RESEARCH ARTICLE

Prevalence of Fibromyalgia Syndrome Among a Sample of Iraqi Patients with Coronary Artery Disease at AL-Kindy Teaching Hospital

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MBChB. MSc. Histopatholog Correlation of EBV-LMP immune markers expression with the clinicopathological parameters of gastric adenocarcinoma by using immunohistochemistry y/Uruk University-College of dentistry/Baghdad/Iraq

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Abstract: *Background:* Fibromyalgia (FM) is a chronic disorder characterized by widespread musculoskeletal pain, fatigue, and cognitive dysfunction, often coexisting with other chronic conditions such as coronary artery disease (CAD). Emerging evidence suggests a potential association between FM and CAD, possibly mediated by shared mechanisms like systemic inflammation and autonomic dysfunction. This study aimed to evaluate the prevalence of FM among Iraqi patients with CAD and explore its associations with socio-demographic, clinical, and lifestyle factors. Patients and Methods: A cross-sectional study was conducted at Al-Kindy Teaching Hospital from October 2024 to April 2025, involving 160 CAD patients aged 40–80 years. FM was diagnosed using the 2016 ACR criteria, including the Widespread Pain Index (WPI) and Symptom Severity Scale (SSS). Data on demographics, chronic diseases, occupation, and lifestyle factors were collected via structured questionnaires. Statistical analysis was performed using SPSS version 27. Results: The prevalence of FM among CAD patients was 29.38% (n = 47). Females exhibited a higher prevalence of FM (36.11%) than males (27.42%), although the association was not statistically significant (p = 0.554). The highest proportion of FM cases occurred in the 46–60 age group (53.2%). A significant association was found between FM and occupation (p = 0.040), with manual workers, retirees, and housewives being more affected. Chronic diseases were also significantly associated with FM (p = 0.027). No significant associations were observed with CAD status (p = 0.958), smoking (p = 0.911), or marital status (p = 0.809). Conclusion: FM is prevalent among Iraqi CAD patients, particularly in middle-aged individuals, females, and those with physically demanding occupations or chronic comorbidities. These findings underscore the need for integrated management strategies that address both conditions. Further large-scale studies are recommended to validate these associations and explore underlying mechanisms.

Keywords: Fibromyalgia syndrome; Iraqi patients; coronary artery disease; AL-Kindy Teaching Hospital.

INTRODUCTION

Fibromyalgia (FM) is a chronic disorder characterised by widespread musculoskeletal pain, fatigue, sleep disturbances, and cognitive dysfunction. It primarily affects women and is often associated with psychiatric comorbidities such as depression and anxiety (6). The pathophysiology of FM is complex and involves central sensitisation, dysregulation of pain processing, and dysfunction of the autonomic nervous system (7). Multiple epidemiological studies have demonstrated that FM is significantly prevalent worldwide, with regional and sociocultural variations (8,9). Likewise, poor sleep quality has been reported by FM patients, which contributes to pain perception and overall disability (14).

Fibromyalgia (FM) and coronary artery disease (CAD) are significantly correlated in current studies, with CAD patients having a higher chance of developing FM (1,2). This elevated risk may be attributed to several possible processes, including chronic inflammation, endothelial dysfunction, increased sympathetic nervous system activation, and poor sleep quality (3,4). Together, all of these factors improve cardiovascular stress, which may make CAD patients more at risk for FM.

Cardiovascular illness and FM are both known to exhibit sympathetic hyperactivity. Research has demonstrated how elevated sympathetic drive contributes to arterial stiffness, myocardial ischemia, and hypertension—all of which are linked to the advancement of FM (3). Further increasing the risk of FM are chronic pain and stress, two characteristics of IHD that can worsen autonomic dysfunction and raise FM (3,14). Another meaningful connection between FM and CAD is systemic inflammation.

So, FM patients have been found to have elevated levels of pro-inflammatory cytokines, including tumour necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6) (5). These inflammatory mediators raise the risk of ischemic heart events by promoting endothelial dysfunction and the development of atherosclerotic plaque (6). Furthermore, insulin resistance and dyslipidaemia are two coexisting metabolic syndrome components that patients with CAD frequently present

with, increasing their risk of FM (7,8). Patients with FM also frequently experience sleep disturbances. Because poor sleep is linked to elevated blood pressure, impaired glucose metabolism, and endothelial dysfunction, a systematic review has found that it significantly contributes to the progression of FM (4). Sleep apnoea and non-restorative sleep are common in FM patients (14). Additionally, FM patients have a high prevalence of psychological comorbidities like anxiety and depression (6). Because depression affects autonomic function, inflammation, and unhealthy lifestyle choices, it has been independently linked to higher cardiovascular morbidity and mortality (6). Because of their chronic pain and exhaustion, those suffering from FM frequently show a reduced capacity for physical activity.

Aim of current Study: To evaluate the relationship between fibromyalgia and coronary artery disease, with a focus on shared risk factors, disease mechanisms, and potential implications for clinical management.

Patients and Methods: A cross-sectional, retrospective, analytic study was conducted in Baghdad, Iraq, at Al-Kindy Teaching Hospital, to assess the prevalence of Fibromyalgia Syndrome (FMS) among patients with coronary artery disease (CAD) during the period from October 2024 to April 2025.

Patients & sample size: The study population was 160 patients diagnosed with coronary artery disease from Al-Kindy Teaching Hospital.

Inclusion criteria: the study included patients attuned to Al-Kindy teaching hospital with coronary artery disease via angiography, from age 40-80 yrs and of each sex were included in the patient group

Exclusion criteria: 1-younger than 40 years old; 2-incomplete information

Data Collection: Data was collected from patients by answering a questionnaire during interviews. The First station was a questionnaire structured and contained 4 questions and was developed after an extensive literature review, comprising sections on demographic information. The first three items assessing personal data (age, sex, marital status, Occupation and educational status)

And the second section asks about medical history (ischemic heart diseases, chronic diseases such as Hypertension, Diabetes, thyroid disorders, lipid disorders and kidney disease). The following section discusses Fibromyalgia symptoms, using the Widespread Index (WPI) and Symptom Severity Scale (SSS) questions.

This information has been collected using an organising questionnaire according to the ACR.

Ethical consideration: The study was approved by the Ethical and Scientific Committee of the Community and Family Medicine department at Al-Kindy College of Medicine. Participants' involvement was voluntary. Before data collection, informed consent was sought from all participants. The privacy of the collected data was maintained. Diagnosis of fibromyalgia has been made based on using the WPI and SSS scores, based on the ACR 2016 criteria."

Statistical analysis: The collected data were statistically analyzed using the Microsoft Excel 365 application, along with IBM SPSS software version 27, and presented in the form of frequencies, percentages, means, standard deviations, ranges, tables, and charts. Pearson's Chi-square test was used to assess the significance of the difference between percentages (qualitative data), and statistical significance was considered when the P-value was equal to or less than 0.05.

RESULTS:

The study included a total of 160 participants, with 124 males (77.5%) and 36 females (22.5%). Among those diagnosed with fibromyalgia (FM), 34 were males (27.42%), while 13 were females (36.11%), indicating a slightly higher prevalence of FM among females. The highest proportion of FM patients was in the 46-60 years age group, where 25 out of 47 individuals with FM (53.2%) belonged to this category. This suggests that FM is more common among middle-aged individuals with coronary artery disease.

1. Prevalence of Fibromyalgia
Among the 160 participants, 29.38% (n = 47) met the diagnostic criteria for fibromyalgia, as determined by the Widespread Pain Index (WPI) and Symptom Severity Scale (SSS).
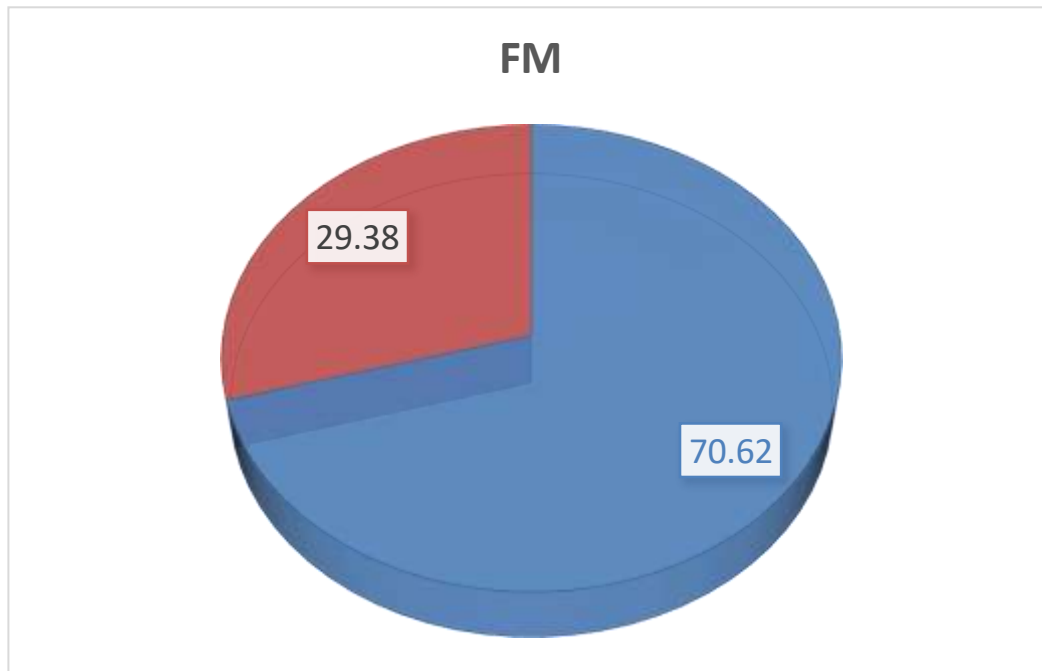
FM

29.38

70.62

Figure (1): prevalence of fibromyalgia in CAD patients

Table (1): prevalence of Fibromyalgia in CAD patients

Percentage	Frequency(n)	Fibromyalgia Diagnosis
70.62%	113	No
29.38%	47	Yes
100%	160	Total

2. Socio-demographic characteristics and Fibromyalgia

Age with Fibromyalgia:

The highest proportion of FM cases was observed among participants aged 46-60 years (25 out of 82, 30.49%), followed by those over 60 years (14 out of 41, 34.15%). Participants aged 31-45 years had a lower prevalence (8 out of 36, 22.22%).
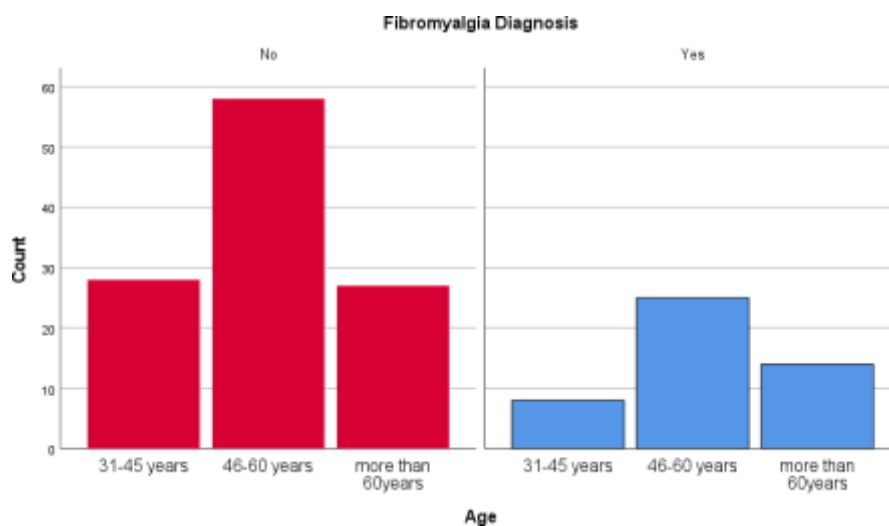
Figure (2): association between age and Fibromyalgia

A chi-square test showed no significant association between age and FM ($\chi^2 = 1.803$, p = 0.614).

Gender with Fibromyalgia:

Females had a higher proportion of FM cases (13 out of 36, 36.11%) compared to males (34 out of 124, 27.42%)
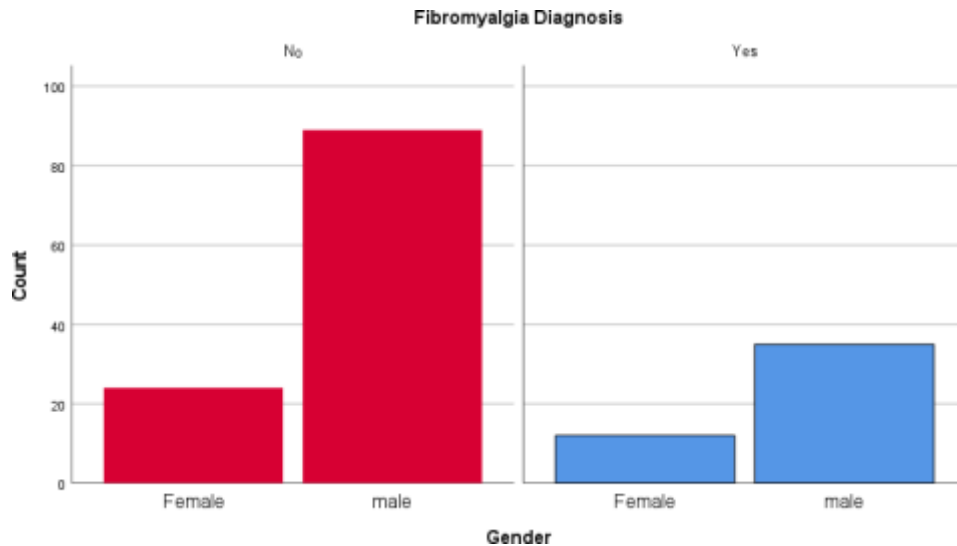
Figure (3): Association between Gender and Fibromyalgia

The chi-square test indicated no significant association between gender and FM ($\chi^2 = 0.506$, p = 0.554).

Occupation and Marital Status with Fibromyalgia:
The majority of participants in both groups were married, with 82% of FM patients and 84% of non-FM patients being married. The proportion of unmarried participants was slightly higher in the FM group (18%) compared to those without FM (16%). However, statistical analysis showed no significant association between marital status and FM (p > 0.05), indicating that marital status is not a determining factor for FM in CAD patients.

Table (2): association between Marital status and Fibromyalgia

Marital status	No Fm	Fm	Total
Married	102	43	145
Unmarried	11	4	15
Total	113	47	160

According to chi-square result, there is no significant association between marital status and fibromyalgia (0,809). P>0.05. Regarding employment status, 37% of FM patients were employed, compared to 33% in the non-FM group. The most common occupations among FM patients included manual workers, housewives, and retired individuals. While housewives and retired individuals had a slightly higher prevalence of FM, the Chi-Square Tests table yielded the following results: The p-value (0.040) is less than 0.05, indicating a statistically significant association between occupation and fibromyalgia. also, this means that fibromyalgia prevalence differs significantly among different occupational groups.
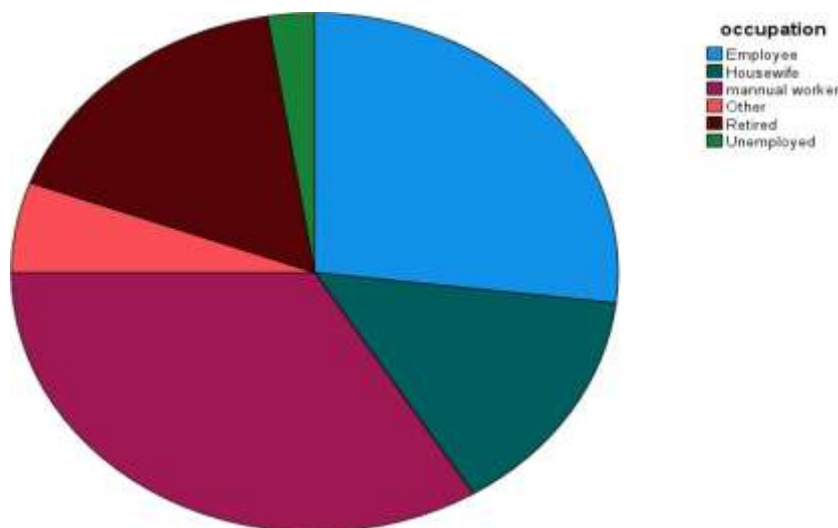

Figure (4): occupation distribution

Table (3): Association between Occupation and Fibromyalgia

Occupation	No Fm	Fm	Total
Employee	30	13	43
Manual worker	42	12	54
Retired	17	10	27
Unemployed	1	3	4
Housewife	18	5	23
Other	5	4	9
Total	113	47	160

Chronic Disease and Fibromyalgia:
FM was slightly more prevalent among participants with chronic diseases (36 out of 121, 29.75%) compared to those without chronic diseases (11 out of 39, 28.21%).

Table (4): association between chronic disease and Fibromyalgia

Total	Fm	No Fm	Chronic Disease
39	11	28	No
121	36	85	Yes
160	47	113	Total

A chi-square test revealed a significant association between chronic disease and FM (p = 0.027).

4. Coronary artery disease and Fibromyalgia:

Table (5): association between CAD and Fibromyalgia

Total	Fm	No Fm	CAD status
0	0	0	no
160	47	113	Yes
160	47	113	Total

The chi-square test showed no significant association between CAD and FM, p=0.958.

5. Lifestyle Factors and Fibromyalgia:

Smoking and Fibromyalgia:
Smokers had a slightly higher prevalence of FM (29 out of 93, 31.18%) compared to non-smokers (18 out of 67, 26.87%).
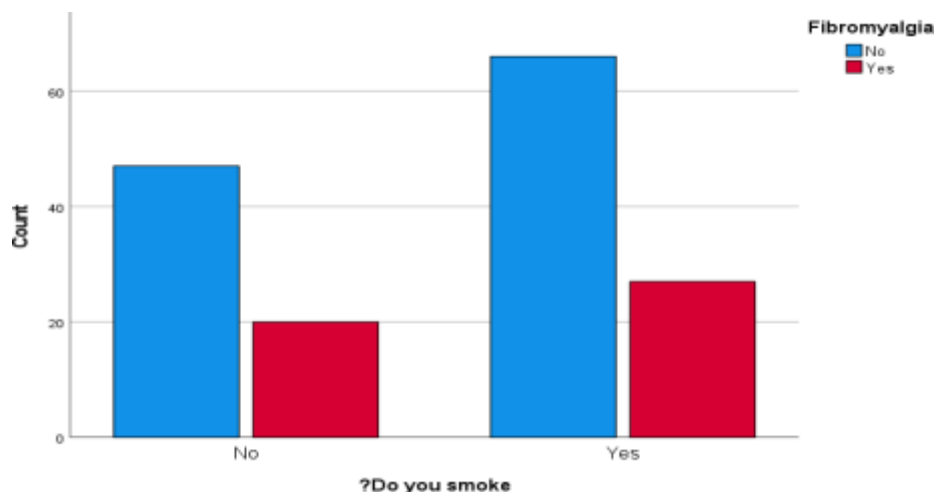

Figure (5): association between smoking and Fibromyalgia

The chi-square test showed no significant association between smoking and FM (p = 0.911).

6. Pain and Fibromyalgia Symptoms:

Widespread Pain and Pain Severity; 41.25% of participants (n = 66) reported experiencing widespread pain for at least three months. Among them, 25.33% rated their pain as 7, 24% rated it as 8, and 16% rated it as 10 on a visual analogue scale

DISCUSSION

This study aimed to assess the prevalence of fibromyalgia (FM) in patients with coronary artery disease (CAD) and explore its associations with various socio-demographic, lifestyle, and clinical factors. A total of 160 participants were included, with 47 individuals (29.38%) diagnosed with FM. The prevalence of FM in this study was higher among females (36.11%) compared to males (27.42%), which is consistent with numerous studies that have reported a higher incidence of FM in women [1& 2].

Previous research has suggested that hormonal differences, genetic factors, and differences in pain perception may contribute to this gender disparity, although the exact mechanisms remain unclear [3&4]. However, the chi-square test for gender showed no significant association between gender and FM (χ^2 = 0.506, p = 0.554), suggesting that gender alone may not be a substantial determinant of FM in CAD patients in this cohort.

The age distribution in FM patients revealed that the highest proportion of FM cases was observed in the 46-60 years age group (53.2%). This result aligns with previous research suggesting that FM is more prevalent among middle-aged individuals [5&6].

Notably, the chi-square test revealed no significant correlation between age and FM (χ^2 = 1.803, r = 0.614), despite the greater incidence of FM observed among the 46–60 age group. The in comparison small sample size of FM patients in the study may be a reason for the absence of statistical significance among different age groups, or it may indicate that while FM is more common in certain age groups, other factors might play a more prominent role in the development of FM among CAD patients.

One interesting finding from this study was the significant association between occupation and the prevalence of FM. Participants who were manual workers, housewives, or retirees had higher prevalence rates of FM compared to employed individuals (p = 0.040). This suggests that occupation may influence the development of or reporting of FM symptoms. Physically demanding jobs, such as those in manual labour, may exacerbate the musculoskeletal pain associated with FM. Additionally, housewives and retirees may experience a different set of stressors that could contribute to the onset or exacerbation of FM, such as a lack of physical activity, social isolation, or increased psychological stress. This is in line with previous studies showing that occupation and physical activity levels can significantly impact FM symptomatology [7&8].

Although marital status did not show a significant association with FM in this study (p = 0.809), it is worth noting that most participants in both the FM and non-FM groups were married, with only a small percentage of individuals being unmarried. While social support from a spouse or partner may play a role in the quality of life for FM patients, it may not directly influence the prevalence of FM itself. Previous studies on the relationship between marital status and FM have yielded mixed results, with some suggesting that social support can enhance the well-being of FM patients. In contrast, others have found no significant effect on FM diagnosis [8&9].

The relationship between chronic diseases and FM was another important focus of this study. FM was slightly more prevalent among participants with chronic diseases (36 out of 121, 29.75%) compared to those without chronic diseases (11 out of 39, 28.21%). The chi-square test revealed a significant association between chronic disease and FM (p = 0.027), indicating that CAD patients with other comorbidities are at a higher risk for FM. Chronic diseases, such as CAD, have been shown to contribute to increased inflammation, autonomic dysfunction, and pain sensitisation, which may be key mechanisms that predispose individuals to FM. This finding supports previous studies linking FM to other chronic conditions, including cardiovascular disease [10&11]. Furthermore, a bidirectional relationship may exist, where the presence of FM could exacerbate cardiovascular symptoms and vice versa [12].

Interestingly, no significant association was found between CAD and FM (p = 0.958) in this study. While it is known that FM and CAD often coexist in the same patient population, CAD may not directly contribute to the development of FM. This finding suggests that while the two conditions may share common risk factors such as inflammation and autonomic dysfunction, CAD itself may not be a determining factor in the onset of FM. This finding aligns with the results of previous studies, which have reported a higher prevalence of FM in CAD patients, but did not confirm a direct causal relationship [13 & 14].

The role of smoking in FM development was also explored in this study. Smokers had a slightly higher prevalence of FM (31.18%) compared to non-smokers (26.87%), but the chi-square test indicated no significant association between smoking and FM (p = 0.911). Smoking has long been associated with increased inflammation and pain sensitivity, which could potentially contribute to FM symptoms. However, as suggested by previous studies, the direct relationship between smoking and FM remains unclear, with some studies reporting a positive association while others do

not [15&16]. It is possible that other factors, such as the severity of smoking or the duration of smoking, may play a role in the development of FM symptoms, warranting further investigation in future studies.

Another key aspect of the study was the evaluation of pain and FM symptoms. Among the participants, 41.25% reported experiencing widespread pain for at least three months, with the majority rating their pain intensity as high (7-10 on a visual analogue scale). This is consistent with the hallmark symptoms of FM, which include widespread pain, fatigue, and sleep disturbances. The presence of chronic pain and its severity are central to the diagnosis and management of FM, and understanding these factors is essential for improving patient outcomes. It is noteworthy that patients with FM often experience not only physical pain but also significant psychological distress, including anxiety and depression, which can further complicate the management of both CAD and FM [17&18].

Conclusion: There is a high prevalence of fibromyalgia (FM) among patients with coronary artery disease (CAD). Patients with CAD and comorbid FM were more likely to be middle-aged or older, female, and reported higher levels of psychological distress, particularly anxiety and depression. FM was also more common among individuals engaged in physically demanding occupations and those with chronic diseases. Additionally, patients with CAD and FM experienced widespread pain and had a higher burden of symptoms that could impact their overall quality of life.

Recommendation: For future research, it is recommended that similar studies be conducted on a larger scale with a more diverse sample to obtain a more comprehensive and accurate evaluation of the relationship between fibromyalgia (FM) and coronary artery disease (CAD). Expanding the study population will enhance the generalizability of findings and provide deeper insights into the contributing factors of FM in CAD patients. Additionally, improving the efficiency of data collection through stronger collaboration between research teams and local hospitals can ensure better participant engagement and more reliable results.

Limitation:
1- The sample size was relatively small
2- The study was conducted in a single hospital
3- Diagnosis was based on patient records without direct clinical examination
4- The short data collection period may not reflect long-term changes in patients' conditions.
5- Fibromyalgia symptoms may overlap with other chronic conditions, which can make diagnosis and differentiation challenging.

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