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Clinical Outcomes of Peripartum Cardiomyopathy in Sub-Saharan Africa: A Systematic Review

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Abstract

Background

Peripartum cardiomyopathy (PPCM) is a severe form of pregnancy-associated heart failure with significant maternal morbidity and mortality, particularly in Sub-Saharan Africa where variations in diagnosis and management exist. Therefore, this systematic review aimed to synthesize the available evidence on mortality and recovery outcomes of peripartum cardiomyopathy (PPCM) among reproductive women in Sub-Saharan Africa.

Methods

We conducted a systematic review of quantitative studies published from January 2000 to December 2025, following PRISMA guidelines and registered with PROSPERO (ID: CRD420261376381). Searches were performed in PubMed, Web of Science, Google scholar, and the Cochrane Library using combinations of PPCM-related terms and all SSA country names. Eligible studies were observational cohort studies reporting at least one of the following outcomes: mortality, or recovery of left ventricular function, which were included. Data were extracted into standardized tables and synthesized descriptively. Determinants and prognostic factors associated with outcomes were also recorded and summarized narratively. The quality of study was assessed using the Joanna Briggs Institute checklist.

Results

Six cohort studies from South Africa, Zambia, Nigeria, Uganda, Burkina Faso, and Zimbabwe met the inclusion criteria, comprising a total of 651 women with PPCM. Across the studies included, 100 deaths were reported, corresponding to an overall mortality of 15.4%. Recovery of left ventricular function was achieved in 197 patients, representing an overall recovery rate of 30.1%. Recovery was assessed between 6 and 12 months postpartum and was generally defined by a left ventricular ejection fraction (LVEF) of ≥ 50% or > 55%.

Conclusion

Peripartum cardiomyopathy in Sub-Saharan Africa is associated with high mortality and relatively low rates of recovery of left ventricular function. The wide variation in outcomes highlights gaps in early diagnosis and access to effective care. Strengthening early detection and optimizing management are essential to improving maternal outcomes in the region.

1.0 Introduction

Cardiovascular disease in pregnancy affects women of reproductive age, complicating 1–4% of pregnancies and is a significant contributor to maternal morbidity and mortality [1]. Among these

conditions, peripartum cardiomyopathy (PPCM) is an idiopathic cardiomyopathy characterized by heart failure resulting from left ventricular systolic dysfunction that develops toward the end of pregnancy or within the months following delivery, in the absence of another identifiable cause, with left ventricular ejection fraction usually less than 45% [2–4]. Peripartum cardiomyopathy has been reported across different regions of the world, with considerable variation in clinical presentation and outcome [5]. Notably, Nigeria has reported the highest incidence of PPCM at 1 in 102 live births (with a maternal mortality rate of 814 per 100 000 live births in 2020), while Haiti follows closely at one new diagnosis of PPCM in 299 live births (in a country that has 359 maternal deaths per 100 000 live births) [6]. Conversely, Asian populations display a range of incidences, from 1 in 837 in Pakistan to 1 in 15 533 in Japan [7]. These marked geographical differences may reflect variations in population characteristics, healthcare access, diagnostic practices, and disease awareness, making it difficult to establish universally applicable management strategies [8].

Several risk factors have been associated with PPCM, including hypertensive disorders of pregnancy such as preeclampsia, as well as advanced maternal age, multiparity, and multiple gestations [9–11]. The underlying pathophysiology of PPCM is complex and not fully understood. While earlier studies suggested hormonal and vascular mechanisms [12, 13], more recent evidence has identified truncating mutations in the sarcomeric gene titin (TTN), highlighting a potential genetic contribution to disease development [14]. The diagnosis of PPCM is often challenging because symptoms such as dyspnea, fatigue, and peripheral edema overlap considerably with the physiological changes of pregnancy and the postpartum period [15]. Consequently, many women may present late in the course of the disease, particularly in resource-limited settings where access to specialized cardiovascular care may be limited [16].

Disease severity at presentation has an important influence on prognosis. Several clinical and echocardiographic parameters have been identified as important predictors of outcomes in PPCM. In particular, the left ventricular ejection fraction (LVEF) and left ventricular diastolic diameter (LVDD) at diagnosis are among the most reliable indicators of disease severity and long-term recovery [17–19]. Notably, PPCM disproportionately affects women of African descent, who are more likely to present later, with more severe left ventricular dysfunction, larger cardiac dimensions, and poorer clinical outcomes [20]. Clinical outcomes following PPCM are highly variable. Although some women achieve complete recovery of left ventricular function, a substantial proportion develop persistent dilated cardiomyopathy and chronic heart failure [17]. Evidence from an international registry demonstrated that only 46.5% of women recovered normal left ventricular function within six months after diagnosis, leaving more than half with persistent myocardial dysfunction and an increased risk of long-term heart failure [21]. Similarly, studies conducted in sub-Saharan Africa have reported high mortality rates and variable recovery patterns ranging from 36.7% to 44.4% [11, 18], highlighting the substantial burden of PPCM in the region [11, 22], underscoring the substantial burden of PPCM in the region. Management of PPCM is largely based on guideline-directed heart failure therapy, including diuretics, beta blockers, vasodilators, and angiotensin-converting enzyme inhibitors in the postpartum period [23].

Despite growing interest in PPCM, many available studies in SSA are limited by small sample sizes, single-center designs, and retrospective methodologies, with limited prospective data on contemporary evidence-

based management and outcomes [24, 25]. The lack of consolidated evidence limits the ability to fully characterize disease burden and inform clinical decision-making. Therefore, there is a need for a systematic evaluation of available evidence to better define the epidemiology and clinical outcomes of PPCM in sub-Saharan Africa. Such synthesis is essential to inform clinical practice, guide resource allocation, and support the development of context-specific interventions aimed at improving maternal cardiovascular outcomes. Therefore, the study aims to systematically review and synthesize available evidence on the mortality and recovery outcomes of peripartum cardiomyopathy in Sub-Saharan Africa. In addition, the study seeks to identify key clinical and demographic factors associated with these outcomes.

2.0 Method

2.1 Protocol and registration

This systematic review was carried out following PRISMA guidelines [26]. This systematic review was registered at PROSPERO (ID: CRD420261376381).

2.2 Data Sources and Search Strategy

We conducted comprehensive literature searches in PubMed, Web of Science, Google scholar, and the Cochrane Library from January 2000 to December 2025 to identify studies reporting peripartum cardiomyopathy (PPCM) in sub-Saharan Africa. Search terms were applied individually and in combination using Boolean operators (“AND”, “OR”). Our search included the following Medical Subject Headings (MeSH) terms: (“peripartum cardiomyopathy” OR “pregnancy associated cardiomyopathy” OR “PPCM” OR “maternal heart failure” OR “left ventricular dysfunction” OR “LVEF ”) AND (“outcomes” OR “mortality” OR “recovery”) AND (“Sub-Saharan Africa” OR “Africa South of the Sahara”). Only peer-reviewed articles published in English were considered.

2.2 Eligibility Criteria

The study adhered to the PIOS (Population, Index condition, Outcome, and Study design) framework to ensure a structured and transparent approach to study selection.

1. Population (P): Women of reproductive age diagnosed with peripartum cardiomyopathy (PPCM) in Sub-Saharan Africa.
2. Index condition (I): Peripartum cardiomyopathy, defined an idiopathic cardiomyopathy characterized by heart failure resulting from left ventricular systolic dysfunction that develops toward the end of pregnancy or within the months following delivery, in the absence of another identifiable cause, with left ventricular ejection fraction usually less than 45% [2–4].
3. Outcome (O): Studies reporting at least one of the following: mortality outcomes and recovery of left ventricular function. Outcomes were extracted as absolute counts and proportions were available.
4. Study design (S): Quantitative studies including hospital-based cohorts (prospective or retrospective), cross-sectional investigations, and registry-based cohorts. Studies published from January 2000 to December 2025 were eligible.

2.3 Data Extraction

Studies meeting the eligibility criteria were reviewed in full, and data were independently extracted by two reviewers using a standardized Microsoft Excel data extraction form. Full-text articles were accessed and reviewed in Mendeley (version 2.145.0) throughout the extraction process. Extracted data included the first author, year of publication, country, study design, sample characteristics, and reported outcomes. The primary outcomes of interest were mortality and recovery of left ventricular function. Where reported, mortality and recovery outcomes were extracted as absolute frequencies and corresponding percentages. Recovery was defined according to study-specific criteria, most commonly as improvement in left ventricular ejection fraction (LVEF) to ≥ 50% or normalization of systolic function, with follow-up periods ranging from 6 to 12 months postpartum. Information on determinants and prognostic factors associated with outcomes was also extracted. For studies that reported prevalence estimates without absolute event counts, the number of cases was calculated by multiplying the reported prevalence by the total sample size. Upon completion of data extraction, the dataset was independently cross-checked by two reviewers to ensure accuracy and consistency. Any discrepancies were resolved through discussion, with a third reviewer consulted when consensus could not be reached before quantitative synthesis.

2.4 Quality Assessment

The quality of each study was evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal Tools Checklist for cohort studies [27]. The checklist comprised eleven questions, with each question receiving a score of 1 for a "yes" response and 0 for a "no" or "unclear" response, yielding a maximum score of 11. Each study was evaluated across 11 domains addressing selection bias, confounding, outcome measurement, follow-up adequacy, and statistical analysis. Studies scoring greater than 8 were considered high quality, 4–7 moderate quality, and 0–3 low quality (Supplementary Table 1).

2.5 Data Analysis

Data from the included studies were organized into evidence tables summarizing country, study design, PPCM patients, mortality, recovery rate, and reported determinants. Descriptive synthesis was performed to present frequencies and proportions across studies. Mortality and recovery outcomes were reported as absolute counts with percentages. Determinants and prognostic factors associated with outcomes were synthesized narratively based on recurring patterns across the included studies. A formal meta-analysis was not undertaken due to the limited number. Therefore, statistical assessment of publication bias was not performed.

3.0 Results

3.1 Study Selection

The electronic data sources and study selection processes are presented in Fig. 1. Initially, a total of 177 records were identified from PubMed, Web of Science, Google Scholar, and Cochrane databases. After removing 51 duplicate records, the remaining 126 studies were screened based on their titles and

abstracts. An additional 78 records were excluded due to the wrong study population, reviews, reports, full text unavailable, publications in languages other than English, and those outside of sub-Saharan Africa. Following this, 48 studies were subjected to full-text screening. During full-text review, 42 studies were excluded for the following reasons: 28 studies did not report prevalence, mortality, or recovery outcomes for PPCM and 14 studies on maternal cardiovascular risk factors without PPCM as the primary condition Ultimately, 6 studies met the eligibility criteria and were included in both the qualitative and quantitative synthesis.

3.2 Characteristics of Included Studies

The six studies included in this review were conducted across six Sub-Saharan African countries: Nigeria, South Africa, Zambia, Uganda, Burkina Faso, and Zimbabwe, with each country contributing one study. All studies employed cohort designs, with sample sizes ranging from 41 to 406 participants. In total, the review encompassed a pooled sample of 651 women diagnosed with peripartum cardiomyopathy. Mortality outcomes and recovery outcomes were reported in all studies. Mortality rates ranged from 0% in the Ugandan cohort to 18.7% in the Nigerian cohort, while recovery rates ranged from 22.7% in Nigeria to 69.6% in South Africa. Several studies also reported prognostic factors associated with outcomes, including disease severity, delayed presentation, hypertension, renal dysfunction, and age (Table 1).

Table 1
Characteristics of included studies

Study	Country	Study Design	PPCM Patients	Mortality n (%)	Recovery definition	Recovery n (%)	Notes
Azibani et al. [28]	South Africa	Cohort	56	8 (14.3)	LVEF ≥ 50% at 6 months follow-up	39 (69.6)	Mortality occurred in advanced NYHA class
Strasserking et al. [22]	Zambia	Cohort	45	3 (7.7)	LVEF ≥ 50% at 6 months follow-up	20 (44.4)	Hypertension was frequent. Mortality associated with severe LV dilation
Karaye et al. [29]	Nigeria	Cohort	406	76 (18.7)	LVEF ≥ 50% in 12 months follow-up	92 (22.7)	Poor outcomes linked to hypotension, renal dysfunction, and late presentation
Nabbaale et al. [30]	Uganda	Cohort	41	0 (0)	LVEF > 55% at 6months follow-up	19 (46.3)	Hypertension and HIV were common. Recovery associated with younger age
André et al. [11]	Burkina Faso	Cohort	60	8 (13.3)	LVEF ≥ 50% at 12 months follow-up	22 (36.7)	Delayed diagnosis and poor adherence reduced recovery. Mortality higher in older age
Gambahaya et al. [31]	Zimbabwe	Cohort	43	5 (11.6)	LVEF > 50% at 6 months follow-up	15(34.9)	Primigravida and pregnancy-induced hypertension were frequent. LV thrombus contributed to death. Improvement in ejection fraction over time

Study	Country	Study Design	PPCM Patients	Mortality n (%)	Recovery definition	Recovery n (%)	Notes
							suggests partial myocardial recovery is possible

3.3 Mortality of Peripartum Cardiomyopathy in Sub-Saharan Africa

A total of six studies reported mortality outcomes, comprising 651 participants from Nigeria, South Africa, Burkina Faso, Zambia, Uganda and Zimbabwe. According to these studies, 100 deaths were recorded, corresponding to an overall mortality proportion of 15.4% (Table 2).

Table 2
Mortality Outcomes of Peripartum Cardiomyopathy in Sub-Saharan Africa

Study	PPCM patients	Country	Mortality n (%)
Azibani et al. [28]	56	South Africa	8 (14.2)
Strasserking et al. [22]	45	Zambia	3 (6.67)
Karaye et al. [29]	406	Nigeria	76 (18.7)
André et al. [11]	60	Burkina Faso	8 (13.3)
Gambahaya et al. [31]	43	Zimbabwe	5 (11.6)
Nabbaale et al. [30]	41	Uganda	0 (0)
Overall	651		100 (15.4)

3.4 Recovery Outcomes of Peripartum Cardiomyopathy in Sub-Saharan Africa

Across the six included studies comprising 651 women with PPCM, 197 achieved recoveries of the left ventricular function, corresponding to an overall recovery rate of 30.3%. Recovery was observed at follow-up periods ranging from 6 months to 12 months postpartum, with definitions based on LVEF cut-offs of ≥ 50% or > 55%. Reported recovery ranged from 11.2% to 70.0%, indicating variability across study settings (Table 3).

Table 3
Recovery Outcomes of Peripartum Cardiomyopathy in Sub-Saharan Africa

Study	PPCM patients	Country	Recovery definition	Recovery n (%)
Azibani et al. [28]	56	South Africa	LVEF ≥ 50% at 6 months follow-up	39 (69.6)
Strasserking et al. [22]	45	Zambia	LVEF ≥ 50% at 6 months follow-up	20 (44.4)
Karaye et al. [29]	406	Nigeria	LVEF ≥ 50% at 12 months follow-up	92 (22.7)
Nabbaale et al. [30]	41	Uganda	LVEF > 55% at 6 months follow-up	19 (46.3)
André et al. [11]	60	Burkina Faso	LVEF ≥ 50% at 12 months follow-up	22 (36.7)
Gambahaya et al. [31]	43	Zimbabwe	LVEF > 50% after 6 months follow-up	5 (11.6)
Overall	651			197 (30.3)

4.0 Discussion

This review demonstrates that peripartum cardiomyopathy (PPCM) remains a significant contributor to maternal morbidity and mortality in Sub-Saharan Africa. Within Sub-Saharan Africa, prevalence varied widely, ranging from 5.8% in Senegal to 30% in South Africa [10, 28]. This variation is likely driven by differences in access to echocardiography and diagnostic capacity, which directly influence case detection and reporting [32]. Mortality outcomes in this study were notably high, with an overall case fatality rate of 15.4%, consistent with findings from other regional studies in SSA [11, 29, 33]. This estimate is considerably higher than the 8% mortality reported in a Scottish cohort study despite one year of follow-up [34]. Similarly, a systematic review reported substantially lower mortality rates of 3.7%, 1.2%, and 3.3% in the Asia/Pacific, Europe and Middle East, respectively [35].

From our review, mortality proportions varied widely across settings in our study, ranging from 7.0% in Zambia to 18.7% in Nigeria [22, 29]. A key factor underlying this variation is delayed presentation, as many women are not evaluated by healthcare providers in the early postpartum period when symptoms first emerge [22]. We suggest that this delay may partly reflect community-level factors that influence how postpartum symptoms are perceived and acted upon. Cultural beliefs, health-seeking practices, and perceptions of postpartum symptoms may lead some women to interpret cardiac symptoms as expected consequences of pregnancy or childbirth, potentially delaying clinical evaluation and recognition of PPCM. hen women eventually present for care, left ventricular ejection fraction (LVEF) may already be severely reduced, frequently to < 45%, a level associated with adverse outcomes and a diminished likelihood of recovery [8, 11, 36]. Evidence further indicates that once significant ventricular impairment is established,

the likelihood of recovery decreases substantially [37]. This progression from delayed presentation to severe ventricular dysfunction may consequently contribute to the higher mortality observed in this review.

Unlike many other forms of cardiomyopathy, patients with PPCM retain the potential for full recovery of left ventricular function[31]. Our study showed that recovery was observed in only 30.1% of women. This proportion is lower than rates reported in many non-African cohorts, where recovery rates frequently exceed 50%, a difference that has been attributed to sustained use of evidence-based therapy [9, 38]. In many Sub-Saharan African settings, access to guideline-directed medical therapy remains inconsistent, with challenges related to availability, affordability, and clinical expertise contributing to suboptimal treatment [32]. These limitations may hinder ventricular remodeling and reduce the likelihood of recovery. A wider recovery range of left ventricular function was observed across studies, from 11.2% to 70.0%. Such variability underscores the heterogeneity of recovery outcomes, driven by differences in study design, definitions of recovery (LVEF ≥ 50% vs. >55%), and follow-up duration (6–12 months) [31, 33, 36, 39, 40]. Furthermore, patient-level factors may further influence recovery patterns. Studies by Azibani et al.[28] shows that some African PPCM cohorts have demonstrated profibrotic biomarker profiles, which predispose patients to less favorable recovery and a higher risk of persistent left ventricular dysfunction. This biological milieu helps explain why recovery rates in Sub-Saharan Africa, as shown in our study, remain lower than in European cohorts, even when baseline ejection fraction appears relatively preserved.

Based on these findings, we also recommend that PPCM care incorporate a simple risk- and symptom-based screening approach to identify women who warrant further cardiac assessment, particularly those with relevant clinical risk factors or persistent symptoms during pregnancy and the postpartum period. Women identified as suspected or confirmed cases should have clear referral pathways for timely cardiac evaluation and appropriate management, with structured follow-up to monitor ventricular recovery and persistent dysfunction. Stronger integration of cardiovascular assessment within maternal healthcare services is also needed, while multicenter prospective studies should evaluate these approaches across different healthcare settings to determine their effectiveness in improving early recognition, timely management, and clinical outcomes.

5.0 Limitation

One of the major limitations of this paper is the small number of studies included in this review. This is due to a combination of limiting the papers to those written in English and the overall paucity of studies addressing PPCM outcomes in SSA. Although publication bias could not be statistically assessed, another key limitation is that the geographic distribution of studies across Sub-Saharan Africa was uneven, with limited representation from several regions. This imbalance may contribute to under-reporting of the burden of peripartum cardiomyopathy within Sub-Saharan Africa. Finally, the heterogeneity of the studies reviewed including differences in definitions of outcomes as well as duration of follow-up add to the limitation in drawing robust generalizable conclusions.

6.0 Conclusion

This systematic review underscores the disproportionate burden of peripartum cardiomyopathy in Sub-Saharan Africa, characterized by elevated mortality, and limited recovery compared with non-African populations. Across the included studies, outcomes varied substantially between settings, reflecting differences in the clinical course of PPCM and the circumstances in which affected women are diagnosed and managed. The findings indicate that PPCM can result in persistent cardiac dysfunction and serious maternal consequences beyond the immediate postpartum period. PPCM should consequently be regarded as an important component of maternal cardiovascular disease in the region, with its clinical burden extending beyond pregnancy itself.

Abbreviations

NYHA
New York Heart Association (functional classification)

Declarations

Ethics approval and consent to participate: Not applicable

Consent for publication: Not applicable

Availability of data and materials: All data generated or analyzed during this study are included in this published article and its additional files.

Competing interests: The authors declare no competing interests.

Clinical trial number: not applicable.

Authors' contributions: EKA, TL, and CO made substantial contributions to the conception, design, conduct, analysis, interpretation, and initial draft of manuscript. AA, CHC, LJ, and MMM provided intellectual input and contributed to the critical revision of the manuscript. All authors read and approved the final manuscript.

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Figures

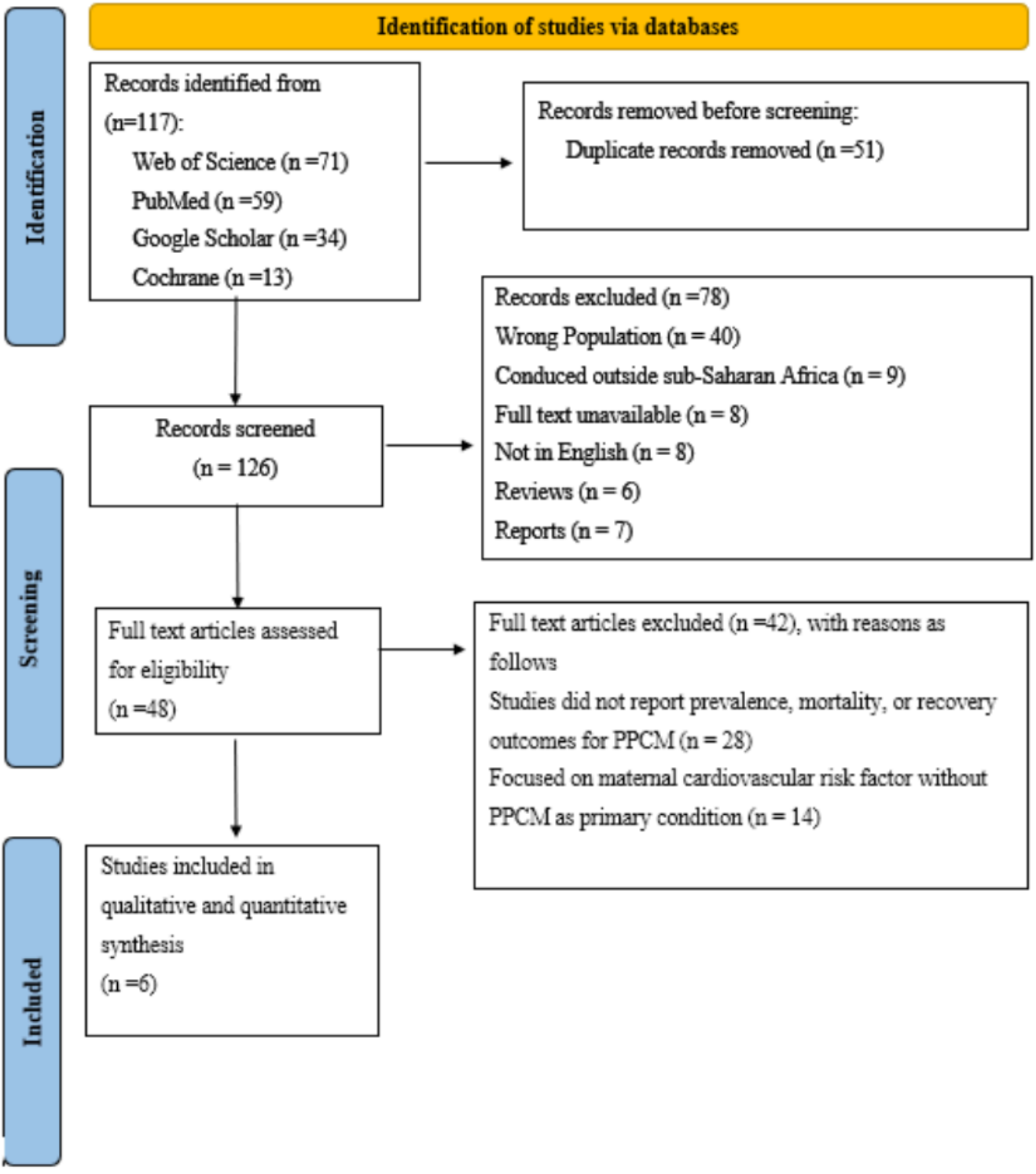


Figure 1

Flow diagram showing studies selection process implemented for this analysis.

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