PAD Prevalence: Systematic Review with ☸SAIMSARA.

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Abstract: This paper aims to systematically review and synthesize current research on the prevalence of peripheral artery disease across various populations and clinical settings, identifying key demographic, clinical, and methodological factors influencing reported rates. The review utilises 1259 studies with 4769304 total participants (naïve ΣN). The median prevalence of peripheral artery disease (PAD) across the diverse populations and clinical settings reported in the structured summary is 7.4%, with reported rates ranging from 0.9% for symptomatic PAD in Italy to 100% for PAD in patients with progressive fibrosing interstitial lung disease. This wide range underscores the significant variability in PAD burden globally and across different patient groups. The generalizability of these findings is most affected by the heterogeneous definitions and diverse study populations employed. For clinicians, a practical takeaway is to maintain a high index of suspicion for PAD in high-risk individuals, such as the elderly and those with diabetes or hypertension, even in the absence of classic symptoms, to facilitate earlier diagnosis and intervention.

Keywords: Peripheral Artery Disease; Prevalence; Epidemiology; Ankle-Brachial Index; Type 2 Diabetes Mellitus; Cardiovascular Disease; Risk Factors; Public Health; Cross-sectional Studies; Global Health

Review Stats

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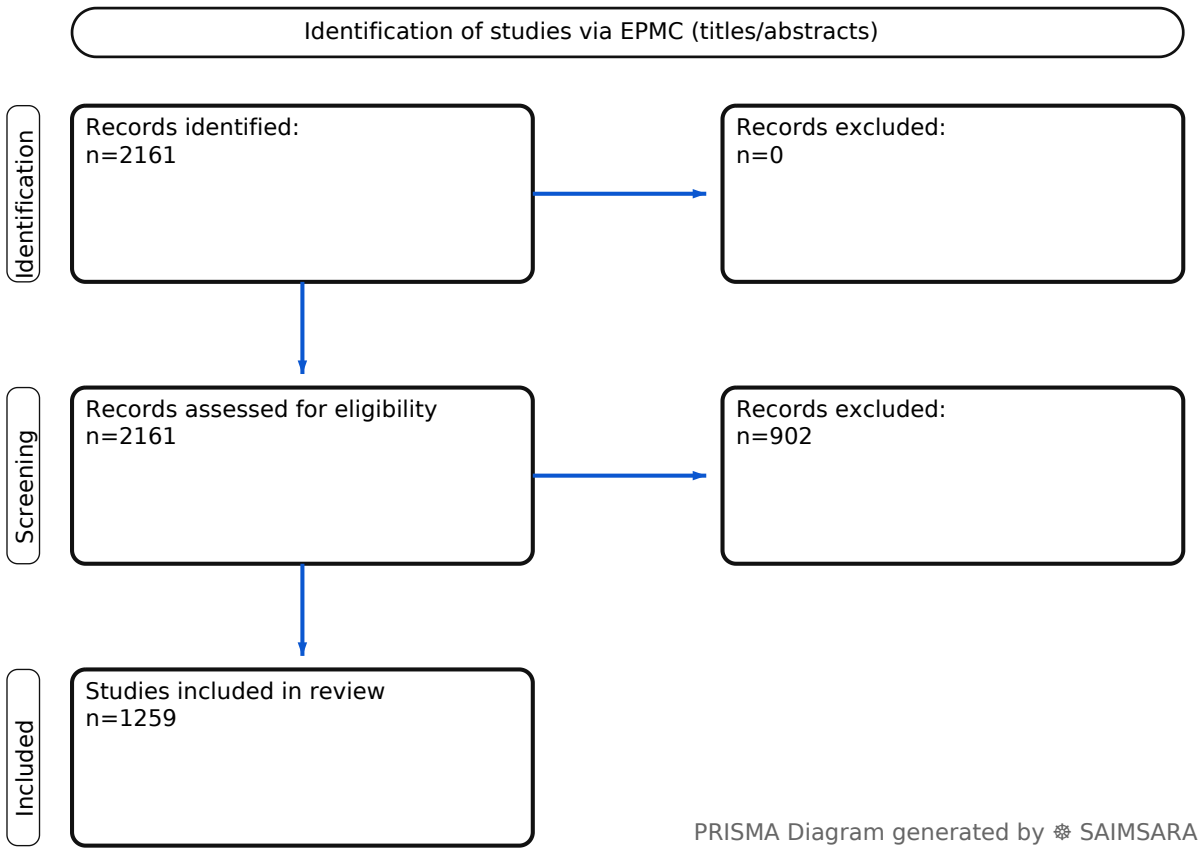
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Records excluded:
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Records excluded:
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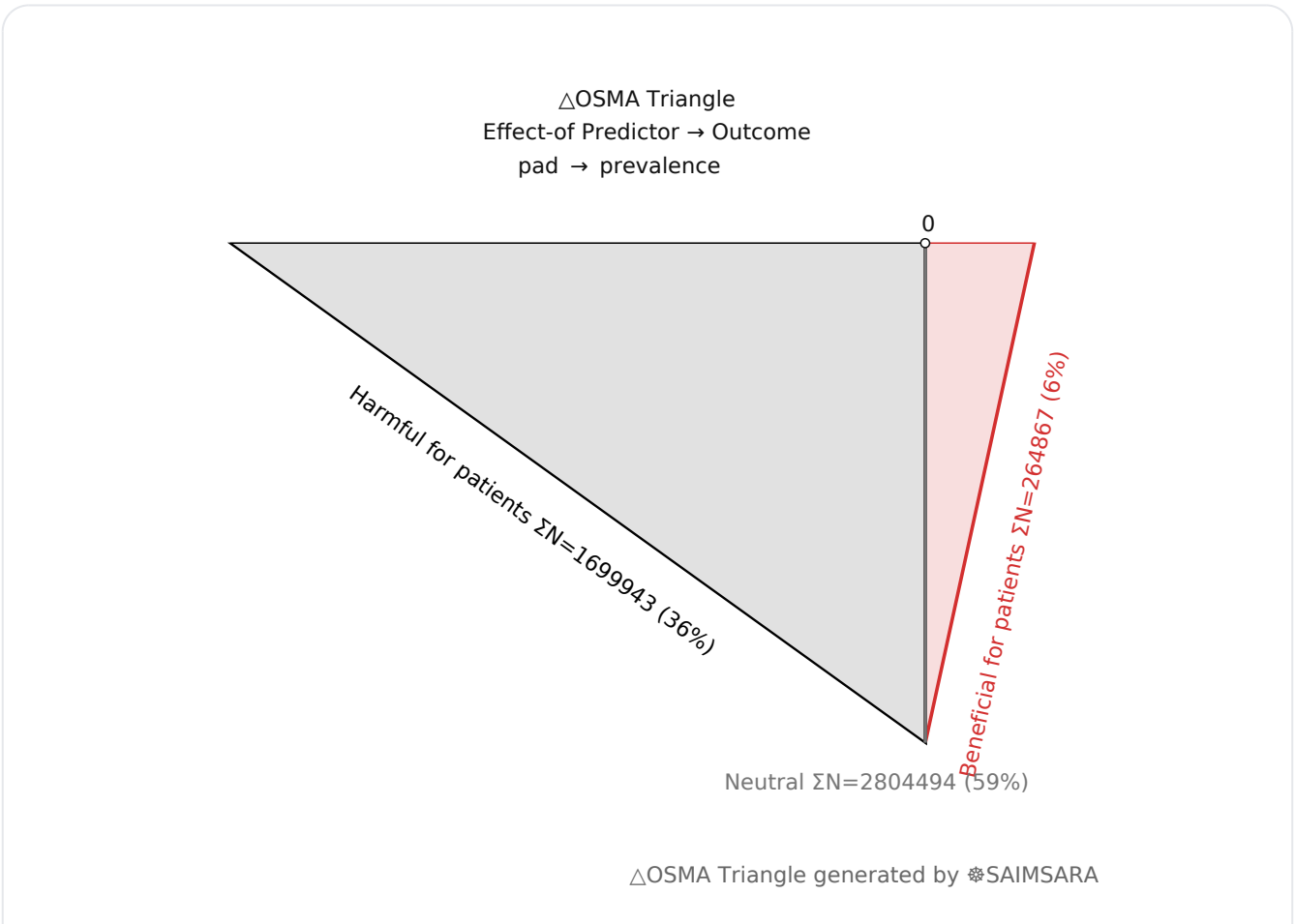
Included
Studies included in review
n=1259
PRISMA Diagram generated by ☸ SAIMSARA


△OSMA Triangle
Effect-of Predictor → Outcome
pad → prevalence
0
Harmful for patients ΣN=1699943 (36%)
Beneficial for patients ΣN=264867 (6%)
Neutral ΣN=2804494 (59%)
△OSMA Triangle generated by ☸SAIMSARA

Outcome-Sentiment Meta-Analysis (OSMA): *(LLM-only)*

Frame: Effect-of Predictor → Outcome • *Source*: Europe PMC

Outcome: prevalence Typical timepoints: peri/post-op, 65-y. Reported metrics: %, CI, p.

Common endpoints: Common endpoints: complications, mortality, healing.

Predictor: pad — exposure/predictor. Doses/units seen: 31.0 mg, 13.5 mg, 4g, 25.7 kg, 28 g, 100 ml. Routes seen: oral, iv, topical. Typical comparator: autochthonous german men, low cvh, non-ssc controls, 21.6….

- **1) Beneficial for patients** — prevalence with pad — [14], [23], [39], [42], [54], [68], [144], [163], [262], [273], [298], [441], [744], [755], [834], [848], [929], [1009], [1073], [1101], [1108], [1201], [1220] — ΣN=264867
- **2) Harmful for patients** — prevalence with pad — [1], [2], [6], [7], [9], [10], [15], [17], [21], [22], [24], [25], [26], [27], [28], [29], [30], [31], [32], [33], [35], [36], [37], [38], [43], [45], [46], [48], [49], [50], [51], [52], [56], [58], [59], [60], [62], [63], [64], [65], [66], [67], [69], [70], [71], [74], [75], [79], [80], [81], [92], [97], [98], [101], [102], [103], [104], [105], [106], [107], [108], [109], [111], [112], [113], [114], [115], [116], [117], [118], [119], [120], [121], [122], [123], [124], [125], [126], [127], [128], [129], [130], [131], [133], [135], [136], [137], [138], [139], [140], [141], [142], [143], [145], [146], [148], [149], [150], [152], [153], [154], [155], [156], [158], [159], [161], [162], [164], [166], [167], [168], [171], [172], [173], [174], [175], [177], [180], [185], [189], [191], [194], [196], [201], [203], [204], [205], [206], [207], [208], [210], [212], [213], [214], [219], [222], [224], [225], [226], [227], [229], [230], [232], [234], [236], [237], [238], [239], [241], [242], [246], [248], [249], [250], [251], [254], [255], [257], [258], [259], [263], [264], [267], [272], [274], [275], [276], [280], [284], [285], [287], [289], [291], [292], [293], [294], [296], [300], [304], [309], [316], [351], [352], [353], [354], [355], [356], [357], [358], [359], [360], [361], [362], [363], [364], [365], [366], [367], [369], [370], [372], [373], [374], [375], [401], [402], [403], [404], [408], [411], [412], [414], [415], [416], [418], [419], [421], [422], [423], [424], [425], [427], [431], [433], [436], [438], [439], [440], [443], [449], [451], [454], [455], [456], [457], [458], [459], [461], [462], [464], [465], [467], [468], [469], [470], [471], [472], [473], [474], [475], [477], [478], [480], [481], [482], [483], [486], [487], [490], [491], [492], [494], [495], [496], [497], [498], [499], [500], [501], [502], [503], [507], [508], [510], [512], [515], [517], [518], [520], [521], [551], [552], [556], [558], [559], [560], [562], [563], [564], [565], [566], [568], [569], [571], [574], [579], [582], [584], [594], [595], [601], [602], [603], [604], [605], [606], [607], [608], [609], [614], [617], [618], [620], [622], [623], [624], [625], [677], [678], [679], [682], [683], [684], [685], [686], [688], [689], [690], [691], [692], [693], [694], [696], [697], [698], [700], [701], [702], [703], [704],

[705], [706], [707], [708], [709], [710], [711], [712], [713], [714], [715], [716], [717], [718], [720], [721], [722], [723], [724], [725], [726], [727], [728], [729], [730], [731], [732], [733], [734], [735], [737], [738], [739], [741], [745], [746], [747], [748], [749], [750], [784], [785], [786], [788], [794], [797], [798], [800], [801], [802], [803], [804], [805], [806], [807], [809], [810], [816], [818], [820], [821], [822], [823], [824], [825], [826], [828], [829], [830], [831], [832], [837], [838], [839], [840], [841], [842], [843], [847], [901], [902], [903], [905], [908], [909], [910], [911], [913], [915], [916], [917], [920], [923], [925], [926], [927], [928], [930], [931], [932], [933], [935], [936], [937], [938], [939], [940], [941], [942], [943], [944], [946], [947], [949], [950], [969], [973], [977], [980], [993], [995], [1001], [1002], [1003], [1004], [1005], [1006], [1007], [1008], [1010], [1011], [1012], [1013], [1014], [1015], [1016], [1018], [1019], [1020], [1021], [1022], [1023], [1024], [1025], [1026], [1028], [1029], [1030], [1031], [1032], [1033], [1034], [1035], [1036], [1037], [1038], [1042], [1043], [1044], [1047], [1048], [1049], [1050], [1051], [1052], [1053], [1054], [1055], [1056], [1057], [1058], [1059], [1060], [1061], [1062], [1063], [1064], [1065], [1066], [1067], [1068], [1069], [1074], [1075], [1078], [1080], [1081], [1083], [1084], [1085], [1086], [1087], [1088], [1092], [1094], [1096], [1098], [1099], [1100], [1102], [1104], [1105], [1109], [1110], [1111], [1112], [1114], [1116], [1117], [1118], [1120], [1121], [1125], [1128], [1151], [1152], [1153], [1155], [1156], [1157], [1159], [1162], [1167], [1169], [1170], [1171], [1174], [1198], [1221], [1225], [1251], [1252], [1253], [1256], [1257], [1259] — ΣN=1699943

- **3) No clear effect** — prevalence with pad — [3], [4], [5], [8], [11], [12], [13], [16], [18], [19], [20], [34], [40], [41], [44], [47], [53], [55], [57], [61], [72], [73], [76], [77], [78], [82], [83], [84], [85], [86], [87], [88], [89], [90], [91], [93], [94], [95], [96], [99], [100], [110], [132], [134], [147], [151], [157], [160], [165], [169], [170], [176], [178], [179], [181], [182], [183], [184], [186], [187], [188], [190], [192], [193], [195], [197], [198], [199], [200], [202], [209], [211], [215], [216], [217], [218], [220], [221], [223], [228], [231], [233], [235], [240], [243], [244], [245], [247], [252], [253], [256], [260], [261], [265], [266], [268], [269], [270], [271], [277], [278], [279], [281], [282], [283], [286], [288], [290], [295], [297], [299], [301], [302], [303], [305], [306], [307], [308], [310], [311], [312], [313], [314], [315], [317], [318], [319], [320], [321], [322], [323], [324], [325], [326], [327], [328], [329], [330], [331], [332], [333], [334], [335], [336], [337], [338], [339], [340], [341], [342], [343], [344], [345], [346], [347], [348], [349], [350], [368], [371], [376], [377], [378], [379], [380], [381], [382], [383], [384], [385], [386], [387], [388], [389], [390], [391], [392], [393], [394], [395], [396], [397], [398], [399], [400], [405], [406], [407], [409], [410], [413], [417], [420], [426], [428], [429], [430], [432], [434], [435], [437], [442], [444], [445], [446], [447], [448], [450], [452], [453], [460], [463], [466], [476], [479], [484], [485], [488], [489], [493], [504], [505], [506], [509], [511], [513], [514], [516], [519], [522], [523], [524], [525], [526], [527],

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1) Introduction

Peripheral artery disease (PAD) is a prevalent manifestation of systemic atherosclerosis, characterized by narrowed arteries that reduce blood flow to the limbs, most commonly the legs. This condition significantly increases the risk of major adverse cardiovascular events (MACE) and limb-related complications, including amputation. Given its substantial global burden and increasing incidence, understanding the prevalence of PAD across diverse populations and its associated risk factors is crucial for effective public health strategies, early diagnosis, and improved patient outcomes.

2) Aim

This paper aims to systematically review and synthesize current research on the prevalence of peripheral artery disease across various populations and clinical settings, identifying key demographic, clinical, and methodological factors influencing reported rates.

3) Methods

Systematic review with multilayer AI research agent: keyword normalization, retrieval & structuring, and paper synthesis (see SAIMSARA About section for details).

- **Bias:** The qualitative assessment of bias indicates that many studies are cross-sectional in design, which limits the ability to infer causality. Furthermore, a notable number of studies are retrospective cohorts, which may introduce selection and recall biases. The reliance on convenience samples or specific patient cohorts (e.g., those with diabetes, undergoing specific procedures) in many studies limits the generalizability of their findings to broader populations. Reporting inconsistencies, particularly regarding diagnostic criteria and demographic representation (e.g., race/ethnicity, sex-specific data), also contribute to potential bias in synthesizing results.

4) Results

4.1 Study characteristics

The included studies predominantly employed cross-sectional designs, often analyzing large national health survey datasets or patient registries, with some cohort studies providing longitudinal insights. Populations ranged from general adults in various countries (e.g., US, Nepal, Gabon, China, Spain, Sweden) to specific high-risk groups such as patients with type 2 diabetes mellitus (T2DM), chronic kidney disease (CKD), hypertension, or those undergoing specific medical procedures like coronary angiography or hemodialysis. Follow-up periods were generally not applicable for cross-sectional studies, while cohort studies reported follow-up durations ranging from 1 to over 19 years.

4.2 Main numerical result aligned to the query

The median prevalence of peripheral artery disease (PAD) across the diverse populations and clinical settings reported in the structured summary is 7.4%. The prevalence rates observed in these studies exhibit substantial heterogeneity, ranging from a low of 0.9% for symptomatic PAD in Italy [997] to a high of 100% for PAD in patients with progressive fibrosing interstitial lung disease (PF-ILD) [246]. For broader adult populations, prevalence typically falls between 1.18% in a managed care setting in the US [1035] and 37.8% in elderly patients in Southern Nigeria [307].

4.3 Topic synthesis

- **Global and Regional Variability:** PAD prevalence varies widely, from 1.18% in a US managed care setting [1035] and 1.71% in rural Japan [765] to 25.7% in urban Gabon [11] and 37.8% in elderly Southern Nigerians [307]. Global estimates suggest PAD affects approximately 5% to 6% of the population [96] or over 230 million adults worldwide [241].
- **Diabetes as a Primary Risk Factor:** Patients with type 2 diabetes mellitus (T2DM) consistently show higher PAD prevalence, with rates such as 22.7% [4], 37.5% [10], 39.7% [13], 46.3% in Kerala [38], and 68.7% in Brazil [154]. This is significantly higher than in non-diabetic controls (e.g., 37.8% vs 6.7% in children with T1DM [152]; 24% vs 8% in general populations [898]).
- **Age and Sex-Related Disparities:** PAD prevalence generally increases with age, reaching up to approximately 25% in individuals aged 95-99 years [200]. While some studies report higher prevalence in men (e.g., 6.6% vs 4.5% in Denmark for 67-year-olds [192]), others indicate similar or higher rates in women (e.g., 24.8% vs 22.7% in Hamburg [173]; 4.1% vs 2.6% in US [766]), with concerns about underdiagnosis in women [73, 223, 235].
- **Comorbidities and Inflammatory Markers:** PAD frequently coexists with other cardiovascular risk factors and conditions. Hypertension is a significant associate (e.g., 31.4% in hypertensive patients in Addis Ababa [58], OR 1.53 [104]), as are chronic kidney disease (CKD) (e.g., 17% to 48% [136], 31% in ESKD [222]), and coronary artery disease (CAD) (e.g., 20.8% in CAD patients [56]). Elevated inflammatory markers like dNLR (OR 1.11 [1]), MLR [6], NPAR [9], PAC [22], PCS [52], CRP [52], TMAO [69], endocan [70], and AIP (OR 1.30 [71]) are also associated with increased PAD prevalence.
- **Impact on Clinical Outcomes:** PAD is a strong predictor of adverse outcomes, including increased mortality (e.g., 23.5% of TAVR patients with PAD had increased mortality [7]; 18% higher risk in sepsis hospitalizations [48]), higher amputation rates (e.g., 4.36 times the risk in sepsis [48]; 10 times the risk in diabetic patients [154]), and increased risk of major adverse cardiovascular events [170].
- **Diagnostic Challenges and Screening Efficacy:** Ankle-brachial index (ABI) is a common diagnostic tool, but its prevalence rates can vary substantially depending on the calculation

method (e.g., 7.8% to 28.2% in T2DM patients [5, 37]). A high proportion of PAD cases remain undiagnosed (e.g., 87.5% unknown before screening in Denmark [192], 12.8% previously unrecognized in coronary angiography patients [360]), highlighting the need for improved screening strategies [273, 299].

- **Lifestyle and Environmental Factors:** Higher oxidative balance score (OBS) [23] and Composite Dietary Antioxidant Index (CDAI) [14] are associated with reduced PAD prevalence, while a proinflammatory dietary pattern (DII) is linked to higher risk (OR 1.543 [204]). Exposure to air pollutants is associated with increased risk of symptomatic PAD [17]. Smoking remains a critical risk factor [58, 145, 172, 251, 438].

5) Discussion

5.1 Principal finding

The median prevalence of peripheral artery disease (PAD) across diverse populations and clinical settings is 7.4%, with reported rates ranging from 0.9% to 100% [997, 246], underscoring its widespread yet highly variable occurrence.

5.2 Clinical implications

- **Targeted Screening:** Given the high prevalence in specific groups (e.g., 22.7% in T2DM [4], 31.4% in hypertensives [58], 38.1% in hemodialysis patients [534]), screening for PAD should be prioritized in elderly patients and those with diabetes, hypertension, or chronic kidney disease, even in the absence of classic symptoms.
- **Comorbidity Management:** The strong association of PAD with conditions like diabetes, hypertension, and CAD necessitates integrated care models that address these comorbidities concurrently to mitigate overall cardiovascular risk and improve PAD outcomes [56, 104, 136].
- **Addressing Diagnostic Gaps:** The high proportion of undiagnosed PAD cases (e.g., 87.5% in 67-year-olds in Denmark [192]) highlights the need for increased awareness among clinicians and the consistent application of diagnostic tools like the ankle-brachial index (ABI), with careful consideration of calculation methods [5, 37].
- **Sex-Specific Considerations:** Recognizing that women may experience atypical symptoms and face underdiagnosis [73, 223, 235], clinicians should maintain a high index of suspicion for PAD in female patients, and consider sex-specific risk factor profiles.
- **Lifestyle Interventions:** Promoting healthy lifestyles, including dietary improvements (e.g., higher CDAI [14], OBS [23]) and physical activity [211], can contribute to reducing PAD prevalence and progression, particularly in at-risk populations.

5.3 Research implications / key gaps

- **Standardized Diagnostic Criteria:** Future research should aim to standardize PAD diagnostic criteria and ABI calculation methods to reduce heterogeneity in reported prevalence rates and allow for more robust comparisons across studies and populations [5, 37].
- **Longitudinal Studies on Risk Factors:** While many cross-sectional associations are identified, more prospective cohort studies are needed to establish causal relationships between emerging risk factors (e.g., specific inflammatory markers [1, 6, 22], genetic variants [21, 515, 888, 891], environmental pollutants [17]) and PAD incidence.
- **Sex- and Ethnicity-Specific Epidemiology:** Large-scale, well-powered studies are required to comprehensively characterize sex- and ethnicity-specific differences in PAD prevalence, clinical presentation, and response to therapies, particularly in underrepresented populations [112, 147, 223, 235, 395].
- **Cost-Effectiveness of Screening:** Research is needed to evaluate the cost-effectiveness of widespread PAD screening programs in various healthcare settings and populations, especially considering the high rates of undiagnosed cases and the potential for improved outcomes with early intervention [273, 299].
- **Impact of Novel Therapies:** Further investigation into the impact of novel therapeutic strategies (e.g., cilostazol for wound healing [55], dual antiplatelet therapy [85], RAS inhibitors [91]) on PAD prevalence and progression in diverse patient cohorts is warranted.

5.4 Limitations

- **Heterogeneous Definitions** — The definition of PAD and the methods used for its diagnosis (e.g., ABI thresholds, exclusion of incompressible ABIs) vary significantly across studies, contributing to wide ranges in reported prevalence.
- **Varying Study Populations** — Studies encompass a broad spectrum of populations, from general community-dwelling adults to highly specific patient cohorts (e.g., T2DM, hemodialysis, specific ethnic groups), making direct comparisons of prevalence challenging.
- **Cross-Sectional Designs** — A substantial number of included studies are cross-sectional, which can only establish associations and cannot infer causality or track changes in prevalence over time.
- **Geographic and Socioeconomic Bias** — There is an uneven geographic distribution of studies, with some regions (e.g., US, China) being heavily represented while others are less so, potentially limiting the global generalizability of findings.
- **Reporting Inconsistencies** — Data on key demographic factors (e.g., race/ethnicity, sex) and detailed clinical characteristics are not consistently reported across all studies,

hindering comprehensive subgroup analyses.

5.5 Future directions

- **Standardize Diagnostic Criteria** — Implement globally harmonized diagnostic criteria for PAD, particularly for ABI measurements and interpretation, to enhance comparability of prevalence data.
- **Longitudinal Cohort Studies** — Conduct more prospective, long-term cohort studies to track PAD incidence and progression, and to validate identified risk factors.
- **Sex-Specific Research** — Prioritize research focusing on sex-specific risk factors, clinical presentations, and treatment responses to address diagnostic and therapeutic disparities in women.
- **AI-Enhanced Screening** — Develop and validate AI-driven tools for more efficient and accurate PAD screening in diverse primary care and high-risk settings.
- **Targeted Interventions** — Design and evaluate targeted interventions for high-prevalence populations (e.g., diabetics, elderly, specific ethnic groups) to reduce PAD burden and improve outcomes.

6) Conclusion

The median prevalence of peripheral artery disease (PAD) across the diverse populations and clinical settings reported in the structured summary is 7.4%, with reported rates ranging from 0.9% for symptomatic PAD in Italy [997] to 100% for PAD in patients with progressive fibrosing interstitial lung disease [246]. This wide range underscores the significant variability in PAD burden globally and across different patient groups. The generalizability of these findings is most affected by the heterogeneous definitions and diverse study populations employed. For clinicians, a practical takeaway is to maintain a high index of suspicion for PAD in high-risk individuals, such as the elderly and those with diabetes or hypertension, even in the absence of classic symptoms, to facilitate earlier diagnosis and intervention.

References

SAIMSARA Session Index — session.json

Figure 1. Publication-year distribution of included originals

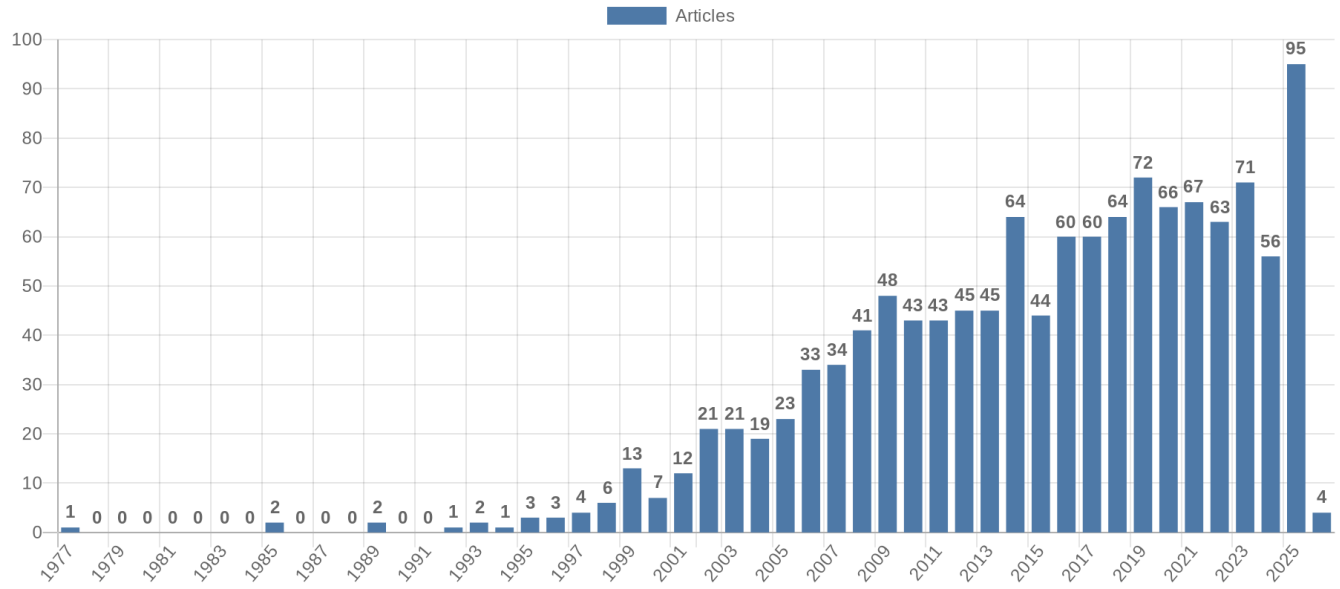

Figure 2. Study-design distribution of included originals

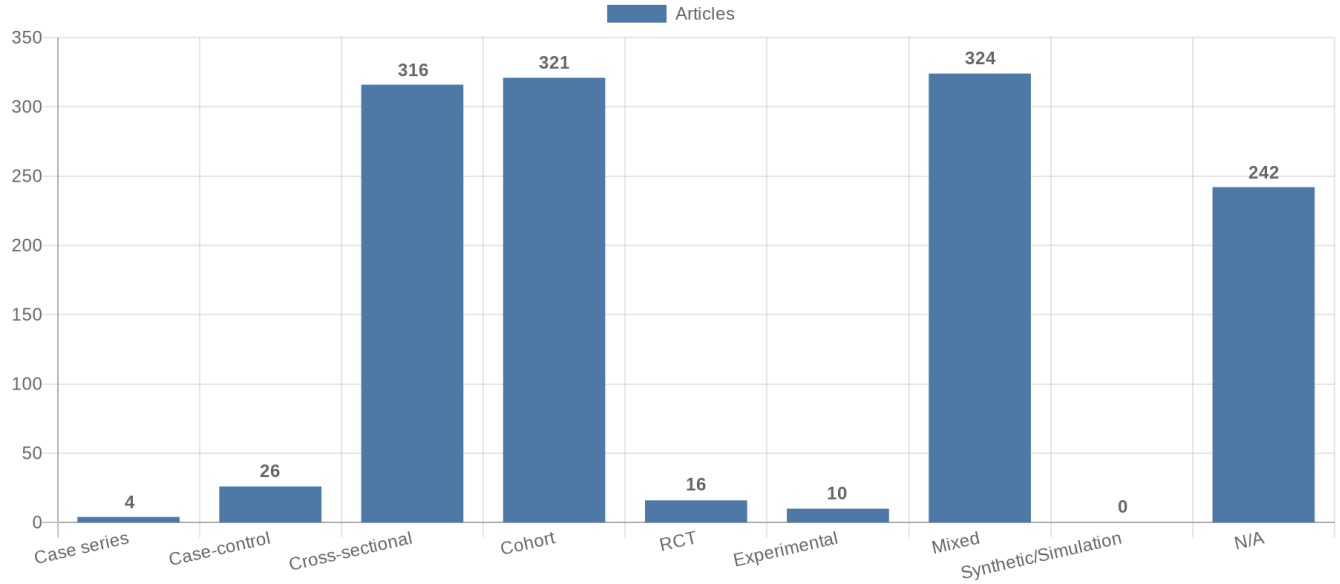

Figure 3. Study-type (directionality) distribution of included originals

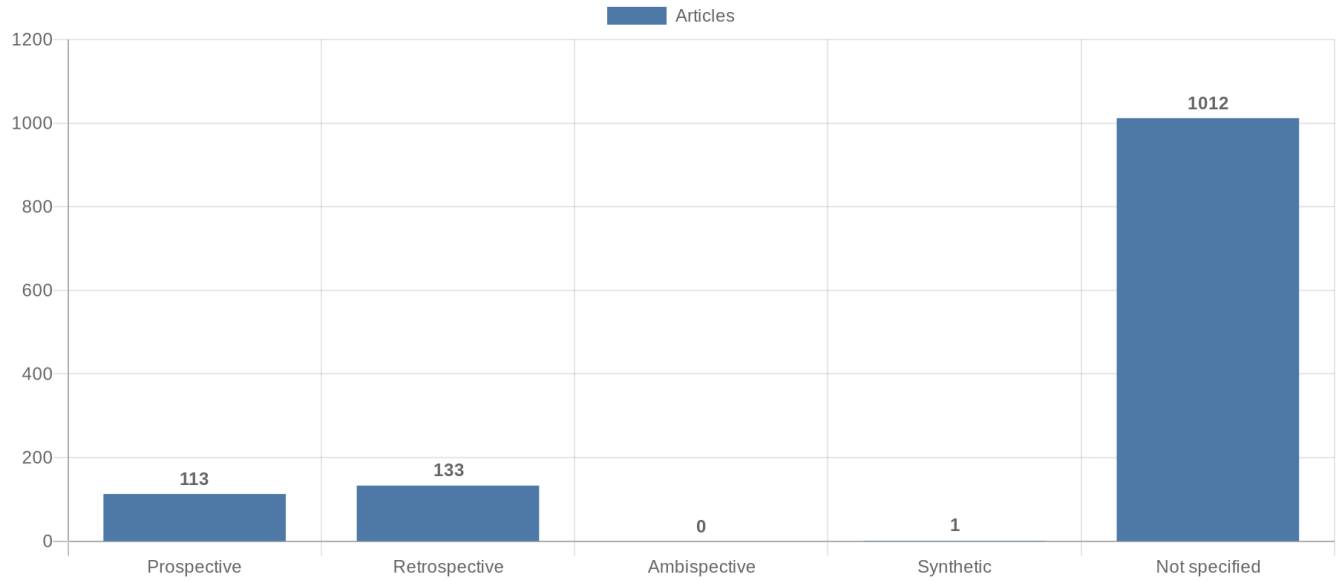

Figure 4. Main extracted research topics

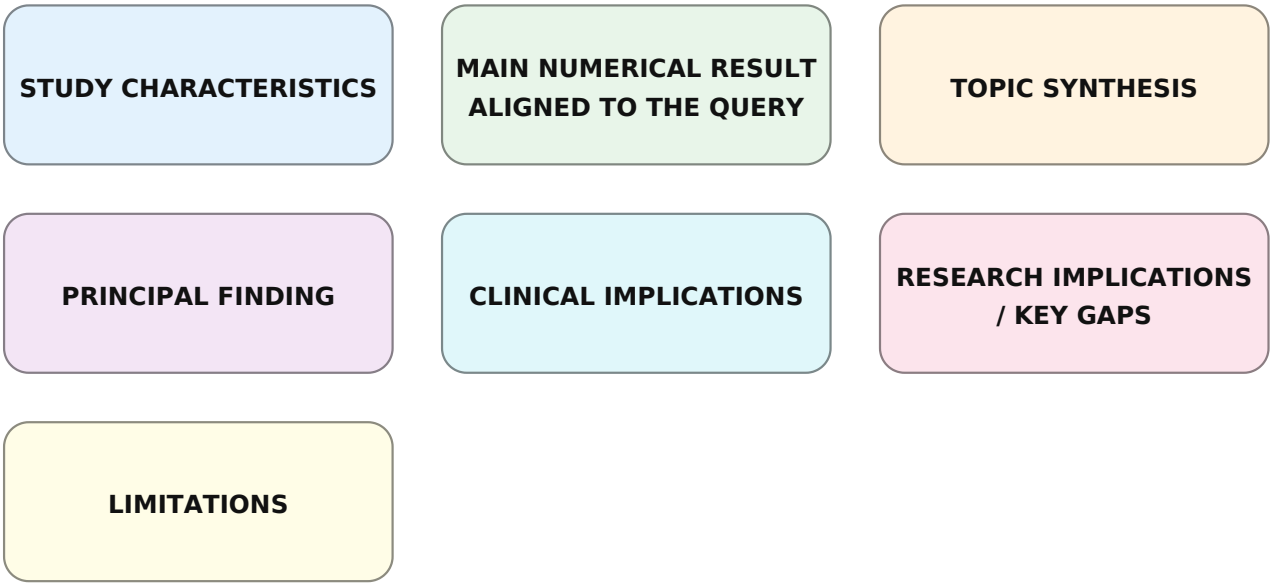

Figure 5. Limitations of current studies (topics)

Figure 6. Future research directions (topics)