

The Impact of Lifestyle Medicine on Healthy Ageing in Older Adults: A Systematic Review

Almoutaz Alkhier Ahmed *

A/Professor - Family Medicine- MBRU, SSR family medicine -Nad Alhamar Health Center. DAHC

FRCGP [int], MSc Diabetes, MSc endocrinology, Senior fellow of IDF, MPH, FESC, FASLM, Dip IBLM, ELMC, Pg Cer medical education.

Abstract

Background: The global population is aging rapidly, leading to increasing rates of chronic diseases, frailty, cognitive decline, disability, and reduced quality of life. Lifestyle medicine, which promotes evidence-based interventions such as healthy nutrition, regular physical exercise, restorative sleep, and stress management, offers a comprehensive approach to healthy aging.

Objective: To systematically assess the effectiveness of lifestyle medicine interventions on physical, cognitive, psychological, metabolic, and functional outcomes in adults aged 60 years and older.

Method: A systematic review was conducted in accordance with the PRISMA 2020 guidelines. PubMed/MEDLINE, Embase, Scopus, CINAHL, and the Cochrane Library were searched for studies published between January 2014 and March 2026. Eligible studies included randomized controlled trials, prospective cohort studies, and systematic reviews evaluating lifestyle medicine interventions among community-dwelling or institutionalized older adults (>60 years). Outcomes included mortality, cardiovascular health, frailty, physical function, cognition, depression, metabolic health, quality of life, and healthcare utilization. Study quality was assessed using the Cochrane Risk of Bias tool and the Newcastle–Ottawa Scale.

Results: Thirty-eight (38) studies met the inclusion criteria, comprising 24 randomized controlled trials, 10 prospective cohort studies, and 4 systematic reviews. These studies were associated with improvements regarding cardiovascular health, muscle strength, mobility, cognitive function, depressive symptoms, and health-related quality of life. In these data, frequent physical exercise was associated with the strongest evidence of reduced frailty and falls, while Mediterranean-style dietary patterns were associated with lower risks of cardiovascular disease and cognitive decline. Sleep optimization, stress management, smoking cessation, and alcohol reduction were also associated with better psychological well-being and lower morbidity.

Conclusion: Lifestyle medicine appears to support healthy aging in older adults. By incorporating lifestyle changes into routine care, we can help maintain independence, reduce the burden of chronic disease, and improve quality of life.

Keywords: Healthy aging; Lifestyle medicine; Physical activity; Nutrition; Frailty.

Introduction

Population aging is one of the most significant demographic transformations of the twenty-first century. According to the World Health Organization (WHO), by 2050, approximately 22% of the global population will be aged 60 years or older [1]. This change has been accompanied by a substantial increase in the prevalence of chronic non-communicable diseases (NCDs), including cardiovascular disease, type 2 diabetes mellitus, hypertension, osteoporosis, dementia, chronic kidney disease, and cancer [2]. Collectively, these conditions are major contributors to functional decline, disability, healthcare utilization, institutionalization, and premature mortality, placing considerable pressure on global healthcare systems [3].

Traditional healthcare has often focused on identifying disease and prescribing medicine to treat it [4]. Although medicine remains important for managing long-term health problems, it often fails to tackle the underlying causes of illness. Older adults are especially at risk of polypharmacy [5], which may cause adverse reactions, drug interactions, nonadherence, and treatment burden [5,6]. For this

reason, it has become increasingly important to focus on preventing health problems and supporting healthy aging rather than treating disease only after it develops [3]. This means addressing lifestyle and other risk factors and trying to prevent problems before they occur [2]. By doing this, we can help older adults stay healthier and more independent for longer.

Lifestyle medicine is a medical specialty that uses evidence-based approaches to prevent, treat, and even reverse chronic diseases [7]. It stresses healthy lifestyle choices as the foundation of treatment. The six main areas of lifestyle medicine are eating a healthy, whole-food, mostly plant-based diet, getting regular physical exercise, sleeping well, managing stress effectively, avoiding tobacco and excessive alcohol use, and developing strong social relationships [7]. These behaviours can positively affect the body through multiple biological pathways. For example, they can reduce chronic inflammation, boost insulin response, and support vascular health [7]. They can also preserve muscle mass, boost energy levels, and support the immune system [7]. Together, these effects can help prevent or manage chronic

***Corresponding Author:** *Almoutaz Alkhier Ahmed, A/Professor -MBRU, SSR family medicine -Nad Alhamar Health Center. DAHC

Citation: Almoutaz Alkhier Ahmed*, **The Impact of Lifestyle Medicine on Healthy Ageing in Older Adults: A Systematic Review.** Jour of Clin & Med Case Rep, Imag 2026; 6(3): 1229.

diseases and, in some cases, even reverse them [7].

In older adults, lifestyle medicine has the potential to delay the onset and progression of frailty, preserve physical function and independence, reduce falls, maintain cognitive performance, and improve psychological well-being and health-related quality of life [8]. Evidence from large perspective cohort studies [9-11] additionally link adherence to healthy lifestyle behaviours with increased life expectancy, longer disability-free survival, and lower risks of chronic disease and mortality. Healthy lifestyle changes can have a major impact on health as we age, but it is not always clear what works best. Many studies [12-14] have examined exercise, diet, and stress management, yet comparisons remain uncertain. It is also unclear whether combining multiple approaches provides added benefit. To address these questions, this review integrates the latest evidence on lifestyle interventions to help older adults stay healthy and independent. We focus on physical function, cognitive health, mental wellbeing, and metabolic health. By reviewing the existing research, we hope to inform healthcare professionals and direct future studies on healthy aging. The goal is to help older adults lead their best lives, and to do that, we need to know what really works.

Methods Study Design

This study followed the PRISMA 2020 guidelines [15] to guarantee proper conduct and reporting.

Search Strategy: We searched PubMed/MEDLINE, Embase, Scopus, CINAHL, and the Cochrane Library for studies published between January 2014 and March 2026. We searched for studies on lifestyle medicine and healthy aging using keywords and free-text terms, including lifestyle medicine, healthy aging, older adults, physical activity, nutrition, the Mediterranean diet, sleep, stress management, social isolation, frailty, cognition, and randomized controlled trials. We used AND and OR to maximize retrieval and checked reference lists of relevant reviews and articles for additional studies.

Eligibility Criteria: Studies were considered eligible if they met the following inclusion criteria: Included adults aged 60 years or older; examined interventions to support healthier behaviour, such as increased exercise, improved diet, better sleep, stress management, social engagement, and modification of harmful behaviours; reported clinical, functional, cognitive, or quality-of-life outcomes; used a randomized trial, prospective cohort study, or systematic review; and were published in English. Studies were excluded if they: Did not examine participants over 60 separately and included them with younger participants; did not report original outcome data; were conference abstracts, editorials, commentaries, letters, or case reports; or focused only on medication or surgery without considering lifestyle change. We imported all records into a reference management program and removed duplicates. We screened titles and abstracts for eligibility, then assessed full texts when relevant. Disagreements were resolved by discussion or by external reviewer.

Data Extraction: We used a standardized form to extract study design, setting, participants, sample size, intervention, duration, comparator, outcomes, and main results.

Quality Assessment: Two reviewers assessed study quality employing specialized tools: the Cochrane Risk of Bias 2 tool for randomized studies, the Newcastle-Ottawa Scale for observational studies, and AMSTAR 2 for reviews. Disagreements were resolved by discussion.

Data Synthesis: We did not combine the studies quantitatively because they differed in methods, duration, populations, and out-

comes. Instead, we summarized the findings narratively and organized them by the main areas of lifestyle medicine: exercise, food, sleep, stress, social connections, and risk factor modification. When appropriate, we grouped the evidence by study type and by strength and consistency of results.

Results

Study Selection

We identified 3,486 records from various electronic databases. After removing duplicates, 2,741 unique titles and abstracts remained for eligibility screening. We assessed 126 full-text articles in detail, and 38 studies met our predefined inclusion criteria for the final review (Figure 1).

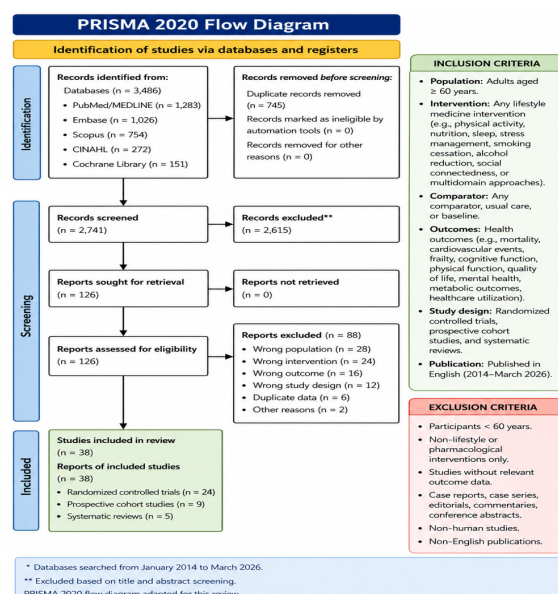


Figure 1: PRISMA flow diagram for studies selection

The included studies comprised 24 randomized controlled trials, 10 prospective cohort studies, and 4 systematic reviews (Table 1). Collectively, they included more than 1.6 million older adults from North America, Europe, Asia, and Australia (Table 2).

Table 1: Study Design and Evidence Classification of Included Studies.

Study design	Number of studies	example
Randomised controlled trials (RCTs)	24	FINGER, PREDIMED, LIFE, Look AHEAD, LIFTMOR-related exercise trials
Systematic reviews/meta-analyses	4	Northy 2018, Sherrington 2019, Beswick 2008, Rosato 2017
Prospective cohort studies	10	EPIC, Whitehall II, Framingham, Nurses' Health Study, SAGE
Total studies	38	

Characteristics of Included Studies

The study durations varied from 8 weeks to more than 20 years, and sample sizes ranged from 96 participants to more than 1.6 million participants (table 2). The interventions included exercise programs, special diets such as the Mediterranean and DASH diets, weight training, sleep-improvement programs, stress-reduction techniques, counselling to quit smoking, strategies to reduce alcohol consumption, and combined lifestyle approaches. These interventions aimed to improve overall health and wellbeing by targeting different aspects of daily life.

Table 2: Studies included in the review.

Study	Participants	Mean age	Lifestyle Intervention	Comparator	Follow-up	Primary Outcome
Ngandu et al., (16)	1,260	69.4	Multidomain lifestyle intervention	General health advice	24 months	Cognitive function
Estruch et al (17)	7,447	67.0	Mediterranean diet	Low-fat diet	4.8 years	Major cardiovascular events
Williamson et al.,(18)	5,145	59.0	Intensive lifestyle intervention	Diabetes education	9.6 years	Weight loss, diabetes outcomes
Pahor et al, (19)	1,635	79.0	Structured physical activity	Health education	2.6 years	Major mobility disability
SPRINT-MIND Investigators, (20)	9,361	68.0	Intensive blood pressure/lifestyle management	Standard care	5.1 years	Mild cognitive impairment
Villareal et al., (21)	160	70.0	Diet plus resistance exercise	Diet alone	12 months	Physical function
Fiatarone et al., (22)	100	87.0	Progressive resistance training	Usual care	10 weeks	Muscle strength
Liu-Ambrose et al., (23)	155	74.0	Resistance training	Balance training	12 months	Executive function
Binder et al.(24)	115	74.0	Exercise programme	Usual care	6 months	Physical performance
King et al., (25)	357	65.0	Home-based physical activity	Health education	24 months	Physical activity adherence
Li et al, (26)	152	78.8±8.4	comprehensive geriatric assessment	Standard care	6 months	Frailty
Valls-Pedret et al., (27)	447	67.0	Mediterranean diet	Low-fat diet	6.5 years	Cognitive performance
Razavi et al., (28)	580	71.5	Comprehensive lifestyle programme	Standard care	12 months	Cardiometabolic health
Irwin et al., (29)	123	70	CBT-I	Tai Chi vs sleep education	16 months	Sleep quality, insomnia remission, inflammation
Black et al., (30)	134	72.0	Mindfulness meditation	Health education	6 months	Sleep and stress
Gallegos et al., (31)	200	65	Mindfulness-based stress reduction	Wait-list	8 weeks	Psychological well-being
Drake et al., (32)	150	56	CBT for insomnia	Sleep education	6 months	Insomnia severity index
Li et al.,(33)	670	77.7	Tai Ji Quan exercise	Stretching	12 months	Falls
Li et al., (34)	670	77.7	Tai Ji Quan: Moving for Better Balance (TJQMBB)	multimodal exercise and stretching exercise	24 weeks	serious injurious falls
Kivipelto et al., (35)	1260	68.5	Multidomain lifestyle intervention	Health advice	2 years	Dementia risk
Grönstedt et al., (36)	120	61	Physical activity plus nutrition	Standard care	12 weeks	Functional independence
Stathi et al.(37)	777	77	Exercise and behaviour counselling	Usual care	12 months	Physical function
Mohammadi et al., (38)	96	65	Lifestyle education programme	Standard care	2 months	Quality of life
Pahor et al., (39)	1,635	79.0	Physical activity intervention	Health education	2.6 years	Mobility disability
Trichopoulou et al,(40)	22,043	69.0	Mediterranean diet adherence	Lowest adherence	10 years	Mortality
de Bruijn et al,(41)	7003	69	Healthy lifestyle behaviours	Routine care	10 years	Incident dementia
Brach et al,(42)	3075	74	Higher physical activity	Sedentary lifestyle	10 years	Brach
Hamer et al,(43)	11,391	68.0	Healthy lifestyle score	Low lifestyle score	8 years	Healthy ageing
Samieri et al,(44)	10,670 women	59	Diet and exercise adherence	Low adherence	15 years	Healthy ageing
Trichopoulou et al,(45)	23,153	65.0	Mediterranean diet	Low adherence	12 years	Mortality
Gopinath et al,(46)	1,584	49	Physical activity	Sedentary lifestyle	10 years	successful ageing
Ozawa et al,(47)	5,083	56	Lifestyle behaviours	Low adherence	10 years	Cognitive decline
Enserro et al,(48)	3,460	55.4	Healthy lifestyle	Standard risk	20years	Cardiovascular disease
Kowal et al,(49)	34,124	≥50	Lifestyle behaviours	Standard lifestyle	3years	Functional decline
Northey et al., (50)	2,031 (39 RCTs)	>50 years	Exercise interventions	Various control	6weeks -12 months	Cognitive function
Rosato et al,(51)	>1.6 million (29 studies)	57.5	Mediterranean diet	Various diets	Approximately 4–20+ years	Mortality and cardiovascular disease
Sherrington et al., (52)	23,407 (108 trials)	76	Exercise programmes	Usual care	25 weeks	Falls prevention
Beswick et al., (53)	97,984 (89 studies)	>65 years	Complex health promotion	Standard care	≥6 months	Functional health

Researchers examined various health outcomes to assess how lifestyle changes affect aging (Table 3). They wanted to know whether these changes could help prevent diseases that occur as people get older, such as heart disease, diabetes, and dementia. They also looked at how lifestyle changes might impact frailty, falls, and de-

pression. Through studying these areas, they built a picture of how lifestyle medicine can help people age and avoid chronic diseases. The studies included a wide range of interventions, allowing them to evaluate effects on many aspects of health, including overall quality of life.

Table 3: Subclassification of included studies.

Physical Activity Intervention studies	Nutrition and Dietary studies	Sleep and Restorative Health studies	Stress Management studies	Smoking Cessation and Alcohol Reduction studies	Social Connectedness and Healthy Relationships
Ngandu et al. (16)	Ngandu et al. (16)	Irwin et al. (29)	Black et al. (30)	de Bruijn et al. (41)	Ngandu et al. (16)
Pahor et al. (19)	Estruch et al. (17)	Black et al. (30)	Gallegos et al. (31)	Hamer et al. (43)	Kivipelto et al. (35)
Villareal et al. (21)	Williamson et al. (18)	Drake et al. (32)	Razavi et al. (28)	Samieri et al. (44)	Razavi et al. (28)
Fiatarone et al. (22)	Villareal et al. (21)		Mohammadi et al. (38)	Ozawa et al. (47)	Mohammadi et al. (38)
Liu-Ambrose et al. (23)	Valls-Pedret et al. (27)		Ngandu et al. (16)	Enserro et al. (48)	Gallegos et al. (31)
Binder et al. (24)	Razavi et al. (28)			Kowal et al. (49)	Hamer et al. (43)
King et al. (25)	Kivipelto et al. (35)			Ngandu et al. (16)	Samieri et al. (44)
Li et al. (33)	Grönstedt et al. (36)			Kivipelto et al. (35)	Kowal et al. (49)
Li et al. (34)	Mohammadi et al. (38)			Razavi et al. (28)	de Bruijn et al. (41)
Kivipelto et al. (35)	Trichopoulou et al. (40)				
Grönstedt et al. (36)	Hamer et al. (43)				
Stathi et al. (37)	Samieri et al. (44)				
Pahor et al. (39)	Trichopoulou et al. (45)				
Brach et al. (42)	Ozawa et al. (47)				
Gopinath et al. (46)	Rosato et al. (51)				
Northey et al. (50)					
Sherrington et al. (52)					

Physical Activity

Physical activity was the most extensively investigated lifestyle intervention, with 17 studies (Table 3) showing improvements in physical function, muscle strength, gait speed, mobility, and overall functional capacity among older adults in structured exercise programs. Resistance training consistently increased lean muscle mass, improved balance, and reduced the risk of falls, whereas aerobic exercise improved cardiorespiratory fitness, blood pressure regulation, endothelial function, and insulin sensitivity. Combined resistance and aerobic exercise produced greater improvements across multiple health outcomes than either modality alone.

Studies (Table 2) have shown that supervised exercise programs can significantly benefit frail people. These programs can improve self-care and everyday functioning. Exercise has also been linked to lower levels of inflammation, as measured by C-reactive protein and interleukin-6, suggesting benefits outside physical health. By reducing inflammation, exercise may foster overall health and well-being. Routine physical activity, such as at least 150 minutes of moderate exercise per week, can help people live longer and healthier lives. It can also support independence and reduce disability. In contrast, too

much sitting is linked to serious health problems, including hospitalization, frailty, disability, and death. Staying active is key to a long and healthy life.

Nutrition and Dietary Interventions

Research has shown that what we eat can have a big impact on health as we age. Fifteen studies (Table 3) examined how different diets affect older adults, and the Mediterranean diet stood out. This way of eating emphasizes vegetables, fruits, legumes, whole grains, nuts, and olive oil, while limiting red meat, sugary carbs, and processed foods. Fish is also encouraged. The evidence for this diet is strong and consistent, suggesting that it is a good choice for older adults who want to stay healthy. Following this dietary pattern can help maintain well-being and reduce the risk of certain health problems.

High adherence to the Mediterranean diet was consistently associated with lower incidences of cardiovascular disease, type 2 diabetes mellitus, stroke, and all-cause mortality compared with Western dietary patterns. Several prospective cohort studies also reported slower cognitive decline and a reduced incidence of dementia among people with higher adherence to Mediterranean dietary principles.

Higher overall diet quality was consistently associated with better physical performance and a lower prevalence of frailty. Older adults consuming adequate dietary protein (1.0–1.2 g/kg/day), together with sufficient vitamin D, calcium, and omega-3 fatty acids, showed greater preservation of skeletal muscle mass and strength, reduced progression of sarcopenia, and improved musculoskeletal health. These nutritional components aid muscle protein synthesis, bone mineralization, and neuromuscular function.

Randomized controlled trials (Table 3) evaluating individualized nutritional counselling showed significant improvements in glycaemic control, body composition, lipid profiles, and inflammatory biomarkers. Dietary modification also resulted in modest but clinically meaningful reductions in systolic blood pressure and low-density lipoprotein cholesterol concentrations (Table 3). Eating habits high in processed foods, saturated fats, sugars, and excess salt are linked to a higher risk of obesity, high blood pressure, metabolic problems, heart disease, and cognitive issues (Table 3). Many studies () show that customized dietary advice is key for helping people manage the physical changes that accompany aging, such as decreased appetite, altered taste, dental problems, and digestive issues. This bespoke guidance can help ensure that people get the nutrients they need and maintain healthy eating habits over time. By addressing these age-related changes, people can better maintain their general health and well-being. Research also highlights the relevance of considering individual needs when developing dietary plans, as this can greatly affect adherence and reduce the chance of chronic diseases.

Sleep and Restorative Health

Three studies (Table 3) evaluated sleep-focused interventions in older adults. Poor sleep quality was consistently associated with declined cognitive function, depressive symptoms, increased fall risk, insulin resistance, hypertension, obesity, impaired immune function, higher hospitalization rates, and reduced quality of life. Sleep is important for overall health and wellbeing (Table 3). Good sleep habits, such as keeping a regular sleep schedule, limiting naps, avoiding caffeine at night, staying active during the day, and making the bedroom comfortable, can improve sleep quality plus restfulness (Table 3). This is called sleep hygiene. Some people may need extra help with sleep. Cognitive behavioural therapy for insomnia, or CBT-I, can help change sleep habits and thoughts about sleep so people can sleep better without medication (). It can also have long-lasting effects on fatigue, anxiety, and depression. Better rest may improve thinking and attention, and some studies show it can support concentration and memory (table 3). Sleeping well may also help keep the body healthy as it ages and reduce inflammation. Getting enough sleep is an important part of overall health [16-20].

Stress Management

Six studies (Table 3) investigated stress-management interventions, including mindfulness-based stress reduction (MBSR), meditation, yoga, breathing exercises, and relaxation therapy (Table 3). Chronic psychological stress was consistently associated with activation of the hypothalamic-pituitary-adrenal axis, elevated cortisol levels, oxidative stress, and persistent low-grade inflammation. Structured stress-management interventions significantly reduced perceived stress, anxiety, depressive symptoms, and psychological distress while improving sleep quality, blood pressure, heart rate variability, and mental well-being (table 3). Mindfulness-based interventions strengthened emotional resilience plus coping strategies among older adults with chronic conditions, including diabetes, cardiovascular disease, and arthritis. Several studies (Table 3) also reported modest improvements in inflammatory biomarkers and immune function following regular meditation practice. Overall, the evidence supports

stress management as an integral component of lifestyle medicine in older adults.

Smoking Cessation and Alcohol Reduction

Seven cohort studies (Table 3) assessed behavioural interventions targeting tobacco use and heavy alcohol consumption. Smoking was consistently associated with increased risks of cardiovascular disease, chronic obstructive pulmonary disease, malignancy, osteoporosis, frailty, and premature mortality. Smoking cessation at any age significantly reduced cardiovascular risk and improved respiratory function, showing clear health benefits even in later life (Table 3) [21-24]. Excessive drinking alcohol can increase the risk of falls, cognitive impairment, liver damage, and heart disease (Table 3). It can also interfere with the effectiveness of medication. Motivational counselling and support can help people change their drinking habits. Programs that focus on healthy living, smoking cessation, and alcohol reduction can help people live longer and need less medical care (Table 3).

Social Connectedness and Healthy Relationships

Research has shown that strong social connections can have a significant impact as people age. Nine studies (Table 3) found that people with strong social connections tend to live longer, have better mental health, and are more likely to stay physically active. They also seem to maintain sharper focus and concentration for longer. Overall, social connectedness is an important part of aging well. Community involvement and social support can have a significant impact in people's lives (Table 3). Programs that encourage people to exercise together, volunteer, and support one another can improve self-esteem and general well-being. Family involvement and community connections can be very powerful (table 3). By contrast, loneliness and isolation can have serious negative effects on health, including depression, heart disease, and a shorter lifespan (table 3). Many studies (table 3) have shown that being alone can be as harmful as other well-known risk factors. It has also been found that people are more likely to stick with healthy group activities than with activities done alone. This shows how important support from others is when making healthy changes [24-27].

Multidomain Lifestyle Interventions

Fourteen studies (Table 3) evaluated multidomain interventions that integrated multiple pillars of lifestyle medicine. Overall, programs that combine physical activity, nutrition, sleep optimization, stress management, and behavioural counselling consistently demonstrate greater clinical benefits than single-component interventions. These thorough interventions led to major improvements across heart health, physical abilities, mental sharpness, and general well-being. Participants showed better blood pressure control, lower blood sugar levels, and better mobility. They also experienced less frailty, better cognitive function, particularly in executive tasks, fewer depressive symptoms, a higher quality of life, and fewer hospital visits. Overall, these interventions had a significant positive effect on both physical and mental health [27-39]. Several studies (Table 3) focused on individuals at elevated risk of cognitive decline and dementia. Multidomain interventions produced modest but clinically meaningful improvements in memory, processing speed, executive function, and activities of daily living, suggesting a potential role in preserving cognitive function and delaying functional decline (Table 4).

Table 4: studies with multidomain lifestyle intervention.

Study	Parti- pants	Mean age (years)	Multidomain Lifestyle Intervention	Comparator	Follow-up	Primary Outcome
Ngandu et al. (16)	1,260	69.4	Diet, physical activity, cognitive training, and vascular risk monitoring	General health advice	24 months	Cognitive function
Williamson et al. (18)	5,145	59	Intensive lifestyle intervention (diet, physical activity, weight-loss counselling, behavioural support)	Diabetes educa- tion	9.6 years	Weight loss, dia- betes outcomes
SPRINT-MIND Investigators (20)	9,361	68	Intensive blood pressure management with comprehensive lifestyle counselling	Standard care	5.1 years	Mild cognitive im- pairment
Razavi et al. (28)	580	71.5	Comprehensive lifestyle programme (nutrition, physical activity, stress management, health edu- cation)	Standard care	12 months	Cardiometabolic health
Kivipelto et al. (35)	1,260	68.5	Diet, exercise, cognitive training, and vascular risk management	Health advice ²	years	Dementia risk
Grönstedt et al. (36)	1206	61	Physical activity plus nu- tritional intervention	Standard care	12 weeks	Functional inde- pendence
Mohammadi et al. (38)	96	65	Lifestyle education pro- gramme (diet, physical ac- tivity, stress management, self-care)	Standard care	2 months	Quality of life
de Bruijn et al. (41)			Healthy lifestyle behav- iours (diet, physical activ- ity, smoking, alcohol)			Incident dementia
Hamer et al. (43)			Healthy lifestyle score			Healthy ageing
Samieri et al. (44)			Diet, exercise, smoking, BMI, and other healthy behaviours			Healthy ageing
Ozawa et al. (47)			Multiple lifestyle be- haviours			Cognitive de- cline
Enserro et al. (48)			Healthy lifestyle score			Cardiovascular disease
Kowal et al. (49)			Lifestyle behaviours			Functional de- cline

These lifestyles programs relied heavily on behaviour change strategies such as motivational talks, personal goal setting, progress assessment, and regular follow-ups. By using these methods, people were more likely to stick to their new lifestyle habits and make lasting changes, which improved effectiveness. This approach helped people develop healthy habits they could maintain over time.

Discussion

As we age, our lifestyle plays an important role in our health. This study shows that making a few simple changes can have a significant impact on overall health. By being more active, eating well, getting enough sleep, managing stress, spending time with friends and family, and steering clear of harmful habits, we can reduce our risk of developing chronic diseases (Table 3&4). It is not only about living longer but about living better. When we take care of ourselves, we can stay healthy and independent for longer. Therefore, it is a good idea

for doctors to encourage their older patients to make these changes and support their efforts to live improved lifestyles.

When we consider different areas of our lifestyle, one thing stands out: physical activity has a significant impact (Table 3). Exercise, especially resistance training, helps prevent muscle loss as we age by building muscle and maintaining effective neuromuscular function (Tables 3&4). It also helps keep the body lean, which is important for overall health. On the other hand, aerobic exercise, such as running or cycling, improves cardiac and pulmonary function, supports vascular health, and supports maintaining metabolic regulation (Tables 3&4). Combining both types of exercise, resistance and aerobic, is even more beneficial (Tables 3&4). It helps prevent frailty, improves mobility and balance, and reduces the risk of falls, all of which are important for maintaining independence as we age (). It delivers numerous benefits, including a lower risk of heart disease, better blood

sugar control, and a sharper mind (Tables 3&4). It can even help people live longer. These advantages are likely due to several factors, including lowered inflammation and oxidative stress, healthier blood vessels, improved insulin sensitivity, and a positive impact on the gut microbiota through nutrients such as omega-3 fatty acids, fibre, antioxidants, and polyphenols (Tables 3&4). By adding these nutrients into our diet, we can reduce our risk of various health problems and age more healthily. A healthy diet can greatly affect our general health, and it's essential to make informed choices about what we eat to give our bodies the best chance to thrive as we age (Tables 3&4) [40-53].

Upholding mental health is essential, especially for older adults who face multiple health issues simultaneously. Practices such as mindfulness, meditation, and stress management can make a substantial difference. They can aid in reducing anxiety and depression and may also improve sleep (Tables 3&4). Since many older adults struggle with mental health, these approaches can be a useful addition to traditional treatments and may reduce the need for medication. By focusing on psychological well-being, we can help people cope better with health problems and boost their overall quality of life (Tables 3&4). Getting a good night's sleep is important for our overall health and well-being. When we sleep well, we think more clearly, feel happier, and our bodies work better. But as we get older, it can be harder to sleep because of natural aging, health problems, taking many medications, and stress (Tables 3&4). Luckily, there are things we can do to help us sleep better. One thing that works well is a type of talk therapy called cognitive behavioural therapy for insomnia, or CBT-I for short (Tables 3&4). This therapy helps us change our sleep habits and thoughts, so we can sleep better without needing to take sleeping pills, which can have bad side effects if we take them for too long. By improving our sleep, we can feel better, think more clearly, and live a healthier life.

One of the main things we learned from this study is that changing multiple aspects of one's lifestyle simultaneously is more effective than changing just one (). As we get older, our health is affected by many factors, including biology, behaviour, psychology, and social situation (Tables 3&4). When we try to improve our lifestyle in many areas at once, we tend to see greater improvements in physical health, brain function, and metabolism. This shows that an integrated approach to healthy living is an effective way to promote healthy aging (Tables 3&4).

The mechanisms underlying these noted benefits are multifactorial. Regular physical exercise enhances mitochondrial biogenesis, skeletal muscle function, endothelial health, insulin sensitivity, and anti-inflammatory pathways (table 3-4). Healthy dietary patterns reduce oxidative stress, chronic low-grade inflammation, and metabolic dysfunction while promoting a diverse and metabolically favourable gut microbiome (). Proper sleep supports neuroendocrine regulation, immune function, and cognitive health, whereas stress reduction decreases hypothalamic–pituitary–adrenal axis activation, lowers cortisol concentrations, and attenuates sympathetic nervous system activity (Tables 3&4). Furthermore, strong social relationships promote psychological well-being, reduce loneliness, and improve long-term adherence to healthy lifestyle behaviours (Tables 3&4).

As people get older, lifestyle medicine can be a smart way to cut healthcare costs. By stopping or slowing chronic diseases, we can reduce hospital use, medication needs, and the likelihood of frailty or care home placement. This can also lower healthcare costs (Tables 3&4). As more people age, it is vital that we make lifestyle medicine a key part of how we care for older adults and deliver primary care

(). This approach is evidence-based and can help people age healthily while making sure our medical systems can keep up with demand. By doing so, we can improve patients' lives and make healthcare more durable.

Limitations

There are some limitations to this review that we need to consider when interpreting the results. One main issue is that the studies we looked at differed in several ways: the participants, interventions, study length, and outcome measures. This made direct comparison difficult and meant we couldn't use meta-analysis to combine the results. We need to determine how different aspects of lifestyle medicine, such as diet, exercise, sleep, and stress management, affect health individually and in combination. To do this, we should have more studies that test one factor at a time and more that test combinations of a few factors. This will help us understand what really makes a difference in health. Right now, many studies examine multiple factors at once, making it hard to know what's really working. By breaking it down and testing each part, we can get a clearer picture of what helps us live healthier lives.

People's ability to stick to lifestyle changes varied widely across studies. Many factors affect how well someone can keep up these changes, such as income, cognitive ability, physical limitations, social support, health literacy, and access to medical care. Also, few studies examined long-term adherence, usually beyond 2 years, making it hard to know whether the changes last. This is a problem because we want to know if these lifestyle changes can make a difference in people's health over the long run. Many studies relied on self-reported dietary intake and physical activity, which may be inaccurate. Future studies could improve measurement by deploying specialized activity-tracking devices, food-based biomarkers, and digital health tools to assess these variables more objectively. This would help reduce recall and reporting errors.

Most of the studies we looked at were conducted in wealthy countries, such as those in Europe, North America, and Australia. So, we are not sure whether the results would be the same in poorer countries, in which culture, income, and healthcare differ. This makes it hard to say whether lifestyle changes would work in those places. It is also possible that the results are skewed because studies with good outcomes are more likely to be shared than those with average or bad results, which could make the interventions seem more effective than they are. Even with some limitations, the overall quality of the studies was fairly good, and the consistency of results across study types, including randomized controlled trials, prospective cohort studies, and systematic reviews, makes the overall conclusions more reliable.

Clinical Implications

The results of this study are important for how we practice medicine and make healthcare decisions. We should think of lifestyle medicine as a key part of staying healthy as we age and a keyway to prevent and manage long-term diseases in older adults. Rather than replacing traditional medical treatments, we should use evidence-based lifestyle changes alongside standard care to achieve better disease control, reduce the requirement for multiple medications and their potential side effects, help people stay independent, and boost their overall quality of life. By doing this, we can make a big difference in the health and wellbeing of older adults.

To make a real difference, we need a team effort from many professionals, including family doctors, specialists in caring for older adults,

nurses, diet experts, physical therapists, psychologists, occupational therapists, and exercise specialists. When helping people make healthy changes, we should tailor our approach to each person's specific needs and abilities, considering how well they function, any health issues they are dealing with, and what they want to achieve. This way, we can help them stick with the changes and see real benefits over time.

Comprehensive geriatric assessment should routinely include evaluation of key lifestyle domains, such as physical activity, dietary quality, sleep health, tobacco and alcohol use, psychological stress, social connectedness, functional capacity, and frailty. Early identification of modifiable behavioural risk factors generates opportunities for prompt intervention and prevention of functional decline. To make a substantial difference in people's health as they age, we need to invest in community programs that promote healthy aging. These programs should include regular exercise plans, advice on healthy eating, ways to prevent falls, help to quit smoking, and activities that encourage social interaction. We should also use digital technologies to support lasting lifestyle change. Through incorporating healthy habits into standard healthcare, especially for older adults, we can help people live longer, healthier lives and reduce the burden of chronic disease and demand on healthcare services. This approach can have a big impact on the health and wellbeing of elderly populations.

Conclusion

This systematic review demonstrates that lifestyle medicine confers considerable benefits for older adults across physical, psychological, cognitive, and functional domains. The evidence consistently sup-

ports regular physical exercise, healthy dietary patterns, refreshing sleep, effective stress management, tobacco avoidance, moderation of alcohol consumption, and strong social connectedness as key determinants of healthy aging.

Among the lifestyle interventions evaluated, structured physical activity demonstrated the most robust evidence, with consistent improvements in muscle strength, balance, mobility, cardiovascular fitness, metabolic health, and functional independence, as well as reductions in frailty and fall risk. Mediterranean-style dietary patterns were associated with lower cardiovascular risk and better cognitive outcomes, while sleep and stress management interventions improved psychological wellbeing and overall quality of life. Social engagement emerged as an important contributor to healthy aging through its association with reduced loneliness, improved psychological well-being, and enhanced functional outcomes. Multidomain lifestyle interventions that integrate multiple behavioural components consistently yield greater benefits than single-component interventions, highlighting the synergistic effects of addressing interconnected biological, behavioural, and social determinants of health. In the context of rapid population aging and the increasing burden of chronic disease, lifestyle medicine should be incorporated as a core element of comprehensive geriatric care. Integrate evidence-based lifestyle interventions into routine clinical practice to promote healthy aging, delay functional decline and disability, reduce healthcare utilization, extend health span, and improve quality of life among older adults.

References

1. [World Health Organization. Ageing and health \(2024\) Geneva: World Health Organization.](#)
2. Organization WH (2015) World report on ageing and health. World Health Organization.
3. [Beard JR, Officer A, De Carvalho IA, Sadana R, Pot AM, et al. \(2016\) The World report on ageing and health: a policy framework for healthy ageing. The lancet 387\(10033\): 2145-2154.](#)
4. [Katz DL, Frates EP, Bonnet JP, Gupta SK, Vartiainen E, Carmona RH \(2018\) Lifestyle as medicine: the case for a true health initiative. American Journal of Health Promotion. 32\(6\): 1452-1458.](#)
5. [Maher RL, Hanlon J, Hajjar ER \(2014\) Clinical consequences of polypharmacy in elderly. Expert opinion on drug safety. 13\(1\): 57-65.](#)
6. [Wastesson JW, Morin L, Tan EC, Johnell K \(2018\) An update on the clinical consequences of polypharmacy in older adults: a narrative review. Expert opinion on drug safety. 17\(12\): 1185-1196.](#)
7. [Lippman D, Stump M, Veazey E, Guimarães ST, Rosenfeld R, et al. \(2024\) Foundations of lifestyle medicine and its evolution. Mayo Clinic Proceedings: Innovations, Quality & Outcomes. 8\(1\): 97-111.](#)
8. [Drewnowski A, Evans WJ \(2001\) Nutrition, physical activity, and quality of life in older adults: summary. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences. 56\(2\):89-94.](#)
9. [Li Y, Schoufour J, Wang DD, Dhana K, Pan A, et al. \(2020\) Healthy lifestyle and life expectancy free of cancer, cardiovascular disease, and type 2 diabetes: prospective cohort study. BMJ pp. 368.](#)
10. [Nyberg ST, Singh-Manoux A, Pentti J, Madsen IE, Sabia S, et al. \(2020\) Association of healthy lifestyle with years lived without major chronic diseases. JAMA internal medicine 180\(5\): 760-768.](#)
11. [Dhana K, Evans DA, Rajan KB, Bennett DA, Morris MC \(2020\) Healthy lifestyle and the risk of Alzheimer dementia: Findings from 2 longitudinal studies. Neurology 95\(4\): e374-83.](#)
12. [Nuzum H, Stickel A, Corona M, Zeller M, Melrose RJ, Wilkins SS \(2020\) Potential benefits of physical activity in MCI and dementia. Behavioural neurology 2020\(1\):7807856.](#)
13. [Pahor M, Guralnik JM, Ambrosius WT, Blair S, Bonds DE, et al. \(2014\) Effect of structured physical activity on prevention of major mobility disability in older adults: the LIFE study randomized clinical trial. Jama 311\(23\): 2387-2396.](#)
14. [Estruch R, Ros E, Salas-Salvadó J, Covas MI, Corella D, et al. \(2018\) Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with extra-virgin olive oil or nuts. New England journal of medicine. 378\(25\): e34.](#)
15. [Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, et al. \(2021\) The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Bmj pp. 372.](#)
16. [Ngandu T, Lehtisalo J, Solomon A, Levälahti E, Ahtiluoto S, et al. \(2015\) A 2 year multidomain intervention of diet, exercise, cognitive training, and vascular risk monitoring versus control to prevent cognitive decline in at-risk elderly people \(FINGER\): a randomised controlled trial. The Lancet 385\(9984\): 2255-2263.](#)
17. [Estruch R, Ros E, Salas-Salvadó J, Covas MI, Corella D, et al. \(2018\) Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with extra-virgin olive oil or nuts. New England journal of medicine. \(25\): e34.](#)
18. [Williamson DA, Rejeski J, Lang W, Van Dorsten B, Fabricatore AN, Toledo K \(2009\) Look AHEAD Research Group. Impact of a weight management program on health-related quality of life in overweight adults with type 2 diabetes. Archives of internal medicine. 169\(2\):163-171.](#)
19. [Pahor M, Guralnik JM, Ambrosius WT, Blair S, Bonds DE, et al. \(2014\) Effect of structured physical activity on prevention of major mobility disability in older adults: the LIFE study randomized clinical trial. Jama 311\(23\): 2387-2396.](#)
20. [Sprint Mind Investigators for the SPRINT Research Group.](#)

- Williamson JD, Pajewski NM, Auchus AP, Bryan RN, Chelune G, Cheung AK, et al. (2019) Effect of intensive vs standard blood pressure control on probable dementia: a randomized clinical trial. *Jama* 321(6): 553-561.
21. Villareal DT, Aguirre L, Gurney AB, Waters DL, Sinacore DR, et al. (2017) Aerobic or resistance exercise, or both, in dieting obese older adults. *New England Journal of Medicine* 376(20): 1943-1955.
22. Fiatarone MA, O'Neill EF, Ryan ND, Clements KM, Solares GR, et al. (1994) Exercise training and nutritional supplementation for physical frailty in very elderly people. *New England Journal of Medicine* 330(25): 1769-1775.
23. Liu-Ambrose T, Nagamatsu LS, Graf P, Beattie BL, Ashe MC, et al. (2010) Resistance training and executive functions: a 12-month randomized controlled trial. *Archives of internal medicine*. 170(2): 170-178.
24. Binder EF, Schechtman KB, Ehsani AA, Steger-May K, Brown M, et al. (2002) Effects of exercise training on frailty in community-dwelling older adults: results of a randomized, controlled trial. *Journal of the American Geriatrics Society* 50(12): 1921-1928.
25. King AC, Haskell WL, Taylor CB, Kraemer HC, DeBusk RF (1991) Group-vs home-based exercise training in healthy older men and women: a community-based clinical trial. *Jama* 266(11): 1535-1542.
26. Li CM, Chen CY, Li CY, Wang WD, Wu SC (2010) The effectiveness of a comprehensive geriatric assessment intervention program for frailty in community-dwelling older people: a randomized, controlled trial. *Archives of gerontology and geriatrics*. 50: S39-S42.
27. Valls-Pedret C, Sala-Vila A, Serra-Mir M, Corella D, de la Torre R, et al. (2015) Mediterranean diet and age-related cognitive decline: a randomized clinical trial. *JAMA internal medicine*. 175(7): 1094-1103.
28. Razavi M, Fournier S, Shepard DS, Ritter G, Strickler GK, Stason WB (2014) Effects of lifestyle modification programs on cardiac risk factors. *PLoS One* 9(12): e114772.
29. Irwin MR, Olmstead R, Carrillo C, Sadeghi N, Breen EC, et al. (2014) Cognitive behavioral therapy vs. Tai Chi for late life insomnia and inflammatory risk: a randomized controlled comparative efficacy trial. *Sleep* 37(9): 1543-1552.
30. Black DS, O'Reilly GA, Olmstead R, Breen EC, Irwin MR (2015) Mindfulness meditation and improvement in sleep quality and daytime impairment among older adults with sleep disturbances: a randomized clinical trial. *JAMA internal medicine*. 175(4): 494-501.
31. Gallegos AM, Moynihan J, Pigeon WR (2018) A secondary analysis of sleep quality changes in older adults from a randomized trial of an MBSR program. *Journal of Applied Gerontology* 37(11): 1327-1343.
32. Drake CL, Kalmbach DA, Arnedt JT, Cheng P, Tonnu CV, et al. (2019) Treating chronic insomnia in postmenopausal women: a randomized clinical trial comparing cognitive-behavioral therapy for insomnia, sleep restriction therapy, and sleep hygiene education. *Sleep* 42(2): zsy217.
33. Li F, Harmer P, Fitzgerald K, Eckstrom E, Akers L, et al. (2018) Effectiveness of a therapeutic Tai Ji Quan intervention vs a multimodal exercise intervention to prevent falls among older adults at high risk of falling: a randomized clinical trial. *JAMA internal medicine* 178(10): 1301-1310.
34. Li F, Harmer P, Eckstrom E, Fitzgerald K, Chou LS, Liu Y (2019) Effectiveness of Tai Ji Quan vs multimodal and stretching exercise interventions for reducing injurious falls in older adults at high risk of falling: follow-up analysis of a randomized clinical trial. *JAMA network open* 2(2): e188280.
35. Kivipelto M, Solomon A, Ahtiluoto S, Ngandu T, Lehtisalo J, et al. (2013) The Finnish geriatric intervention study to prevent cognitive impairment and disability (FINGER): study design and progress. *Alzheimer's & Dementia* 9(6): 657-665.
36. Grönstedt H, Vikström S, Cederholm T, Franzén E, Luiking YC, et al. (2020) Effect of sit-to-stand exercises combined with protein-rich oral supplementation in older persons: the older person's exercise and nutrition study. *Journal of the American Medical Directors Association*. 21(9): 1229-1237.
37. Stathi A, Greaves CJ, Thompson JL, Withall J, Ladow P, et al. (2022) Effect of a physical activity and behaviour maintenance programme on functional mobility decline in older adults: the REACT (Retirement in Action) randomised controlled trial. *The Lancet Public Health*. 7(4): e316-e326.
38. Mohammadi Mehr M, Zamani-Alavijeh F, Hasanzadeh A, Fasihi T (2019) Effect of healthy lifestyle educational programs on happiness and life satisfaction in the elderly: A randomized controlled trial study. *Iranian Journal of Ageing* 13(4): 440-451.
39. Pahor M, Guralnik JM, Ambrosius WT, Blair S, Bonds DE, et al. (2014) Effect of structured physical activity on prevention of major mobility disability in older adults: the LIFE study randomized clinical trial. *Jama*. 311(23): 2387-2396.
40. Trichopoulos A, Costacou T, Bamia C, Trichopoulos D (2003) Adherence to a Mediterranean diet and survival in a Greek population. *New England Journal of Medicine* 348(26): 2599-608.
41. de Bruijn RF, Bos MJ, Portegies ML, Hofman A, Franco OH, et al. (2015) The potential for prevention of dementia across two decades: the prospective, population-based Rotterdam Study. *BMC medicine* 13(1): 132.
42. Brach JS, Simonsick EM, Kritchevsky S, Yaffe K, Newman AB (2004) Health, Aging and Body Composition Study Research Group. The association between physical function and lifestyle activity and exercise in the health, aging and body composition study. *Journal of the American Geriatrics Society* 52(4): 502-509.
43. Hamer M, Lavoie KL, Bacon SL (2014) Taking up physical activity in later life and healthy ageing: the English longitudinal study of ageing. *British journal of sports medicine* 48(3): 239-243.
44. Samieri C, Sun Q, Townsend MK, Chiuve SE, Okereke OI, et al. (2013) The association between dietary patterns at midlife and health in aging: an observational study. *Annals of internal medicine* 159(9): 584-591.
45. Trichopoulos A, Bamia C, Trichopoulos D (2009) Anatomy of health effects of Mediterranean diet: Greek EPIC prospective cohort study. *Bmj* pp. 338.
46. Gopinath B, Kifley A, Flood VM, Mitchell P (2018) Physical activity as a determinant of successful aging over ten years. *Scientific reports*. 8(1): 10522.
47. Ozawa M, Shipley M, Kivimaki M, Singh-Manoux A, Brunner EJ (2017) Dietary pattern, inflammation and cognitive decline: the Whitehall II prospective cohort study. *Clinical Nutrition* 36(2): 506-512.
48. Enserro DM, Vasan RS, Xanthakis V (2018) Twenty-year trends in the American Heart Association cardiovascular health score and impact on subclinical and clinical cardiovascular disease: the Framingham Offspring Study. *Journal of the American Heart Association*. 7(11): e008741.
49. Kowal P, Chatterji S, Naidoo N, Biritwum R, Fan W, et al. (2012) Data resource profile: the World Health Organization Study on global AGEing and adult health (SAGE). *International journal of epidemiology*. 41(6): 1639-1649.
50. Northey JM, Cherbuin N, Pumpa KL, Smee DJ, Rattray B (2018) Exercise interventions for cognitive function in adults older than 50: a systematic review with meta-analysis. *British journal of sports medicine*. 52(3): 154-160.
51. Rosato V, Temple NJ, La Vecchia C, Castellan G, Tavani A, Guercio V (2019) Mediterranean diet and cardiovascular disease: a systematic review and meta-analysis of observational studies. *European journal of nutrition* 58(1): 173-191.
52. Sherrington C, Fairhall NJ, Wallbank GK, Tiedemann A, Michaleff ZA, et al. (2019) Exercise for preventing falls in older people living in the community. *Cochrane database of systematic reviews* p.1.
53. Beswick AD, Rees K, Dieppe P, Ayis S, Gooberman-Hill R, et al. (2008) Complex interventions to improve physical function and maintain independent living in elderly people: a systematic review and meta-analysis. *The Lancet* 371(9614): 725-735.