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EFFECTS OF SHORT-TERM TRAINING ON CARDIOVASCULAR RISK ASSESSMENT AND MANAGEMENT FOR FAMILY MEDICINE TEAMS: IMPACT ON PRACTICE AND OUTCOMES

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Abstract:

Background/Aim: Decreasing cardiovascular risk factors and managing cardiovascular disease leads to a reduction in cardiovascular mortality. Quality indicators have been used to measure the impacts of these activities.

Aim: The purpose of this research was to assess how the family medicine team training workshop and the application of clinical guidelines impact the management of cardiovascular risk factors and diseases in primary health care in the Republic of Srpska/Bosnia and Herzegovina.

Method: The study "CardioVascular Risk Assessment and Management" involved 373 teams from 41 primary health care centers who were educated to offer proper services, in order to assess the quality of cardiovascular risk management pre and post training workshop and guidelines implementation. The evaluation used nine performance indicators related to hypertension, type 2 diabetes mellitus, hyperlipidaemia, tobacco smoking, and obesity for comparison.

Results: Following the training workshop and implementation of guidelines, notable enhancements were seen in six indicators. More than 80% of patients reached the desired blood pressure and HbA1c levels (82.12 ± 15.81 vs). Before the training workshop, the mean value for LDL cholesterol was 84.49 ± 12.71, which increased to 85.49 ± 24.55 after the workshop. The target values for LDL cholesterol were met by 54.98% ± 20.33 before the workshop and 57.64% ± 16.66 after the workshop. After the training workshop and guidelines were implemented, the amount of teams with less than 20% recorded data decreased significantly, while the complete recording of all indicators saw an improvement.

Conclusion :In summary, the quality of managing cardiovascular diseases in primary health care improved significantly due to the training workshop for family medicine teams and the implementation of clinical guidelines.

Key words:

Family medicine team, clinical guidelines, cardiovascular risk factors, quality indicators, and prevention are all important aspects in managing the health of patients.

Introduction :

Chronic non-communicable diseases are responsible for 74 % of global deaths, with 31 % attributed to cardiovascular diseases (CVD) (1,2) . In the Republic of Srpska (RS), Bosnia and Herzegovina (B&H), CVDs account for 47.3 % of all deaths, (3) in a population of 1 170 342 people.(4) Primary health care in RS is managed by the Ministry of Health and Social Welfare and financed by the Health Insurance Fund, focusing on health promotion, disease prevention, early detection, and timely treatment to address population health needs.(5) The foundation of primary healthcare in the RS is the family medicine team (FMT). FMT serves as the fundamental organizational form for providing PHC, serving as the primary

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organizational structure for most activities at the PHC level. FMTs can be structured as either standalone FMTs (operating as their own legal entity, whether public or private), group practices, or FMTs located within a PHC Centre (PHCC) as part of its internal structure. FMT is composed of a primary care doctor with expertise in family medicine, or a specialist in other medical fields who has received extra training in family medicine, along with two nurses who have completed additional nursing education in family medicine. FMTs serve as the main entryway for citizens/patients into the health system. FMT operates in a primary healthcare ambulance that is part of and functions within a primary healthcare center. PHCC (Health Center) - is a public health facility that operates based on the FM model at the municipal level.

Therefore, there are a total of 54 PHCCs in RS, which matches the number of municipalities in the region. FMT serves as the initial point of contact for citizens with the health system. There are a total of 698 FMT in RS. A single FMT is capable of enrolling anywhere from 500 to 830 families, which translates to a population of 1,500 to 2,500 people. The organization of FMT's is done at a local level and the number and makeup of each, along with the population of the corresponding municipality, stay fairly consistent over a prolonged period. The family practitioners' organization has been instrumental in promoting the importance of following clinical guidelines for better health outcomes. Cardiovascular risk factors are categorized as either modifiable or non-modifiable, and addressing modifiable risk factors and managing patients with CVD are key in reducing CVD mortality rates.
Quality indicators have been used to measure the impact of these activities. A systematic review of 38 studies demonstrated the effectiveness of educational interventions in enhancing CVD prevention and guideline adherence. Audit-based education in the UK and multimodal intervention in the US and Italy have led to improved attainment of target values for blood pressure and cholesterol, with positive clinical outcomes (7,8). The text should be rewritten and contain the same number of words. (6) Analysis identified the requirement for a comprehensive approach in addressing multiple risk factors in patients as simply disseminating guidelines had not enhanced adherence or clinical outcomes.(6)
The Swiss Agency for Development and Cooperation (SDC), the World Health Organisation (WHO) Regional Office for Europe, the WHO Country Office in Bosnia and Herzegovina, and local health authorities collaborated on the project "Reducing Health Risk Factors in Bosnia and Herzegovina," with the aim of enhancing public health strategies and services to enhance population health from 2013 to 2019 (9) . The project focused on implementing interventions to improve cardiovascular disease (CVD) prevention and standardizing "CardioVascular Risk Assessment and Management" (CVRAM) in primary care facilities. The project involved creating clinical guidelines, conducting short-term training workshops, and identifying indicators for evaluating educational impacts (baseline assessment and post-CVRAM training evaluation). Several clinical guidelines have been created as part of the project, including guidelines for hypertension, diabetes mellitus and cardiovascular diseases, hyperlipidemia, child obesity prevention, adult obesity prevention, physical activity promotion, and smoking cessation. Following the creation and widespread acceptance, the guidelines were utilized as educational aids for FMT training workshops. This study aimed to assess the impact of brief FMT training workshops and the incorporation of clinical guidelines on the treatment of patients with modifiable cardiovascular risk factors, CVDs, and type 2 diabetes mellitus (T2DM) in primary health care centers in the RS/B&H.

Method:

Participants in the study

The research involved 373 FMTs from 41 primary healthcare centers, with 367 FMTs from 35 public PHCC and 6 FMTs from 6 private healthcare centers. The requirements for participating in the project

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with FMTs were: having finished CVRAM training, following clinical guidelines, registering the population to FMT before 1 July 2015, and ensuring all data is in patient electronic medical records. This research did not raise any ethical concerns, hence it did not require official approval from the ethics committee. The quality indicators' values were taken from the primary health care's electronic database. The information regarding FMTs and the recorded population was kept confidential.

Intervention

The training workshop for Family Medicine Trainees (FMTs) was carried out by the Family Medicine Departments of two medical faculties in Republika Srpska, namely Banja Luka Faculty of Medicine at the University of Banja Luka and Foča Faculty of Medicine at the University of Eastern Sarajevo. The training program lasted for two days and focused on teaching how to implement clinical guidelines for assessing cardiovascular risk, planning prevention activities, and properly recording data in electronic medical records. The CVRAM training sessions took place in the three educational locations of Banja Luka, Doboj, and Foča, providing sufficient national territorial reach, spanning from 30 June 2016 to 1 July 2017. A specific group of experienced family medicine educators conducted the training workshop to guarantee consistency.

Collection of data

All patient medical records in family medicine were maintained as electronic records in a web-based information system for family medicine and stored in a centralized electronic database. For this study, data on male and female patients was extracted, including the average of the last two blood pressure values for those with hypertension, last HbA1c value for patients with T2DM, last LDL cholesterol value for those with hyperlipidaemia, body weight for patients with a BMI ≥ 30 kg/m2, and tobacco smoking history. The information regarding the diagnosis of hypertension, T2DM, hyperlipidemia, and obesity was determined by physician diagnosis using ICD10 coding. Data reliability was maintained by cross-referencing it with the registers for chronic diseases at the FMT level: (1) Hypertension patients registry, (2) Chronic disease registry (3) Database of individuals with type 2 diabetes, (4) Database of individuals with high levels of lipids in their blood, (5) Database of individuals who are overweight (with a BMI of 30 kg/m2 or higher), (6) Database of individuals with both high levels of lipids and type 2 diabetes who have been given statin medication, (7) Database of individuals who are at least 18 years old with information on whether or not they smoke tobacco. The current data information system was created for the primary healthcare system in the Republic of Srpska and is capable of efficiently extracting necessary data for analysis, including data that can be used as specific indicators for this study.

Measures

Prior to the FMT training workshop, the project created nine quality indicators. The assessment relied on the indicators identified earlier, which were categorized as process and outcome indicators (Table 1).

Period of observation

The initial assessment took place a year before the CVRAM training workshop and guideline implementation (1 July 2015 – 30 June 2016), followed by an evaluation conducted one year after the completion of the workshop and implementation of the guidelines (1 July 2017- 30 June 2018).

Analysis of statistics

The statistical analysis was conducted using the statistical software SPSS Statistics version 18, which is from the United States. The majority of variables were displayed in terms of the frequency of specific categories, with significance testing done using either the Chi-squared test or the two-sample t-test for proportions. The most significant findings were showcased by average percentages with standard

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deviations (SD). A Pearson correlation analysis was conducted to determine the relationship between the two variables. A probability of less than 0.05 was selected as the threshold for determining statistical significance between the two groups.

Results

483 out of 698 FMTs successfully finished the CVRAM training workshop. Nevertheless, the evaluation included only 373 FMTs (53.44%) because the accuracy of data from their electronic system was deemed acceptable.

Baseline assessment

The initial evaluation revealed that a high proportion of performance indicators were not met. The monitoring of hypertensive patients and the recording of BP values were either not properly documented or not documented at all in the patient's electronic medical records. In over half of the FMTs, the supervision of T2DM patients was lacking, with insufficient documentation of HbA1c and LDL levels. In most FMTs, only a small number of obese patients had recorded body weight values.

Evaluation after training has been completed

There was a notable enhancement observed in six of the nine indicators that were analyzed. A small variation in deterioration was observed in statin prescribing for T2DM patients with high LDL values, but it was not statistically significant ($p = 0.320$). The BP measurements for hypertensive patients were found to be similar percentages before and after CVRAM training (57.40 % compared to 57.06 %). HbA1c recording for T2DM patients saw a 4.96% improvement, while LDL recording improved by 2.42%. However, body weight measurement recording for obese patients decreased by 7.6% (Table 2).

Indicators of the process

To gain a better understanding of process improvement, the analysis focused on the proportion of FMTs with less than 20% of data recorded. After completing the task, 18 FMTs (5.36 %) had recorded BP values below 20 % at baseline, which decreased to 11 (2.94 %) after the training. The remaining FMTs stayed above 20% in value (Figure 1A). The HbA1c measurement showed improvement in 22 (5.9 %) patients with type 2 diabetes. Before the training, there were 124 FMTs (33.24%) in the 0-20% range, while after the training there were 102 FMTs (27.34%) (Figure 1B). 24 FMTs showed improvements in LDL cholesterol values in hyperlipidaemia patients, while 139 FMTs had less than 20% baseline data recorded.

However, following the training, the amount of FMTs within this range reduced to 115 (30.83 %; Figure 1C). Before education, the rate of recording tobacco smoking status in the adult population was lower than in 62 (16.62 %) FMTs, but improved afterwards.

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Table 1: The list of CVRAM indicators

No	Indicator	Type	Calculation formula
1.	Percentage of hypertensive patients with BP measurements recorded within the last 12 months	process	Nominator is the number of patients with hypertension who had a record of BP measurement in last 12 months. Denominator is the number of patients with hypertension.
2.	Percentage of patients with hypertension with recorded value of BP ≥ 140/90 mmHg in last 12 months	outcome	Nominator is the number of patients with hypertension who had a record of BP measurement in last 12 months and the value of that BP was ≥ 160/100 mmHg. Denominator is the number of patients with hypertension who had a record of BP measurement in last 12 months.
3.	Percentage of HbA1c measurements among T2DM patients in last 12 months	process	Nominator is the number of patients with T2DM who had a record of HbA1c measurement in last 12 months. Denominator is the number of patients with T2DM.
4.	Percentage of patients with T2DM with measured HbA1c level ≥ 7 % in last 12 months	outcome	Nominator is the number of patients with T2DM who had a record of HbA1c measurement in last 12 months and value of HbA1c was ≥ 9.0 %. Denominator is the number of patients with T2DM who had a record of HbA1c measurement in last 12 months.
5.	Percentage of patients with hyperlipidaemia with recorded LDL cholesterol measurement in the last 12 months	process	Nominator is the number of patients with hyperlipidaemia who had a record of LDL cholesterol measurement in last 12 months. Denominator is the number of patients with hyperlipidaemia.
6.	Percentage of patients with hyperlipidaemia with recorded LDL cholesterol ≥ 3 mmol/L in the last 12 months.	outcome	Nominator is the number of patients with hyperlipidaemia who had a record of LDL cholesterol measurement in last 12 months and value of LDL cholesterol ≥ 4.1 mmol/L. Denominator is the number of patients with hyperlipidaemia who have a record of LDL cholesterol measurement in last 12 months.
7.	Percentage of patients with T2DM with recorded LDL cholesterol ≥ 3 mmol/L who were prescribed statin therapy in the last 12 months	process outcome	Nominator is the number of patients with T2DM who had measured LDL cholesterol greater than 4.1 mmol/L in the last 12 months and who were prescribed statins. Denominator is the number of patients with T2DM whom had measured LDL cholesterol ≥ 4.1 mmol/L in the last 12 months
8.	Percentage of patients older than 18 with recorded tobacco smoking status	process	Nominator is the number of patients older than 18 with recorded tobacco smoking status. Denominator is a number of patients older than 18.
9.	Percentage of body weight measurements recorded in the last 12 months with obese patients (BMI ≥ 30 kg/m^2)	process	Nominator is the number of patients with obesity who had a record of body weight in the last 12 months. Denominator is the number of obese patients (BMI ≥ 30 kg/m^2)

**All indicators were calculated in relation to the registered population in FMT, older than 18 years. CVRAM: CardioVascular Risk Assessment and Managemen BP: blood pressure; LDL: low-density lipoprotein, T2DM: type 2 diabetes mellitus, BMI: body mass index.*

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(Table 2 *: Trend of indicators before and after CVRAM training workshop)*

No	Indicator	Baseline N (%)	Post training N (%)	Improvement	p value
1.	Percentage of hypertensive patients with BP measurements recorded within the last 12 months	124931 (57.40)	125655 (57.06)	NO	0.001
2.	Percentage of hypertensive patients with recorded value of BP ≥ 160/100 mmHg in last 12 months	74112 (17.88)	77687 (15.51)	YES	0.001
3.	Percentage of HbA1c measurements among T2DM patients in last 12 months	26966 (36.43)	30316 (41.39)	YES	0.001
4.	Percentage of patients with T2DM with measured HbA1c level ≥ 9.0 % in last 12 months	10709 (17.36)	13408 (14.51)	YES	0.001
5.	Percentage of patients with hyperlipidaemia with recorded LDL cholesterol measurement in the last 12months	36905 (34.09)	55496 (36.50)	YES	0.001
6.	Percentage of patients with hyperlipidaemia with recorded LDL cholesterol ≥ 4.1 mmol/L in the last 12 months	16448 (45.02)	24687 (42.36)	YES	0.001
7.	Percentage of patients with T2DM with recorded LDL cholesterol ≥ 4.1 mmol/L whom were prescribed statin therapy in the last 12 months	1433 (64.48)	1797 (62.76)	NO	0.320
8.	Percentage of patients older than 18 with recorded smoker's status	567732 (17.92)	570874 (26.70)	YES	0.001
9.	Percentage of body weight measurements recorded in the last 12 months with obese patients (BMI ≥ 30 kg/m^2)	26997 (36.79)	34432 (29.19)	NO	0.001

Table 2: Trend of indicators before and after CVRAM training workshop

CVRAM: CardioVascular Risk Assessment and Management, BP: blood pressure; LDL: low-density lipoprotein, T2DM: type 2 diabetes mellitus, BMI: body mass index.

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Table 3: The achievement of target values for outcome indica- tors - comparison before and after CVRAM training workshop

Indicator % of patients with target values (± SD)			p value
	Baseline	Post training	
BP<140/90mmHg	82.12 ± 15.81	84.49±12.71	0.001
HbA1c < 7 %	82.64 ± 26.75	85.49±24.55	0.001
LDL cholesterol	54.98 ± 20.33	57.64±16.66	0.001

CVRAM: CardioVascular Risk Assessment and Management, BP: blood pressure; LDL: low-density lipoprotein, BMI: body mass index

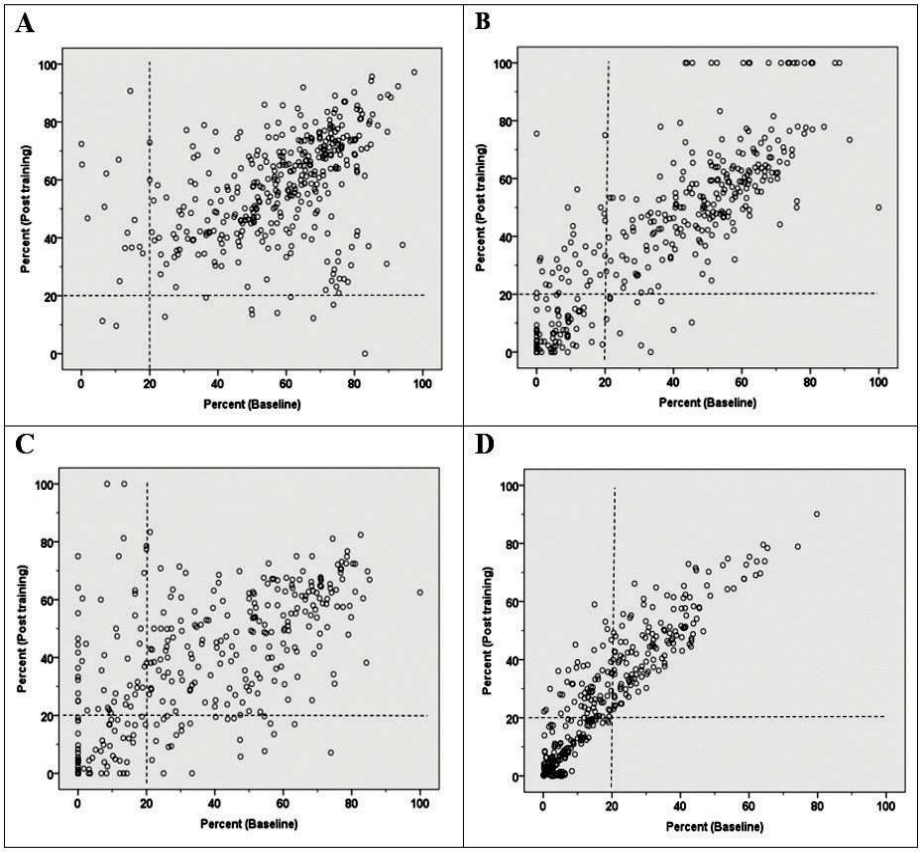

Figure 1: The number of FMTs that recorded the BP (A), HbA1c (B), LDL cholesterol (C) and to- bacco smoking status (D) in a range less than 20 % before and after CVRAM training.
FMT: family medicine team; BP: blood pressure; LDL: low-density lipoprotein; CVRAM: CardioVascu- lar Risk Assessment and Management.

Discussion :

The American Society for Preventive Cardiology has listed ten essential cardiovascular risk factors in this study, highlighting the importance for primary health care professionals to address multiple risk

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factors in patients.(10) Healthcare authorities in our country mandated Family Medicine Teams to record patient data in an electronic medical system, necessitating evaluation and documentation of CVD risk factor control and care quality in patient registries. These databases have offered the initial examination and monitoring.(11)
Consisting of well-informed patients improving CVD risk factor control through healthy lifestyle choices. Patient databases containing information on individuals with hypertension, diabetes, and cardiovascular disease risk factors have been added to electronic health records and are regularly updated. These databases assist in monitoring and managing these patients. The process of putting into practice clinical guidelines for non-communicable chronic diseases in RS began in 2004. Since then, multiple revisions of the guidelines have been made according to the newest advice from appropriate professional groups. The CVRAM training workshop introduced new guidelines on hypertension, DM, and hyperlipidaemia. (12-14)The research in RS/B&H also examined the significance of implementing guidelines at primary and secondary levels.
The study's findings indicated a reduction in hypertensive patients with fluctuating BP levels following the CVRAM training workshop.(7,15) The majority of patients with high blood pressure had their BP well managed, and the percentage of those who reached their target values increased significantly following the training workshop for Family Medicine Trainees.
The findings of this research indicated a reduction in the amount of hypertensive individuals with unstable blood pressure readings following participation in the CVRAM training session. The majority of patients with high blood pressure had their BP controlled well, and the percentage of those who reached target values significantly increased following the training workshop for FMTs. Likewise, Aguilar-Palacio in their research, discovered that over 50% of patients had a normal blood pressure, however, the rise in BMI negatively impacted blood pressure management. The proportion of hyperlipidaemia patients who had their LDL cholesterol levels checked in the past year rose, while the proportion of hyperlipidaemia patients with LDL cholesterol ≥ 4.1 mmol/L in the past year dropped following the training workshop. The enhancements demonstrated that the CVRAM training workshop motivated FMTs to adopt guidelines, providing a distinctive strategy for cardiovascular risk patients. However, the number of patients receiving treatment following the hyperlipidemia guideline fell short of expectations.
Klimchak and colleagues discovered that over half of the population sampled in the United States were not being treated with statins, despite a high prevalence of atherosclerotic cardiovascular disease. (17) In a separate study, dyslipidemia was identified as the most common risk factor for diabetic patients, leading to an increase in the number of patients on statin therapy. However, approximately one third of patients were able to achieve normal levels of LDL and HbA1c, indicating a strong connection between a diabetes diagnosis and poor dyslipidemia control. (16)

Family physicians around the globe are faced with a difficult challenge. Low income countries have been dealing with issues such as a lack of socioeconomic status, urbanization, cultural factors, and social determinants like poverty, illiteracy, and ignorance, along with the challenges of traditional medicine. Most people in wealthy nations live in cities and are exposed to various controllable risk factors for cardiovascular disease.(18-20) A worldwide demand exists for increased adherence to suggestions and enhanced adoption of guidelines. In this study, it has been noted that there is a necessity for better documentation of obese patients' body weight values both before and after the training event. (21)
Training approaches need to be tailored to the various abilities of healthcare practitioners, in alignment with the obesity guideline rollout. Educational initiatives played a crucial part in bolstering the identification of tobacco use, mirroring the situation in Spain where healthcare professionals stepped

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up screening for cardiovascular risk factors post educational intervention. Enhanced recording of risk factors led to improved clinical outcomes.(23) Continuing education on smoking cessation for healthcare professionals and patients is essential. CVRAM training improved guideline implementation, aligning with results from a systematic review of 38 randomised control trials. (6) Gil-Guillén et al observed increased screening of cardiovascular risk factors after an educational intervention in primary health care.(22)

This research demonstrated that providing educational intervention along with fully following clinical guidelines was especially successful for Family Medicine Trainees with poor performance on indicators during the initial assessment. These FMTs experienced significant benefits from the intervention, which greatly impacted their handling of cardiovascular risk factors and chronic diseases.

In the six-month period, BP values decreased in the sample, with 74.3% of patients showing improved hypertension control.(24) Monitoring of BP, HbA1c, LDL, and BMI levels, tobacco use, and utilizing training programs and clinical guidelines serve as a solid foundation for organizing preventive measures and enhancements in managing cardiovascular risk factors and CVDs. Widespread adoption of medical education continues, but changes to the training structure need to be thought about. A significant drawback of this study is that the observed FMTs did not receive training simultaneously. The training duration was one year, allowing early-trained FMTs almost two years for implementing knowledge and recommendations, while later-trained FMTs had only one year for these activities. (25) Subgroups were not compared in this study. The research was conducted without including a control group, which was an additional constraint. Utilizing an alternative research structure, like a quasi-experimental study with a control group, may enhance the robustness of these results. Nevertheless, the research has multiple advantages: it is, to our understanding, the initial study to assess how FMT short training workshops impact the cardiovascular risk evaluation.

Conclusion

The CVRAM training workshop and implementing clinical guidelines greatly helped improve the documentation of process indicators and reach the desired levels for BP, HbA1c, and LDL. Attending a brief training workshop for FMTs on evaluating and treating cardiovascular risks can enhance their performance and healthcare results for patients with CVD and related risk factors. Training programs should be customized for specific groups of FMTs according to their needs, achievements, and current guidelines. Providing universal education to all field maintenance technicians (FMTs) on its own may result in minor enhancements in quality control. However, to achieve more significant improvements in quality, it might be necessary to integrate various approaches.

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