Life Quality in Peripheral Artery Disease: Systematic Review with ☸SAIMSARA.

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Abstract: This systematic review aims to comprehensively assess the current understanding of life quality in patients with peripheral artery disease, identifying its determinants, methods of assessment, and the impact of various interventions on patient-reported quality of life outcomes. The review utilises 277 studies with 231946 total participants (naïve ΣN). Peripheral artery disease significantly impairs patients' quality of life, with various interventions demonstrating improvements in functional capacity, notably a median increase of 35.2 meters (range: 21.3 to 85 meters) in 6-minute walking distance. These findings are generally applicable across symptomatic PAD populations, emphasizing the importance of functional improvements for overall well-being. However, the variability in QoL assessment tools across studies represents a significant limitation, hindering comprehensive cross-study comparisons. Future research should prioritize the standardization of quality of life measures to enable more robust comparative effectiveness studies and better inform clinical practice.

Keywords: Peripheral Artery Disease; Health-Related Quality of Life; Intermittent Claudication

Review Stats

- Generated: 2026-02-03 12:18:38 CET
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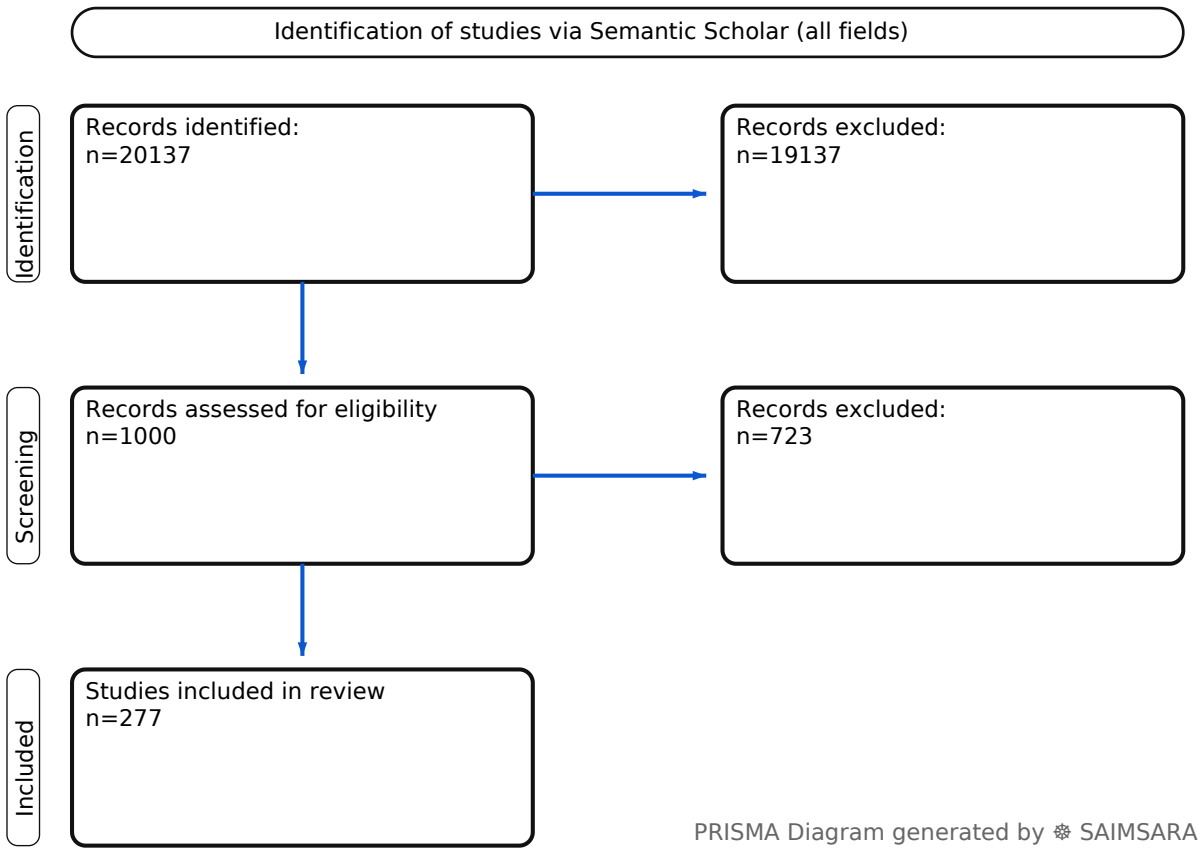
- Source: Semantic Scholar
- Scope: All fields
- Keyword Gate: Fuzzy (≥60% of required terms, minimum 2 terms matched in title/abstract)
- Total Abstracts/Papers: 20137
- Downloaded Abstracts/Papers: 1000
- Included original Abstracts/Papers: 277
- Total study participants (naïve ΣN): 231946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Records excluded:
n=19137
Screening
Records assessed for eligibility
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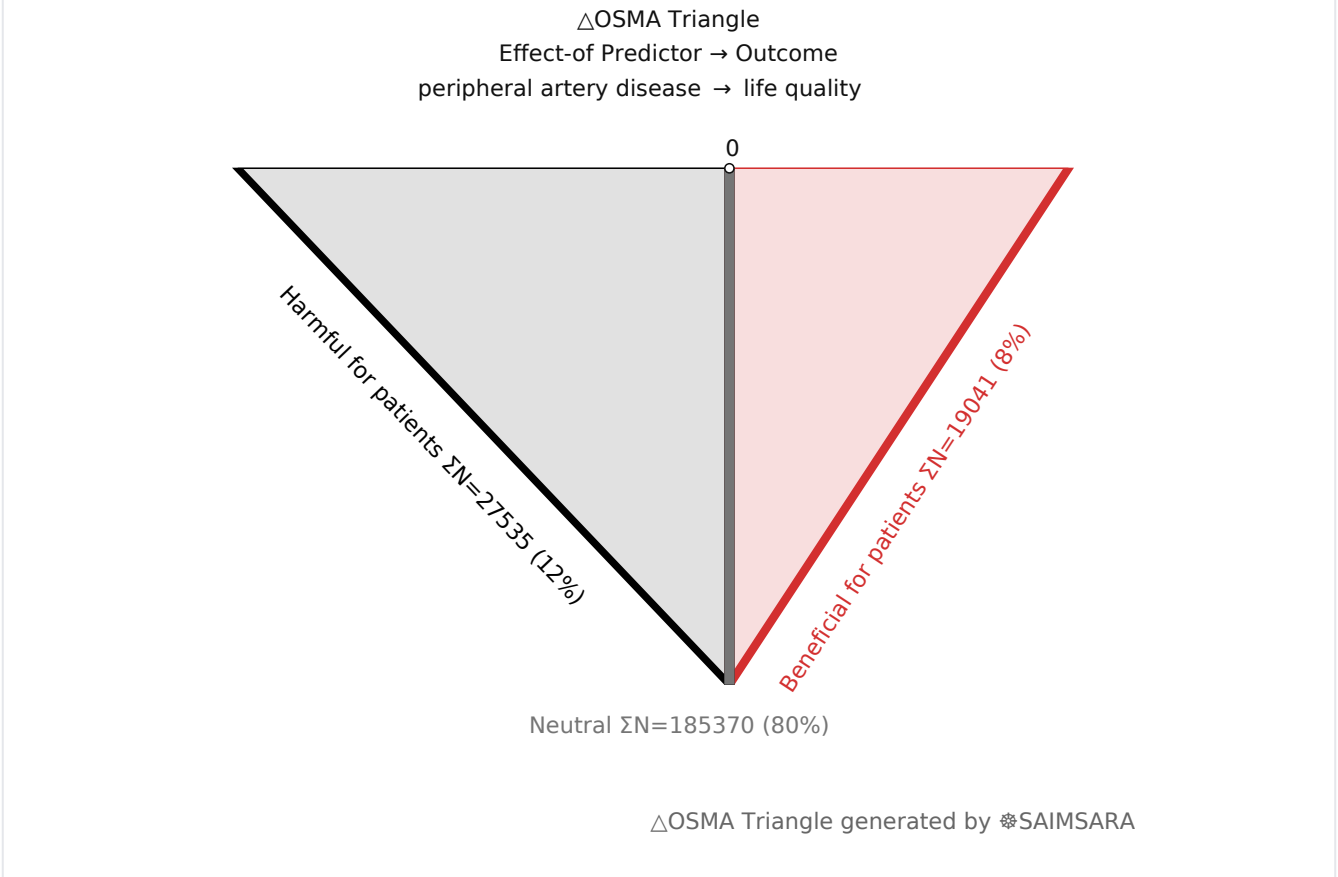
Records excluded:
n=723
Included
Studies included in review
n=277
PRISMA Diagram generated by ☸ SAIMSARA


△OSMA Triangle
Effect-of Predictor → Outcome
peripheral artery disease → life quality
0
Harmful for patients ΣN=27535 (12%)
Beneficial for patients ΣN=19041 (8%)
Neutral ΣN=185370 (80%)
△OSMA Triangle generated by ☸SAIMSARA

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

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

Outcome: life quality Typical timepoints: 1-y, 12-mo. Reported metrics: %, CI, p.

Common endpoints: Common endpoints: qol, functional, mortality.

Predictor: peripheral artery disease — exposure/predictor. Doses/units seen: 100 mg, 2.5 mg. Routes seen: iv, oral. Typical comparator: hf or stroke patients, 6-minute walking distance, control, lbet….

- **1) Beneficial for patients** — life quality with peripheral artery disease — [4], [5], [7], [9], [12], [13], [14], [17], [21], [25], [26], [27], [29], [31], [33], [35], [36], [37], [40], [45], [49], [50], [51], [52], [53], [54], [56], [57], [61], [63], [64], [67], [69], [75], [91], [95], [108], [109], [110], [112], [114], [115], [117], [118], [122], [124], [125], [152], [153], [155], [156], [157], [163], [164], [165], [167], [168], [169], [170], [171], [172], [173], [175], [177], [178], [180], [183], [187], [189], [190], [193], [197], [201], [212], [214], [215], [217], [218], [221], [225], [257], [263], [269], [271], [272], [273], [277] — ΣN=19041
- **2) Harmful for patients** — life quality with peripheral artery disease — [3], [11], [15], [16], [20], [22], [23], [30], [32], [42], [43], [46], [55], [58], [66], [68], [71], [72], [73], [74], [76], [77], [81], [82], [85], [93], [97], [98], [99], [151], [158], [159], [160], [161], [166], [182], [194], [195], [196], [198], [200], [202], [207], [208], [210], [213], [216], [219], [220], [222], [223], [224], [255], [265], [275], [276] — ΣN=27535
- **3) No clear effect** — life quality with peripheral artery disease — [1], [2], [6], [8], [10], [18], [19], [24], [28], [34], [38], [39], [41], [44], [47], [48], [59], [60], [62], [65], [70], [78], [79], [80], [83], [84], [86], [87], [88], [89], [90], [92], [94], [96], [100], [101], [102], [103], [104], [105], [106], [107], [111], [113], [116], [119], [120], [121], [123], [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], [154], [162], [174], [176], [179], [181], [184], [185], [186], [188], [191], [192], [199], [203], [204], [205], [206], [209], [211], [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], [251], [252], [253], [254], [256], [258], [259], [260], [261], [262], [264], [266], [267], [268], [270], [274] — ΣN=185370

1) Introduction

Peripheral Artery Disease (PAD) is a chronic condition affecting millions of adults globally,

characterized by reduced blood flow to the limbs [20, 73, 159]. This arterial insufficiency often leads to symptoms such as intermittent claudication (IC), rest pain, non-healing wounds, and in severe cases, critical limb ischemia (CLI) and limb loss [66, 73, 133, 151]. These physical manifestations profoundly impair patients' functional capacity, mobility, and overall health-related quality of life (HRQoL) [16, 72, 77, 82, 96, 97, 150, 154, 255]. The burden of PAD extends beyond physical limitations, encompassing psychosocial and emotional distress, reduced life satisfaction, and increased depressive symptoms [30, 58, 71, 159]. Given its widespread impact, improving quality of life (QoL) is a primary treatment objective for patients with PAD [102, 117, 156, 177]. This systematic review synthesizes recent findings on the multifaceted aspects of life quality in PAD patients, identifying key determinants and therapeutic strategies.

2) Aim

This systematic review aims to comprehensively assess the current understanding of life quality in patients with peripheral artery disease, identifying its determinants, methods of assessment, and the impact of various interventions on patient-reported quality of life outcomes.

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 predominantly consist of cohort, cross-sectional, and randomized controlled trial (RCT) designs. While RCTs offer robust evidence, the presence of numerous observational studies, mixed-method designs, and study protocols introduces potential for selection bias, confounding, and variability in reporting quality. Many studies lacked specified directionality, and some had relatively small sample sizes or short follow-up periods, which could limit the generalizability and long-term insights into QoL changes.

4) Results

4.1 Study characteristics:

The review encompassed a broad range of study designs, including numerous cohort studies [1, 3, 5, 6, 9, 11, 13, 14, 16, 36, 37, 40, 43, 45, 46, 54, 55, 58, 61, 63, 116, 118, 119, 130, 137, 154, 161, 162, 174, 177, 190, 193, 194, 195, 196, 197, 198, 202, 208, 213, 214, 216, 217, 226, 231, 239, 242, 243, 245, 247, 271, 275], cross-sectional studies [2, 7, 10, 15, 22, 48, 57, 62, 68, 70, 120, 123, 147, 149, 162, 206, 207, 210, 213, 215, 236, 238], and randomized controlled trials (RCTs) [4, 8, 12, 17, 21, 28, 35, 44, 50, 52, 53, 56, 60, 65, 80, 108, 109, 110, 112, 126, 144, 163, 165, 167, 168, 171, 173, 175, 178, 181, 184, 185, 186, 191, 199, 203, 205, 211, 218, 234, 235, 250, 251, 256, 258, 261, 264, 270, 274]. Populations primarily included adults with symptomatic PAD, often with intermittent

claudication or critical limb ischemia. Follow-up periods varied widely, from short-term (e.g., 4 weeks [41], 6 weeks [56], 8 weeks [50, 126, 167], 12 weeks [8, 21, 65, 112, 171, 181, 185, 205], 3 months [9, 43, 45, 108, 117, 190, 203, 218]) to intermediate (e.g., 6 months [36, 37, 44, 56, 116, 186, 212], 12 months [5, 43, 55, 63, 118, 119, 175, 191, 193, 217, 219, 248, 251, 264, 266], 18 months [189], 24 months [116, 245]) and long-term (e.g., 3 years [54, 190, 226], 4.5 years [257], 5 years [43], 11 years [137]).

4.2 Main numerical result aligned to the query:

Improvements in 6-minute walking distance (6MWD), a key indicator of functional capacity and quality of life, were frequently reported across various interventions. The median absolute improvement in 6MWD was 35.2 meters, with a range from 21.3 meters to 85 meters [31, 33, 50, 114, 172]. For instance, supervised exercise training (SET) led to an average improvement of 32.1 ± 6.6 meters [31] and 53.5 ± 4.5 meters [33]. Home-based leg heat therapy showed a median improvement of 21.3 meters compared to a control group's -0.91 meters [50], while high-pressure intermittent limb compression (HPILC) resulted in a 35.2 ± 38.7 meters improvement [172]. Another study reported an increase from 137 ± 12 meters to 222 ± 10 meters, representing an 85-meter gain [114]. These improvements consistently correlated with enhanced quality of life metrics [9, 53, 114].

4.3 Topic synthesis:

- **Significant Negative Impact of PAD on QoL:** PAD consistently reduces HRQoL across physical, social, and emotional domains, often worse than other cardiovascular diseases [3, 16, 20, 30, 58, 66, 71, 73, 77, 81, 82, 96, 97, 99, 113, 121, 123, 140, 148, 150, 154, 159, 160, 161, 169, 176, 182, 213, 220, 224, 230, 232, 255, 276].
- **Exercise-Based Interventions for QoL Improvement:** Supervised exercise training (SET), including aerobic, resistance, high-intensity interval training (HIIT), and home-based programs, significantly improves walking distance, functional capacity, and HRQoL [4, 9, 21, 25, 27, 31, 33, 35, 37, 38, 45, 50, 51, 53, 65, 75, 110, 114, 141, 143, 145, 153, 157, 165, 167, 168, 170, 171, 180, 184, 218, 271, 272, 277]. Improvements in 6-minute walking distance (6MWD) ranged from 21.3 meters [50] to 85 meters [114].
- **Revascularization and Interventional Therapies:** Early invasive treatment, endovascular therapy, percutaneous transluminal angioplasty (PTA), drug-coated balloon (DCB) angioplasty, and spinal cord stimulation (SCS) are associated with significant improvements in QoL outcomes, wound healing, and limb salvage [5, 6, 29, 54, 61, 63, 117, 118, 124, 127, 134, 135, 138, 144, 188, 189, 190, 193, 201, 212, 214, 217, 219, 221, 249, 273].
- **Impact of Comorbidities and Risk Factors:** Conditions like lower ankle-brachial index (ABI) [1, 11, 12, 14, 162, 196], diabetes (especially with complications like DPN, diabetic

foot, erectile dysfunction) [22, 69, 93, 120, 128, 136, 137, 149, 198, 202, 207, 210, 213, 216, 240, 243, 274], chronic kidney disease (CKD) [13, 32, 223, 229, 239, 263], sleep apnea [43], and socioeconomic/financial barriers [55, 18] significantly worsen QoL in PAD patients. Female gender was also noted as a factor for lower QoL scores [6, 15, 166].

- **Pharmacological and Novel Therapies:** Medications like cilostazol [112, 180], ramipril [28], semaglutide [17], tapentadol PR [115], rivaroxaban plus aspirin [95, 122, 139, 142], and potentially new vasodilative/angiogenetic molecules [225] can improve walking distance, pain, and QoL. Lipoprotein apheresis [26, 59, 257] and home-based leg heat therapy [50, 56, 167] also show promise.
- **Importance of QoL Assessment Tools:** Validated questionnaires such as the Peripheral Artery Questionnaire (PAQ) [1, 5, 19, 40, 43, 45, 55, 178, 196], Vascular Quality of Life-6 (VascuQol-6) [2, 33, 57, 59, 88, 215], Short-Form 36 (SF-36) [9, 16, 113, 199], Walking Impairment Questionnaire (WIQ) [19, 41, 48, 49, 70, 100], and Quality of Life questionnaire for patients with peripheral artery disease (QOLPAD) [10] are crucial for evaluating patient-reported outcomes and guiding treatment [19, 40, 79, 88, 100, 211, 215, 230].
- **Multidisciplinary and Holistic Care:** An integrative, multidisciplinary approach considering social determinants of health, lifestyle modifications (e.g., smoking cessation, physical activity), and comprehensive rehabilitation programs is recommended to optimize outcomes and improve QoL in PAD patients [18, 23, 36, 37, 71, 153, 179, 180, 246, 247, 253, 254].

5) Discussion

5.1 Principal finding:

The review consistently highlights that peripheral artery disease significantly impairs patients' quality of life, with various interventions demonstrating improvements in functional capacity, notably a median increase of 35.2 meters (range: 21.3 to 85 meters) in 6-minute walking distance [31, 33, 50, 114, 172]. This underscores the critical link between physical function and perceived well-being in this patient population.

5.2 Clinical implications:

- **Prioritize QoL in Treatment Goals:** Clinicians should recognize that improving quality of life is often the single most important treatment goal for PAD patients, particularly those with claudication [102, 177].
- **Integrate Supervised Exercise Training:** Supervised exercise programs, including aerobic and resistance training, are highly effective as primary therapy for improving functional capacity and QoL in PAD patients [4, 25, 31, 33, 145, 180]. Referral and

completion rates for these programs should be improved [170, 174].

- **Consider Early Revascularization:** For appropriate patients, early invasive treatment or endovascular interventions can lead to significant and sustained improvements in health status and QoL, even in those with worse baseline health status [5, 54, 63, 117, 118].
- **Address Comorbidities and Social Determinants:** A holistic approach addressing comorbidities (e.g., diabetes, CKD, sleep apnea, depression) and social determinants of health (e.g., financial barriers, neighborhood walkability) is crucial for tailored treatment and improved QoL [1, 18, 22, 23, 43, 55, 71, 120, 210, 213].
- **Utilize Validated QoL Tools:** Routine use of disease-specific QoL questionnaires like PAQ or VascuQol-6 can effectively monitor patient-reported outcomes, guide shared decision-making, and assess treatment efficacy [2, 10, 19, 40, 88, 169].

5.3 Research implications / key gaps:

- **Long-Term QoL Trajectories:** Future prospective cohort studies are needed to understand the long-term QoL trajectories of PAD patients, especially beyond 1-2 years, and identify factors influencing sustained improvement or decline [54, 119].
- **Comparative Effectiveness of Exercise Modalities:** More randomized controlled trials are required to directly compare the long-term efficacy of different exercise modalities (e.g., HIIT vs. moderate intensity, home-based vs. supervised, novel therapies like NMES) on QoL outcomes across diverse PAD populations [21, 165, 171, 181, 185].
- **Impact of Social Interventions:** Research should investigate the effectiveness of interventions targeting social determinants of health (e.g., improving neighborhood walkability, addressing financial barriers) on QoL in PAD patients through mixed-methods studies or community-based trials [1, 18, 55].
- **Personalized Treatment Algorithms:** Studies are needed to develop and validate algorithms or AI models that predict optimal treatment strategies for individual PAD patients to maximize QoL, moving beyond traditional clinical outcomes [189].
- **QoL in Specific Subpopulations:** Further research should focus on QoL in understudied or vulnerable PAD subpopulations, such as younger patients, women, those with in-stent restenosis, or those with non-reconstructable critical limb ischemia, to identify specific needs and effective interventions [3, 6, 15, 127, 134, 166, 199, 201].

5.4 Limitations:

- **Heterogeneous Study Designs** — The review synthesized findings from various study designs, including observational studies and RCT protocols, which can limit the comparability and strength of evidence for certain conclusions.
- **Variability in QoL Measures** — Different studies utilized a range of generic and disease-specific quality of life questionnaires, making direct quantitative comparisons of QoL outcomes challenging.
- **Inconsistent Reporting of Numerics** — While many studies reported improvements, the specific metrics (e.g., absolute change, percentage change, different scales) and timepoints varied, hindering robust meta-analysis for all outcomes.
- **Limited Long-Term Follow-up** — A substantial number of studies had short follow-up durations (e.g., <1 year), which may not capture the sustained impact of interventions or the long-term trajectory of QoL in a chronic disease like PAD.
- **Geographic and Population Specificity** — Some studies were conducted in specific geographic regions (e.g., Hungary, Korea, China) or focused on particular subpopulations (e.g., diabetic patients), potentially limiting the generalizability of findings to broader PAD populations.

5.5 Future directions:

- **Standardize QoL Assessment** — Develop consensus on core QoL outcome measures for PAD research to enable better comparability across studies.
- **Longitudinal Outcome Studies** — Conduct more long-term prospective studies to track QoL changes over several years following various interventions.
- **Larger Multicenter Trials** — Implement larger, multicenter randomized controlled trials to evaluate novel therapies and exercise programs with robust QoL endpoints.
- **Tailored Intervention Development** — Research and develop personalized interventions that address patient-specific QoL determinants, including social and psychological factors.
- **Investigate Digital Therapeutics** — Explore the long-term efficacy of digital therapeutic programs and telehealth interventions for improving QoL in diverse PAD populations.

6) Conclusion

Peripheral artery disease significantly impairs patients' quality of life, with various interventions demonstrating improvements in functional capacity, notably a median increase of 35.2 meters (range: 21.3 to 85 meters) in 6-minute walking distance [31, 33, 50, 114, 172]. These findings are generally applicable across symptomatic PAD populations, emphasizing the importance of functional improvements for overall well-being. However, the variability in QoL assessment tools across studies

represents a significant limitation, hindering comprehensive cross-study comparisons. Future research should prioritize the standardization of quality of life measures to enable more robust comparative effectiveness studies and better inform clinical practice.

References

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Figure 1. Publication-year distribution of included originals

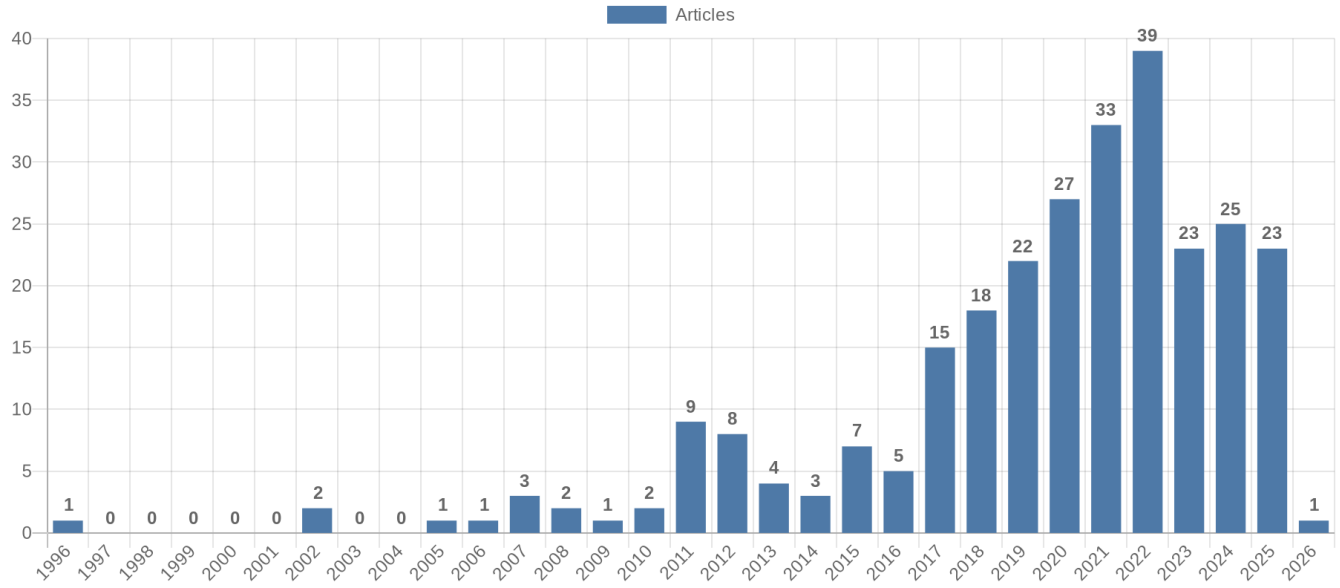

Figure 2. Study-design distribution of included originals

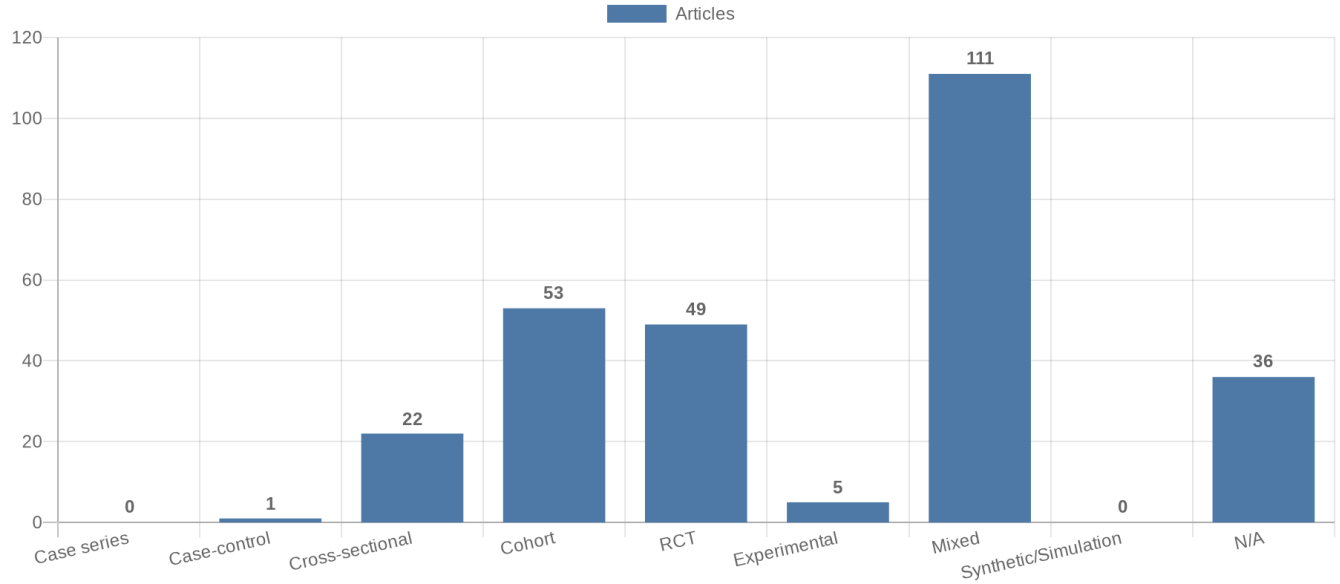

Figure 3. Study-type (directionality) distribution of included originals

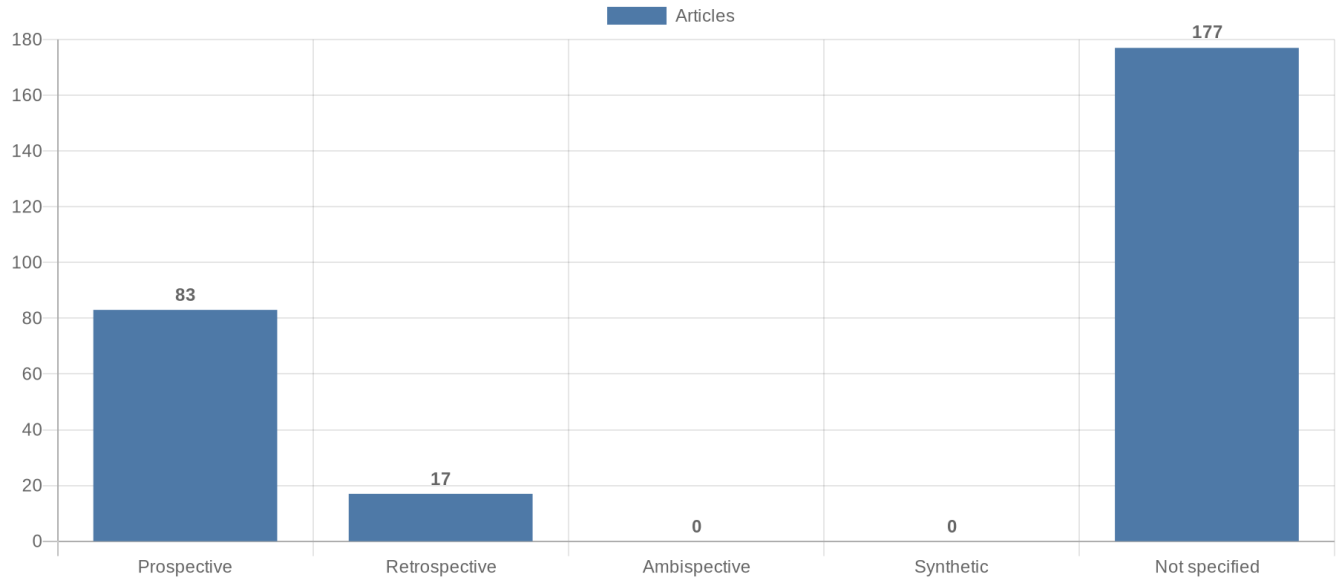

Figure 4. Main extracted research topics

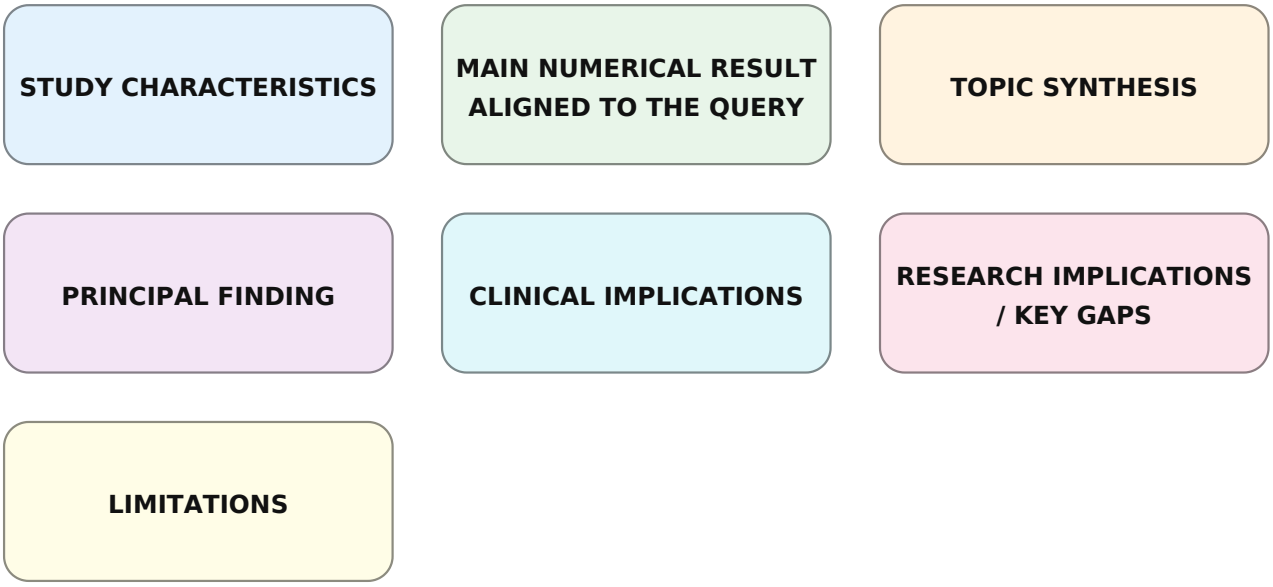

Figure 5. Limitations of current studies (topics)

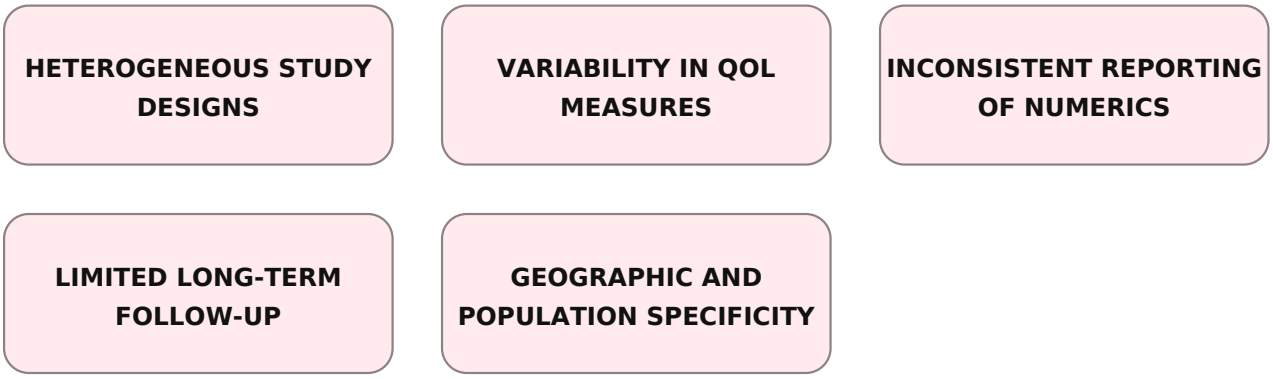

Figure 6. Future research directions (topics)

LONG-TERM QOL TRAJECTORIES

COMPARATIVE EFFECTIVENESS OF EXERCISE MODALITIES

IMPACT OF SOCIAL INTERVENTIONS

PERSONALIZED TREATMENT ALGORITHMS

QOL IN SPECIFIC SUBPOPULATIONS

STANDARDIZE QOL ASSESSMENT

LONGITUDINAL OUTCOME STUDIES