

Research Article

Implementing a Walking Program for Sedentary Patients in a Weight Management Clinic: Review of Literature

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Abstract

Introduction

A sedentary life is defined as consistent physical inactivity. To encourage sedentary patients to adopt active lifestyles, structured exercise programs activate healthier living.

Methods

A literature search consisted of EBSCO, CINAHL, Clinical Key Nursing, Cochrane, Google Scholar, and PubMed database search with inclusion criteria of English language in the outpatient setting and within the last 5 years. Articles excluded were non-English language and done in the inpatient setting. The final number of articles selected was 22. The articles were evaluated using the Johns Hopkins Nursing Evidence-Based Practice: Evidence Level and Quality Guide.

Evidence Summary

Walking programs improve overall quality of life, increase physical activity capabilities, and decrease sedentary behavior.

Gaps

Few studies have been published in the last five years that focus on objective data related to walking programs. Other gaps included gender, race, and participation.

Recommendations for Practice

Practice recommendations include promoting walking exercises for sedentary individuals to improve healthy behaviors. A structured exercise program led by trained clinicians in an outpatient setting can increase a patient's number of steps over time. Initiating a walk-

ing routine can decrease sedentary behavior and promote an active lifestyle and healthy weight in inactive patients. Decreasing sedentary lifestyles while maintaining a healthy weight improves overall health and well-being.

Keywords: Walk with Ease; Weight management; Sedentary lifestyle; Sedentary behavior; Physical activity; Exercise; Obesity; Walking program

Implementing a Walking Program for Sedentary Patients in a Weight Management Clinic: Review of Literature

Many components contribute to an unhealthy lifestyle; sedentary behavior is one critical component. Living a physically inactive life is associated with a greater risk for type 2 diabetes, cardiovascular disease, metabolic syndrome, depressive symptoms, advancing age-related diseases, obesity, and all-cause mortality [1]. Sedentary behavior is defined as a high volume of awake time spent sitting, reclining, or lying down and is interpreted as low energy expenditure [2,3]. An estimated 5-10% of non-communicable diseases are a result of an inactive lifestyle [4].

Along with sedentary behavior, obesity correlates to poor health outcomes.

Obesity affects over 33% of United States (US) citizens [5]. Obesity is defined as having a body mass index (BMI) greater than 30 kg/m² and consists of excessive amounts of body fat contributing to poor health [4]. Both sedentary behavior and obesity are modifiable risk factors for non-communicable diseases such as heart disease [6]. It can be challenging to determine causation when comparing sedentary behavior and obesity. Higher body weight may contribute to impaired physical functioning. Meanwhile, studies show the more inactive a person becomes the more their weight will likely increase [7,8].

Physical activity is essential in the process of losing weight or maintaining a desirable weight [3]. Individuals with higher activity levels and less sedentary time are more apt to maintain a healthy BMI in comparison to those who are less active. Walking is an excellent initiating exercise activity and allows for gradual physical growth leading to behavior change over time [9].

The cause of poor or low mobility can often be multifactorial; multiple contributing factors can hinder a person's ability or willingness to engage in physical activity [10,11]. Physical disabilities, such as musculoskeletal impairments, chronic pain conditions, or mobility limitations can directly impact a person's ability to engage in physical activity. These disabilities may affect their range of motion, strength, balance, or coordination, making certain exercises difficult or impossible to perform [12,13]. Mental disabilities or mental health conditions can also influence an individual's motivation and ability to participate in exercise. Depression and anxiety disorders can impact a person's energy levels, motivation, and interest in physical activity [14].

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Accountability is critical when starting an exercise routine. Participating in a group exercise program versus exercising alone yields better results in physical, mental, and emotional quality-of-life measures as well as perceived stress level. Initiating a walking routine can be more effective in a structured, group environment.

Significance

Sedentary behavior has been linked to negative health outcomes and poorer quality of life. Obesity rates continue to rise significantly and contribute to approximately 3.4 million deaths annually. Together, obesity and overweight classification rank fifth on a global death factor scale. Obesity paired with sedentary lifestyles results in greater all-cause mortality. The cost of managing physically inactive patients is around 11% of all healthcare costs [3]. Additionally, costs related to overweight and obese patients in the US are estimated to be \$173 billion per year and will increase as average BMI levels continue to rise in the US.

Clinical Question

To guide the review of the evidence, the PICOT question developed states, “In sedentary adult patients who do not require assistive devices (P), how does a walking program (I) in comparison to no walking program (C) affect steps taken over 20 minutes (O) in 6 weeks (T)?”

Methods

A literature review was completed using EBSCO, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Clinical Key Nursing, Cochrane, Google Scholar, and PubMed. Keywords used for the literature search included Walk with Ease, weight management, sedentary lifestyle, sedentary behavior, physical activity, exercise, obesity, and walking program. Inclusion criteria were articles written in the English language, peer-reviewed articles from 2017-2023, and articles with the setting listed as an outpatient environment. Exclusion criteria consisted of non-English languages, inpatient populations, pediatric populations, and articles greater than 5 years old.

Sixty-four articles were extracted; 22 articles remained after further analysis and specific selection focusing on measurable outcomes and eliminating association with COVID-19. Appendix A presents an evidence table of the 22-article analysis. The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model (Appendix B) was used in determining the appropriate level and grade for each article. Appendix C provides a table breakdown of 13 level I articles, 6 level II articles, 2 level III articles, and 1 level IV article. Article quality consisted of 10 grade A, 11 grade B, and 1 grade C article.

Appendix D presents the JHNEBP permission documentation.

Evidence Findings

There were six themes found in the evidence. The themes addressed outcomes of a sedentary lifestyle, benefits of activity, risks of physical injury, patient motivation for lifestyle change, walking programs, and Walk with Ease (WWE).

Outcomes of a Sedentary Lifestyle

Walking less than 5,000 steps a day and consistent inactivity are key indicators of sedentary behavior [15,16]. Sedentary lifestyles have been linked to adverse effects on mental health, including

depression symptoms and cognitive decline [4]. Engaging in consistent exercise has been associated with positive effects on mental health, including reduced symptoms of depression and anxiety, as well as improved mood and overall psychological well-being.

Consistent exercise goals have been shown to improve the ability to maintain a healthy weight through increased caloric expenditure, improved muscle mass, and joint movement [17]. Obesity, often accompanied by chronic musculoskeletal pain, places additional stress on weight-bearing joints, leading to accelerated wear and tear of joint cartilage and the development of osteoarthritis. As a result, individuals who are obese and experience pain or musculoskeletal conditions may avoid walking or exercise.

Sedentary behavior and obesity’s association highlight the need to promote physical activity to address the rising prevalence of obesity. Overweight or obese individuals are at a higher risk of cardiovascular complications such as myocardial infarction, stroke, heart failure, diabetes, atherosclerosis, elevated low-density lipoprotein (LDL), cholesterol, and increased blood pressure. These complications may result in disability and further sedentary behavior [3].

Prolonged periods of inactivity, known as sedentary behavior, can lead to negative physical and mental health outcomes and increase mortality risk [18-20]. Obesity is strongly linked to sedentary behavior, emphasizing the importance of promoting physical activity to combat this growing issue [21,22]. Living a sedentary lifestyle can also increase the risk of mortality and chronic diseases, ultimately leading to premature death [9].

Benefits of Walking Exercise

Exercise is a key component of weight management and reducing the risks of health conditions. Whether a patient is trying to lose or maintain a healthy weight, calories burned may help guide weight goals weight loss with exercise $p < .0001$; Fanning, 2022. There is evidence supporting that physical activity improves morale, cardiorespiratory fitness ($p < 0.050$), quality of life ($p = 0.007$), and BMI.

Walking exercises have been shown to improve depression symptoms and decrease cardiovascular disease risk by improving blood pressure ($p < 0.001$), increasing high-density lipoprotein (HDL), decreasing LDL, and lowering glucose levels ($p < 0.001$) and BMI ($p = 0.007$). In addition, walking programs increase muscle strength, promote strenuous activity, encourage more outdoor walking, and improve quality of life indicated that a 7,000-step daily goal and group walking program increased daily steps ($p < 0.001$) and decreased body weight ($p < 0.001$), BMI, visceral fat percentage ($p < 0.001$), and body fat percentage. There are numerous measurements across physical activity studies that support walking as a beneficial exercise activity [23].

Walking can be highly beneficial for individuals with a sedentary lifestyle due to its low-impact nature and positive impact on joint health. Walking is a low-impact form of exercise, meaning it puts minimal stress on the joints compared to higher-impact activities like running or jumping. This makes it an excellent choice for individuals with a sedentary lifestyle who may have joint discomfort or concerns. Walking promotes joint health by providing gentle movement and lubrication to the joints. The repetitive motion of walking helps to nourish the cartilage, which cushions the joints and increases the production of synovial fluid, which lubricates the joints. This can help

reduce stiffness, improve flexibility, and alleviate joint pain, making it easier for sedentary individuals to incorporate physical activity into their daily lives.

Walking allows for gradual progression and can be adapted to different fitness levels. Sedentary individuals can start with short, comfortable walks and gradually increase the duration and intensity over time. This gradual progression minimizes the risk of injury or excessive strain on the joints, allowing individuals to develop a sustainable exercise routine. Walking requires no special equipment or gym membership. It can be done almost anywhere and at any time making it a convenient option for sedentary individuals. Walking is a practical way to incorporate physical activity into daily life. By emphasizing the low-impact nature of walking and its positive impact on joint health, individuals with a sedentary lifestyle can see walking as an accessible, effective, and safe exercise option. It can serve as a starting point to gradually increase physical activity levels ($p < 0.0001$), improve joint mobility, and experience the numerous health benefits associated with regular exercise [24].

Sedentary lifestyles often lead to obesity as well as decreased muscle tone, mobility, and metabolism abnormalities. Inactivity and obesity are closely intertwined. Being active helps target those complications. Walking was shown to be the safest and most effective intervention for patients with these complications.

Moderate-intensity walking decreased visceral fat thickness ($p < 0.001$), cardiopulmonary capacity ($p < 0.05$), and BMI in women.

Risks of Physical Injury

Safety topics for a walking program include proper warm-up, appropriate footwear and location, and resting when short of breath, weak, or fatigued. Cool-down stretches are reserved for the last 5 minutes of sessions to reduce the heart rate to baseline and allow muscles to relax. Group walking programs carry little risk but may provide high levels of long-term adherence [25]. Group-based structured activity programs may expose patients to the risk of physical injury, but the accountability benefits far outweigh that risk. When initiating any exercise regimen, pain or injury on exertion may occur. When walking, there is a risk of falls, and when stretching, there is a risk of muscle strain. Medical clearance is recommended to assess these risk potentials regarding unforeseen instability.

Primary provider clearance is advised to assess for potential complications associated with exercise participation such as unstable angina, uncontrolled hypertension, or unmanaged arrhythmia. Including medical clearance helps provide safety support for walking participants to move forward with activity and decreases the risk of potential harm.

Patient Motivation for Lifestyle Change

To maintain motivation for change, it can be helpful to set realistic and achievable goals, track progress, celebrate successes, and find enjoyment in the chosen forms of physical activity (Arthritis Foundation, 2021; Blain et al., 2017). Ultimately, the key is to find personal reasons and meaningful incentives that resonate with one's values and aspirations, paving the way for a successful exercise routine. Adults should partake in 150 minutes of moderate-intensity activity according to health guidelines [3]. Studies show, however, that even with clear exercise recommendations of 150 minutes per week, or 10,000 steps per day, the majority of adults fall short of those

recommendations on their own. Along with the positive physical attributes discussed above, it is also appropriate to consider levels of motivation for participation. For patients who have been sedentary, slow progression of exercise is recommended. Patients seeking to improve activity routines for health benefits may build off the basics of walking programs to get active and stay active for life. Living an active lifestyle can provide endless benefit that grows over time. Participants are more likely to carry over behaviors learned and practiced amongst others; organized groups provide a sense of accountability [26].

Walking Programs

Evidence-based structured exercise activity programs include Fit and Strong (F&S) (1998) by Roybal Center, Silver Sneakers (SS) (1992) created by Mary Swanson, Active Living Every Day (ALED) (2001) by the Cooper Institute, and WWE (1999) from the Arthritis Foundation, the F&S program, endorsed by the National Cancer Institute, focuses on strength training exercises that help build and maintain muscle mass, improve bone density, and enhance overall functional fitness. The program's goal is to improve strength, balance, and mobility, allowing individuals to perform daily activities with ease and reduce the risk of falls or injuries. The program typically includes a combination of resistance training, bodyweight exercises, and flexibility exercises to cater to different fitness levels and abilities. Benefits of F&S are bone density enhancement, reducing the risk of osteoporosis and fractures, and balance and mobility improvement which reduces the risk of falls. Disadvantages of F&S are the requirement of access to appropriate exercise equipment or a gym facility. Participants need to learn proper form and technique to prevent injury, which may require guidance from a trainer or instructor. Some individuals may find strength training physically demanding, especially if they are new to exercise or have certain health conditions (National Institute on Aging, 2022).

Silver Sneakers (SS) is a fitness program specifically tailored for older adults. It provides access to a variety of exercise classes, ranging from low-impact aerobics and yoga to water-based workouts and strength training sessions. SS emphasizes the importance of social connections and community engagement, promoting a supportive environment where individuals can pursue their fitness goals while enjoying the company of others. The program is often offered through participating gyms and fitness centers.

Wellness seminars and online resources are also included. The advantages of SS are a range of exercise classes, catering to different interests and fitness levels, encouraging social connections and community engagement, and promoting overall well-being.

Access to participating gyms and fitness centers offers a supportive and inclusive environment. Disadvantages of SS to consider are that availability may vary depending on location and participation of local fitness centers. Some communities may not have a participating facility. Additionally, some individuals may prefer a more individualized exercise routine rather than group classes.

Active Living Every Day (ALED) was determined to be effective by the Cooper Institute in the Project Active research study. ALED is a comprehensive program that promotes regular physical activity and healthy lifestyle choices for individuals of all ages, with a particular focus on older adults. It goes beyond traditional exercise routines and encourages participants to incorporate physical activity into their daily lives. ALED aims to help individuals overcome barriers to physical

activity and develop sustainable habits that support long-term health and well-being. The program includes educational sessions, behavior change strategies, and practical tools to facilitate active living, such as walking groups, home exercises, and tips for incorporating movement into daily routines. The advantages of ALED emphasize the integration of physical activity into daily routines, making it accessible and sustainable. Disadvantages to ALED include a need for self-motivation and commitment to incorporate physical activity into daily routines.

Participants may require ongoing support and accountability to maintain active habits (National Council on Aging [NCOA], 2020).

Informal walking groups may lack structured supportive movements like stretching, wellness discussion, resistance training education, and overall consistency. However, they do provide more autonomy and flexibility in personal schedules (Arthritis Foundation, 2021). Independent activity versus supervised activity yields less weight loss and less BMI reduction. Participants seem to be less compliant with self-directed walking programs due to the lack of accountability. Individual walking exercises provide privacy, and flexibility in location, time of day, and length of activity (Arthritis Foundation, 2021).

Walk with Ease

The instructor-guided WWE curriculum is group-based and helps promote accountability throughout the course (SDSU Extension, 2022). Hensman-Kettrey (2021) showed that WWE participants walked significantly more at the end of the program than at the beginning. Walking more translates into taking more steps and as a result, achieving healthier lifestyle and weight targets.

WWE was created in 2009 by Thurston Arthritis Research Center and the Institute on Aging of the University of North Carolina. This program helps people to live healthier lifestyles by increasing activity safely. The WWE program is a 6-week program designed to improve overall health, instill self-confidence in physical activity goals, decrease arthritis-associated pain, and increase muscle tone (Arthritis Foundation, 2021). WWE is a set of 18 sessions (Arthritis Foundation, 2021). The developers included both a self-guided and group format to tailor to different users. Using a WWE workbook as a guide, participants can choose which direction is a better fit for them. The program provides 3 formats: self-guided, self-directed enhanced, and in-person. The WWE workbook provides step-by-step instructions for each session including setting goals, warm-up movements, tracking walking distance, timing pace, cool-down movements, and behaviors to adopt and carry forward each session (Arthritis Foundation, 2021).

The program was designed for adults and the elderly with arthritis but has proven to help individuals increase their confidence, stability, and strength while decreasing arthritis-associated pain and sedentary habits. Focusing on goals to get moving while improving quality of life through measures like decreasing pain and increasing strength, participants will seek to be routinely active. The WWE program is structured with a trained leader to guide a group, instill confidence, provide feedback, and monitor improvement. The WWE leader conducts three meetings per week for 6 weeks. Each meeting includes a pre-walk discussion and warmup followed by a 10–40-minute walk and wraps up with a cool down (Arthritis Foundation, 2021). Program instructors are educated to lead programs to reduce risks associated with participation.

Leader training is a thorough process that teaches step-by-step program procedures. All WWE leaders are CPR-certified and trained in adverse event responses (Arthritis Foundation, 2021).

Several patient goals were achieved through WWE. One measurement was the ability to walk farther and for longer as the program progressed. Results showed improvement in walking time ($p = 0.01$), mobility, stiffness, and fatigue. By incorporating exercise goals into daily routines, individuals may experience improved mood, self-esteem, and body image, creating a more positive mindset toward physical activity, weight management, and healthy [27].

Gaps in the Literature

The gaps discussed are based on the methods of this project and the literature search. There was limited evidence with a focus on objective data. Gaps included studies analyzing evidence-based steps walked using pedometers, length of walking time, or settings such as weight management clinics. Gender differences were highlighted in very few studies. Reports of participation or dropout were limited. No studies focused on the variability of race or ethnicity.

Recommendations for Practice

Being overweight and inactive may lead to poor health outcomes. Sedentary lifestyles leading to obesity can lead to several comorbidities including diabetes, heart disease, and stroke [28]. Weight loss and long-term weight management help patients decrease their risk of comorbidities and poor outcomes.

Structured weight management programs seek to aid patients in the physical, psychological, nutritional, and activity components of health. A key piece of weight management is physical activity. In the beginning stages of developing a physical activity routine, it can be important to start small. Walk with Ease is an evidence-based walking program that has proven to increase ambulatory function, lower extremity strength, and improved quality of life [29].

WWE has been shown to improve pain, fatigue, stiffness, stress, and quality of life. Implementing the WWE program in a weight management clinic provides patients with a physical activity starting point upon which they can build. Walking programs address the fast-growing population obesity problem [30].

Conclusion

Weight management is a growing obstacle that can put patients at greater risk for several comorbidities. Walking programs help increase ambulatory function, build lower extremity strength, and over time reduce physical limitations to achieve functional outcomes. A structured walking program has the potential to educate weight management patients on many factors that contribute to healthy living. The WWE program has positive outcomes towards encouraging participants to improve their ambulatory stamina and live active.

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Appendix Table

Authors & Date	Study Design/ Method	Participants, Sample, Setting	Intervention/ Variables Studied	Measurement	Data Analysis	Findings/ Recommendations for Practice	Strengths/ Weaknesses	Level of Evidence / Quality
Almevall, A. D., Wennberg, P., Zingmark, K., Öhlin, J., Söderberg, S., Olofsson, B., ... & Niklasson, J. (2022).	Cross-sectional study	77	Walking program, # of steps Time spent walking, time spent sitting	activPAL (onbody movement monitor) PGCMS (morale survey)	For every 1000 steps, morale total score was .190 higher	Walking as physical activity improves morale scores	Small sample, Limited ways to measure morale	II, B
Blain, H., Jaussent, A., Picot, M. C., Maimoun, L., Coste, O., Masud, T., Bousquet, J., & Bernard, P. L. (2017).	RCT	121 women	150 min/week walking program	Distance walked (p<0.0001) duration, mean heart rate (p=0.004), BMI (p<0.01)	6MinuteWalkingDistance increase in exercises than control 41.5% vs 11% p<0.0001// Exercisers	Brisk walking programs improve endurance	Sample bias	I, B
					with lowest			
					6MWD			
					p<0.001and			
					highest			
					BMI			
					p<0.01			
					baselines			
					showed			
					most			
					improvement			
Cavero-Redondo, I., Martinez-Vizcaino, V., Fernandez-Rodriguez, R., Saz-	Systemic review and meta-analysis	20 studies	Weight, BMI, Waist circumference	Weight (kg) Waist circumference (cm) BMI	DerSimonian and Laird method; Cohen's d index	lifestyle mHealth self-monitoring interventions, as part of a behavioral weight management approach, are	Bias, different app use, little control on other covariates, some studies	I, A

Lara, A.,						suitable	with small	
Pascual-						interventions	sample	
Morena, C.,						for short-term	sizes	
& Álvarez-						weight		
Bueno, C.						management in		
(2020).						adults with		
						overweight/obe		
						sity		
Chopra, S.,	Stepwise	NA	Physical	Weight kg	social	practical	No data	II, B
Malhotra,	review-		activity	Height cm	pressures,	dietary	collected,	
A., Ranjan,	expert		planning,		mood	approaches	expert	
P., Vikram,	advice		Diet,		disturbance	which can be	review and	
N. K., &			psychococial		s, food	incorporated in	advice	
Singh, N.			intervention		craving and	standard		
(2020).			for weight		obesogenic	obesity care by		
			BMI		environmen	general		
					t (easy	practitioners		
					accessibilit			
					y to calorie			
					dense food			
					and low			
					walkability			
) as prime			
					reasons for			
					limited			
					compliance			
					to dietary			
					and			
					physical			
					activity			
					advice			
Cooper, L.,	Systemic	4,511,	Mean change	kg and pain	Meta-	Significant	Large	I, A
Ryan, C.	review	obese	in weight or	rating 0-10	aggregation	changes in	sample,	
G., Ells, L.		adults,	change in OA		of	body weight		
J.,		outpatie	pain		individual	and pain		
Hamilton,		nt/			syntheses	monitoring		
S.,		communi						
Atkinson,		ty						
G., Cooper, K., Johnson, M. I., Kirwan, J. P., & Martin, D. (2018).								

Fanning, J., Rejeski, W. J., Leng, I., Barnett, C., Lovato, J. F., Lyles, M. F., & Nicklas, B. J. (2022).	Randomized clinical trial	183	Weight loss program, Guided walking exercise, sedentary behavior and physical activity	Body weight in kg Post-intervention weight regain, activity time	Significant weight loss over 6 months p< 0.001 in sitLess groups improved total activity time p <0.05 and aerobic exercise subjects improved activity time p< 0.003	Diet and exercise helps with less wt regain and similar loss as exercise by itself	Moderate sample size, COVID prevented collection of data, limited population diversity	I, B
Freak-Poli, R. L. A., Cumpston,	Systemic review	4762	multi-component health	Pedometer-steps taken	appeared to observe an increase in	current evidence is insufficient to	High risk of bias, limitations	I, A
M., Albarqouni, L., Clemes, S.A., Peeters, A. (2020)			promotion interventions		physical activity (RoM 1.26, 95% CI 0.96 to 1.66; 60 participants	suggest that a pedometer-based intervention would be more effective than other options.	in the completeness of available evidence	
Göçer E,	Randomized	28	Treadmill walking	BMI, waist circumference	visceral fat thickness (p<0.05)	individualized moderate-intensity physical activity with	small number of participants completing the	I, B
Ardıç F,	control	women	versus ECE					
Akkaya N,	trials		PEDO walking/					
Herek D. (2017)			BMI, waist circumference,		p<0.05)	the ECE PEDO would be able to do in	intervention and short follow-up.	
						anywhere for		
						gaining the		
						health benefit		
Hensman	Single group	86	Physical activity and quality of life	Physical Activity Scale for the Elderly (PASE), Brief Inventory of Thriving (BIT) scale	Standardized mean difference scores, OLS regression models	Elderly that participate in WWE appreciate improved quality of life.	/ no control group, 40% of participants didn't complete the post-test	I, A
Kettrey, H., Schaffer, K. A., & King, S. B. (2021, October 1)	pre-post evaluation							
Hsu, Wu, H., Liao, H., Liao, T., Su, S., & Lin, P. (2021).	Observational study	42 participants	Step count, BMI, physical function	# of steps, grip strength, knee extension	Two way repeated anova	Walking with a pedometer either self-monitored or supervised improves walking consistency. Supervised is more appropriate for older participants.	small sample, weather inconsistency	I, B
Kell, K. P. & Rula, E. Y. (2019)	Non-experimental	46,564 ages 65 and older	frequency of program participation	average visits per week	Friedman test	SilverSneakers participation frequency is associated with higher quality of life for seniors.	S: large sample size W: inconsistent survey answers	III, A

Mierzwicki, J. T., Good, T. A., Reed, D. C., & Greer, C. D. (2018).	Experimental study	8	Pain, fatigue, stiffness, minute walking test (p<0.01), 5X sit to stand test	Minutes (6MWT) Seconds (5xSST),	Friedman test	Formal, guided walking programs likely promotes improved strength in lower extremities and ambulatory functionality	long term follow-up (6 months after completion) / no control group, small sample size	I, B
Monteagudo, P., Roldán, A.,	Quasi-experimental	23	Walking interval training,	6 minute walk test, 5 time sit to stand,	P <0.05, significant improvement	Accumulative walking interval is best	Small sample, no follow-up	II, C
Cordellat, A., Gómez-Cabrera, M. C., & Blasco-Lafarga, C. (2020).	longitudinal study		continuous versus accumulating	timed up and go (s)	nt in cardiorespiratory fitness, agility, walking speed and BMI	for health related quality of life	data collected	
Patel, A. V., Hildebrand, J. S., Leach, C. R., Campbell, P. T., Doyle, C., Shuval, K., Wang, Y., & Gapstur, S. M. (2018).	Prospective cohort analysis	139,255	Walking versus other types of physical activity (unspecified), correlation with mortality	Physical activity scores based on active minutes to hours in 1 week	Inactivity associated with higher all cause mortality HR 1.26, 95% CI 1.21-1.31	Walking lowers risk of cardiovascular mortality	Large sample size Some studies restrictive to gender, self-reported physical activity	I, A
Powell-Wiley, T. M., Poirier, P., Burke, L. E., Després, J.-P., Gordon-Larsen, P.,	Scientific statement	NA	NA	NA	NA	there is a need to evaluate mechanisms underlying obesity-related cardiac dysfunction and to improve	Expert opinion but data based, thorough	IV, B
Lavie, C. J., Lear, S. A., Ndumele, C. E., Neeland, I. J., Sanders, P., & Stone, M.-P. (2021).						the management of patients with obesity and CVD through future research (
Saad, M. F., Cheah, W. L., & Hazmi, H. (2021).	Quasi-experimental	109	Gradual walking program	Pedometer, steps taken	Increase in mean number of steps pre and post	12 wk walking program has a positive effect on anthropometric measures in sedentary individuals	Small sample	II, B
Sheikh, S. Z., Kaufman, K., Gordon, B. B., Hicks, S., Love, A., Walker, J., Callahan, L. F., & Cleveland, R. J. (2019, April).	Pre/post pilot	75	Pain, stiffness, fatigue Walking program	Visual analog scale	Multivariate linear regression	WWE improves pain, fatigue and stiffness in the systemic lupus erythematosus	Small sample, no control group, poor follow-up	I, A
Silveira, E. A., Mendonça, C. R., Delpino, F. M., Souza, G. V. E., de Souza Rosa, L. P., de Oliveira, C., & Noll, M. (2022).	Systemic review, met analysis	638,000	Objective and subjective associations	Mutliple: objective and subjective, sedentary behavior, physical inactivity, obesity, (pedometers, accelerometer)	Meta-analysis	+ Correlation between SB and PA and obesity. Drive for patients to focus on adjusting SB	Large, in depth study, correlation al obesity with SB, fewer objective studies	I, A

Vilen, L. H., Mary, A., & Leigh, C. F. (July, 2022).	Systemic review of qualitative studies	NA	Interview questions identifying personnel involvement and early implementation effects.	NA	Planning for sustainability framework	Results could be useful helping other organizations to streamline WWE implementation by identifying barriers and solutions. Ways to make future lasting programs more flexible.	Identifies short-term uptake only, small sample size, only includes OAAA grantees.	III, B
Ward, Z. J., Bleich, S. N., Long, M. W., Gortmaker, S. L. (2021).	Meta-analysis	175,726	BMI, cost in US dollar	BMI scale, healthcare cost in dollars	two-part regression model	Higher health care costs are associated with excess body weight across a broad range of ages and BMI levels	Unobserved physical activity, only looked at direct costs	I, A
Yorks, D. M., Frothingham, C. A., Schuenke, M. D. (20)	Non randomized control study	69	Quality of life, surveys.	Visual analog scale	Increased QOL p=0.007	Group fitness classes= improved QOL, mood and decreased stress.	Small sample, participants selected own groups	II, A
Yuenyongchaiwat, K., Pipatsitipong, D., & Sangpraserit, P. (2017).	Longitudinal quasi-experimental study	35	Walking program, steps walked, BP, glucose	BP mmHG, steps taken - pedometer, blood glucose levels	Blood glucose levels in intervention group was significant p<0.001	10,000 daily steps decreases SBP and blood glucose in overweight patients	Small sample, no control group, little gender variability	II, B

Appendix B

Johns Hopkins Nursing Evidence Based Practice Model

Evidence Levels	Quality Guides
Level I Experimental study, randomized controlled trial (RCT) Systematic review of RCTs, with or without meta-analysis	A High quality: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence
Level II Quasi-experimental study Systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis	B Good quality: Reasonably consistent results; sufficient sample size for the study design; some control; fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence
Level III Non-experimental study Systematic review of a combination of RCTs, quasi-experimental and non-experimental studies, or non-experimental studies only, with or without meta-analysis Qualitative study or systematic review with or without meta-synthesis	C Low quality or major flaws: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn
Evidence Levels	Quality Guides
Level IV Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence Includes: • Clinical practice guidelines • Consensus panels	A High quality: Material officially sponsored by a professional, public, private organization, or government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years B Good quality: Material officially sponsored by a professional, public, private organization, or government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results; sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years C Low quality or major flaws: Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies; insufficient evidence with inconsistent results; conclusions cannot be drawn; not revised within the last 5 years
Level V	Organizational Experience:
Based on experiential and non-research evidence Includes: • Literature reviews • Quality improvement, program or financial evaluation • Case reports • Opinion of nationally recognized expert(s) based on experiential evidence	A High quality: Clear aims and objectives; consistent results across multiple settings; formal quality improvement, financial or program evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence B Good quality: Clear aims and objectives; consistent results in a single setting; formal quality improvement or financial or program evaluation methods used; reasonably consistent recommendations with some reference to scientific evidence C Low quality or major flaws: Unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement, financial or program evaluation methods; recommendations cannot be made Literature Review, Expert Opinion, Case Report, Community Standard, Clinician Experience, Consumer Preference: A High quality: Expertise is clearly evident; draws definitive conclusions; provides scientific rationale; thought leader(s) in the field B Good quality: Expertise appears to be credible; draws fairly definitive conclusions; provides logical argument for opinions C Low quality or major flaws: Expertise is not discernable or is dubious; conclusions cannot be drawn

Appendix C

Levels of Evidence

Level of Evidence		Grade	
I	13	A	10
II	6	B	11
III	2	C	1
IV	1		
	22		22

Appendix D

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