication with participants.

## Results

Table 1 presents the demographic attributes of the study participants. The mean age of the respondents was  $45.36 \pm 5.82$  years, with female physicians constituting 73% of the sample. A considerable proportion of participants (87.1%) had been practicing medicine for more than five years.

The European guidelines emerged as the most frequently employed (67.3%), followed by national guidelines (25.7%), while a minority (7%) reported using alternative guidelines.

The study also examined perceived challenges to implementing preventive strategies for CVD. Participants could select multiple barriers. The most frequently cited obstacle was insufficient knowledge of preventive measures (62.8%). Deficiencies in counselling skills emerged as the second major challenge (37.9%), while the complexity and subjectivity of assessment criteria were identified as a barrier by 32.6% of the respondents.

A set of binary-choice questions assessed physicians' knowledge of CVD prevention guidelines. Two of these questions received correct response rates below the pre-established 70% competency threshold. The question, "How many steps are involved in CVD prevention?" had a correct response rate of only 53.8%, while the question, "Which of the following does not constitute a component of CVD prevention?" received 67.1% correct responses. However, the question regarding the classification criteria for CVD patients had a correct response rate of 76.5%, exceeding the threshold.

One question measured physicians' adherence to guideline recommendations regarding statin prescriptions for CVD prevention. This was a scaled question where the lowest percentage category received the least points, and the highest adherence to recommended prescription levels received the highest score. The correct prescription range per guidelines was 81%–100%; however, only 4.6% of participants selected this category. Instead, the most common response was prescribing statins for 41%–60% of patients, chosen by 42.3% of respondents.

Similarly, another scaled question assessed the use of antihypertensive medications. The response categories were inversely scored, where lower

Table 1.	Demographic	Characteristics	of Participants	(n = 200).
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Variable	Category	Frequency (%)	
Age Group	Younger (<30)	(30%)	
	Middle-aged (30–60)	(58.3%)	
	Older (>60)	(11.7%)	
Gender	Male	(27%)	
	Female	(73%)	
Years of Practice	<5 years	(13.3%)	
	5–10 years	(38.3%)	
	11–15 years	(31.7%)	
	≥16 years	(16.7%)	
Professional Status	General Practitioners	(73%)	
	Residents	61 (20.3%)	
	Consultants/Fellows	(6.7%)	

prescribing percentages were associated with higher marks. The two least accurate answers had the highest response rates (31.4% and 29.8%), while the most appropriate response (<20%) had the lowest selection rate (8.3%).

Application of CVD prevention guidelines was also assessed, with only four out of twelve questions achieving a 70% or higher correct response rate. The lowest-scoring item pertained to the frequency of implementing preventive strategies for patients, with only 29.2% of respondents answering correctly.

Participants were asked to specify the elements included in their written management plans for CVD prevention. Each management component was scored individually, with a maximum total of six points. Only two components exceeded the 70% threshold: emergency room referral criteria (83.4%) and patient instructions for avoiding risk factors (73.7%).

Finally, the physicians were asked about the proportion of their patients who had written CVD prevention plans. This was another scaled question, where the lowest percentage category was assigned the lowest score, and the highest category was assigned the highest score. Additionally, an "I do not know" option was available but carried no score. The majority of respondents either selected "I do not know" (44.2%) or the lowest category (<20%), which received 42.7% of responses. [8]

The classification of physicians' scores is outlined in Table 3, where scores are divided into two categories: acceptable ( $\geq$ 70%) and unacceptable (<70%). The findings reveal that only 14.2% [43/300] of physicians achieved an acceptable score in guideline knowledge. However, the proportion of physicians who attained an acceptable application score was significantly higher at 48.7% [146/300].

To evaluate the overall performance, the average scores in knowledge and application were compared to the minimum acceptable threshold. Table 4 presents the outcomes of a one-sample t-test, demonstrating that the mean knowledge score (56.5%) was significantly lower than the acceptable 70% benchmark. In contrast, the average application score (69.7%) was not statistically different from the threshold, suggesting a borderline performance.

Further analysis was conducted to identify the factors influencing physicians' knowledge levels using multiple linear regression. Results showed that middleaged physicians exhibited the highest level of knowledge, surpassing their younger counterparts. Senior physicians also demonstrated higher knowledge scores compared to younger physicians. Without adjusting for external factors, the baseline knowledge score was 51%, and the model accounted for 28% of the variability in physicians' knowledge, indicating a moderate explanatory power in understanding knowledge disparities.

Similarly, multiple linear regression was applied to assess factors affecting guideline application. Female physicians demonstrated significantly higher application scores compared to their male colleagues. In addition, senior physicians and consultants exhibited better application scores than other groups. Physicians adhering to national guidelines scored higher in application than those following other international guidelines. Conversely, physicians relying on alternative guidelines had significantly lower application scores. The regression model explained 35% of the variability in guideline application among physicians, which is considered a moderate level of explanation.

# Discussion

This study highlights that family physicians (FPs) demonstrate moderate to low levels of knowledge and application regarding cardiovascular disease (CVD) prevention guidelines. Notably, adherence to locally adapted guidelines is lower than that of international ones. Differences in knowledge and application were evident among physicians, particularly between less experienced and more senior practitioners. Furthermore, factors such as gender, professional qualifications, and job roles were found to influence both knowledge and application.

Given these findings, it is essential to enhance risk assessment tools by incorporating patient-specific factors and promoting behavioural modifications alongside pharmacological interventions. Encouraging the broader use of absolute risk assessment models—ones that account for variables such as socioeconomic background, hereditary risks, and lifestyle behaviours-may offer more practical benefits for FPs [9], [10], [11].

Ensuring adherence to both lifestyle modifications and prescribed medications remains a significant challenge. Although behavioural changes are crucial for preventing CVD, maintaining patient motivation and compliance poses difficulties for FPs [12], [13]. A multifaceted approach that integrates structured physical activity programs, follow-up communications, prescription adherence reminders, and comprehensive FP services can improve patient commitment while addressing common barriers such as time constraints and resource limitations [14], [15].

This study also identifies critical research gaps in understanding overall versus

individual risk assessments, the long-term effects of continuous medication use, primary care prescription practices, and the influence of gender and family support. The differentiation between absolute risk evaluation and individual risk factor analysis is crucial to maintaining consistency in treatment planning. Additionally, the role of primary prevention strategies and the necessity of medication for asymptomatic patients remain underexplored [16], [17].

Raising awareness and ensuring consistent adherence to evidence-based treatment guidelines—particularly for patients without evident symptoms— could improve the standardization of CVD risk assessment and management. Additionally, the role of family support in patient compliance remains an area requiring further investigation. Family members can play a pivotal role in encouraging adherence to preventive strategies, reinforcing lifestyle changes, and ensuring patients follow their prescribed medication regimens [18], [19].

While FPs recognize the importance of lifestyle modifications and medical management in preventing CVD, influencing patient behaviour remains a challenge. Some physicians believe that decision-making in preventive care is highly dependent on the patient's life circumstances, self-discipline, and environment-factors often overlooked in risk assessment models. Expanding the availability and adaptability of evidence-based strategies for CVD prevention, including those focused on behavioural interventions, could strengthen FPs' ability to manage and mitigate CVD risks effectively.

Several limitations should be acknowledged when interpreting these findings. First, the cross-sectional nature of the study restricts causal inferences. However, since many of the identified factors are relatively stable over time, the likelihood of reverse causation is minimal. Second, the study population was limited to FPs within a specific region, which may affect the generalizability of the findings. Furthermore, only knowledge related to CVD prevention was assessed, while other dimensions of health literacy were not considered. Lastly, as the study relied on self-reported data, potential biases may exist despite the implementation of rigorous quality control measures during data collection and processing.

## Conclusion

This study highlights significant gaps in the knowledge and application of CVD prevention guidelines among FPs, with only 14.2% demonstrating sufficient competence in both areas. Limited awareness and inconsistent application of guidelines in primary care require urgent attention, as adherence to evidence-based practices plays a critical role in reducing CVD risks. These challenges are particularly pronounced among less experienced physicians.

Efforts should focus on increasing awareness of available guidelines and ensuring their widespread implementation across different healthcare settings. Future research should examine how well guidelines are integrated into practice and identify strategies to enhance their adoption among FPs.

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