EACEA:
European Education and Culture Executive Agency

Project 101133802 — TMA4ALL

Systematic Review of Inclusive Martial Arts Clubs/Sessions (Report 2)

Project acronym:	TMA4ALL
Project number:	101133802
Project name:	Traditional Martial Arts for All
Coordinator:	INSIDE.EU
Project partners:	UCSI University, Malaysia Landesfachverband Ikkaido Baden Wurttemberg E.V., Germany Kyu Shin Kan, Spain Taekwondo Klub Susedgrad Sokol, Croatia

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Martial Arts as Physical Health Interventions for Adults in Non-Clinical Settings:

A Systematic Review

Abstract

Background: Physical inactivity contributes significantly to global health concerns, including chronic diseases and diminished quality of life. Despite the increasing acknowledgement of martial arts as beneficial therapies for physical health, their potential benefits for healthy people in non-clinical environments remain insufficiently investigated.

Objective: This review aimed to evaluate the effects of martial arts on physical health outcomes in individuals aged 18–59 years, including cardiovascular fitness, muscular strength, flexibility, balance, and metabolic health.

Methods: Adhering to PRISMA principles, a systematic search of Web of Science, Scopus, SPORTdiscus, and Google Scholar was conducted to identify papers published from 2000 to 2024. The inclusion criteria focused on healthy adults engaged in martial arts within non-clinical environments. The methodological quality was meticulously evaluated.

Findings: Martial arts regularly enhanced cardiovascular fitness (e.g., VO_2Max and blood pressure), muscular strength, flexibility, and balance. Disciplines, such as Tai Chi, Taekwondo, and Kickboxing, have shown distinct advantages regarding aerobic capacity, body composition, and psychological health. Nonetheless, there are methodological discrepancies and longitudinal studies have been limited. So, any results should be viewed with caution.

Conclusion: Martial arts provide a comprehensive, evidence-based strategy for enhancing physical health. Policymakers, sports groups, and healthcare professionals must promote inclusive and accessible martial arts programmes informed by evidence-based frameworks to optimise public health benefits. Additional studies are required to standardise these approaches and investigate their long-term advantages across various groups.

Keywords: quality education, health and well-being, cardiovascular fitness, quality of life, health promotion, public health

Introduction

Most countries are not on track to meet the 2030 United Nations Sustainable Development Goal (SDG) 3.4, which aims to reduce premature mortality from non-communicable diseases (NCDs) by one-third. NCDs, which include cardiovascular diseases (such as heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma), and diabetes, account for 74% of global deaths, and 85% of premature deaths occurring in low- and middle-income countries (LMICs) (World Health Organization, 2023). Currently, the broader SDG 3 goal of ensuring healthy lives and promoting well-being for all by the year 2030 appears very unlikely to be met. Addressing modifiable risk factors such as physical inactivity is a cost-effective strategy to reduce the economic and social burden of NCDs. In LMICs (such as China, Malaysia, and the Russian Federation), the impact of NCD is most severe (World Bank, 2024). However, progress in these regions has been frustratingly slow.

Physical inactivity has been called the 'Cinderella' risk factor for NCDs (Bull & Bauman, 2011). Despite considerable empirical evidence demonstrating the direct and indirect pathways by which physical activity prevents many of the significant NCDs associated with premature death and disability (e.g. Bucciarelli et al., 2023; Ekelund et al., 2024; Koorts et al., 2024), it has rarely received policy attention and resourcing proportionate to its impact on quality and length of life (Esmonde, 2023).

As a consequence of the general marginalisation of physical activity, martial arts have received little academic attention in public health discourses worldwide, and it might be assumed that there is little funding and policy support as well. Nevertheless, the evidence for its efficacy in promoting health and combatting NCDs within specific populations has been generally positive

(Lee et al., 2021; Linhares et al., 2022; Kim et al., 2021; Origua et al., 2018). Additionally, several characteristics of martial arts practice make them well-suited for public health promotion. Martial arts provide a flexible and accessible setting for promoting physical activity suitable for diverse environments such as community centres, schools, and outdoor spaces. This adaptability helps reduce barriers to participation, including cost and location, making martial arts particularly effective for reaching marginalised groups (DelCastillo-Andrés et al., 2018; Meyer & Bittmann, 2018; Vertonghen et al., 2012).

Certain concepts foundational to this research are widely debated; therefore, subsequent definitions that should be understood as merely 'stipulative' (Bailey, 2021; Bailey et al., 2013) are provided. We follow the standard practice of defining physical activity as "any bodily movement produced by skeletal muscles that requires energy expenditure" (World Health Organization, 2018, p. 14). Here, energy expenditure is highlighted as an integral part of physical activity, which can be expressed in many forms of movement that benefit health and overall well-being. For this study, we defined martial arts as expressions of physical culture that originated in Asia (although they are often now global traditions), retaining the form and function associated with armed and unarmed personal combat. We make no ‘descriptive’ claim for this perspective. Rather, it stipulates how martial arts are generally understood in much of the scholarly literature in a parsimonious way, and allows for performance-based, spiritual, and health-promoting activities that may no longer have any direct combat applications but originate in combat, while excluding forms of movement that are explicitly dance or exercise. In the context of the present study, these practices are examined in terms of their shared characteristics; nevertheless, we do recognise the heterogeneity within this category, which can be noticed in factors such as country of origin (e.g., China, Korea, Malaysia, etc.), prevailing

techniques (punches, kicks, weapons, etc.), purpose (self-cultivation, competitive sports, self-defence, etc.), among others (see, for example, Martínková & Parry, 2016).

This systematic review gathers and analyses findings from empirical studies on the effects of martial arts on various physical health-related outcomes, including cardiovascular fitness, muscular strength, flexibility, balance, and metabolic indicators. The majority of previous reviews have focused on either children (e.g., Stamenković et al., 2022), older adults (e.g., Miller et al., 2022), or those in on-going medical care (Chen et al., 2020). In contrast, this review investigates the effect of martial arts practice on the physical health of healthy adults ('healthy', in this context, refers to individuals without a pre-existing, life-shortening medical condition requiring regular treatment or hospitalisation) in non-clinical settings.

Methodology

Approach

The methodology employed for the review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021), using a systematic approach to search databases such as Web of Science, Scopus, SPORTdiscus, and Google Scholar for peer-reviewed articles published between 2014 and 2024 to capture the most recent and relevant evidence, and informed by an initial exploratory assessment of the extant literature. Each identified source was subjected to an extensive quality assessment that evaluated the findings' methodological robustness, pertinence, and validity. This approach aims to ensure that the findings are rooted in reliable evidence, providing a robust foundation for comprehending the physical health benefits associated with martial arts.

Eligibility Criteria

Specific inclusion and exclusion criteria were established before screening to ensure that only the most relevant studies were included. Adults aged 18 to 65 were the primary population of interest, and the review focused on interventions involving Tai Chi, Karate, Judo, Taekwondo, Aikido, and other martial arts. The physical health outcomes included cardiovascular fitness, musculoskeletal strength, balance, flexibility, and overall physical performance. Studies were required to report measurable outcomes related to physical health and be written in English. Articles focusing solely on mental health or combining martial arts with unrelated interventions such as diet or pharmacology were excluded. Secondary research, conference papers, and non-peer-reviewed publications were excluded to maintain the quality of evidence. Studies without accessible full texts were excluded from the analysis.

A summary of the inclusion and exclusion criteria is presented in Table 1

Table 1. Inclusion and exclusion criteria

Category	Inclusion Criteria	Exclusion Criteria
Population	Adults aged 18 to 59 years.	Children (<18 years) or elderly (>59 years).
Intervention	Martial arts interventions aimed at improving physical health.	Mixed interventions or interventions unrelated to physical health.
Outcome	Studies reporting measurable physical health outcomes such as balance, strength, or flexibility.	Studies reporting only mental health outcomes or other unrelated outcomes.
Language	English-language publications.	Non-English publications.
Publication Type	Peer-reviewed journal articles.	'Grey literature', conference papers, practitioner literature or theses.
Timeframe	Published between 2014 and 2024.	Studies published before 2014 or after 2024.
Accessibility	Full-text articles available.	Studies with inaccessible full texts.

Search strategy

The search approach included a combination of keywords and Boolean operators to guarantee thoroughness. The search query comprised phrases like "Martial art*" AND ("physical health" OR "cardiovascular fitness" OR "musculoskeletal strength" OR "balance" OR "flexib*", where * was employed to encompass several word forms by truncating at the root). Filters were utilised to restrict the findings to research published in English and papers released within a designated window. The reference lists of the included publications were meticulously examined to guarantee that no suitable studies were overlooked. The preliminary search produced 1,045 records. After eliminating 131 duplicates, the residual 914 articles were evaluated for relevance according to their titles and abstracts. During this screening phase, studies not pertaining to martial arts or lacking outcomes connected to physical health were excluded. This procedure yielded 436 studies that qualified for comprehensive evaluation.

Screening and Study Selection

The screening and selection process followed a multi-step approach. After removing duplicates, the titles and abstracts of 914 studies were screened against the eligibility criteria. Of these, 478 were excluded because of their lack of relevance to martial arts or physical health outcomes. The remaining 436 studies underwent a full-text assessment. During this stage, 294 studies were excluded because they did not specifically investigate the physical health effects of martial arts interventions. Additionally, 16 studies were removed due to inaccessible full texts, 9 were secondary research (e.g. review articles), and 104 combined martial arts with unrelated mental health interventions. Ultimately, 13 studies met all inclusion criteria and were included in the review.

Data Extraction and Synthesis

Relevant data were extracted from the 13 included studies using a standardised template. Extracted information included authors, publication year, country, sample size, participant demographics, martial arts type, intervention duration, frequency, physical health outcomes, and the tools used to measure these outcomes. A narrative synthesis was conducted to account for the diversity in study designs. This approach allowed for identifying key trends and insights regarding the effects of martial arts on physical health. Quantitative findings were reported descriptively, while qualitative results were analysed thematically. Figure 1 shows the PRISMA flow diagram for this review/

Quality Assessment

The quality of the included studies was evaluated using the Cochrane Risk of Bias Tool for quantitative research and the Critical Appraisal Skills Programme (CASP) checklist for qualitative studies. Each study was blindly assessed by two reviewers, and disagreements were resolved through discussion or consultation with a third reviewer. This ensured that the findings were based on high-quality evidence and that methodological limitations were minimised (Samsudin et al., 2024).

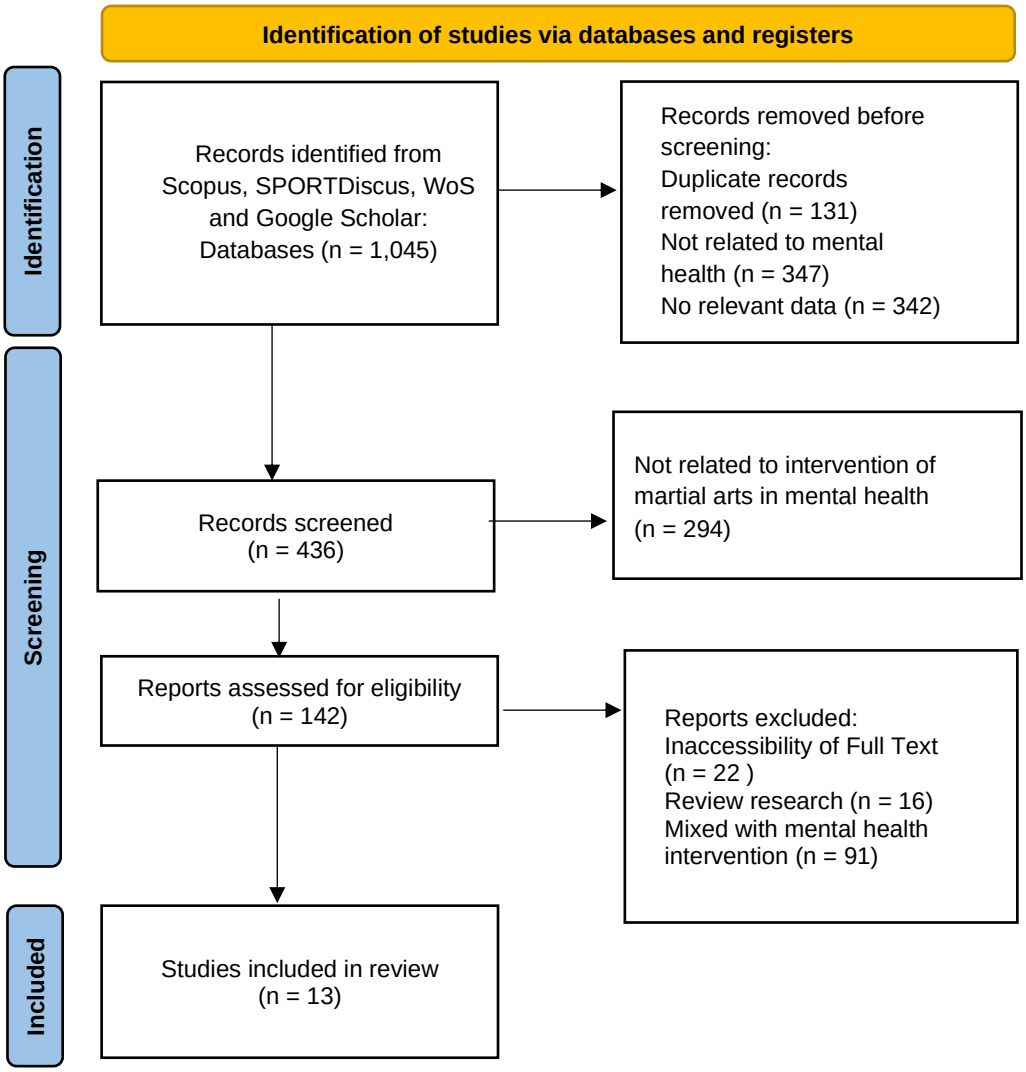


Figure 1. PRISMA Flowchart

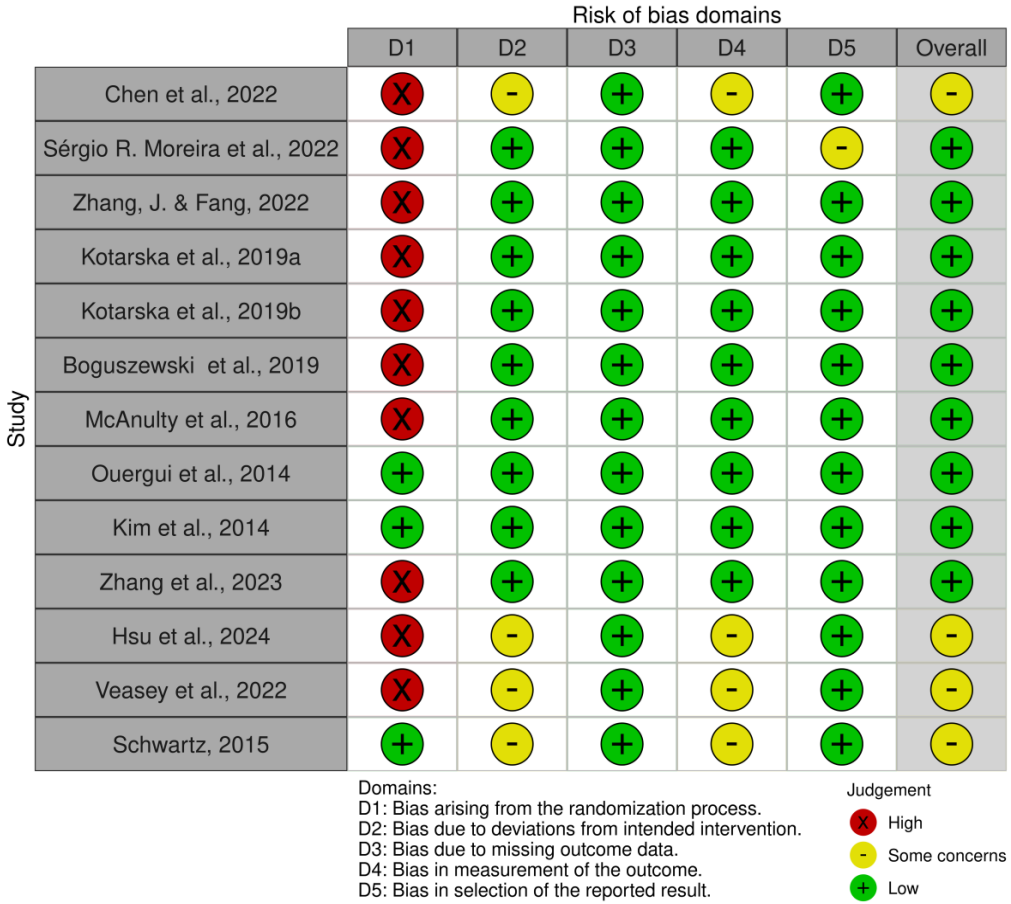
Table 2. The Basic Characteristics of Included Studies

Author (Year)	Sample Size	Control Group	Intervention Group	Statistical Significance	Statistical outcome	Session Duration	Frequency (sessions/week)	Intensity	Study Indicators
Chen et al., 2022	N/A	N/A	Fitness & health education focus	N/A	CF, SMSE, BC, Flexibility improved	60–90 min	2–3	LI: ~30%–40% HRmax, MI: ~50%–70% HRmax	CF, SMSE, BC, Flexibility, Balance, PFM
Sérgio R. Moreira et al., 2022	245	10/F, 67.3±6.6 years	13/F, 69.3±6.4 years	$p < 0.001$	QoL higher in psychological, environmental domains	30–90 min	<2 to ≥5	LI: ~30%–40% HRmax, MI: ~50%–70% HRmax, VI: ~70%–85% HRmax	TI, WHOQOL-BREF
Zhang, J. & Fang, 2022	195	Group 1: No activities	Group 2: Sports games; Group 3: Taekwondo; Group 4: Both	$p < 0.05$	G2-4 better strength, aerobic capacity, life skills vs. control	60 min	3	MI–VI: ~50%–80% HRmax	CF, SMSE, LS
Kotarska et al., 2019a	543	N/A	Group I: Recreational, Group II: Mixed sports, Group III: Competitive	$p \leq 0.05$	Competitive group had highest QoL	N/A	N/A	MI–VI: ~50%–85% HRmax	QoL, HB
Kotarska et al., 2019b	441	N/A	Boxing, BJJ, Karate, MMA, MT	$p \leq 0.05$	↑ Health behaviors in CEH, PB, PMA, HP for B, K, MMA	N/A	N/A	MI: ~50%–70% HRmax	CEH, PB, PMA, HP, HBI
Boguszewski et al., 2019	561	Group 3: No activity	Group 1: Combat sports & martial arts, Group 2: Other sports	$p \leq 0.05$	Group 1 had highest HB	N/A	Group 1: 3–5/week, Group 2: 2–3/week	MI: ~50%–70% HRmax	HB: Diet, PA, MA
McAnulty et al., 2016	17	N/A	Young Group: n=9, <40 years, Old Group: n=8, ≥40 years	$p = 0.001$, $p = 0.007$, $p = 0.049$, $p = 0.011$, $p = 0.035$, $p = 0.036$	Older practitioners had higher SBP, CVI, reported more sleep interference and pain	N/A	N/A	N/A	SBP, CVI, SI, OP

Author (Year)	Sample Size	Control Group	Intervention Group	Statistical Significance	Statistical outcome	Session Duration	Frequency (sessions/week)	Intensity	Study Indicators
Ouergui et al., 2014	30	n = 15	n = 15	$p < 0.05$	Significant improvements in upper-body muscle power, aerobic power, anaerobic fitness, flexibility, speed, agility	60 min	3	MI: ~50%–70% HRmax	UBMP, AP, AF, Flexibility, Speed, Agil, BC, SJ, CMJ
Kim et al., 2014	14	7 (no Taekwondo)	7 (Taekwondo)	$p < 0.05$ (anaerobic threshold, VO_2max, lactate)	Improvements in anaerobic threshold, VO_2max, lactate recovery	8 weeks	3	MI–VI: ~50%–85% HRmax	VO_2max, AT, Lactate rec.
Zhang et al., 2023	45	18	27	$p = 0.004$ (IVD hydration), $p < 0.04$ (paraspinal FF), $p = 0.001$ (VB FF)	↑ IVD hydration, ↓ FF (paraspinal muscles & VB), ↑ CSA (muscles)	N/A	N/A	N/A	T2, q-Dixon, CSA, FF, VB hydration
Hsu et al., 2024	N/A	N/A	Elderly	N/A	↑ Strength, Speed, Flex, Self-Esteem, Resilience, QoL, WC, O_2 Sat, BP	N/A	N/A	N/A	Str, Spd, Flex, SE, Res, QoL, WC, O_2 Sat, BP
Veasey et al., 2022	N/A	N/A	JMA participants	N/A	↑ Self-awareness, ↑ Self-Mastery, ↓ Stress/Anxiety/Depression	N/A	N/A	N/A	WB, SA, SM, Stress, Anxiety, Depression
Schwartz, 2015	935	N/A	Brazilian jiu-jitsu, Judo, Karate, Kung-fu, Taekwondo	$p \leq 0.05$	↑ Body comp, Flexibility, Strength Endurance	N/A	N/A	N/A	BMI, WHR, BF%, VO_2max, Muscle Strength, Flexibility

Abbreviations: HRmax, Maximum Heart Rate; LI, Low Intensity; MI, Moderate Intensity; VI, Vigorous Intensity; CF, Cardiovascular Fitness; SMSE, Skeletal Muscle Strength and Endurance; BC, Body Composition; PFM, Physical Fitness Metrics; QoL, Quality of Life; WHOQOL-BREF, World Health Organization Quality of Life Instrument (Brief Version); LS, Life Skills; HB, Health Behaviours.

Table 3. Risk of Bias Assessment



Discussion

Introduction

This systematic review attempted to assess the health impact of martial arts through the synthesis of a range of interventions, populations, and methodologies. This finding indicates the versatility and adaptability of martial arts as an intervention, with evidence furnished for quality improvement in the basic elements of physical fitness: aerobic capacity, muscle strength, flexibility, and balance. Additional considerations include the distinctive contributions of martial arts towards mental well-being through mechanisms, as they may encourage mindfulness, stress reduction, and emotional control, which are sometimes already embedded into traditional practices. Besides individual health, martial arts cultivate social interaction and build community, thus making them even more valuable as tools for resolving social isolation while improving quality of life. These benefits are derived from different martial styles, like high-intensity techniques such as Taekwondo and Kickboxing, as well as mindfulness-based arts under the umbrella of Tai Chi and Kung Fu practices. Evidence strongly supports the integration of martial arts within physical activity programmes, which should be seen on the grounds of health across multiple domains and for being culturally relevant, inclusive, and engaging resources (Westerbeek & Eime, 2021).

Emerging Themes

The synthesis of findings revealed certain themes. However, caution should always be exercised in martial arts research, as it is, as explained further in this section, an under-researched emerging area of inquiry.

Physical Fitness Improvements

The examined martial arts significantly improved aerobic and anaerobic performance metrics. In high-intensity martial arts, such as Taekwondo (Kim et al., 2014) and Chinese martial arts, where additional benefits, such as improved intervertebral disc hydration and spinal stability, have been observed (Zhang et al., 2023), studies have demonstrated improvements in VO_2Max (the maximum rate at which an individual can utilise oxygen during intense exercise; widely regarded as a key indicator of cardiorespiratory fitness), anaerobic threshold (the point during exercise at which lactate starts to accumulate in the bloodstream faster than it can be removed), and faster recovery times.

Muscle Strength and Flexibility

Muscle strength and flexibility enhancement have been consistent across various martial arts. For example, kickboxing is linked to improvements in agility and muscle force (Ouergui et al., 2014). Schwartz et al. (2015) conducted additional research demonstrating that Kung Fu practitioners exhibit enhanced balance and flexibility. Martial arts, including Brazilian Jiu-Jitsu and Judo, enhance musculoskeletal stabilisation, reduce fat percentages, and improve body composition (Schwartz et al., 2015; Zhang et al., 2023).

Health-Related Behaviours

The limited evidence available suggests martial arts participation fosters improved health-related behaviours, including sustained physical activity, healthier lifestyles, and effective stress management. Organised, motivating training methodologies inherent in martial arts encourage adherence to exercise routines, distinguishing them from other forms of physical activity (Schwartz et al., 2015). Regular martial arts practice also contributes to improved dietary habits, as participants often adopt broader wellness strategies aligned with their physical

training regimens (Kim et al., 2014). Evidence supporting this behavioural alignment shows that practices such as Kung Fu and Taekwondo promote a shift toward healthier lifestyle choices, including enhanced emotional regulation and resilience (Hsu et al., 2024). The structured nature of martial arts, combined with their emphasis on discipline and mindfulness, provides an environment conducive to lasting lifestyle changes. For instance, Japanese martial arts have been associated with self-regulation, self-awareness, and the ability to manage stress effectively, even in challenging circumstances such as the COVID-19 pandemic (Veasey et al., 2021). This adaptability is particularly relevant in promoting emotional resilience and addressing contemporary public health challenges, making martial arts a valuable addition to both individual wellness routines and community health initiatives.

Strategies to Enhance the Positive Impacts of Martial Arts

Targeted strategies can optimise martial arts' physical, mental, and social advantages. These strategies emphasise optimising training procedures, customising treatments to meet individual requirements, and cultivating supportive practice settings.

Customised Training Programmes

- Personalised Strategies: Customising martial arts programmes according to participants' fitness levels, ages, and health problems can improve fitness results. Practices like Tai Chi and Kung Fu enhance balance and flexibility, and high-intensity disciplines such as kickboxing and Taekwondo improve cardiovascular fitness (Kim et al., 2014; Schwartz et al., 2015).
- Progressive Intensity: Gradual enhancements in intensity and complexity ensure that participants cultivate physical and mental resilience while mitigating the risk of overtraining (Ouergui et al. 2014).

- Goal-oriented Training: Programmes that establish particular physical, psychological, or social objectives (e.g., stress alleviation or enhanced flexibility) demonstrate increased adherence and greater participant satisfaction (Moreira et al., 2022).
- Mentorship Initiatives: Connecting beginners with seasoned practitioners improves learning, offers role models, and encourages on-going engagement. Mentorship is essential in traditional martial arts education (Schwartz et al., 2015).

Sustained Engagement

- Organised Timetables: Consistent, well-organised sessions (e.g., three to five times weekly) provide regular engagement, which is essential for attaining long-term advantages (Schwartz et al., 2015).
- Incentive Structures: Certification systems, coloured belts, competency development frameworks, and incentive rewards promote continuous engagement and objective establishment. Research indicates that a structured progression in martial arts is associated with enhanced commitment and psychological satisfaction (Veasey et al., 2022).

Integration of Technology

- Digital Training Platforms: In crises such as COVID-19, online martial arts workshops facilitate on-going training and engagement, enabling practitioners to sustain physical exercise and mental well-being (Veasey et al., 2022).
- Wearable technology: Devices that monitor heart rate, caloric expenditure, and recuperation indicators deliver real-time feedback, motivating users and guiding training modifications. Emerging technologies are increasingly being utilised in martial arts to improve performance analysis (Zhang et al., 2023).

Facilitative Environments

- Secure Training Environments: Providing sufficient facilities and safety protocols mitigates injury risks and enhances practitioners' confidence. Research underscores the significance of physical surroundings in promoting effective martial arts training (Schwartz et al., 2015).
- Positive Coaching: Educators who prioritise encouragement, empathy, and individualised feedback foster environments conducive to skill development and psychological safety. Positive reinforcement enhances motivation and learning results in martial arts environments (Moreira et al., 2022).

Methodological Insights

Quality and Robustness of Included Studies

Research on martial arts has made significant strides, but critical evaluation reveals substantial limitations that compromise the reliability and generalisability of the findings. Although many studies have demonstrated potential benefits, the field remains plagued by inconsistencies in methodology, small sample sizes, and a lack of theoretical grounding.

Specific limitations in the current empirical base include the following.

i. Small and Homogeneous Samples: A pervasive issue is the reliance on small, convenience-based samples, often drawn from a single geographic or demographic group. This severely limits the generalisability of the findings and fails to account for the diverse cultural and contextual factors influencing martial arts practices (Schwartz et al., 2015).

ii. Short Intervention Durations: Many studies have focused on short-term interventions, often lasting less than 12 weeks. While such designs can detect immediate effects, they fail to capture prolonged martial arts practice's sustained benefits or potential drawbacks. The long-term impacts on mental health, quality of life, and physical fitness remain underexplored.

iii. Lack of standardisation: Significant variability exists in how interventions are structured and reported. Differences in session frequency, intensity, and duration complicate cross-study comparisons and reduce field coherence. This lack of standardisation is particularly problematic in studies of mental health outcomes, where diverse methodologies produce conflicting results.

iv. Limited Theoretical Frameworks: Much of the research lacks a strong theoretical foundation, often treating martial arts as a generic intervention without considering the unique mechanisms underlying their benefits, such as embodied cognition or cultural significance.

v. Overreliance on Self-Reported Data: Many studies rely heavily on subjective measures such as self-reported stress reduction or quality of life. Without the inclusion of objective measures such as biomarkers or physiological data, the validity of these findings is questionable.

vi. Risk of Bias: Few studies have adequately addressed selection bias, lack of blinding, or publication bias. Positive results are often overrepresented, while null or negative findings are underreported, creating a skewed understanding of the effectiveness of martial arts.

Areas for Methodological Improvement

i. Larger, Diverse, and Representative Samples: Future research must prioritise recruiting larger, more diverse populations to ensure that the findings are generalisable across different ages, genders, cultural contexts, and levels of expertise.
ii. Longitudinal Studies: Research needs to move beyond short-term interventions to investigate the sustained effects of martial arts. Longitudinal studies could provide insights into how benefits evolve, and whether continued practice mitigates or exacerbates injuries and overuse.
iii. Standardised Protocols: Clear and consistent guidelines for reporting the training intensity, duration, frequency, and intervention specifics are essential. Best practices in exercise science and behavioural research should inform these.
iv. Incorporation of Objective Measures: Adding objective assessments, such as physiological biomarkers, wearable technology data, and neuroimaging, would lend greater validity to the findings, particularly in mental health research.
v. Theoretical Integration: Future studies should integrate robust theoretical frameworks to explore the unique mechanisms of martial arts, such as their interplay with cultural identity, embodied cognition, and psychosocial dynamics.
vi. Mixed Methods Approaches: Employing qualitative methods alongside quantitative analysis can provide richer, more nuanced insights into practitioners' experiences, motivations, and contextual factors influencing outcomes.

Recommendations for Evidence-Based Guidelines and Frameworks Linked to Findings

i. Inclusion Framework for Martial Arts

This review highlighted that martial arts can be adapted for individuals with varied abilities, underscoring the importance of universal design in training spaces to accommodate diverse

participants. The effectiveness of structured yet flexible programmes in martial arts suggests that adapted techniques and practices can make participation more equitable for individuals with disabilities or differing skill levels.

ii. Guidelines for Diversity and Equity

The review’s findings on martial arts' physical health benefits highlight the importance of representation in promotional materials and campaigns to attract underrepresented groups, including women and people from marginalised communities. Financial barriers were not directly addressed in the reviewed studies but were implicit in the accessibility challenges for underserved populations. Subsidising training programmes align with the evidence showing the broad quality of life benefits from consistent participation in martial arts.

iii. Participation Frameworks

The group-based benefits highlighted in the review highlight the need for martial arts programmes to be integrated into schools, workplaces, and community centres. These programmes can increase accessibility, while promoting physical, mental, and social health. Online martial arts programmes during the COVID-19 pandemic demonstrated the viability of digital platforms for expanding access, especially for those unable to attend in person. This strategy aligns with findings on martial arts practices' adaptability and mental health benefits.

Conclusion

This systematic review underscores the substantial benefits of martial arts in enhancing physical health in non-clinical settings among healthy adults aged 18–59 years. By integrating the findings from diverse interventions, this review highlights improvements in cardiovascular fitness, muscular strength, flexibility, balance, and metabolic health markers. In addition,

martial arts mental health and quality of life benefits, particularly through mechanisms such as mindfulness and social engagement, position these practices as valuable tools for holistic health promotion. However, significant gaps remain in the research, including inconsistent methodologies, limited longitudinal data, and lack of inclusion of diverse populations. Addressing these shortcomings through rigorous, standardised research is essential for maximising the potential of the martial arts. Policymakers, sports organisations, and healthcare providers should leverage these findings to develop evidence-based, inclusive frameworks that expand access to martial arts and promote their adoption in public health initiatives.

Martial arts offer a culturally significant, accessible, and scientifically supported approach to improving physical health and overall well-being. By fostering inclusion, diversity, and participation, they hold transformative potential for individuals and communities. The findings will inform scholars, practitioners, and policymakers of the importance of martial arts in improving physical well-being and offer evidence-based suggestions for their inclusion in health promotion programmes and strategies. This review aims to position martial arts as a credible, culturally relevant, and scientifically validated approach for enhancing the physical health of healthy adults.

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