Abdominal Aortic Aneurysm Prevalence: Systematic Review with ☸SAIMSARA.

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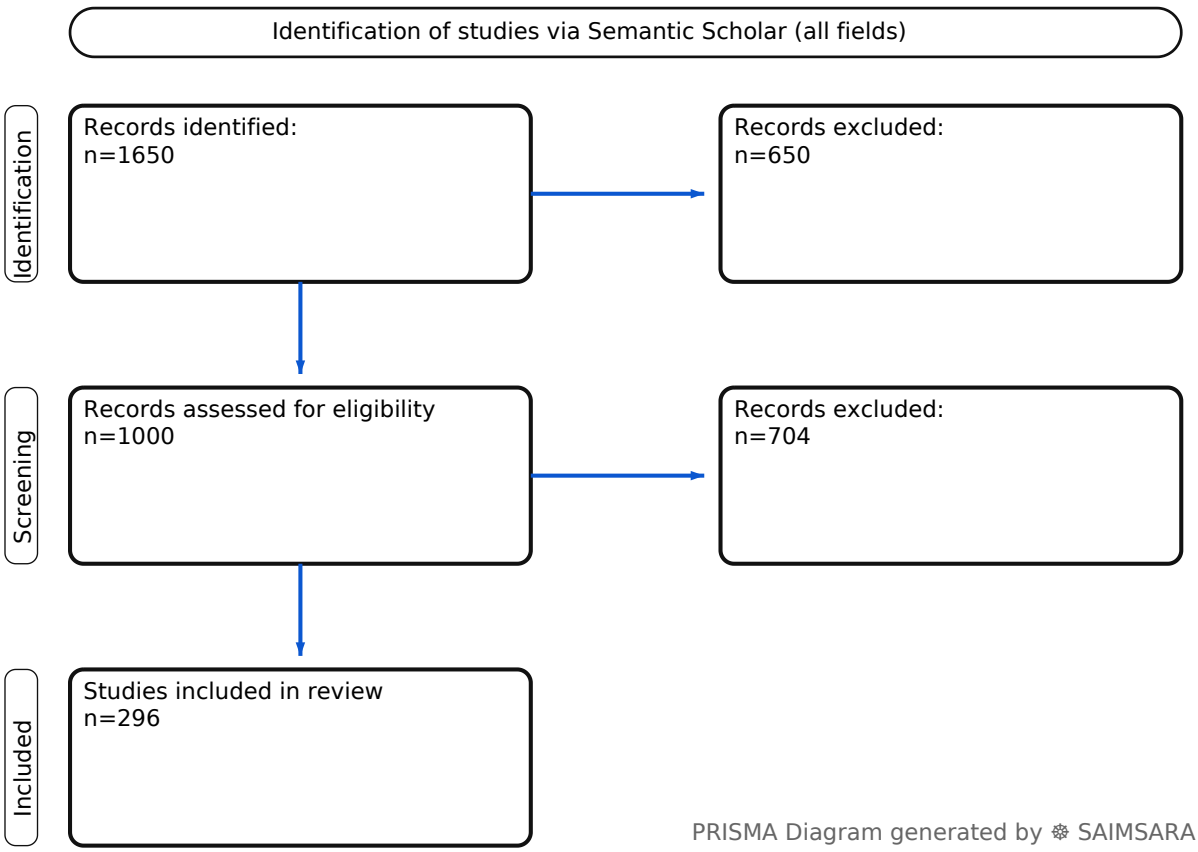
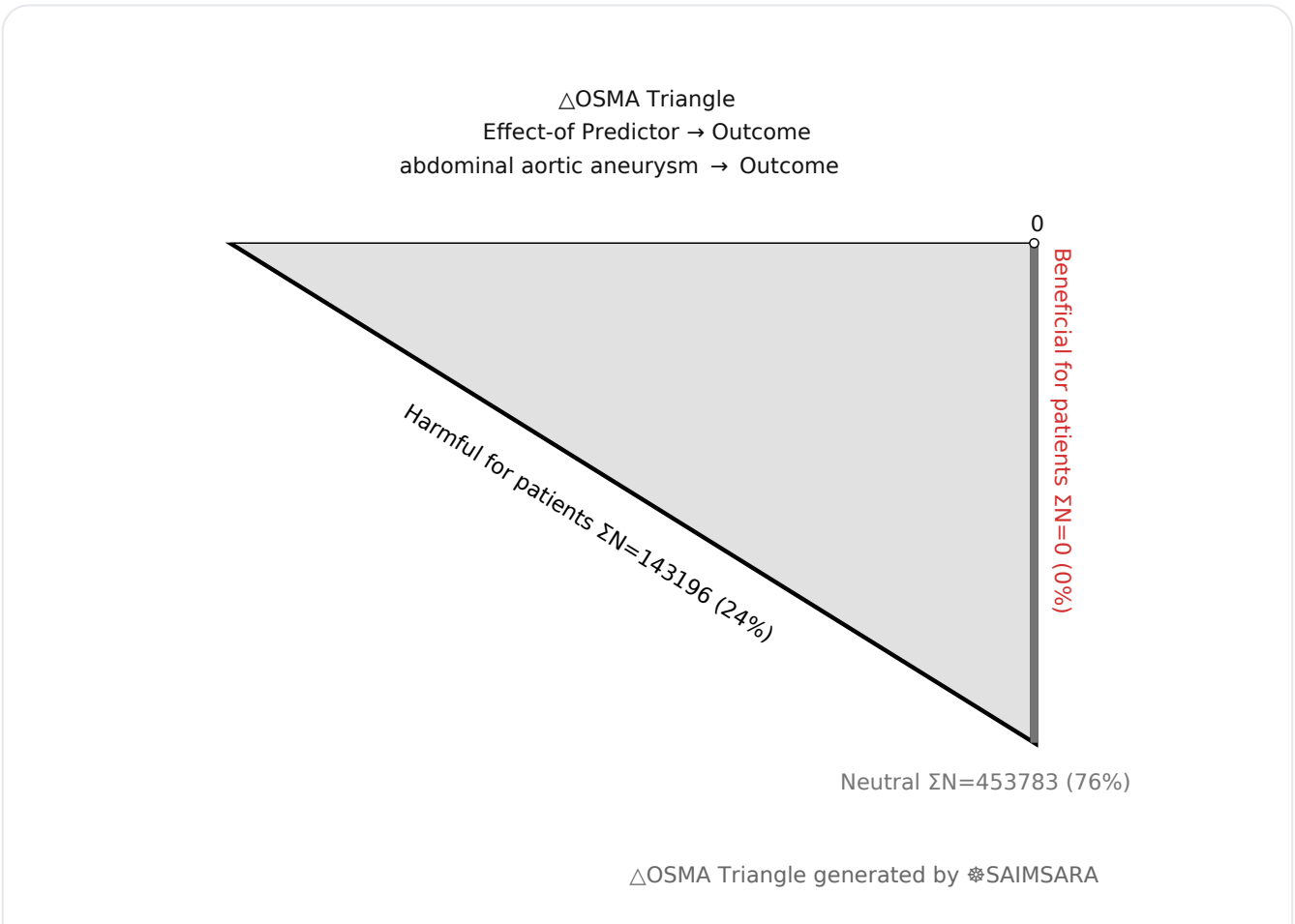
Abstract: The aim of this study is to systematically review the prevalence of abdominal aortic aneurysms and associated factors based on structured extraction from scientific literature. The review utilises 296 studies with 596979 total participants (naïve ΣN). The median prevalence of abdominal aortic aneurysm (AAA) in general populations and screening cohorts was 1.9%, with reported values ranging widely from 0.12% to 8.8%. These figures highlight AAA as a significant vascular disease, particularly affecting older men and those with cardiovascular comorbidities. The considerable variability in reported prevalence across studies, largely due to heterogeneous study designs and populations, represents the most significant limitation affecting the certainty of a single global estimate. A practical takeaway for clinicians is to maintain a high index of suspicion for AAA in elderly male patients and those with known cardiovascular risk factors or related vascular pathologies, recommending screening as appropriate.

Keywords: Abdominal Aortic Aneurysm; AAA prevalence; Older adults; Sex differences; Coronary artery disease; Cancer prevalence; Diabetes mellitus; Inguinal hernia; Non-alcoholic fatty liver disease; Thoracic aortic aneurysm

Review Stats

- Generated: 2026-02-13 00:09:25 CET
- Plan: Pro (expanded craft tokens; source: Semantic Scholar)
- Source: Semantic Scholar
- Scope: All fields
- Keyword Gate: Fuzzy (≥60% of required terms, minimum 2 terms matched in title/abstract)
- Total Abstracts/Papers: 1650
- Downloaded Abstracts/Papers: 1000
- Included original Abstracts/Papers: 296
- Total study participants (naïve ΣN): 596979


Identification of studies via Semantic Scholar (all fields)
Identification
Records identified:
n=1650
Records excluded:
n=650
Screening
Records assessed for eligibility
n=1000
Records excluded:
n=704
Included
Studies included in review
n=296
PRISMA Diagram generated by ☸ SAIMSARA


△OSMA Triangle
Effect-of Predictor → Outcome
abdominal aortic aneurysm → Outcome
0
Beneficial for patients ΣN=0 (0%)
Harmful for patients ΣN=143196 (24%)
Neutral ΣN=453783 (76%)
△OSMA Triangle generated by ☸SAIMSARA

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

Frame: Effect-of Predictor → Outcome • *Source*: Semantic Scholar

Outcome: Outcome Typical timepoints: 65-y, 30-day. Reported metrics: %, CI, p.

Common endpoints: Common endpoints: mortality, complications, survival.

Predictor: abdominal aortic aneurysm — exposure/predictor. Routes seen: topical. Typical comparator: those without hs, the control group, control, controls. inguinal hernia….

- **1) Beneficial for patients** — Outcome with abdominal aortic aneurysm — — — ΣN=0
- **2) Harmful for patients** — Outcome with abdominal aortic aneurysm — [26], [30], [32], [35], [36], [38], [40], [41], [43], [46], [48], [49], [50], [58], [113], [119], [159], [161], [163], [251], [263], [273], [276] — ΣN=143196
- **3) No clear effect** — Outcome with abdominal aortic aneurysm — [1], [2], [3], [4], [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24], [25], [27], [28], [29], [31], [33], [34], [37], [39], [42], [44], [45], [47], [51], [52], [53], [54], [55], [56], [57], [59], [60], [61], [62], [63], [64], [65], [66], [67], [68], [69], [70], [71], [72], [73], [74], [75], [76], [77], [78], [79], [80], [81], [82], [83], [84], [85], [86], [87], [88], [89], [90], [91], [92], [93], [94], [95], [96], [97], [98], [99], [100], [101], [102], [103], [104], [105], [106], [107], [108], [109], [110], [111], [112], [114], [115], [116], [117], [118], [120], [121], [122], [123], [124], [125], [126], [127], [128], [129], [130], [131], [132], [133], [134], [135], [136], [137], [138], [139], [140], [141], [142], [143], [144], [145], [146], [147], [148], [149], [150], [151], [152], [153], [154], [155], [156], [157], [158], [160], [162], [164], [165], [166], [167], [168], [169], [170], [171], [172], [173], [174], [175], [176], [177], [178], [179], [180], [181], [182], [183], [184], [185], [186], [187], [188], [189], [190], [191], [192], [193], [194], [195], [196], [197], [198], [199], [200], [201], [202], [203], [204], [205], [206], [207], [208], [209], [210], [211], [212], [213], [214], [215], [216], [217], [218], [219], [220], [221], [222], [223], [224], [225], [226], [227], [228], [229], [230], [231], [232], [233], [234], [235], [236], [237], [238], [239], [240], [241], [242], [243], [244], [245], [246], [247], [248], [249], [250], [252], [253], [254], [255], [256], [257], [258], [259], [260], [261], [262], [264], [265], [266], [267], [268], [269], [270], [271], [272], [274], [275], [277], [278], [279], [280], [281], [282], [283], [284], [285], [286], [287], [288], [289], [290], [291], [292], [293], [294], [295], [296] — ΣN=453783

1) Introduction

Abdominal aortic aneurysm (AAA), a localized dilation of the abdominal aorta, represents a significant

public health concern due to its potential for rupture, which carries high mortality rates. Understanding the prevalence of AAA is crucial for informing screening guidelines, risk stratification, and resource allocation in healthcare systems. This paper synthesizes current evidence on AAA prevalence, exploring its demographic distribution, associated comorbidities, and risk factors, as well as geographic and temporal trends.

2) Aim

The aim of this study is to systematically review the prevalence of abdominal aortic aneurysms and associated factors based on structured extraction from scientific literature.

3) Methods

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

- **Bias:** The included studies exhibit a range of designs, from cross-sectional and cohort studies to mixed-design and randomized controlled trials, with many not specifying directionality or having limited sample sizes, which may introduce selection and reporting biases. The qualitative nature of some main results and the lack of comprehensive statistical reporting in several entries further limit the ability to conduct a quantitative meta-analysis or robust bias assessment.

4) Results

4.1 Study characteristics:

The review encompassed a diverse range of study designs, including mixed-design studies, cohort studies (both prospective and retrospective), cross-sectional analyses, case-control studies, randomized controlled trials (RCTs), experimental studies, and case series. Populations varied widely, from general elderly populations (e.g., individuals aged 60 years and above [1], 65-year-old men [58]), to specific patient cohorts such as those with acute coronary syndrome (ACS) [4], cerebrovascular disease [5, 101], chronic obstructive pulmonary disease (COPD) [22, 90], hypertension [35, 128], manifest vascular disease [46], various cancers [6, 12, 47], and HIV infection [33, 217]. Geographical settings spanned multiple continents, including Europe (e.g., Poland [16], Denmark [42], Sweden [66], Italy [94]), Asia (e.g., Turkey [49], Korea [111], Iran [55], China [180]), Africa [20], North America (e.g., United States [28]), Australia [200], and South America (e.g., Brazil [105]). Follow-up periods, when specified, ranged from short-term (e.g., 30 days [45], 3 months [25], 6 months [32]) to long-term (e.g., 5 years [14, 145, 244], 7 years [18], 8.7 years [33], 14 years [58], 15 years [99], 20 years [275], 22 years [109]). Many studies did not specify a follow-up duration.

4.2 Main numerical result aligned to the query:

The prevalence of abdominal aortic aneurysm (AAA) in general populations and screening cohorts demonstrates considerable variability across studies. The median prevalence observed was 1.9% [145, 219], with a wide range from 0.12% [1] to 8.8% [103]. Specific studies reported prevalence rates such as 0.6% in a large screening population in the UK/US [43], 1.2% in men invited to a screening program in Stockholm [41], 2.49% in men aged 60 years and older in primary healthcare settings [51], and 4.8% in a meta-analysis of the general population [200]. Higher rates were noted in specific demographics, reaching 8.8% in a population above 65 years [103] and 4.32% in men in Poland [16], compared to 1.23% in women in the same region [16]. Geographic differences were also apparent, with prevalence ranging from 0.89% to 4.9% in Eastern countries and 4.57% to 19% in Western countries [173].

4.3 Topic synthesis:

- **Age and Sex-Specific Prevalence:** AAA prevalence is consistently higher in men and increases with age, with rates like 4.32% in men versus 1.23% in women aged over 65 years [16], and 4–8% in men over 65 years [63, 85, 143].
- **Cardiovascular Comorbidities:** AAA is frequently associated with other cardiovascular diseases, including coronary artery disease (CAD) (4.8% prevalence of AAA in CAD patients [21], 2.4% in Asian CAD patients [92]), acute coronary syndrome (ACS) (6.25% prevalence [4]), peripheral arterial disease (PAD) (14.2% prevalence of PAD in men screened for AAA [37], 9.0% prevalence of AAA in claudicant patients [61]), and cerebrovascular disease (6.9% in older men with TIA/stroke [5]).
- **Metabolic and Systemic Associations:** A higher prevalence of cancers (45.2% in AAA group vs. 35.7% in controls [6]), non-alcoholic fatty liver disease (NAFLD) (43.7% in AAA group vs. 31.1% in controls [15]), and chronic kidney disease (CKD) (5.1% in AAA patients aged ≥65 years [65]) is observed in AAA patients. Diabetes mellitus (DM) is associated with reduced AAA growth [24, 97, 198] and a lower prevalence in ruptured AAAs [44].
- **Genetic and Inflammatory Markers:** Familial history is a significant risk factor [95], with relatives of AAA patients having a high risk for various aneurysms [30]. Elevated plasma levels of C5 [10], arachidonic acid [19], Hpx and heme [29], and myeloperoxidase [179] are associated with AAA presence or progression. Blood group O is linked to a reduced AAA prevalence [184].
- **Lifestyle and Environmental Risk Factors:** Smoking is a predominant risk factor, increasing risk by 15 times in women and 7 times in men [43], and by 12.75 times in Turkish men [49]. Hypertension is also a key correlate [57, 97, 248]. Reported salt intake [31] and influenza pneumonia [40] are associated with higher AAA prevalence.

- **Screening and Detection:** Screening programs reveal varied prevalence rates, such as 0.6% in a large UK/US population [43] and 1.2% in Swedish men [41], with declining trends in some populations over time (e.g., 1.32% to 0.69% in 65-year-old men over a 14-year period [58]).
- **Associated Aneurysms and Vascular Pathologies:** Concomitant thoracic aortic aneurysms (TAA) are present in 10.8% of AAA patients, with an additional 5.1% developing TAA over 7 years [18]. Intracranial aneurysms are found in 12.7% of AAA patients [114], and inguinal hernias are significantly more prevalent in AAA patients (25% vs. 9% in controls [39]).
- **Outcomes and Management Considerations:** The perioperative mortality rate for ruptured AAA (rAAA) is substantial (19.04% [26]). Post-contrast acute kidney injury (PC-AKI) impacts outcomes and survival in endovascularly treated AAAs [60]. Sexual dysfunction, including erectile dysfunction (32% severe ED [9], 18% ED post-surgery [25]), is highly prevalent in AAA patients.
- **Geographic and Temporal Trends:** Prevalence rates vary globally, with Western countries showing higher rates (4.57–19%) compared to Eastern countries (0.89–4.9%) [173]. Age-adjusted mortality rates for AAA significantly decreased in the United States from 69.0 in 1999 to 27.9 in 2020 [28].

5) Discussion

5.1 Principal finding:

The median prevalence of abdominal aortic aneurysm (AAA) in general populations and screening cohorts was found to be 1.9% [145, 219], with reported values ranging widely from 0.12% [1] to 8.8% [103]. This broad range underscores the heterogeneous nature of AAA epidemiology and detection.

5.2 Clinical implications:

- **Targeted Screening:** Given the significantly higher prevalence in men and increasing rates with age [16, 63, 85, 143], targeted screening programs for males over 65 years remain critical.
- **Comorbidity Awareness:** Clinicians should be highly vigilant for AAA in patients presenting with cardiovascular comorbidities such as coronary artery disease [21, 92], peripheral arterial disease [37, 61], hypertension [57, 97, 248], and cerebrovascular disease [5, 101].
- **Risk Factor Modification:** Aggressive management of modifiable risk factors, particularly smoking [43, 49, 95] and hypertension [57, 97, 248], is crucial for prevention and potentially slowing AAA progression.

- **Holistic Aortic Assessment:** The high co-occurrence of AAA with other aortic aneurysms (thoracic [18, 197], intracranial [114, 185]) and vascular pathologies (carotid stenosis [36, 283], inguinal hernias [39]) suggests a need for comprehensive vascular evaluation.
- **Post-Intervention Monitoring:** Awareness of potential post-repair complications such as endoleaks (30.4% at 30 days [45]), sexual dysfunction [9, 25], and acute kidney injury [48, 60] is important for long-term patient care.

5.3 Research implications / key gaps:

- **Standardized Prevalence Reporting:** Future studies should adopt standardized definitions and reporting metrics for AAA prevalence to allow for more robust comparisons and meta-analyses across diverse populations [81].
- **Longitudinal Studies on Risk Factor Impact:** More prospective cohort studies are needed to precisely quantify the long-term impact of various risk factors (e.g., specific inflammatory markers [10, 19, 29, 179], genetic variants [42, 203, 204, 211, 296], or influenza pneumonia [40]) on AAA incidence and progression.
- **Sex-Specific Pathogenesis:** Research is needed to further elucidate the sex-based differences in AAA prevalence, progression, and outcomes, potentially exploring underlying biological mechanisms such as elastin degradation or MMP-9 levels [93, 249, 252].
- **Cost-Effectiveness of Expanded Screening:** Studies evaluating the cost-effectiveness of expanding AAA screening to broader populations, including high-risk women [38, 187] or specific comorbid groups, are needed to inform public health policy [112, 164].
- **Impact of Novel Therapies on Growth:** Further investigation into the effect of specific medical therapies (e.g., statins [84, 176, 225], doxycycline [265], radiation exposure [34]) on AAA growth rates and long-term outcomes is warranted.

5.4 Limitations:

- **Heterogeneous Study Designs** — The diverse study designs (mixed, cohort, cross-sectional, etc.) limit direct comparability and pooling of data.
- **Varied Population Demographics** — Studies included a wide range of ages, sexes, and health statuses, affecting generalizability.
- **Inconsistent Diagnostic Criteria** — Differences in AAA diagnostic criteria and measurement techniques may influence reported prevalence rates.
- **Geographic and Temporal Variability** — Prevalence rates vary significantly by region and over time, making a single global estimate challenging.

- **Qualitative Reporting of Outcomes** — Many studies provided qualitative results or lacked precise numerical data, hindering quantitative synthesis.

5.5 Future directions:

- **Global Standardized Screening** — Implement uniform AAA screening protocols across diverse populations for consistent data.
- **Sex-Specific Risk Models** — Develop and validate predictive models for AAA risk tailored to men and women.
- **Biomarker-Guided Surveillance** — Investigate novel biomarkers for early detection and progression monitoring of AAA.
- **Intervention Efficacy Trials** — Conduct comparative effectiveness research on different AAA management strategies.
- **Public Health Awareness Campaigns** — Implement targeted campaigns to educate high-risk individuals on AAA and screening benefits.

6) Conclusion

The median prevalence of abdominal aortic aneurysm (AAA) in general populations and screening cohorts was 1.9% [145, 219], with reported values ranging widely from 0.12% [1] to 8.8% [103]. These figures highlight AAA as a significant vascular disease, particularly affecting older men and those with cardiovascular comorbidities. The considerable variability in reported prevalence across studies, largely due to heterogeneous study designs and populations, represents the most significant limitation affecting the certainty of a single global estimate. A practical takeaway for clinicians is to maintain a high index of suspicion for AAA in elderly male patients and those with known cardiovascular risk factors or related vascular pathologies, recommending screening as appropriate.

References

SAIMSARA Session Index — session.json

Figure 1. Publication-year distribution of included originals

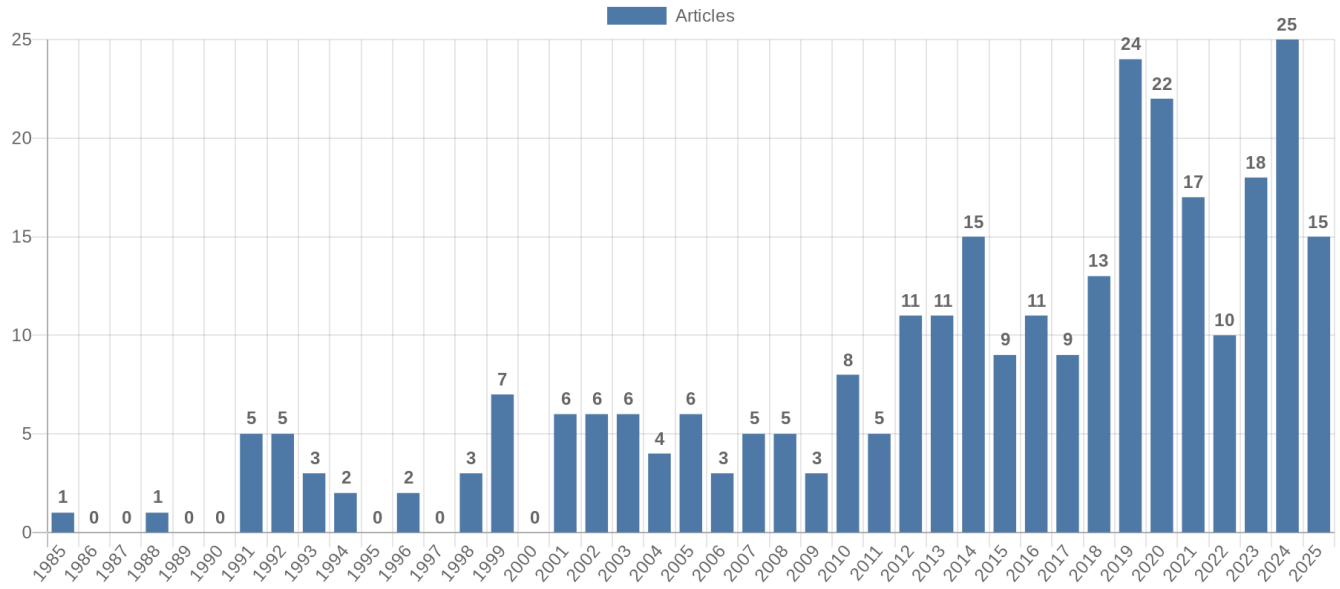


Figure 2. Study-design distribution of included originals

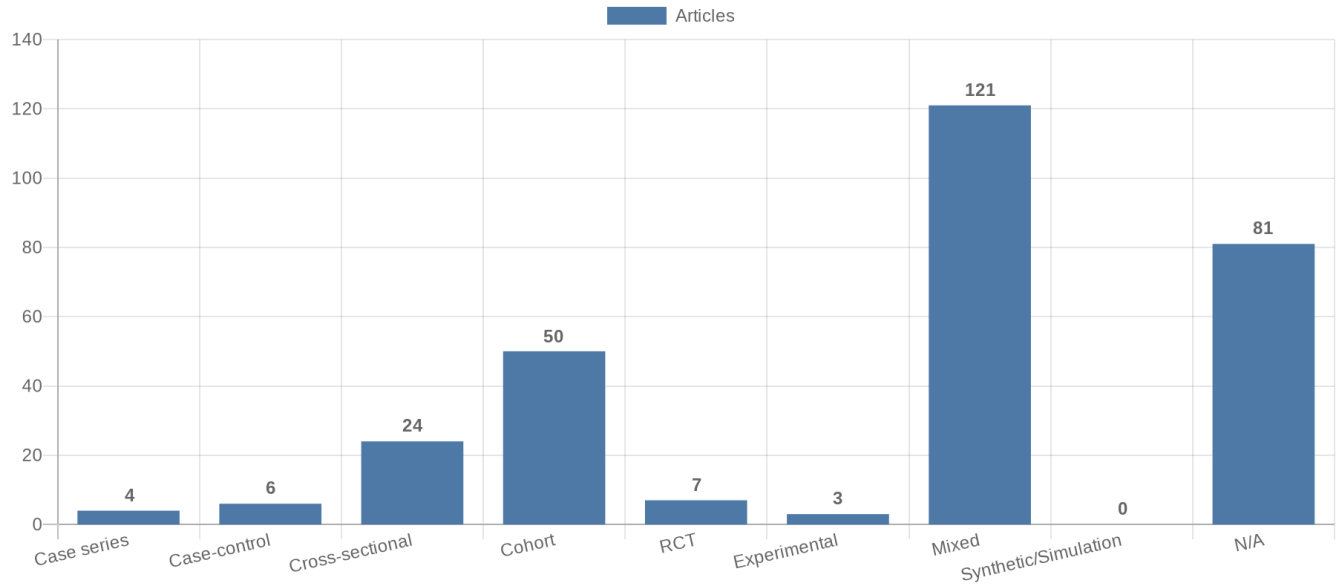


Figure 3. Study-type (directionality) distribution of included originals

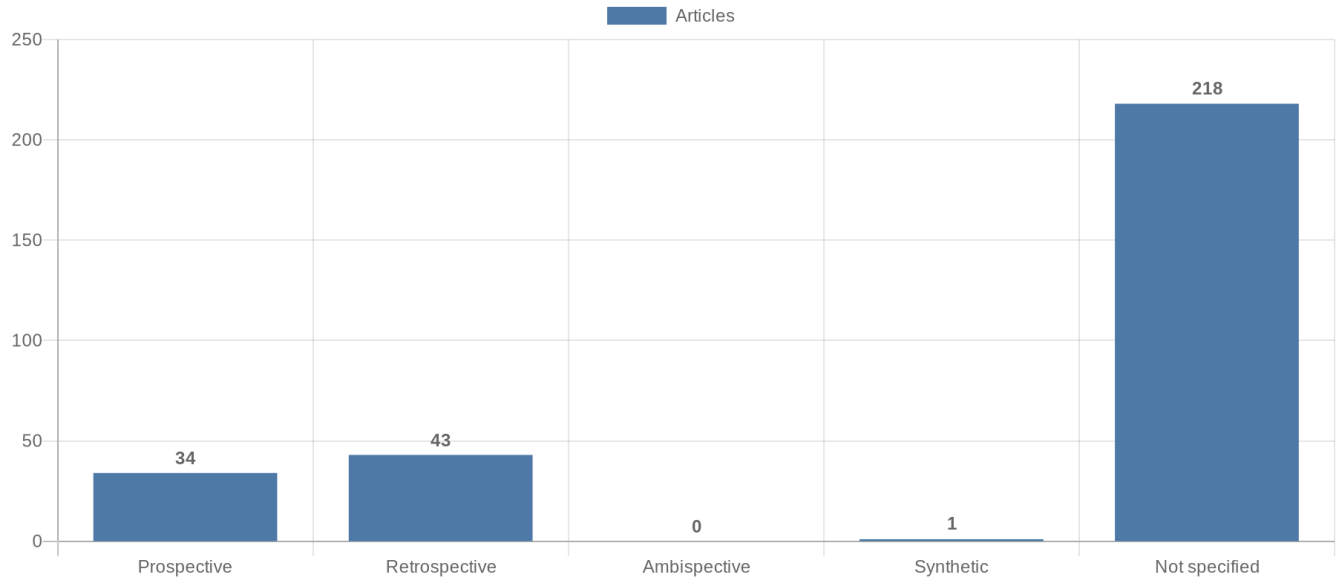


Figure 4. Main extracted research topics

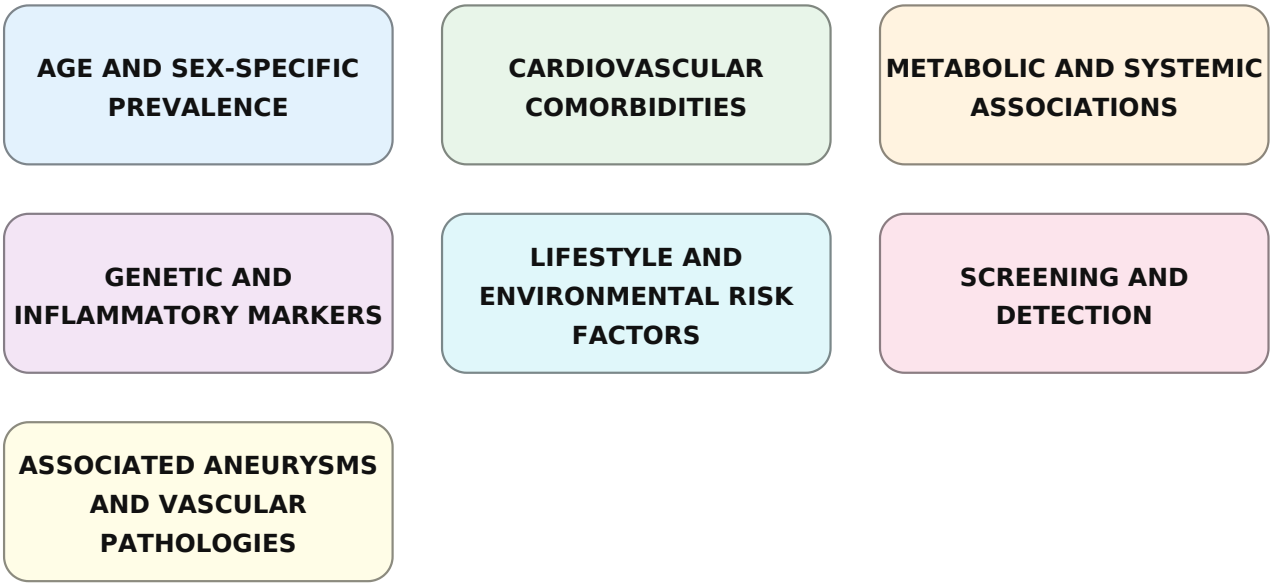


Figure 5. Limitations of current studies (topics)

Figure 6. Future research directions (topics)