



Review article

Summary and application of the WHO 2020 physical activity guidelines for patients with essential hypertension in primary care

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ABSTRACT

The new World Health Organization (WHO) 2020 guidelines on physical activity (PA) and sedentary behavior include recommendations for adults with chronic conditions. The guidelines provide adaptable and general recommendations for people living with chronic medical conditions. This article summarizes the content and provides suggestions for the application of the guidelines for patients with essential hypertension in primary care. The WHO 2020 PA guidelines recommend broad advice for adults and older adults with chronic conditions. The key recommendations are consistent with other hypertension guidelines. A systemic approach to promote PA in primary care (i.e., PA assessment, safety considerations, PA prescription, behavioral counseling, and referral) along with applying the WHO guidelines is required. Health risk assessment and safety issues related to hypertension (e.g., current PA levels, level of blood pressure, treatment plans, comorbidities) should be concerned. The FITT Pro (frequency, intensity, time, type, and progression) can be adopted as a framework to break down the guidelines into specific PA prescription. The WHO 2020 PA guidelines address the importance of PA in clinical populations. The guidelines can be adapted for patients with hypertension in primary care settings.

1. Introduction

Hypertension is a global health burden, affecting approximately one third of the adult population (1.39 billion) [1, 2]. High systolic blood pressure (≥ 140 mmHg) is attributed to 7.8 million deaths worldwide [2] as it is an important risk factor for several health conditions, such as cardiovascular disease, cerebrovascular disease, chronic kidney disease, and dementia [3, 4]. More than 90% of people living with hypertension are diagnosed as primary or essential hypertension, with the rest of the cases classified as secondary hypertension [5, 6]. In addition, hypertension is responsible for economic losses due to direct (\$1,497.36/person/year) and indirect (\$282.34/person/year) costs [7]. A majority of

people with hypertension receive care and management in primary care settings [8, 9, 10]. Thus, primary care has an important role in the treatment and prevention of essential hypertension.

Management of hypertension consists of pharmacological and non-pharmacological (i.e., lifestyle modifications) treatments [11]. Lifestyle modifications involve changes to health behaviors including salt reduction, consumption of a healthy diet, moderation of alcohol consumption, weight reduction, smoking cessation, regular physical activity (PA), reduction of stress, and reduced exposure to air pollution and cold temperature [11]. Specifically, the benefits of PA have been well documented. Studies support that regular aerobic activity and resistance exercise are beneficial as a preventive and therapeutic intervention for hypertension

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[12, 13, 14]. Regular PA reduces blood pressure and cardiometabolic risk factors through arterial and cardiac, hemodynamic, metabolic, and neural mechanisms [15]. A review of randomized controlled trials revealed that regular moderate- to vigorous-intensity aerobic PA reduced systolic and diastolic blood pressure by 11 and 5 mmHg, respectively [16]. Although there are several mutual considerations of management of essential and secondary hypertension, patients with secondary hypertension may require specific treatment and specialist care [17].

In 2020, the World Health Organization (WHO) launched the new guidelines on PA and sedentary behavior (SB) [18, 19]. The new guidelines describe PA promotion in various populations from healthy children to older adults. The guidelines also incorporate recommendations among people living with disabilities and chronic diseases. The recommendations on chronic medical conditions were developed based on the scientific and medical evidence on hypertension, type 2 diabetes mellitus, HIV, and cancer [18, 19]. However, the recommendations provide general advice for people living with chronic conditions, rather than any particular disease. Moreover, other disease-specific guidelines also provide generic recommendations. For example, the 2020 International Society of Hypertension Global Hypertension Practice Guidelines provides recommendations, such as engaging in multi-component, lifestyle modification that includes moderate-intensity aerobic exercise for 30 min on 5–7 days/week or high-intensity interval training, as well as strength or resistance exercise on 2–3 days/week [11]. Therefore, it is a challenge for healthcare providers to translate these guidelines into clinical practice [20]. This article summarizes WHO 2020 PA guidelines and provides pragmatic recommendations for primary care providers to advise patients with essential hypertension on PA as the following aspects: the WHO guidelines on PA and SB, implications for patients with essential hypertension in primary care, PA assessment, safety considerations, PA prescription, behavioral counseling, and referral to PA resources and professionals.

2. The World Health Organization guidelines on physical activity and sedentary behavior

The WHO 2020 PA guidelines have several differences from the 2010 guidelines (Global Recommendations on Physical Activity for Health) [19, 21]. The WHO 2020 PA guidelines have been developed based on

scientific and epidemiological evidence for both apparently healthy and clinical populations [18, 22, 23, 24, 25, 26]. The main difference is highlighted in the title of the guidelines as the term SB is emphasized as an essential component in the 2020 version, as well as greater emphasis on light-intensity activity [19]. Table 1 summarizes the other key differences between the WHO 2020 and 2010 PA guidelines. Further, the WHO 2020 PA guidelines emphasizes the importance of PA for all. Guidelines for children aged below 5 years of age were published separately in 2019 [27].

3. Implications for patients with essential hypertension in primary care

The WHO 2020 PA guidelines provide additional recommendations for adults and older adults living with chronic medical conditions (Table 2) [18,19]. The guidelines are considered as public health recommendations and represent general recommendations for “chronic conditions”. Encouraging people with chronic illnesses to change their behaviors may need more specific guidance for effectively tailor PA advice [20]. Individuals with different health risks and conditions require tailored recommendations to ensure the safety and appropriateness of the program [28]. For example, De la Corte-Rodriguez et al. [29] provided suggestions for how the WHO 2020 PA guidelines could be adapted for people with hemophilia through consideration of several clinical characteristics (e.g., age, therapeutic strategy, degree of disease, level of disability). This reflects that the WHO 2020 PA guidelines could be expanded upon and made more applicable for patients with chronic medical conditions based on disease-specific considerations.

As mentioned above, the WHO 2020 PA guidelines emphasize the importance of PA in adults and older adults with chronic medical conditions. The recommendations are potentially applicable for patients with chronic medical conditions, including hypertension. Existing evidence supports that moderate- to vigorous-intensity aerobic PA is a first-line treatment to improve clinical risk factors and reduce disease progression in patients with hypertension [30]. The following sections suggest a potential framework (i.e., PA assessment, safety considerations, PA prescription, behavioral counseling, referral) to apply the WHO 2020 PA guidelines in the context of hypertension care in primary care settings.

Table 1. Differences between the WHO 2020 and 2010 guidelines on physical activity.

Detail	WHO guidelines on physical activity and sedentary behavior (2020) [19]	Global recommendations on physical activity for health (2010) [21]
Activity intensity/energy expenditure	<ul style="list-style-type: none"> Emphasize moderate- to vigorous-intensity aerobic PA Reducing SB and replacing with PA of any intensity including light intensity 	<ul style="list-style-type: none"> Emphasize moderate- to vigorous-intensity aerobic PA
Activity duration	<ul style="list-style-type: none"> Any bout duration 	<ul style="list-style-type: none"> At least 10 min per bout of aerobic PA
Weekly time for adults and older adults	<ul style="list-style-type: none"> At least 150–300 min of moderate-intensity aerobic PA or At least 75–150 min of vigorous-intensity aerobic PA or Equivalent combination 	<ul style="list-style-type: none"> At least 150 min of moderate-intensity aerobic PA or At least 75 min of vigorous-intensity aerobic PA or Equivalent combination
Additional PA for older adults	<ul style="list-style-type: none"> Multicomponent PA ≥3 days/week emphasizing balance and strength training at moderate or greater intensity to enhance functional capacity and prevent falls 	<ul style="list-style-type: none"> Balance training ≥3 days/week to prevent falls
Dose of PA among children and adolescents	<ul style="list-style-type: none"> At least an average of 60 min/day of moderate- to vigorous-intensity aerobic PA 	<ul style="list-style-type: none"> Accumulation of at least 60 min/day of moderate- to vigorous-intensity aerobic PA
Population-specific recommendations	<ul style="list-style-type: none"> Children and adolescents aged 5–17 years Adults aged 18–64 years Older adults aged 65 years and older Pregnant and postpartum women Adults and older adults with chronic conditions aged 18 years and older Children and adolescents living with disability aged 5–17 years Adults living with disability aged 18 years and older 	<ul style="list-style-type: none"> Children and youth aged 5–17 years Adults aged 18–64 years Older adults aged 65 years and above

PA: physical activity; SB: sedentary behavior.

Table 2. WHO 2020 physical activity recommendations for adults and older adults with chronic medical conditions.

Physical activity [18, 19]	
Aerobic physical activity	
<ul style="list-style-type: none"> • At least 150–300 min/week of moderate-intensity aerobic activity or • At least 75–150 min/week of vigorous-intensity aerobic activity or • Equivalent combination of moderate- and vigorous-intensity aerobic activity 	
<i>For additional benefits to health outcomes</i>	
<ul style="list-style-type: none"> • More than 300 min/week of moderate-intensity aerobic activity or • More than 150 min/week of vigorous-intensity aerobic activity or • Equivalent combination of moderate- and vigorous-intensity aerobic activity 	
Muscle-strengthening activity	
<ul style="list-style-type: none"> • At least 2 days/week at moderate or greater intensity involved all major muscle groups 	
Multicomponent physical activity	
<ul style="list-style-type: none"> • At least 3 days/week of multicomponent activities emphasized functional balance and strength training at moderate or greater intensity 	
Sedentary behavior [18, 19]	
<ul style="list-style-type: none"> • Limit time spent on SB • Replace sedentary time with PA at any intensity including light intensity 	
Good practice statements	
<ul style="list-style-type: none"> • Engaging in PA according to people's abilities • Start with small amounts of PA and gradually increase frequency, intensity, and duration • (May require) consulting with a healthcare professional or PA specialist for advice on types and amount of activity based on individual needs, abilities, functional limitations/complications, medications, and treatment plan • No requirement of pre-exercise medical clearance for people without contraindications prior to beginning light- or moderate-intensity PA 	

PA: physical activity; SB: sedentary behavior.

4. Physical activity assessment

PA as a vital sign is an approach to standardize the assessment of patient PA habits at every visit [31]. Two brief questions: i) "On average, how many days per week do you engage in moderate- to-vigorous PA (like a brisk walk)?" and ii) "On average, how many minutes do you engage in PA at this level?" – can be done within 30 s along with the assessment of other vital signs. The PA Vital Sign can be assessed by any member of the medical team (i.e., medical assistant) to identify whether the patient meets the recommended PA level [31]. Indeed, conducting the PA Vital Sign is an important first step in catalyzing further PA promotion by the rest of the medical team [32]. Once a patient's PA level has been determined, the next step is to identify safety considerations for that individual to begin (or increase) a PA program.

5. Safety considerations

The WHO 2020 PA guidelines state that pre-exercise medical clearance is not required for most people [18, 19]. Although the guidelines outline a dose-response relationship with greater amounts of PA being more beneficial [33, 34, 35], higher doses also contribute to a greater risk of injury [36]. Increased PA levels increase risks ranging from minor musculoskeletal injuries to sudden cardiac arrest [28]. Therefore, comprehensive risks assessment and health screening are necessary for some people to avoid injuries and fatal cardiac events, especially, in clinical populations. Patients with hypertension have significant risk factors for cardiovascular and cerebrovascular diseases and sudden death [37]. Multiple comorbidities, such as diabetes mellitus, obesity, chronic kidney disease, coronary artery disease, and heart failure, are frequently diagnosed along with hypertension [38]. When working with patients with hypertension, primary care providers should pay particular attention to blood pressure levels. Patients with blood pressure >180/105 mmHg should avoid regular PA until receiving pharmacological management [37]. Some antihypertensive medications (e.g., beta-blockers) affect heart rate, therefore, heart rate may not be a good indicator to evaluate the intensity of PA in patients taking those medications [39]. Therefore, there is a need to more carefully assess risks and contraindications related to comorbidities and therapeutic effects in patients with hypertension before clearing them for PA.

Several self-screening tools (e.g., Physical Activity Readiness Questionnaire and You (PAR-Q+)) have been developed for people to assess their health readiness before PA participation [20, 28]. Within primary care settings, advanced instruments, such as exercise stress and cardiopulmonary exercise tests, are excellent diagnostic tools, but are not commonly available. More feasible tools (i.e., Physical Activity Readiness Medical Examination (PARmed-X)) are designed for physicians to provide PA counseling with patients who have concerns flagged by a self-screening tool [40]. Nevertheless, the length and complexity of the PARmed-X is a barrier to regular utilization [40]. Therefore, a pragmatic tool or guideline is essential for the practice in primary care.

The American College of Sports Medicine (ACSM) exercise pre-participation health screening process can be used as a first line of screening to reduce unnecessary barriers to adopting and maintaining regular PA by identifying only those individuals at greater risk for serious cardiometabolic adverse events [41]. This process consists of three core factors: i) current participation in regular exercise (≥ 30 min, ≥ 3 days/week, and ≥ 3 months of moderate-intensity exercise); ii) the presence of underlying cardiovascular (i.e., cardiac, peripheral artery, cerebrovascular), metabolic (i.e., type 1 or 2 diabetes mellitus), or renal diseases; and iii) symptoms and/or signs (e.g., chest pain, palpitation, dyspnea, dizziness, syncope, orthopnea, intermittent claudication, ankle edema, heart murmur) [41]. The results of the assessment classify patients into one of six categories (Table 3).

According to the ACSM exercise preparticipation health screening, some patients may need further attention based on their conditions (i.e., category 2, 3, 5, and 6) (Table 3). Primary care providers may need to consider referring those patients to specialists for special investigations (e.g., exercise stress test).

Even with performing exercise pre-participation health screening to ensure patient safety, risks of adverse events remain. Some symptoms (e.g., musculoskeletal pain, fatigue, shortness of breath) can occur and should be anticipated [42]. If patients experience a dramatic increase in breathlessness, new or worsening chest pain, a sudden onset of arrhythmia, dizziness, decreased exercise capacity, or sudden change in vision, they should stop and seek medical attention [42]. Primary care providers should monitor abnormal and new-onset symptoms to ensure the safety and avoid risks of adverse events. Nevertheless, the benefits of PA far outweigh the risks of adverse events [43, 44].

6. Physical activity prescription

A key starting point in developing a PA prescription is that individuals should start with small amounts of PA and gradually progress frequency, intensity, and duration to meet the recommended levels or as their abilities allowed [18, 19]. The specific guidelines for hypertension, the FITT PRO (Frequency, Intensity, Time, Type, and Progression) principle, can be adopted as a framework to break down the PA guidelines into smaller portions and clearer information [20, 28]. The FITT PRO principle is adaptable for PA counseling among patients with hypertension [45] and primary care providers can adopt this tool and adjust each component for the tailored PA prescription.

6.1. Frequency

The new WHO 2020 PA guidelines highlight the importance of moderate- to vigorous-intensity aerobic PA and that "doing some PA is better than doing none". However, the guidelines do not specify the frequency of aerobic PA [18, 19]. Multiple organizations have provided more specific guidance on the frequency of aerobic activity, ranging from 3 to 7 days/week [45]. In other words, moderate- to vigorous-intensity aerobic PA are recommended on most days of the week. Evidence supports that 1–2 days/week of moderate- to vigorous-intensity PA has some health benefits and should be recommended [46]. A total of 2–3 days/week of muscle-strengthening with rest days in between should be suggested in patients with hypertension [45].

Table 3. American College of Sports Medicine exercise preparticipation health screening and recommendations.

Underlying diseases symptoms and/or signs [41]	Medical clearance or approval from a healthcare professional requirement [41]	Activity recommendations
Non-regular exercisers		
Category 1: • Without cardiovascular, metabolic, and renal disease • Without symptoms and/or signs	Not necessary	<ul style="list-style-type: none"> • Light- to moderate-intensity activity recommended • May gradually progress to vigorous-intensity activity
Category 2: • With cardiovascular, metabolic, and renal disease • Without symptoms and/or signs	Recommended	<ul style="list-style-type: none"> • Follow medical clearance • Light- to moderate-intensity activity recommended • May gradually progress as tolerated
Category 3: • With cardiovascular, metabolic, and renal disease • With symptoms and signs	Recommended	<ul style="list-style-type: none"> • Follow medical clearance • Light- to moderate-intensity activity recommended • May gradually progress as tolerated
Regular exercisers		
Category 4: • Without cardiovascular, metabolic, and renal disease • Without symptoms and/or signs	Not necessary	<ul style="list-style-type: none"> • Continue moderate- or vigorous-intensity activity • May gradually progress
Category 5: • With cardiovascular, metabolic, and renal disease • Without symptoms and/or signs	<ul style="list-style-type: none"> • Not necessary for moderate-intensity activity • Recommended for vigorous-intensity activity 	<ul style="list-style-type: none"> • Continue moderate-intensity activity • Follow medical clearance • May gradually progress as tolerated
Category 6: • With cardiovascular, metabolic, and renal disease • With symptoms and signs	Recommended	<ul style="list-style-type: none"> • Discontinue activity • May return to activity following medical clearance • May gradually progress as tolerated

6.2. Intensity

Moderate- to vigorous-intensity aerobic PA, which are similar to recommendations for healthy individuals, are recommended for individuals with hypertension [18, 19]. For those who cannot perform moderate- to vigorous-intensity aerobic PA, light-intensity PA (e.g., casual walking, doing household chores) should be recommended according to the evidence that shows the potential of light-intensity PA to improve blood pressure [47].

Intensity of aerobic PA can be measured by different methods. Previous work has provided guidance on assessment of PA intensity, such as the talk test [48, 49, 50], heart rate monitoring by using wearable devices [51, 52, 53, 54], metabolic equivalent (MET) [28], and rating of perceived exertion (RPE) [55, 56]. Each method has different limitations and benefits that should be considered by the patient and/or the exercise professionals with whom they are working. For example, a patient with hypertension who is taking a medication that lowers the heart rate (e.g., beta-blockers) could be advised the use of the talk test or RPE as alternative methods to assessing intensity, instead of heart rate monitoring.

The intensity of muscle-strengthening and multicomponent PA should reach moderate or greater intensity if possible. A percent of a one-repetition maximum (1RM), defined as the heaviest weight a person can lift once, can be applied to measure the intensity of activities [28]. RPE, a subjective rating method, can be used to measure the intensity of muscle-strengthening and multicomponent PA [19, 57]. One consideration when determining the intensity of strenuous muscle-strengthening exercises is that it can raise left ventricular pressure, which can be a fatal harm [37]. To avoid adverse events, patients with hypertension should start muscle-strengthening exercises at a low load and gradually increase the load as tolerate.

According to the PA guidelines, the target intensity is moderate to vigorous. Light intensity is also recommended to replace sedentary behaviors and for individuals who cannot perform moderate-intensity PA. A very high-intensity PA may be unsafe for patient populations and should be performed under supervision of exercise/fitness specialists. Primary care providers should apply an appropriate method to monitor the intensity of PA. For instance, patients who participate in an unsupervised exercise may need to observe the intensity of their activities to achieve their target and avoid adverse events. Some methods (e.g., heart rate measurement) require instruments (e.g., wearable devices) to monitor the intensity. Table 4 summarizes the methods for assessing the intensity of PA that are applicable for patient's self-monitoring in primary care settings [28, 56, 58, 59, 60, 61, 62, 63].

6.3. Time

The WHO 2020 PA guidelines recommend an accumulated time of aerobic PA as minutes per week (≥ 150 –300 min of moderate-intensity or ≥ 75 –150 min of vigorous-intensity or an equivalent combination). While the WHO recommended weekly duration of aerobic PA is consistent with several hypertension guidelines [11, 45], some guidelines recommend aerobic PA duration in minutes per day or session (e.g., ≥ 30 , 30–60, 40 minutes/session or day) [11, 45]. A specific duration of muscle-strengthening and multicomponent PA is not identified. However, numbers of sets and reps (repetition: an action of one complete strengthening exercise) and resting time should be advised. For example, muscle-strength training for each major muscle group may be divided into 2–4 sets of 8–12 reps with approximately 90 s rest between each set.

6.4. Type

According to the WHO 2020 PA guidelines, types of PA, including aerobic PA, muscle strengthening, and multicomponent PA are recommended for people living with chronic conditions to improve cardiorespiratory fitness [18, 19]. *Aerobic PA* is mostly commonly recommended by multiple hypertension guidelines [11, 45] and can be accomplished through a variety of activities such as, brisk walking, cycling jogging, and swimming, across a number of PA domains (i.e., leisure-time, occupation, education, household, transport). *Muscle strengthening*, also called resistance training, can be performed using machine weights, free weights (e.g., dumbbells), resistance bands, and body weight exercises (i.e., push-ups) [45]. *Multicomponent PA* is an activity that combines several types of PA, for example, dancing is an example of a multicomponent PA, combining both aerobic and balance components. While primary care providers may not have the expertise to indicate the most effective activity for patients with essential hypertension, it is important to consider appropriateness of activities based on several considerations, such as physical abilities, comorbidities, contraindications, and personal preferences.

6.5. Progression

Patients with hypertension may not be able to meet the recommended level of PA instantly. Progression of PA consists of frequency, intensity, and duration of activities; however, the WHO 2020 PA guidelines provide a generic recommendation “gradually increase the frequency,

Table 4. Intensity of physical activity and measurement.

Intensity	Aerobic physical activity				Muscle-strengthening and multicomponent physical activity	
	Talk test	RPE (Borg CR10)	%HR _{max}	MET	%RM	RPE (Borg CR10)
Sedentary	Speak normally and can sing	<1	<50	≤1.5 (e.g., sitting)	<30	<1
Light	Speak normally and can sing	1–2	50–63	<3 (e.g., watering plants)	30–49	1–2
Moderate	Speak in sentences but cannot sing	3–4	64–76	3–5.9 (e.g., brisk walk)	50–69	3–4
Vigorous	Speak a few words and need to pause	5–9	77–93	6–8.8 (e.g., jogging)	70–84	5–9
Very high	Cannot speak	10	>93	≥8.8 (e.g., running)	≥85	10
Practical comment	<ul style="list-style-type: none"> • Easy and no cost method • Subjective measurement 	<ul style="list-style-type: none"> • A 10-point scale (0–10) is easier and more practical to use in primary care than the traditional scale (6–20) • Subjective measurement 	<ul style="list-style-type: none"> • Objective measurement • Need to calculate the heart rate range e.g., a 40-year-old patient aims to exercise at moderate intensity should monitor the heart rate between 115 and 137 beats/minute (64–76% of HR_{max}) • May require additional devices such as a wearable device (e.g., smart watch) 	<ul style="list-style-type: none"> • Easy to give examples of activities at each intensity level • Relative intensity e.g., running at 6.4 km/h (4.3 METs) is considered as a moderate-intensity PA, however, running at this pace may be very easy (low intensity) for a well-trained person 	<ul style="list-style-type: none"> • Potential to assign the appropriate weight range <p>e. g., a patient has 1 RM = 10 kg, therefore, the moderate intensity is 5–6.9 kg <ul style="list-style-type: none"> • Limited use in daily life activity <p>e. g., lifting a piece of furniture may not be able to indicate the percentage of 1RM</p> </p>	<ul style="list-style-type: none"> • A 10-point scale (0–10) is easier and more practical to use in primary care than the traditional scale (6–20) • Subjective measurement

Borg CR10: Borg category scales with ratio properties (10-point scale); %HR_{max}: percent of maximum heart rate (HR_{max} = 220 – age); MET: metabolic equivalent (1 MET = 3.5 mL/kg/min of oxygen uptake); 1 RM: one-time repetition maximum; RPE: rating of perceived exertion.

intensity, and duration over time” [18, 19]. Significant increases in frequency, intensity, and duration of PA may cause risks of injury and adverse events [19, 63, 64]. Therefore, a sudden increase in any FITT component, especially intensity should be avoided [45]. More practical techniques should be used by primary care providers as a basic approach for progressing PA components. A concept of a progressive transitional phase within 2–3 months, during which the duration and intensity of PA are gradually increased as tolerated, should be remarked [41]. The 10% rule may also be applied to increase PA, which limits the rate of progression of training load to 10% increases per week [64]. This rule is used in sports training, such as track running, swimming, and cycling; however, it can be adapted for a common activity in daily life (e.g., increasing walking steps counts by 10% per week) [64]. Other factors, such as control of blood pressure, changes in hypertensive medications, adverse effects of medications due to PA, and the presence of end organ damage, should be considered for adjusting tailored PA strategies [45].

6.6. Sedentary behavior guidelines for individuals with essential hypertension

The WHO 2020 PA guidelines do not specify the recommended amount of time spent on SB. However, the guidelines specify that adults with chronic conditions should limit sedentary time and replace with PA of any intensity, including light intensity [18, 19]. Moreover, an increase in moderate- to vigorous-intensity aerobic PA beyond the recommended levels help reduce the detrimental effects of SB [18, 19]. A systematic review reveals that the addition of a single hour per day of time spent in SB is associated with high blood pressure (odds ratio 1.02, 95% confidence interval 1.003–1.03) [65]. Moreover, both SB and hypertension are potential risk factors for several other morbidities and mortalities [6, 66]. Therefore, encouraging patients with hypertension to reduce SB may have a direct effect on blood pressure and an indirect effect on comorbidities of hypertension. Interventions related to motivation (e.g., counseling sessions, individualized lifestyle plan) are feasible to implement in primary care settings [67]. The slogan “sitting less and moving more” is a simple intervention to reduce sedentary time; however, the application of this evidence-based advice is required. For example, walking breaks or simple resistance activities (e.g., half-squats, calf raises, gluteal contractions, knee raises) after a long sitting period is effective in reducing blood pressure [68].

7. Behavioral counseling

In order to encourage patients to implement their PA prescriptions, behavioral counseling is needed. Providing PA recommendations and/or counseling requires tailored or individualized advice based on personal motivations and abilities to participate in PA [28]. Several behavior change techniques are applicable and have the potential to improve individuals PA engagement [69]. Person-centered and autonomy supportive counseling approach has the potential to maintain healthy behaviors over time [70]. These behavior change strategies are essential to motivate patients with hypertension to participate in regular PA. However, a recent systematic review found that PA counseling as a sole intervention in primary care had a limited effect on patients' behaviors [71]. PA counseling with other supportive strategies, such as follow-up visits, telephone calls, tailored reports, goal setting, and PA prescriptions, are more likely to increase PA levels [71]. Further, interventions developed for a longer-term follow-up might be more effective than shorter term interventions [71]. Brief interventions to promote PA within primary care combined with PA/exercise referral schemes (i.e., referring patients to PA professionals) are effective in increasing patient PA levels and are cost-effective [72, 73, 74]. The broad implementation of PA promotion in many countries around the world involves both PA counseling and referral systems as a clinical practice standard to improve PA levels in the population [75]. Primary care settings need to create a system to support PA promotion with patients that starts with behavioral counseling and

extends beyond the walls of the clinic setting. The WHO 2020 PA guidelines can be introduced as a standard guidance and adapted for behavioral counseling to overcome patient's barriers to PA participation [28, 76].

8. Referral to physical activity resources and professionals

Caverly et al. [77] reported that primary care physicians do not have sufficient time to discuss preventive care with their patients, spending only 29 min per working day on discussing preventive care, when they needed 6.1 h [77]. Moreover, lack of training in PA counseling among medical graduates and primary care providers is a barrier to promoting PA in primary care [78, 79, 80, 81, 82]. Primary care providers may have limitations to comprehensively counsel their patients about PA in such a time-limited encounter. Therefore, after an initial discussion in the primary care setting, patients with hypertension, who are cleared for further activity, may be considered for a referral to other health professionals (e.g., trained exercise professionals) outside of the clinic setting to provide more comprehensive care.

PA or exercise referral schemes, which involves a referral of patients (i.e., with essential hypertension) to allied health and exercise professionals, could further support patients to undertake and adhere to PA interventions [83]. PA referral schemes are the potential driver to facilitate individual engagement in PA interventions through several mechanisms such as support from providers, friends, and families, defined goals and motivations, professional supervision, incentives, and social engagement with other participants [83]. A systematic review of Albert et al. revealed different methods for organizing a PA referral schemes, such as group supervised activities, PA counseling and advice, individualized PA with or without supervision [83]. A study conducted in Mexico suggested a combination of PA counseling and referrals to community-based programs was a promising intervention to promote PA among patients with hypertension [84].

9. Conclusion

The WHO 2020 guidelines on PA and SB touches on promoting PA in clinical populations. However, the recommendations are broad for adults and older adults with chronic conditions. The guidelines need to be further adapted specifically to the care of patients with essential hypertension in primary care settings. A systemic approach to promote PA in primary care along with applying the WHO guidelines is required. As a first step, PA assessment can help determine the current PA levels. Safety considerations, including health risks assessment and safety issues related to hypertension, comorbidities, and treatment plans should be considered in designing a PA prescription. PA prescription should be individually tailored based on patient abilities to participate in PA. In addition, abnormal or new-onset symptoms relating to PA should be monitored to limit risks associated with PA participation. The FITT PRO can be adopted as a framework to break down the guidelines into specific components. Progression of PA, including frequency, intensity, and duration should be increased gradually to avoid adverse events. To effectively engage the patients in their PA prescription, behavioral counseling techniques should tailor or individualize advice based on personal motivations. Most importantly, primary care clinics should form collaborative relationships with local programs and professionals that are specifically designed for patients with hypertension to ensure that these patients are getting customized guidance and support from trained professionals.

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Additional information

No additional information is available for this paper.

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