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The study on the relationship between different exercise modalities and physiological effects

This study aimed to systematically review the exercise intensities associated with various physical activities, synthesize the physiological effects induced by different intensity levels, and establish a dose-response reference guide for exercise modalities, thereby providing a foundation for precision-based fitness regimens. Methods: A comprehensive literature search was conducted across PubMed, Cochrane, Embase, Web of Science, EBSCO, CNKI, VIP, and Wanfang databases to identify studies examining the effects of exercise modalities on physiological indicators. The methodological quality of included randomized controlled trials (RCTs) was assessed using the Cochrane 5.1 handbook criteria. Effect sizes were pooled, and subgroup analyses were performed using Review Manager 5.4. Results: A total of 42 RCT studies were included. Low-intensity exercise modalities included ordinary walking, stair climbing, and Pilates. Moderate-intensity exercise modalities included brisk walking, Baduanjin, jogging, square dancing, Tai Chi, swimming, cycling, and dancing. High-intensity exercises included fast walking, fast running, soccer, and yoga. Low-intensity exercises improved HDL-C (d=0.06), resting heart rate (d=-2.98), and diastolic blood pressure (d=-2.93). Moderate-intensity exercises improved TG (d=-0.21), TC (d=-0.32), HDL-C (d=0.09), resting heart rate (d=-4.22), systolic blood pressure (d=-4.92), diastolic blood pressure (d=-3.51), weight (d=-2.46), and vital capacity (d=271.03). High-intensity exercises improved blood glucose (d=-0.18), systolic blood pressure (d=-3.21), and diastolic blood pressure (d=-2.58). Traditional Chinese exercises improved HDL-C (d=0.19), blood glucose (d=-1.49), vital capacity (d=285.09), systolic blood pressure (d=-9.96), and diastolic blood pressure (d=-5.68). Common exercises improved TG (d=-0.18), TC (d=-0.18), HDL-C (d=0.08), vital capacity (d=223.62), resting heart rate (d=-3.51), systolic blood pressure (d=-4.90), diastolic blood pressure (d=-2.96), weight (d=-2.04), and BMI (d=-0.74). Conclusion: Moderate-intensity exercises (e.g., brisk walking, jogging, swimming, Tai Chi) yielded more comprehensive physiological improvements compared to other intensities. Traditional Chinese exercises exhibited superior efficacy in optimizing HDL-C, glucose metabolism, respiratory function, and blood pressure regulation.

Keywords: dose-response relationship, traditional Chinese exercises, exercise modalities, RCT.

Introduction

The health benefits of physical exercise are well-established, with extensive research demonstrating its positive effects on cardiopulmonary function, muscular strength, and metabolic health. Investigating the relationship between exercise modalities and physiological responses holds significant theoretical and practical implications for precision-based fitness interventions.

The latest international Compendium of Physical Activities (CPA) [1] catalogs the metabolic equivalent of task (MET) values for over 1,000 specific activities across 21 categories. Similarly, domestic studies have quantified energy expenditure in physical activities among Chinese populations [2]. However, these efforts primarily focus on energy expenditure calibration and lack exploration of the dose-response relationships between exercise intensity and physiological outcomes.

Furthermore, emerging evidence suggests that different exercise modalities, such as traditional Chinese exercises (e.g., Tai Chi, Baduanjin, Qigong) and conventional exercises (e.g., brisk walking, swimming, Pilates), elicit distinct physiological adaptations and health benefits. Thus, synthesizing the physiological effects of traditional Chinese exercises alongside conventional exercises is critical for optimizing exercise prescriptions.

Methods and materials

2.1 Data Sources and Search Strategy

A systematic literature search was performed across multiple databases, including PubMed, Cochrane, Embase, Web of Science, EBSCO, CNKI, VIP, and Wanfang, to identify relevant studies. In PubMed and Cochrane, Medical Subject Headings (MeSH) terms were employed, while Emtree terms were used for Embase. The specific search strategies are detailed in Table 1.

Table 1

Summary of Search Strategies

	Search Term
P (population)	young people; adolescence; young; Middle Aged [Mesh]; middle age; aged [Mesh]; elderly
I (intervention)	Dancing[Mesh]; Dance; Ballet; Square Dance; Dance, Square; Hip-Hop Dance; Dance, Hip-Hop; Hip Hop Dance; Jazz Dance; Dance, Jazz; Tap Dance; Dance, Tap; Modern Dance; Dance, Modern; Salsa Dancing; Dancing, Salsa; Line Dancing; Dancing, Line; Tai Ji[Mesh]; Tai-ji; Tai Chi; Chi, Tai; Tai Ji Quan; Ji Quan, Tai; Quan, Tai Ji; Taiji; Taijiquan; T'ai Chi; Tai Chi Chuan; Martial Arts[Mesh]; Arts, Martial; Hap Ki Do; Judo; Karate; Jujitsu; Tae Kwon Do; Aikido; Wushu; Kung Fu; Gong Fu; Fu, Gong; Gongfu; Racquet Sports[Mesh]; Racquet Sport; Sport, Racquet; Sports, Racquet; Racket Sports; Racket Sport; Sport, Racket; Sports, Racket; Squash (Sport); Racquetball; Racketball; Racket Ball; Ball, Racket; Badminton; Lacrosse; Bicycling[Mesh]; Jogging[Mesh]; Joggings; Swimming[Mesh]; Basketball[Mesh]; Basketballs; Netbal; Soccer[Mesh]; Soccers; Yoga[Mesh]; Gymnastics[Mesh]; Calisthenics; Mountaineering[Mesh]; vigorously walks; walking; brisk walking; fitness walking; walk
C (comparison)	blank control
O (outcomes)	resting heart rate; hrrest; heart rate at rest; serum total cholesterol; total cholesterol; total serum cholesterol; Lipoproteins, HDL [Mesh]; HDL Lipoproteins; Heavy Lipoproteins; Lipoproteins, Heavy; High-Density Lipoproteins; High Density Lipoproteins; Lipoproteins, High-Density; alpha-Lipoproteins; alpha Lipoproteins; alpha-1 Lipoprotein; Cholesterol, LDL [Mesh]; Low Density Lipoprotein Cholesterol; beta-Lipoprotein Cholesterol; Cholesterol, beta-Lipoprotein; beta Lipoprotein Cholesterol; LDL Cholesterol; Cholesteryl Linoleate, LDL; LDL Cholesteryl Linoleate; Vital Capacity [Mesh]; Capacities, Vital; Capacity, Vital; Vital Capacities; Forced Vital Capacity; Capacities, Forced Vital; Capacity, Forced Vital; Forced Vital Capacities; Vital Capacities, Forced; Vital Capacity, Forced; Blood Pressure [Mesh]; Pressure, Blood; Diastolic Pressure; Pressure, Diastolic; Pulse Pressure; Pressure, Pulse; Systolic Pressure; Pressure, Systolic; Pressures, Systolic; Triglycerides[Mesh]; Triacylglycerol; Triacylglycerols; Metabolic Equivalent; Metabolic Equivalents; RPE;
S (study design)	randomized controlled trial; randomized; placebo

2.2 Inclusion and Exclusion Criteria

Eligible studies met the following criteria: (1) randomized controlled trials (RCTs); (2) participants categorized as adolescents, middle-aged, or older adults; (3) interventions involving common exercise modalities; and (4) outcome measures including at least one of the following: triglyceride (TG), total cholesterol (TC), high-density lipoprotein (HDL), low-density lipoprotein (LDL), resting heart rate, vital capacity (VC), systolic blood pressure (SBP), diastolic blood pressure (DBP), rating of perceived exertion (RPE), body weight, or body mass index (BMI). Studies were excluded if they were duplicate publications, literature reviews, letters to the editor, conference abstracts, or animal model research. Additionally, articles lacking full-text availability or original data were excluded.

2.3 Data Extraction

Two independent researchers extracted all data and compiled the results. Discrepancies were resolved through consultation with a third reviewer. Extracted data included: (1) primary author and publication year; (2) baseline characteristics (age and sample size of experimental and control groups); (3) exercise parameters (type, frequency, duration, and intensity); and (4) reported outcomes. The risk of bias in included studies was assessed using the Cochrane Risk of Bias Tool, which evaluates seven domains: (1) random sequence generation, (2) allocation concealment, (3) blinding of participants and personnel, (4) blinding of outcome assessment, (5) incomplete outcome data, (6) selective reporting, and (7) other potential biases.

2.4 Data Analysis

Quantitative synthesis and subgroup analyses were performed using Review Manager software (version 5.4). Effect sizes were pooled using a random-effects model. Heterogeneity among studies was assessed using the I^2 statistic and Cochran's Q test, with $I^2 > 50\%$ or a Q test P-value ≤ 0.10 indicating significant heterogeneity. Publication bias was evaluated via funnel plot inspection. Sensitivity analyses were conducted by excluding trials with a high risk of bias to test the robustness of the pooled results.

Results and Discussion

2 Results

2.1 Search Results

A total of 4,846 potentially eligible articles were initially identified through database searches. After a systematic screening process—including removal of duplicates, title/abstract screening, and full-text assessment—42 studies met the predefined inclusion criteria and were included in the final analysis.

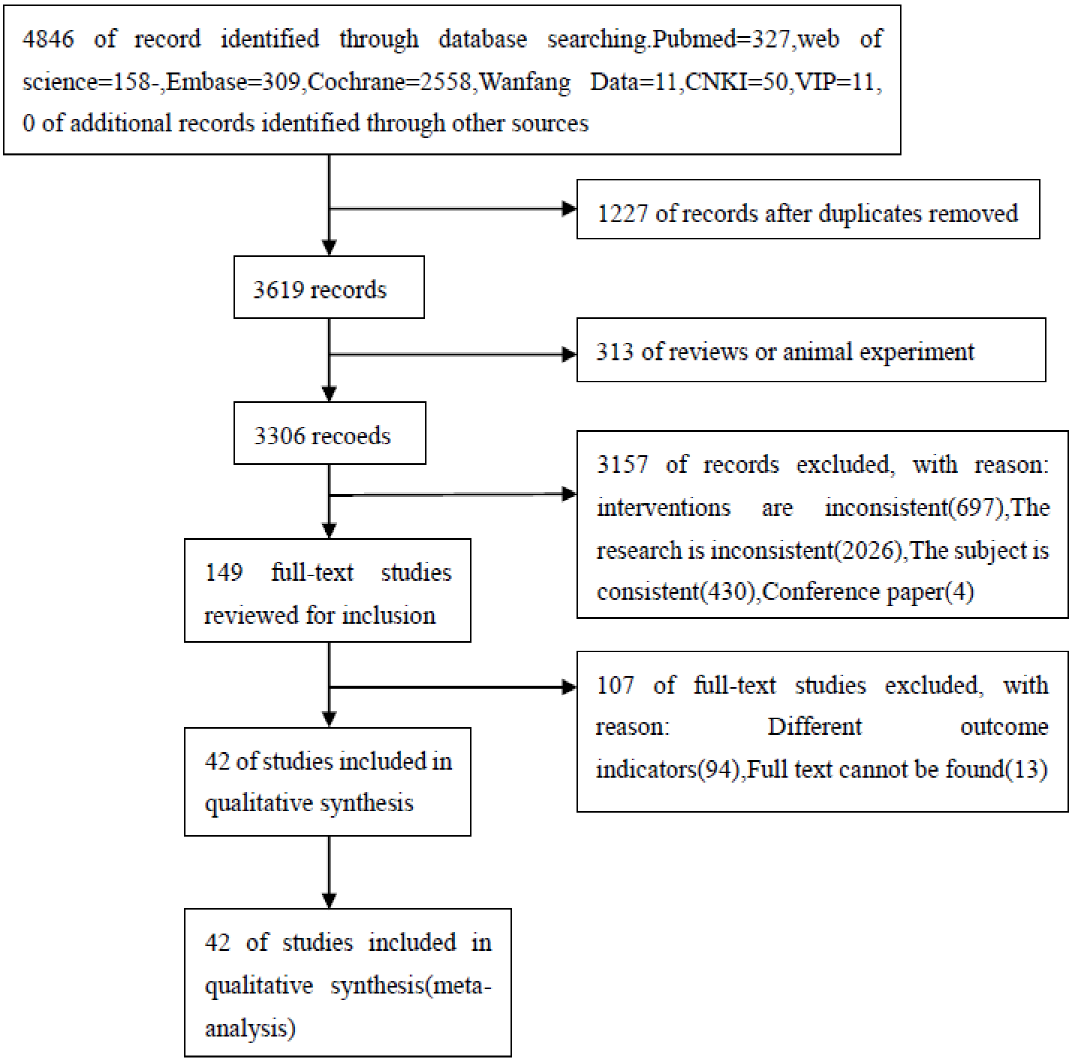

Figure 1. Flowchart of Literature Selection

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2.2 Basic Characteristics of Included Literature

The basic characteristics of the included literature are shown in Table 2. The quality evaluation is presented in Figure 2.

Table 2

Basic Characteristics of Included Literature

Study	Sample Size	Gender	Age	Mode	Intensity	Inflammatory outcome
Guaxia Hu 2014 [3]	230	Male/Female	53~70	Baduanjin	100beats/min	LC, SBP, DBP
A RCOOPER 2000 [4]	176	Male/Female	46-49	walk	4~5mets	SBP, DBP, Body weight
Abdelbasset WK 2020 [5]	31	Male/Female	54.9±4.7	bicycle	50~70 %HRmax	TG, TC, LDL-C, HDL-C
Asikainen, T.M 2003 [6]	385	Female	55（3.7）	walk	45 %VO2max	TC/LDL-C/HDL-C/Glucose/SBP/DBP
Baker, T.T 1986 [7]	34	Male	58.2	running	65 %~85 %HRmax	TC, LDL-C, HDL-C, Body weight
Buttelli 2021 [8]	61	Male	60-75	Pilates	1.5~2met	TG, TC, LDL-C, HDL-C, Glucose
F.M. Finucane 2010 [9]	100	Male/Female	67.4-76.3	Bicycle	50~70 %HRmax	HDL-C, Glucose, SBP, DBP, Body weight
Fulin Lu 2018 [10]	96	Female	57.2 ±10.1.	Dance	Heart rate=170-age（>60age） Heart rate =160-age（<60age）	TG, TC, LDL-C, HDL-C, Glucose, RHR, SBP, DBP, WHR, BMI
Haiping Zhang 2016 [11]	40	Female	62.85 ±1.66	walk	50 %~60 %VO2max	TG, TC, LDL-C, HDL-C, LC, VO2max
Hanxiao Zhu 2009 [12]	135	Male	61-65	walk	30 %~45 %F.C	LC, RHR, SBP, DBP, Body weight, BMI
JE Donnelly 2000 [13]	11	Female	45-60	walk	60~75 %HRmax	TC, HDL-C, Glucose, RHR, SBP, DBP
Koh, Y 2018 [14]	27	Male/Female	18-65	running	70 %HRmax	TG, TC, LDL-C, HDL-C, Body weight
Krustrup P 2013 [15]	66	Male	31~54	Soccer	85 % ± 7 %HRmax	LDL-C, HDL-C, Glucose, RHR
Krustrup, P 2009 [16]	47	Male	20-43	running/Soccer	82 %HRmax	TC, LDL-C, HDL-C, RHR, SBP, DBP, Body weight
Kuo, M. C. 2018 [17]	36	Male/Female	>65	walk	13~15 RPE	WHR
Lee SH 2019 [18]	20	Female	70 ± 4	taekwondo	30~60 %HRR	RHR, SBP, DBP, Body weight
LI He 2018 [19]	88	Male/Female	58±2	walk	45~50 %HRmax	RHR, SBP, DBP, Body weight
Lian, X. Q 2014 [20]	330	Male/Female	40~78	walk	3~6METs	TG, TC, LDL-C, HDL-C
Lorenzo A 2008 [21]	288	Male/Female	63.5±1	Dance/Yoga	70 %HRmax	TG, TC, Glucose
Mao, H. N 2006 [22]	62	Male/Female	45~72	Tai Chi	50~60 %VO2max	SBP, DBP
Marti, B 1990 [23]	61	Male	38.8 + 8.9	running	85 %HRmax	TG, TC, LDL-C, HDL-C, RHR, WHR
Mazurek, Krzystof 2014 [24]	64	Male/Female	19.5±0.6	bicycle	65 %~75 % HRmax	TG, TC, LDL-C, HDL-C, WHR
Miao Sun 2018 [25]	60	Female	55-70	Dance	110~130beats/min	TG, TC, LDL-C, HDL-C, Glucose, LC, RHR, SBP, DBP, Body weight, WHR, BMI
Min Jeong 2018 [26]	18	Male/Female	20.8±1.9	walk/ Climb the stairs	50~60 %HRmax	RHR/SBP/DBP/ Body weight
Miyaki A 2012 [27]	22	Female	52~77	walk/bicycle	60~75 %HRmax	TG, TC, LDL-C, HDL-C, RHR, SBP, DBP, Body weight
Papp 2016 [28]	44	Male/Female	20~37	Yoga	RPE 14~17	RHR, SBP, DBP, Body weight, WHR
Philippe 2018 [29]	115	Female	44±11.5	Walk	4~10 RPE	SBP, DBP, Body weight
Rodrigues-Krause 2018 [30]	30	Female	60~70	Dance	60 % VO2peak	TG, TC, LDL-C, HDL-C, Glucose, Body weight
Shanwei Xue 2013 [31]	40	Male/Female	66.96±13.2	Baduanjin	170-age（>60age); 180-age（<60age)	LC, RHR
Songtao Wang 2005 [32]	99	Male	61-65	Walk	30 %~ 45 %F.C	TG, TC, LDL-C, HDL-C, Body weight, BMI
Tanaka 1997 [33]	18	Male/Female	44~50	Swimming	60 %HRmax	RHR, SBP, DBP
Tsung-Lin 2019 [34]	41	Male/Female	19.72±0.8	Walk	RPE 8	TG, HDL-C, RHR, SBP, DBP, Body weight
Vasconcellos 2016 [35]	30	Male/Female	12.8~15.4	Soccer	80.4 %~88.6 %HRmax	TG, TC, LDL-C, HDL-C, SBP, DBP, Body weight
Vasconcellos 2021 [36]	13	Male/Female	12.3~15.5	Soccer	84.5 %HRmax	TG, HDL-C, Glucose, SBP, DBP, Body weight
Woolf-May 1999 [37]	237	Male/Female	40-66	Walk	68.6 %~78.2 %HRmax	TC, LDL-C, HDL-C
Woolf-May 2000 [38]	97	Male/Female	40-69	Walk	75 %~80 %HRmax	TC, LDL-C, HDL-C
Xiao-Ling 2019 [39]	198	Male/Female	45.5~58.4	Tai Chi	70 %~80 %HRmax	TG, TC, LDL-C, HDL-C, SBP, DBP
Xiaoxia Li 2012 [40]	92	Male/Female	50～65	Walk	40 %~65 %F.C.	TG, TC, LDL-C, HDL-C
Xiaoying Han 2010 [41]	236	Male/Female	45～75	Tai Chi	70%~80%HRmax	SBP, DBP
Xijun Xiao 2005 [42]	120	Male/Female	≥40	Running	40 %~50 %HRR	TG, TC, HDL-C, SBP, DBP, Body weight, WHR, BMI
Yaping Bai 2019 [43]	133	Male/Female	45-75	Dance	60 %~80 %HRmax	TG, TC, LDL-C, HDL-C, SBP, DBP, BMI
zhang 2008 [44]	20	Female	51.2-63.6	Tai Chi	62 %~72.2 %HRmax	TG, TC, LDL-C, HDL-C, Glucose
LC：肺活量，RHR，WHR：waist hip rate						

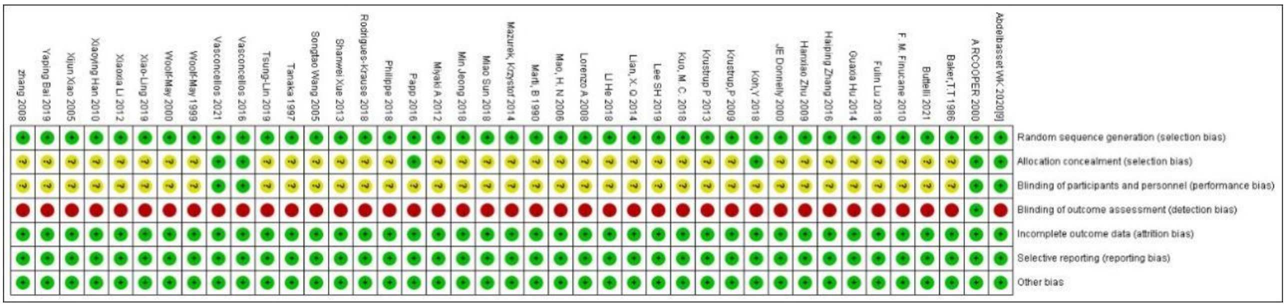

Figure 2. Quality Evaluation Chart

2.3 Dose-Response Relationship of Exercise Intensity

2.3.1 Classification of Exercise Modalities by Intensity

The exercise interventions from the included studies were categorized into three intensity levels based on the American College of Sports Medicine (ACSM) guidelines [45] (Table 3).

Table 3

Classification of Exercise Modalities by Intensity

Intensity	Exercise Modalities
Low	Casual walking, Stair climbing, Pilates
Moderate	Walk, Ba duan jin, Jogging, Dance, Tai Chi, Swimming, Bicycle, Dance, Yoga, Taekwondo
High	Power walking, Running, Soccer, Yoga

2.3.2 Physiological Effects of Different Exercise Intensities

The physiological benefits of different exercise intensities are shown in Figure 3. Low-intensity exercise improved HDL-C (d=0.06, 95 %CI: 0.02–0.10; P<0.05), resting heart rate (d=-2.98, 95 %CI: -4.77 to -1.19; P<0.05), and diastolic blood pressure (d=-2.93, 95 %CI: -5.50 to -0.36; P<0.05). Moderate-intensity exercise improved TG (d=-0.21, 95 %CI: -3.5 to -0.07; P<0.05), TC (d=-0.32, 95 %CI: -0.52 to -0.12; P<0.05), HDL-C (d=0.09, 95 %CI: -0.02 to -0.15; P<0.05), resting heart rate (d=-4.22, 95 %CI: -5.56 to -2.88; P<0.05), systolic blood pressure (d=-4.92, 95 %CI: -8.59 to -1.24; P<0.05), diastolic blood pressure (d=-3.51, 95 %CI: -5.33 to -1.68; P<0.05), body weight (d=-2.46, 95 %CI: -3.79 to -1.16; P<0.05), and vital capacity (d=271.03, 95 %CI: 119.35–422.71; P<0.05). High-intensity exercise improved blood glucose (d=-0.18, 95 %CI: -0.27 to -0.08; P<0.05), SBP (d=-3.21, 95 %CI: -6.07 to -0.34; P<0.05), and DBP (d=-2.58, 95 %CI: -4.31 to -0.85; P<0.05).

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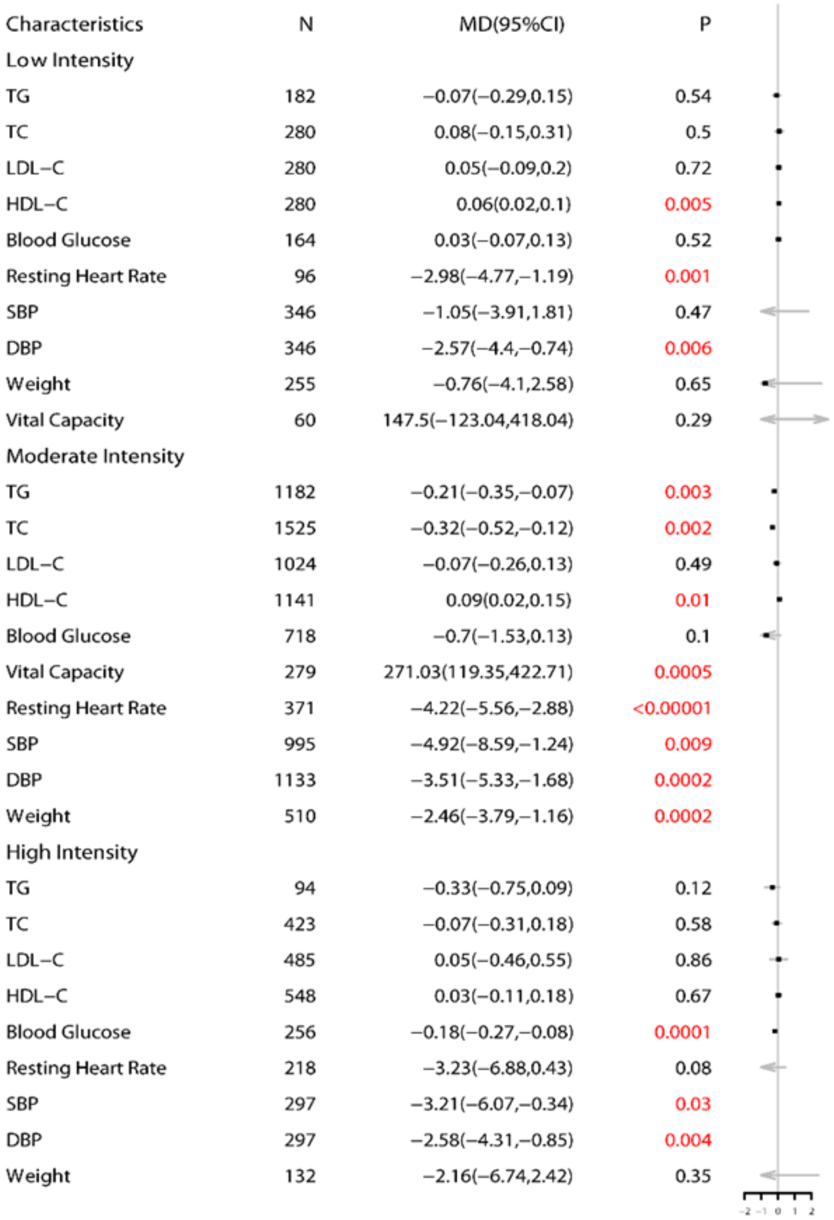

Figure 3. Forest Plot of Physiological Effects by Exercise Intensity

2.4 Dose-Response Relationships of Different Exercise Types

2.4.1 Exercise Modalities Under Different Exercise Types

The specific exercise modalities corresponding to different exercise types are presented in Table 4 below.

Table 4

Exercise Types and Corresponding Modalities

Exercise Type	Exercise Modalities
Traditional Chinese Exercises	Tai Chi, Ba Duan Jin
Popular Exercises	Casual walking, Stair climbing, PilatesWalk, Jogging, Dance, Swimming, Bicycle, Dance, Yoga, TaekwondoPower walking, Running, Soccer, Yoga

2.4.2 Dose-Response Relationships of Different Exercise Types

As shown in Figure 4, traditional Chinese exercises significantly improved HDL-C (d=0.19, 95 %CI: 0.10–0.29, P<0.05), blood glucose (d=-1.49, 95 %CI: -2.83 to -0.15, P<0.05), vital capacity (d=285.09, 95 %CI: 84.05–486.13, P<0.05), systolic blood pressure (d=-9.96, 95 %CI: -15.85 to -4.08, P<0.05), and diastolic blood pressure (d=-5.68, 95 %CI: -7.22 to -4.13, P<0.05). Common exercises demonstrated benefits in improving TG (d=-0.18, 95 %CI: -0.27 to -0.09, P<0.05), TC (d=-0.18, 95 %CI: -0.34 to -0.01, P<0.05), HDL-C (d=0.08, 95 %CI: 0.01–0.15, P<0.05), vital capacity (d=223.62, 95 %CI: 40.97–406.28, P<0.05), resting heart rate (d=-3.51, 95 %CI: -4.92 to -2.10, P<0.05), systolic blood pressure (d=-4.90, 95 %CI: -7.05 to -2.75, P<0.05), diastolic blood pressure (d=-2.96, 95 %CI: -4.53 to -1.40, P<0.05), body weight (d=-2.04, 95 %CI: -3.36 to -0.72, P<0.05), and BMI (d=-0.74, 95 %CI: -1.33 to -0.15, P<0.05).

Characteristics	N	MD(95%CI)	
Traditional Chinese Exercises			
TG	217	-0.50 [-1.14, 0.14]	0.130
TC	217	-0.36 [-0.73, 0.01]	0.060
LDL-C	217	-0.38 [-0.98, 0.23]	0.220
HDL-C	217	0.19 [0.10, 0.29]	0.000
Blood Glucose	19	-1.49 [-2.83, -0.15]	0.030
Vital Capacity	149	285.09 [84.05, 486.13]	0.000
Resting Heart Rate	40	-2.09 [-7.67, 3.49]	0.460
SBP	487	-9.96 [-15.85, -4.08]	0.000
DBP	487	-5.68 [-7.22, -4.13]	0.000
Popular Exercises			
TG	1261	-0.18 [-0.27, -0.09]	0.003
TC	1878	-0.18 [-0.34, -0.01]	0.030
LDL-C	1572	0.02 [-0.15, 0.19]	0.800
HDL-C	1726	0.08 [0.01, 0.15]	0.020
Blood Glucose	1099	-0.40 [-0.97, 0.17]	0.170
Vital Capacity	190	223.62 [40.97, 406.28]	0.020
Resting Heart Rate	665	-3.51 [-4.92, -2.10]	0.000
SBP	894	-4.90 [-7.05, -2.75]	0.000
DBP	894	-2.96 [-4.53, -1.40]	0.000
Weight	947	-2.04 [-3.36, -0.72]	0.000
WHR	421	-0.03 [-0.06, 0.01]	0.110
BMI	420	-0.74 [-1.33, -0.15]	0.010

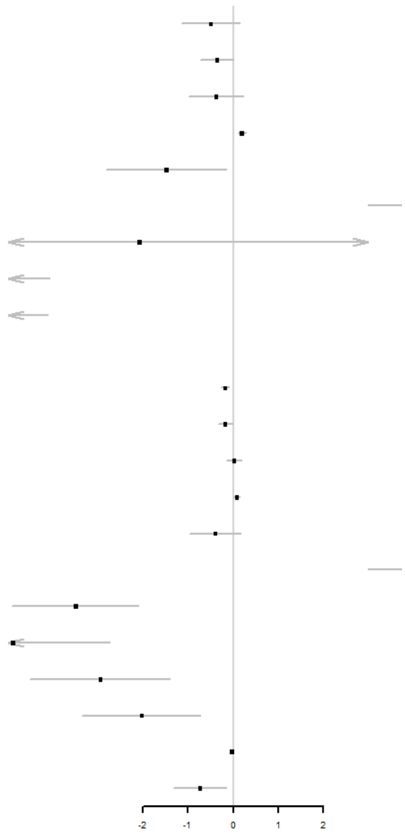

Figure 4. Forest Plot of Physiological Effects by Exercise Type

4 Discussion

4.1 Dose-Response Relationship of Exercise Intensity

The present study demonstrates that body weight improvement was observed only with moderate-intensity exercise, while no significant effects were found for low- or high-intensity interventions. Previous research has established a dose-response relationship between aerobic exercise volume and visceral fat reduction, with a minimum requirement of 10 METs·h/week for significant visceral fat loss [46–48]. The American College of Sports Medicine (ACSM) recommends moderate-intensity physical activity for at least 150 minutes/week for overweight/obese individuals to achieve weight or body fat reduction, supporting moderate intensity as the optimal exercise intensity for body weight management.

Regarding lipid metabolism, our findings show that low-intensity exercise improved HDL-C levels, moderate-intensity exercise benefited TG, TC, and HDL-C, while high-intensity exercise showed no significant lipid-modifying effects. The HDL-C improvement with low-intensity exercise may be mediated through

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enhanced insulin sensitivity and reduced body fat content [49]. Sunami et al. [50] reported significant HDL-C elevation following 5 months of moderate-intensity cycling training. Ye Guohong et al. [51] proposed that prolonged moderate-intensity endurance exercise reduces plasma TG levels by increasing lipoprotein lipase activity, promoting fatty acid utilization in skeletal muscle and hepatic TG export. Moderate-intensity exercise may also improve TC levels by enhancing cholesterol ester transfer protein (CETP) activity, which facilitates cholesterol exchange between HDL-C and LDL-C [52]. Collectively, the lipid-lowering effects of exercise appear to diminish with increasing intensity, with small-to-moderate intensity aerobic exercise demonstrating superior lipid-modulating effects compared to high-intensity exercise [32].

High-intensity exercise significantly reduced blood glucose levels, likely through improved insulin sensitivity in muscle cells and accelerated glycogen synthesis in muscle and liver tissues [53]. Blood pressure improvements were observed across all three intensity levels, consistent with aerobic exercise's established benefits for vascular function, arterial stiffness reduction in hypertensive patients [54, 55], and decreased risk of acute cardiovascular events [56].

Both low- and moderate-intensity exercises reduced resting heart rate, potentially through enhanced parasympathetic nervous system activity [57]. Moderate-intensity exercise uniquely improved vital capacity, attributable to increased tidal volume during exercise and long-term adaptations in respiratory muscle function and lung-thorax elasticity [58].

4.2 Dose-Response Relationship of Different Exercise Modalities

Traditional Chinese exercises (e.g., Tai Chi, Baduanjin) emphasize fluid and continuous movements with mind-body integration, focusing on breath-movement coordination and mental concentration [59]. These exercises typically feature slow tempo and gentle motions but require high neuromuscular control [60]. In contrast, conventional exercises (e.g., running, swimming) prioritize cardiorespiratory endurance and muscular strength through higher-intensity movements with greater physical demands [61].

Regarding antioxidant and anti-inflammatory effects, traditional Chinese exercises reduce oxidative stress and inflammation through slow, rhythmic movements combined with deep breathing, potentially improving HDL-C and blood glucose levels more effectively [62]. Conventional exercises also exhibit antioxidant properties (e.g., running and swimming can increase HDL-C), though high-intensity exercise may transiently elevate oxidative stress [63].

For neuromodulation and cardiovascular health, traditional Chinese exercises improve vascular endothelial function by balancing the autonomic nervous system (reducing sympathetic activity while enhancing parasympathetic tone), thereby lowering blood pressure and improving cardiovascular outcomes [64]. Conventional exercises enhance cardiac function and vascular elasticity to improve blood pressure and cardiovascular health, though acute sympathetic activation may attenuate blood pressure reduction [65].

In terms of energy metabolism and body weight management, traditional Chinese exercises (with lower intensity) show limited direct effects on body weight and BMI [66], whereas conventional exercises effectively manage body weight and BMI through higher energy expenditure [67].

Conclusions

5.1 Low-intensity exercises include regular walking, stair climbing, and Pilates; Moderate-intensity exercises include brisk walking, Baduanjin, jogging, square dancing, Tai Chi, swimming, cycling, and dance; High-intensity exercises include power walking, running, soccer, and yoga.

5.2 Low-intensity exercise can improve HDL-C, resting heart rate, and diastolic blood pressure; moderate-intensity exercise can improve TG, TC, HDL-C, resting heart rate, systolic blood pressure, diastolic blood pressure, body weight, and vital capacity; high-intensity exercise can improve blood glucose, systolic blood pressure, and diastolic blood pressure.

5.3 Traditional Chinese exercises can improve HDL-C, vital capacity, blood glucose, systolic blood pressure, and diastolic blood pressure. Common exercises can improve TG, TC, HDL-C, vital capacity, resting heart rate, systolic blood pressure, diastolic blood pressure, body weight, and BMI.

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