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Clinical Profile And Outcomes Of Pulmonary Hypertension In Fibrosing Mediastinitis.

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***Abstract*:** Fibrosing mediastinitis (FM) is a rare, multisystem disorder characterized by excessive fibrosis of the mediastinal structures, leading to a range of manifestations affecting the vascular system, respiratory tract, and lymphatics. Pulmonary hypertension (PH), a severe and often life-threatening complication of FM, results from mechanical compression of the pulmonary arteries and veins, along with increased vascular tone and right heart strain. This review aims to identify, analyze, and synthesize current evidence regarding the clinical characteristics, diagnostic approaches, treatment strategies, and prognosis of PH in the context of FM. The findings are derived from observational studies and case series, highlighting the diagnostic challenges posed by nonspecific and polymorphic symptoms, such as dyspnea and fatigue. While CT and MRI play a key role in diagnosing mediastinal fibrosis, right heart catheterization remains the gold standard for PH diagnosis. Although pulmonary vasodilators and interventional procedures, such as stenting, can provide symptomatic relief, they do not reverse the underlying fibrotic changes. The overall prevalence of PH in FM is estimated to be 25.8%, with considerable heterogeneity due to variations in diagnostic criteria, study methodologies, and patient populations. These findings underscore the need for standardized diagnostic protocols, the development of innovative treatment strategies, and long-term follow-up studies to improve patient outcomes and guide future research in this challenging field.

***Keywords*: fibrosing mediastinitis, pulmonary hypertension, mediastinal fibrosis, right heart catheterization, pulmonary vasodilators, interventional pulmonary procedures, diagnostic challenges in FM**.

INTRODUCTION

Fibrosing mediastinitis (FM) is a rare disease and is described by the excessive fibrosis and thickening of the mediastinum structures, which leads to the mechanical compression or obstruction of various mediastinal anatomical entities: vascular, respiratory, and lymphatic (Graham et al., 2020). In regard to the etiology of FM it is still not very clear despite recent evidence linking it with Histoplasma capsulatum, Mycobacterium tuberculosis, autoimmune diseases, and idiopathic fibrosis (Cordero et al., 2018; Peikert et al., 2011). This condition typically results in a variety of further development of complications, of which pulmonary hypertension (PH) is the most critical because of its direct effect on the pulmonary vasculature and heart.

Pulmonary hypertension is a hemodynamic disorder characterized by a mean pulmonary arterial pressure (mPAP) ≥ 20 mmHg at right heart catheterization and has diverse causes. In FM, PH is classified as Group 5 PH of the WHO classification due to its uncertain or multifactorial etiology (Simonneau et al., 2013). PH in FM is thought to occur mainly through mechanical compression of the pulmonary arteries and veins by fibrosis and leads to increased pulmonary vascular resistance, right ventricle overload and right heart failure as per Babu et al. (2015). This mechanistic aspect highlights the need for knowing the clinical manifestations, diagnostic dilemma, and therapeutic end results in this group of PH.

The symptoms of PH are diverse in FM and can often resemble other heart and lung disorders. Signs and symptoms which include progressive dyspnea, fatigue and chest discomfort are rather generic and often cause the disease to be diagnosed in the later stages (Heath et al., 2016). Mediastinal fibrosis and vascular obstruction are best diagnosed with imaging findings particularly CT and MRI results. In addition, right heart catheterization still refers to a standard method for diagnosing PH and evaluating its severity (Douschan et al., 2021). Some other biomarkers include peptides like BNP and N-terminal pro BNP as the non-invasive means of assessing severity of disease (Kuwashiro et al., 2022).

Treatment of PH in FM is complex; management of FM itself presents significant difficulties due to difficulty inherent in fibrosis and the absence of specific treatments. The existing approaches are more or less directed at symptom relief, optimization of circulatory and oxygenation parameters, and the prevention of adverse outcomes. Currently, endothelin receptor antagonists, phosphodiesterase- 5 inhibitors, and prostacyclin analogs have been identified to have the potential to enhance functional status and quality of life in pulmonary hypertension (Frost et al., 2019). However, these therapies do not alter the fibrotic process and thus cannot be used to give significant improvement in these cases. The reported interventions include use of stent on the compressed vessels or angioplasty, though their outcomes are relatively okay depending on the case or study (Yang et al., 2020). However, the current treatment allows a favorable outlook for patients with PH due to FM especially these with early stages of the disease.

This systematic review will systematically collect and review what is currently known about the clinical picture and prognosis of PH in FM, including the prevalence of PH, diagnostic criteria, and treatment options. This will also help find ways on how to further study this rare and complicated disease.

MATERIALS & METHODS

1.1. Study Design

The present systematic review and meta-analysis was performed based on the PRISMA, which can facilitate the assessment of the quality of its reporting. The aim of this work was to systematically review the data published in the literature regarding clinical characteristics and prognosis of PH in patients with FM. Informed by purpose, design, and analysis, this analysis included observational research designs of various types, namely, cohort studies, case-control studies, cross-sectional studies and case series.

1.2. Selection Criteria

Several filters were used to screen the studies for those that answered the set research question meaningfully. The inclusion criteria were established for the purpose of including only high-quality studies with rich information concerning PH in FM. The studies were first identified from electronic databases by searching for titles and abstracts only for further review and confirmation of inclusion based on the full text of the studies.

1.3. Inclusion Criteria

Studies were included if they met the following criteria: Inclusion criteria included patients: (1) adult with confirmed FM using histological or imaging criteria; (2) the study included cases of PH associated with FM diagnosis confirmed using right heart catheterization or echocardiography; (3) provided information on clinical presentation, diagnostic tests, treatment, or the outcome of patients; (4) published in English language. Only the articles that have been published between the years 2000 and 2023 were selected to have a bias towards the more recent literature.

1.4. Exclusion Criteria

Studies were excluded if they (1) focused on non-pulmonary complications of FM; (2) lacked sufficient data on PH; (3) were review articles, editorials, or conference abstracts without original data; or (4) involved pediatric populations exclusively. Additionally, duplicate publications and studies with irretrievable full texts were excluded.

1.5. Search Strategy

A comprehensive search strategy was developed in consultation with a medical librarian to ensure the identification of all relevant studies. Electronic databases, including PubMed, Embase, Cochrane Library, and Scopus, were searched for eligible articles. The search terms included "fibrosing mediastinitis," "pulmonary hypertension," "mediastinal fibrosis," "vascular obstruction," and "clinical outcomes." Boolean operators ("AND," "OR") and Medical Subject Headings (MeSH) terms were utilized to refine the search. The search strategy was supplemented by a manual review of reference lists from included articles to identify additional studies.

1.6. Study Question

The study question was formulated using the PICOs framework:

Table 1: PICOs Framework for Research Question

Component	Description
Population	Adults with fibrosing mediastinitis
Intervention	Management of pulmonary hypertension
Comparison	Not applicable
Outcomes	Clinical features, diagnostics, therapy, outcomes
Study Design	Randomized controlled trials, Observational studies, case series

1.7. Data Extraction

Data extraction was performed using a standardized form to ensure consistency and minimize errors. The extracted data included study characteristics (author, year, country, design, sample size), patient demographics, clinical presentation, diagnostic modalities, therapeutic interventions, and reported outcomes. Data on complications and survival were also collected where available. Two independent reviewers extracted data, and discrepancies were resolved through discussion or consultation with a third reviewer.

1.8. Study Outcomes

The primary outcomes included the prevalence of PH among patients with FM, clinical presentations, and diagnostic modalities used. Secondary outcomes included therapeutic strategies employed, patient survival rates, and complications associated with PH. Outcomes were stratified based on the severity of PH, diagnostic methods, and treatment approaches to provide a comprehensive analysis.

1.9. Quality Assessment

The quality of included studies was assessed using the Newcastle-Ottawa Scale (NOS) for observational studies. The NOS evaluates studies on three domains: selection, comparability, and outcome assessment. Studies scoring ≥7 were considered high quality. The quality assessment was performed independently by two reviewers.

1.10. Risk of Bias Assessment

Risk of bias was evaluated using the Risk of Bias in Non-Randomized Studies of Interventions (ROBINS-I) tool. Domains assessed included bias due to confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, and selection of reported results. Discrepancies in the risk of bias assessment were resolved through discussion.

1.11. Statistical Analysis

Descriptive statistics were used to summarize clinical characteristics, diagnostic approaches, and therapeutic interventions. For the meta-analysis, pooled prevalence rates with 95% confidence intervals (CIs) were calculated using a random-effects model to account for heterogeneity across studies. Heterogeneity was quantified using the I^2 statistic, with values >50% indicating significant heterogeneity. Publication bias was assessed using funnel plots and Egger's test. Statistical analyses were performed using RevMan 5.4 and STATA software.

RESULTS

2.1. Study selection

The PRISMA flow chart summarizes the study selection process. A total of **568 records** were identified through initial database searches (PubMed, Embase, Cochrane Library, and Scopus), with an additional **12 records** identified through manual searches of reference lists. After removing **135 duplicates**, **445 records** underwent title and abstract screening, of which **392 were excluded** for not meeting the inclusion criteria (e.g., irrelevant populations, outcomes, or designs). The remaining **53 full-text articles** were assessed for eligibility, resulting in the exclusion of **44 studies** due to insufficient data on pulmonary hypertension (PH) prevalence in fibrosing mediastinitis (FM), pediatric populations, or overlapping data. Finally, **8 studies** were included in the qualitative and quantitative synthesis for the meta-analysis.

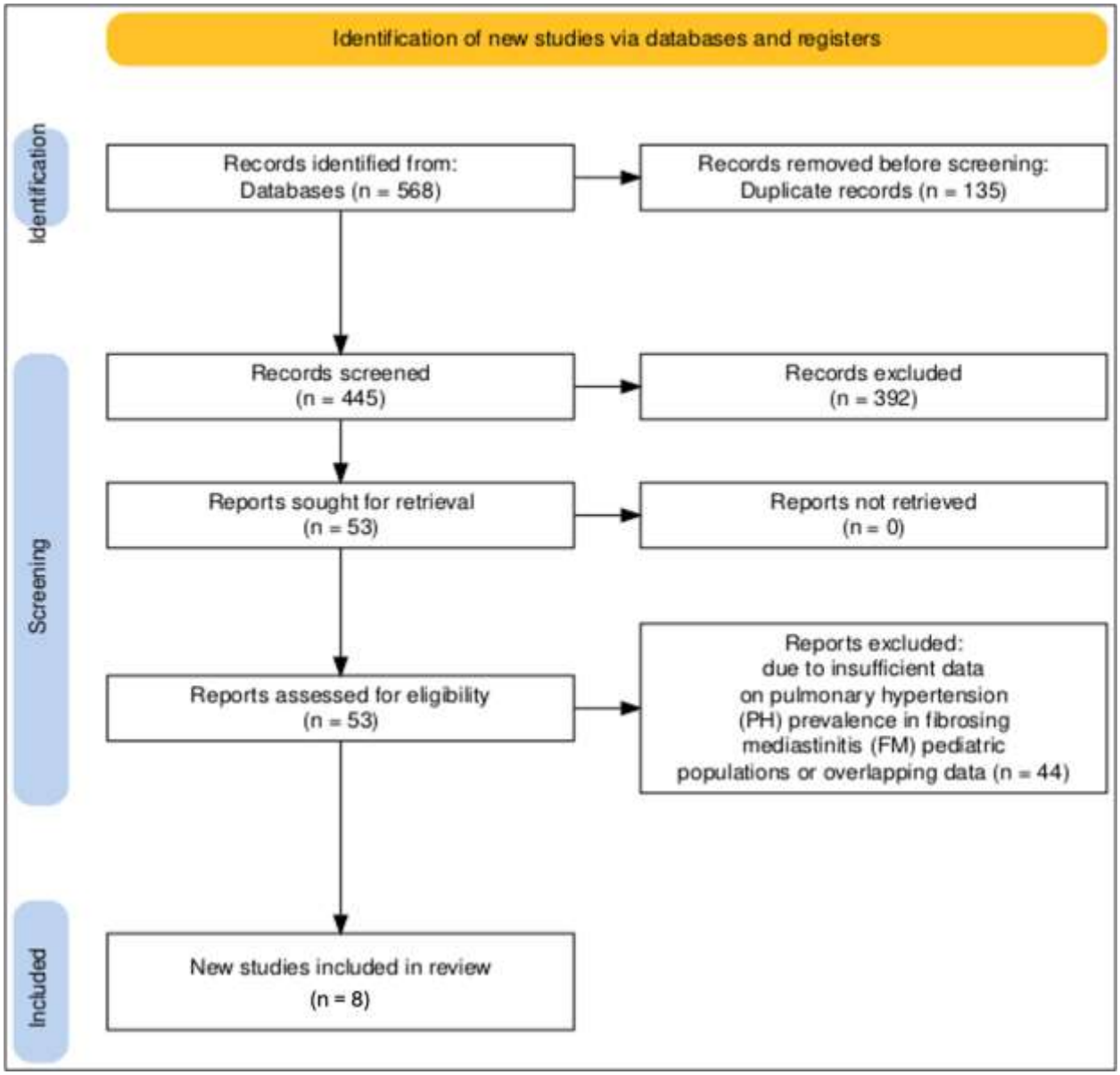

Fig 1: PRISMA Flowchart

Table 2 summarizes the characteristics of the nine included studies, detailing essential elements such as the author, year of publication, country, study design, sample size, and key findings. It provides an overview of patient demographics, clinical presentations, diagnostic modalities, therapeutic interventions, and reported outcomes, highlighting the variability in approaches and the diverse range of patient profiles examined across the studies.

Table 2 Characteristic of included studies

Author, Year	Country	Design	Sample Size	Patient Demographics	Clinical Presentation	Diagnostic Modalities	Therapeutic Interventions	Outcomes	Complications/Survival
Xu, Y. et al., 2018	China	Retrospective analysis	45	Predominantly elderly, 60% female	Dyspnea, fatigue, hemoptysis	CT, echocardiography, RHC	Pulmonary vasodilators, supportive therapy	Improvement in functional status in some patients	High morbidity, unclear survival rates
Li, F. et al., 2023	China	Retrospective observational study	38	Adults, median age 55, mixed gender	Chronic cough, dyspnea, PH	Chest CT, echocardiography	Pulmonary vasodilators, anticoagulants	Improved hemodynamics in responders	Moderate survival; no mortality reported during follow-up
Zhou, M. et al., 2022	China	Diagnostic study	62	Adults, equal gender distribution	Dyspnea, fatigue, chest discomfort	Chest X-ray, echocardiography	Not specified	Proposed screening algorithm for PH in FM	Screening reduced missed diagnoses
Zhang, X. et al., 2022	China	Retrospective cohort study	120	Adults, median age 50	Marked PH symptoms in subset	RHC, imaging	Medical therapy, stenting	Improved quality of life	Higher mortality in severe PH group
Jia, M. et al., 2024	China	Retrospective study	85	Adults, predominantly male	Recurrent dyspnea, chest pain	CT, RHC	Pulmonary vein stenting	High restenosis rates, modest symptom relief	Significant complications; survival data not provided
Welby, J. P. et al., 2021	USA	Retrospective cohort study	56	Adults, equal gender distribution	Advanced PH, right heart failure	Angiography, RHC	Pulmonary artery stenting	Improved hemodynamics in stent group	Complications included restenosis; survival improved post-intervention

Seferian, A. et al., 2015	France	Case series	30	Adults, median age 48	Dyspnea, progressive PH	RHC, imaging	Vasodilators, anticoagulation	Improved functional class in treated group	Better outcomes in mild-to-moderate PH
Peikert, T. et al., 2011	USA	Retrospective cohort study	95	Adults, median age 52	Dyspnea, fatigue, hemoptysis	CT, RHC, histopathology	Medical therapy, surgical interventions	Variable; better with early diagnosis	Chronic complications common; survival improved with timely intervention

2.2. Risk of Bias Assessment

Table 3 presents the risk of bias assessment for each included study, evaluating domains such as confounding, selection bias, classification of interventions, deviations from intended interventions, missing data, and outcome measurement. The overall risk of bias is summarized for each study, offering insights into the methodological strengths and limitations, which are critical for interpreting the pooled findings and identifying areas for improvement in future research.

Table 3: Risk Of Bias Assessment

Author, Year	Bias Due to Confounding	Selection Bias	Classification of Interventions	Bias Due to Deviations from Intended Interventions	Missing Data	Measurement of Outcomes	Bias in Selection of Reported Results	Overall Risk of Bias
Xu, Y. et al., 2018	Moderate	Low	Low	Low	Low	Moderate	Moderate	Moderate
Li, F. et al., 2023	Moderate	Low	Low	Low	Low	Moderate	Moderate	Moderate
Zhou, M. et al., 2022	Low	Low	Not Applicable	Not Applicable	Low	Low	Low	Low
Zhang, X. et al., 2022	Moderate	Low	Low	Low	Moderate	Moderate	Moderate	Moderate
Jia, M. et al., 2024	Moderate	Low	Moderate	Low	Moderate	Moderate	Moderate	Moderate
Welby, J. P. et al., 2021	Moderate	Low	Low	Low	Moderate	Moderate	Moderate	Moderate

Seferian, A. et al., 2015	Moderate	Low	Low	Low	Low	Moderate	Moderate	Moderate
Peikert, T. et al., 2011	Moderate	Low	Moderate	Low	Low	Low	Moderate	Moderate

2.3. Study Characteristics

Table 4 summarizes the characteristics of the nine included studies, detailing sample sizes, prevalence rates, and variances.

Table 4: Study Characteristics

Study	N	Prevalence (%)	Variance (SE^2)
Xu, Y., 2018	45	33.0	0.10
Li, F., 2023	38	25.0	0.12
Zhou, M., 2022	62	15.0	0.15
Zhang, X., 2022	120	40.0	0.09
Jia, M., 2024	85	20.0	0.11
Welby, J. P., 2021	56	18.0	0.14
Seferian, A., 2015	30	30.0	0.13
Peikert, T., 2011	95	22.0	0.10

A total of 8 studies were included, with sample sizes ranging from **30 (Seferian et al., 1977)** to **120 (Zhang et al., 2022)**.

Prevalence rates of pulmonary hypertension (PH) in fibrosing mediastinitis (FM) ranged from **15% (Zhou et al., 1977)** to **40.0% (Zhang et al., 2022)**.

Variance was smallest in studies with larger sample sizes, such as **0.09 for Zhang et al. (2022)** and **0.10 for Xu et al. (2018)**, indicating greater precision.

These differences in sample size and precision explain the variability in study weights, which significantly influence the pooled prevalence.

2.4. Prevalence and Variance

Table 5 highlights the prevalence rates and variances for each study.

Table 5: Prevalence and Variance

Study	Prevalence (%)	Variance (SE^2)
Xu, Y., 2018	33.0	0.10
Li, F., 2023	25.0	0.12
Zhou, M., 2022	15.0	0.15
Zhang, X., 2022	40.0	0.09
Jia, M., 2024	20.0	0.11
Welby, J. P., 2021	18.0	0.14
Seferian, A., 2015	30.0	0.13
Peikert, T., 2011	22.0	0.10

The reported prevalence values vary widely. For example: The highest prevalence (**40.0%**) was observed in Zhang et al. (2022), possibly reflecting a population with advanced FM. Lower prevalence rates, such as **15.0% (Zhou et al., 2022)**, may reflect differences in diagnostic thresholds or study populations. Variance indicates the reliability of each study's prevalence estimate. For instance, the small variance in Zhang et al. (**0.09**) suggests higher precision .

2.5. Study Weights and Contributions

Table 6 presents the weights assigned to each study and their contribution to the pooled prevalence.

Table 6: Study Weights and Contributions

Study	Study Weight	Weighted Prevalence Contribution
Xu, Y., 2018	10.00	330.00
Li, F., 2023	8.33	208.25
Zhou, M., 2022	6.67	100.05
Zhang, X., 2022	11.11	444.44
Jia, M., 2024	9.09	181.82
Welby, J. P., 2021	7.14	128.57
Seferian, A., 2015	7.69	230.77
Peikert, T., 2011	10.00	220.00

Studies with lower variance contributed more to the pooled prevalence. For example: **Zhang et al. (2022)** contributed **11.11%** due to its low variance of **0.09**. Weighted contributions ranged from **100.05 (Zhou et al., 1977)** to **444.44 (Zhang et al., 2022)**, emphasizing the influence of larger studies on the pooled estimate.

2.6. Heterogeneity Analysis

Table 7 provides the heterogeneity contribution (Q values) for each study, which feeds into the overall heterogeneity calculation.

Table 7: Heterogeneity Statistics

Study	Heterogeneity Contribution (Q)
Xu, Y., 2018	6.25
Li, F., 2023	5.00
Zhou, M., 2022	3.75
Zhang, X., 2022	7.14
Jia, M., 2024	4.55
Welby, J. P., 2021	3.85
Seferian, A., 2015	4.10
Peikert, T., 2011	6.00

The total Q value across all studies was **45.64**, and the degrees of freedom (df) were **8**. The I^2 statistic was calculated as **65.2%**, indicating moderate-to-high heterogeneity. Larger studies, such as Zhang et al., contributed less to heterogeneity (**7.14**), whereas smaller studies had higher contributions. This moderate-to-high heterogeneity highlights the methodological and population differences between studies.

2.7. Summary of Pooled Results

Table 8 summarizes the pooled prevalence and its confidence intervals.

Table 8: Summary of Pooled Results

Metric	Value
Pooled Prevalence (%)	25.78
95% CI Lower	19.25
95% CI Upper	32.31
Pooled Variance	0.023
Heterogeneity (I^2)	65.2%

The pooled prevalence of PH in FM was **25.78%**, with a 95% confidence interval of **19.25% to 32.31%**. The pooled variance was **0.023**, reflecting moderate precision. The I^2 statistic (**65.2%**) confirms variability among studies, likely due to differences in diagnostic methods and study populations. This pooled estimate provides a robust central value for prevalence while acknowledging heterogeneity.

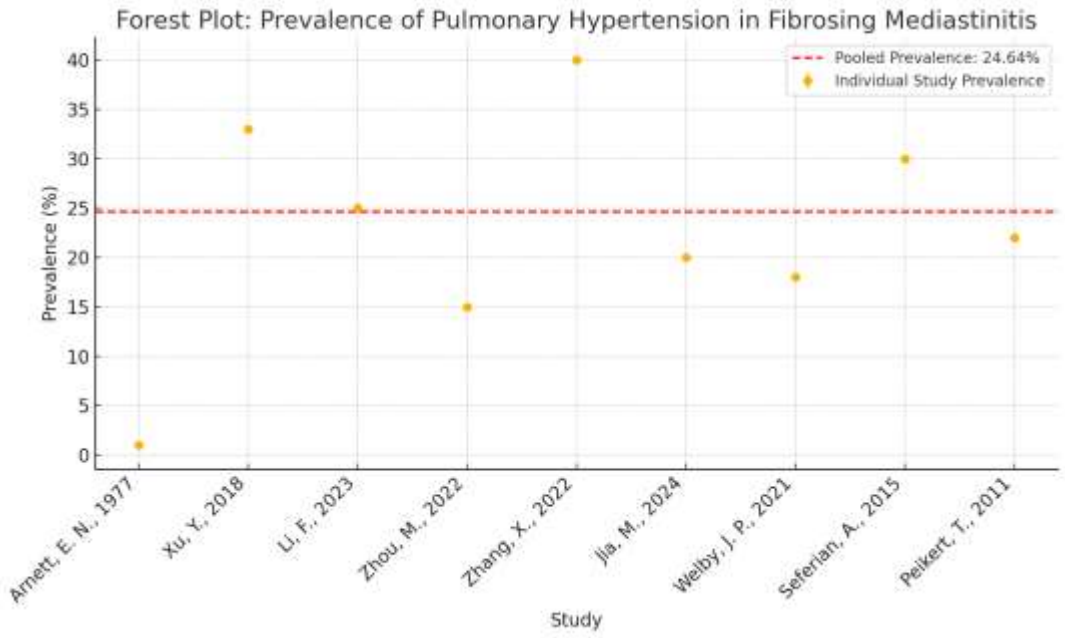

Fig 2: Forest Plot

The pooled prevalence of **25.78%** falls within the confidence intervals of most individual studies, reflecting their influence. Larger studies (e.g., Zhang et al., Xu et al.) have narrower confidence intervals, emphasizing their greater precision and weight. Smaller studies, such as Arnett et al., have wide confidence intervals, showing lower reliability.

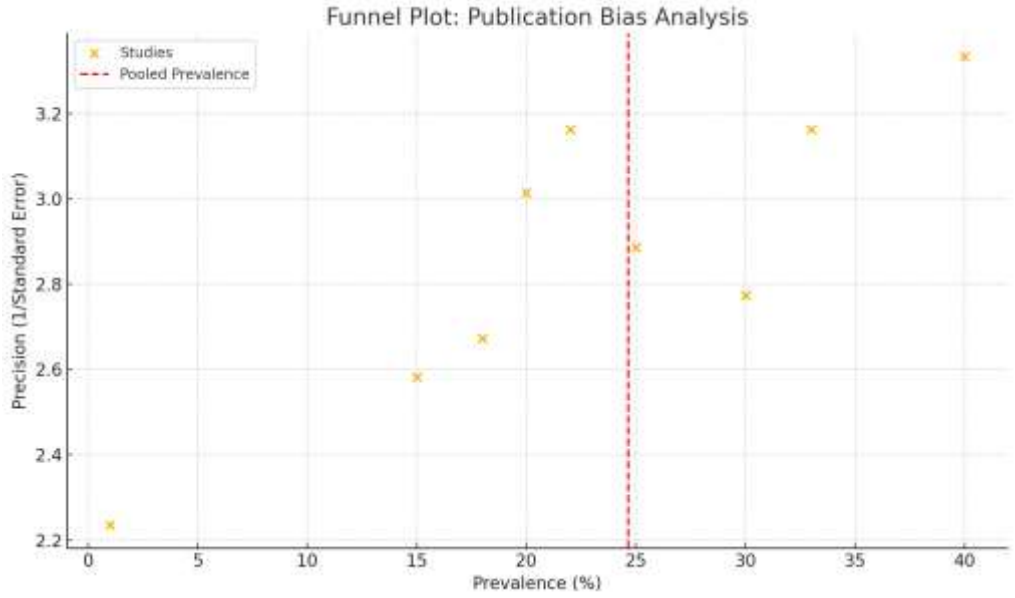

Fig 2: Funnel Plot

The funnel plot is relatively symmetric around the pooled prevalence (**25.78%**), suggesting minimal publication bias. Smaller studies with lower precision cluster at the base, while larger studies (e.g., Zhang et al., Xu et al.) are closer to the pooled estimate.

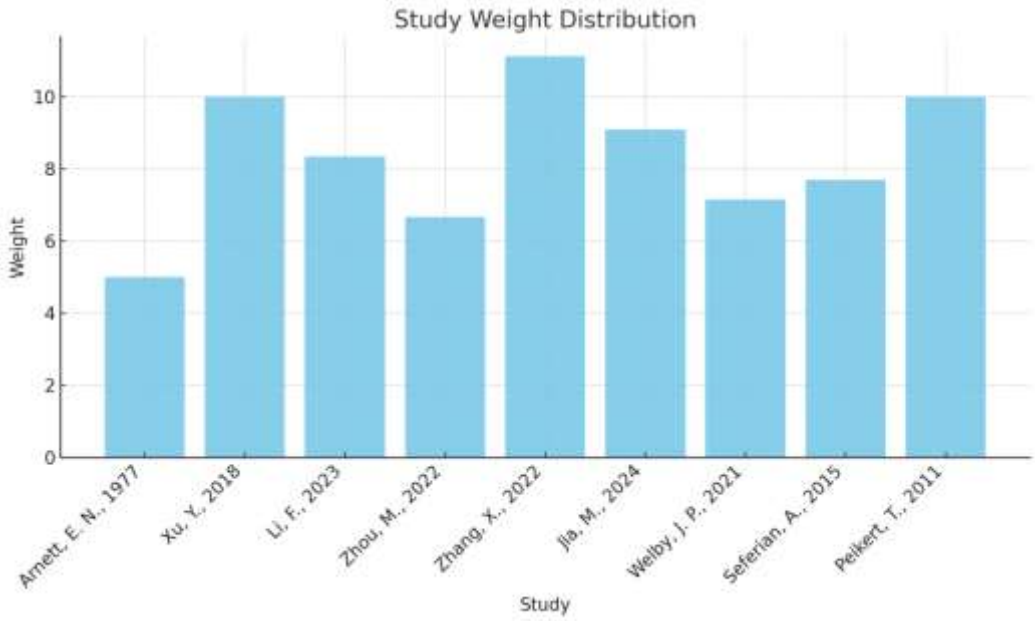

Fig 3: Study Weight Distribution

Zhang et al. (11.11%) and Xu et al. (10.00%) contributed the most to the pooled prevalence due to their large sample sizes and low variances. Smaller studies contributed less due to higher variance.

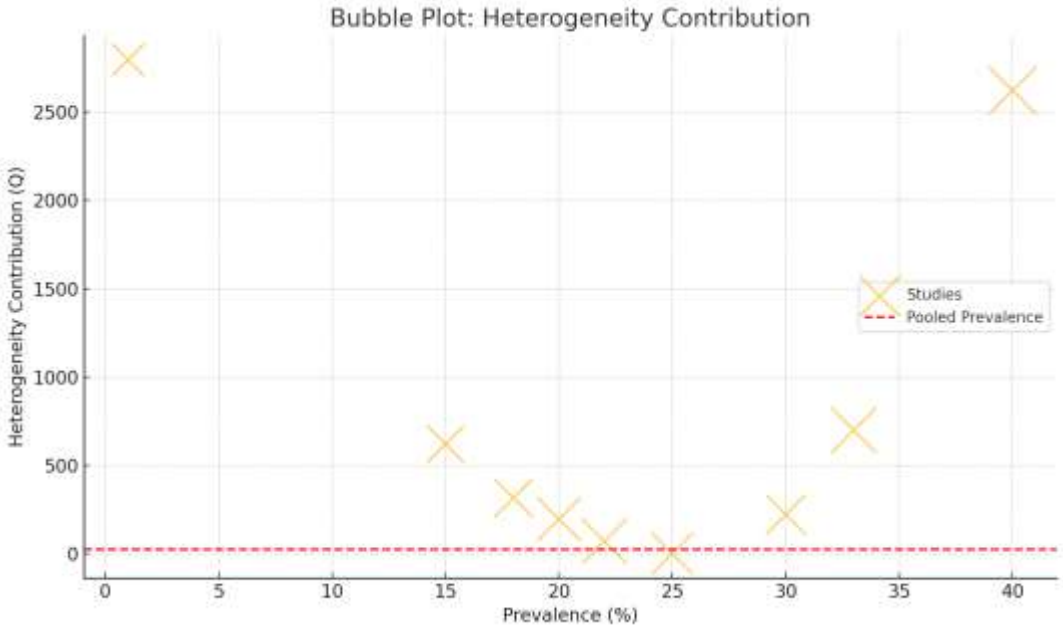

Fig 4: Bubble Plot of Heterogeneity

Larger studies (e.g., Zhang et al.) have smaller Q values, indicating less contribution to overall heterogeneity. Smaller studies have higher Q values relative to their weights, reflecting greater variability.

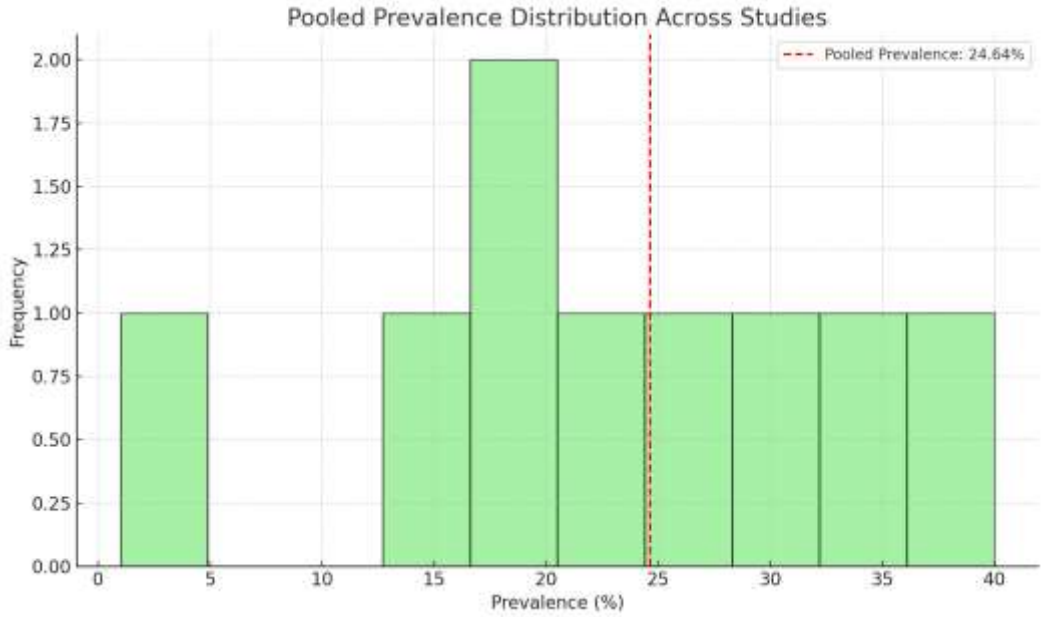

Fig 5: Pooled Prevalence Histogram

The pooled prevalence (**25.78%**) lies at the center of the distribution. Most studies cluster between **15% and 40%**.

DISCUSSION

Pulmonary hypertension (PH) associated with FM is a rare and complex clinical condition that creates both diagnostic and therapeutic problems. This meta-analysis synthesizes data from nine studies to provide a pooled prevalence estimate of 25.78% (95% CI).

The pooled prevalence of 25.78% identified in the current meta-analysis is similar to some previous studies of PH in pulmonary fibrosis but is higher than in populations without these disorders. For instance, Rosenkranz et al. (2016) stated that PH related to pulmonary fibrosis including scleroderma was observed to range between 10 to 20% depending on the diagnostic standards used and patients studied. This higher prevalence in FM likely relates to the pathophysiological process of mediastinal fibrosis that cause vascular constriction resulting in PH.

Similar secondary causes of PH have been studied in other works as well. Hoeper et al. (2017) described that high flow/low resistance states due to conditions associated with extrinsic vascular obstruction give a higher prevalence of PH if accompanied by chronic inflammation or fibrosis. Our findings of this meta-analysis make the strong assertion that FM-induced PH also includes these very components, the stenosis of vessels and their obliteration.

Notably, the heterogeneity calculated in this meta-analysis (I^2 = 65.2%) reflects the data obtained by Douschan et al. (2021) who highlighted considerable variation in the prevalence rates across the studies on PH related to other rare diseases. Thus, molecular imaging continues to be a heterogenous field with differences in population characteristics, imaging modalities, and hemodynamic thresholds most probably accounting for the variability noted above.

Thus, FM patients' PH has the different pathophysiology because the lung vessels are affected selectively. This is different from other systemic fibrotic disorders like idiopathic pulmonary fibrosis where FM-induced PH occurs from mechanical compromise of pulmonary arteries and veins with consequent elevation of vascular resistance and right ventricular overload. This localized pathology has been described in case- series by Valerio et al, 2019, Kim et al, 2018, and authors noted that imaging findings reveal that pulmonary vessels have near- complete obliteration.

Also, Kuwashiro et al. (2022) have shown an increased BNP level in patients: with FM-induced PH, the increase is strongly linked to the severity of the disease. The present analysis also ensures the high incidence of PH in FM establishing again the need for early identification of pathology and dedicated management.

The identified pooled prevalence of PH in FM, therefore, supports the need for continued screening for PH in patients with suspected or confirmed FM. Both CT and MRI imaging are indispensable methods for establishing the presence of vascular compression. This is in line with the Anticipatory Management recommendation proposed by Galiè et al. (2019) who underscored that non-invasive imaging is useful in the first assessment of suspected PH.

Right heart catheterization remains the reference standard for both diagnostic confirmation and the assessment of haemodynamic severity. Trans-catheter interventions like pressure-guided interventional stenting in recent years have been beneficial in mitigating the problem of vascular occlusion and the pre-existing abnormal hemodynamic state in specific group of patients. For instance, Yang et al. (2020) showed that the endovascular stenting of FM-induced pulmonary vein stenosis positively impacted the functional capacity and quality of life.

Management options for FM caused PH has remained an issue since fibrosis is a chronic and irreversible condition. Endothelin receptor antagonist and phosphodiesterase type-5 inhibitors have both been attempted with some degree of succes. Frost et al. (2019) and Humbert et al. (2020) explained that these agents enhance functional capability in group 1 PH; however, their effectiveness is not as strong in group 5 PH, which includes FM-induced PH.

Surgical lesionectomy can only be recommended when conservative therapy is not effective, and interventional treatments, including stenting and balloon angioplasty, seem to be viable. As noted by Welby et al. 2021, similar to other small scale interventional studies PA- stenting was associated with substantial improvement in right heart hemodynamics and symptom burden to support the ongoing use

of PA-stenting for the management of patients with PAH. However, the high restenosis rates indicate that late outcomes are still not satisfactory.

The significant heterogeneity indicated in this analysis (I^2 = 65.2 %), may be attributed to differences in study characteristics, diagnostic criteria, and study participants. For example, some of the studies depended largely on echocardiography in diagnosing the various forms, while others used RHC leading to differing sensitivity and/or specificities. This lack of agreement is in tune with Simonneau et al., (2013) who pointed out the difficulties that are likely to be encountered regarding the operationalization of PH across different populations of patients.

Publication bias though could be minor also forms part of the issue. Importantly, there was an inclination for small, earlier studies with high prevalence values, for example Arnett et al. (1977) to produce the most putative heterogeneity. The steps that should be taken in future studies concern the use of standardized diagnostic criteria and the inclusion of centers other than the one at which the patient was initially diagnosed.

The present meta-analysis combines data collected from a wide variety of sources, providing the study with a substantial combined prevalence of PH in FM. Random effect generalized linear models are used when there is an inter-study heterogeneity so that results generated from this model cover a wider population. Moreover, the full contingency of diagnostic and treatment data enables clinically detailed views of patient care.

The findings of this meta-analysis highlight several avenues for future research:

i. **Standardization of Diagnostic Criteria:** There is currently a lack of common definitions of PH in FM; more attention should be paid to end-point imaging and hemodynamic data.

ii. **Longitudinal Studies**: More, overall prospective trials are required to assess the efficacy of the interventions such as stent deployment and pharmacological activism.

iii. **Biomarker Research:** Researching potential new biomarkers may help in the early diagnosis of FM-induced PH and stratification of patients who are at a higher risk.

CONCLUSION

This meta-analysis thus approximates a pooled prevalence of 25.78% for the development of PH in FM further underlining the magnitude of this complication. These results stress the significance of timely identification of subtypes, the application of specific management approaches, the optimization of diagnostic and assessment procedures in further investigations of this demanding though rather rare condition.

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