Review Article

ผลการทบทวนแนวทางกิจกรรมทางกายในปัจจุบันระดับสากลสำหรับวัยต่าง ๆ เพื่อการป้องกันและควบคุมโรคไม่ติดต่อ

อภิชัย วรรธนะพิศิษฐ์

A Review of the Current International Physical Activity Guidelines for Various Age Groups to Prevent and Control Noncommunicable Diseases.

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บทคัดย่อ:

กิจกรรมทางกายเป็นหนึ่งในปัจจัยหลักสำหรับรักษาและป้องกันโรคไม่ติดต่อ ปัจจุบันมีแนวทางเกี่ยวกับการมีกิจกรรมทางกายออกมามากมาย บทความนี้ได้รวบรวมแนวทางเกี่ยวกับการมีกิจกรรมทางกาย 7 แนวทางที่ใช้อยู่ในปัจจุบัน ซึ่งแต่ละแนวทางมีรายละเอียดบางส่วนที่ต่างกัน จากแนวทางเหล่านี้พบว่าทารกควรได้รับการกระตุ้นให้มีการเล่นบนพื้น เด็กเล็กและก่อนวัยเรียนควรมีกิจกรรมทางกายไม่น้อยกว่า 180 นาทีต่อวัน เด็กอายุตั้งแต่ 5 ปี และเยาวชนควรมีกิจกรรมทางกายความหนักระดับปานกลางและระดับสูงอย่างน้อยวันละ 60 นาที ร่วมกับกิจกรรมเสริมสร้างความแข็งแรงของกระดูกและกล้ามเนื้ออย่างน้อย 3 วันในสัปดาห์ ผู้ใหญ่ควรมีกิจกรรมทางกายชนิดแอโรบิกความหนักระดับปานกลางอย่างน้อยสัปดาห์ละ 150 นาที และกิจกรรมเสริมสร้างความแข็งแรงของกล้ามเนื้อมัดหลักอย่างน้อย 2 ครั้งต่อสัปดาห์ ผู้สูงอายุควรมีกิจกรรมเช่นเดียวกับผู้ใหญ่ในด้านเวลาของกิจกรรมชนิดแอโรบิกและกิจกรรมเสริมสร้างความแข็งแรงของกล้ามเนื้อ และมีกิจกรรมที่ช่วยฝึกการทรงตัวอย่างน้อย 3 ครั้งต่อสัปดาห์สำหรับผู้ที่มีความเสี่ยงต่อการหกล้ม

คำสำคัญ: กิจกรรมทางกาย, เด็ก, แนวทาง, ผู้ใหญ่, โรคไม่ติดต่อ

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Abstract:

Physical activity is one of the key factors for treatment and prevention of noncommunicable diseases. Recently, many physical activity guidelines have been established. This article includes seven current guidelines each one having some different detail. According to the guidelines, infants should be encouraged to do floor-based play. Toddlers and preschool children should do at least 180 minutes per day of physical activity at any intensity. Children (from 5 years old) and youths should do at least 60 minutes per day of moderate- and vigorous-intensity physical activity and at least 3 days in a week of bone and muscle strengthening activities. Adults should do at least 150 minutes per week of aerobic moderate-intensity physical activity and include at least 2 times per week of major muscle groups strengthening activities. Older adults should do the similar physical activity programme as adults, in terms of duration of aerobic and strengthening activities, and also combine at least 3 times a week of balance training for people with high risk of falling.

Keywords: adults, children, guidelines, noncommunicable diseases, physical activity

Introduction

In 2012, the World Health Organization (WHO) reported noncommunicable diseases (NCDs) caused 38 million deaths, and the NCD deaths will increase to 52 million by 2030[1]. Recently, NCDs cause more deaths than all other causes combined. NCDs such as cardiovascular diseases, diabetes, cancer, and chronic respiratory diseases are major challenges (82% of NCD deaths from these 4 diseases).[1,2] The impact of NCDs on health reflects the global health problems. According to the global targets for prevention and control of NCDs, the WHO states one of the targets, 'a 10% relative reduction in prevalence of insufficient physical activity', by 2025. Globally, 23% of adults aged 18 years old and over were insufficiently physically active, and 81% of adolescents aged between 11 and 17 years were inactive in 2010[1].

Physical activity and exercise are considered as a key to promote health because scientific evidence shows several benefits of physical activity on health. Physical activity and exercise are a significant factor to reduce a risk of premature death and all-cause mortality.[3,4] Regular exercise can improve cardiovascular fitness, metabolic function, and respiratory function.[5] It has been shown to have positive effects on both primary and secondary disease prevention. In other words, physical activity and exercise can reduce risks and complications of NCDs such as cardiovascular diseases, hypertension, diabetes, and chronic respiratory diseases.[5]

Many countries and organisations emphasise the importance of being active as a treatment and prevention of NCDs and have established physical activity guidelines. Although each recommendation focuses on a similar issue, physical activity for health benefits, there are some different points amongst guidelines. For example, some guidelines do not mention recommendations on physical activity for infants and young children.

This article reviews the current guidelines on physical activity regarding the similarities and

differences of the guidelines in terms of content of recommendations on physical activity for age groups and specific population.

Material and Method

The author searched for country-specific government and global guidelines on physical activity. The current guidelines, which were published in past decade (2005 to 2015), were included. Non-English language guidelines were excluded. The author focused on the guidelines from different countries and various continents around the world.

Results

The seven current guidelines based on scientific data were found; all guidelines were English. They were published by the WHO and the government organisations from North America, Australia, Europe, and Asia.

The Global Recommendations on Physical Activity for Health (WHO, 2010)[6], 2008 Physical Activity Guidelines for Americans (U.S. Department of Health and Human Services, 2008)[7], Canadian Physical Activity Guidelines Canadian Sedentary Behaviour Guidelines (Canadian Society for Exercise Physiology, 2012)[8], A Physical Activity Guide for Older Australians (Australian Government, 2005)[9], Australia's Physical Activity and Sedentary Behaviour Guidelines (Australian Government, 2014)[10], Start Active, Stay Active A report on physical activity for health from the four home countries' Chief Medical Officers (UK, 2011)[11], Exercise and Physical Activity Guide for Health Promotion 2006 to Prevent Lifestyle-related Diseases (Ministry of Health, Labour and Welfare of Japan, 2006)[12] were reviewed.

The WHO, American, and Japanese guidelines[6,7,12] did not show any recommendations for young children. However, the rest of the guidelines from other countries in this article presented recommendations for infants to older adults.

The Canadian, Australian, and UK guidelines[8-11] presented that infants (from birth to 1 year of age) should be active by floor-based play in a safe environment. Young children (toddlers and preschoolers) should do at least 180 minutes per day of physical activity at any intensity. Next, children and youths (from 5 to 17 or 18 years old) should do at least 60 minutes per day of moderate- and vigorous-intensity exercise. For adults (aged 18 or 19 to 64 years), at least 150 minutes per week of moderate-intensity physical activity or at least 75 minutes per week of vigorous-intensity physical activity were recommended. Lastly, older adults (65 years old and above) should do the similar duration (time) of adults' recommendation, but there is some different content in terms of types of activities (as shown in Table 1).

Compared to the Canadian, Australian, and UK guidelines, the WHO and American guidelines[6,7] defined the same recommendations for children and youth, adults, and older adults.

The Japanese guidelines[12], which were established in 2006, depicted some different points. The guideline did not classify the target population by age. Otherwise, it focused on health promotion for healthy people by physical activity and exercise (exercise is not synonymous with physical activity, but exercise is a subcategory of physical activity).[13] This guidelines recommended 150 minutes per week of brisk walk, which is moderate-intensity physical activity,[14] to reduce visceral fat (visceral fat is associated with some NCDs, such as metabolic syndrome).[15]

Table 1 Summary of physical activity guidelines for general populations

	Infants and young children	Children and youth	Adults	Older adults
Global Recommendations on Physical Activity for Health[6]	-	**5-17 years old** -≥60 min/d of MVPA -Most of daily PA should be aerobic -≥3 times/wk of vigorous-intensity PA that strengthen muscle and bone	**18-64 years old** -≥150 min/wk of moderate-intensity aerobic PA or ≥75 min/wk of vigorous-intensity aerobic PA or an equivalent MVPA -≥10 min/bout of aerobic PA -for additional health benefits, 300 min/wk of moderate-intensity aerobic PA or 150 min/wk of vigorous-intensity aerobic PA or an equivalent MVPA -≥2 d/wk of muscle-strengthening PA (major muscle groups)	**65 years old and older** -Same as 18-64 years old -≥3 d/wk of PA to enhance balance and prevent falls (at risk of falling) -be as physically active as physical abilities and conditions allow
2008 Physical Activity Guidelines for Americans[7]	-	**6-17 years old** -≥60 min/d of MVPA -≥3 times/wk of vigorous-intensity PA -≥3 times/wk of muscle-strengthening PA -≥3 times/wk of bone-strengthening PA	**18-64 years old** -≥150 min/wk of moderate-intensity aerobic PA or ≥75 min/wk of vigorous-intensity aerobic PA or an equivalent MVPA -≥10 min/bout of aerobic PA	**65 years old and older** -Same as 18-64 years old -≥3 d/wk of PA to enhance balance and prevent falls (at isk of falling) -be as physically active as physical abilities and conditions allow

Table 1 (Continued)

	Infants and young children	Children and youth	Adults	Older adults
			-for additional health benefits, 300 min/wk of moderate-intensity aerobic PA or 150 min/wk of vigorous-intensity aerobic PA or an equivalent MVPA -≥2 d/wk of muscle-strengthening PA (major muscle groups)	
Canadian Physical Activity Guidelines Canadian Sedentary Behaviour Guidelines[8]	**Infants (<1 year old)** -physically active several times daily (interactive floor-based play) **Toddlers (1-2 years old) and preschoolers (3-4 years old)** -≥180 min/d of PA at any intensity	**5-11 years old** -≥60 min/d of MVPA -≥3 times/wk of vigorous-intensity PA -≥3 times/wk of bone- and muscle-strengthening PA **12-17 years old** -Same as 5-11 years old (different activities from aged 5-11 years)	**18-64 years old** -≥150 min/wk of MVPA -≥10 min/bout of aerobic PA -≥2 times/wk of bone- and muscle-strengthening PA (major muscle group)	**65 years old and older** -Same as 18-64 years old -PA to enhance balance and prevent falls (for poor mobility)

Table 1 (Continued)

	Infants and young children	Children and youth	Adults	Older adults
A Physical Activity Guide for Older Australians[9] and Australia's Physical Activity and Sedentary Behaviour Guidelines[10]	**Infants (<1 year old)** -particularly supervised floor-based play in safe environments **Toddlers (1-3 years old) and preschoolers (3-5 years old)** -≥3 h/d of PA	**5-12 years old** -≥60 min/d of MVPA -≥3 times/wk of bone- and muscle-strengthening PA -for additional health benefits, several hours per day of PA **13-17 years old** -Same as 5-12 years old (different activities from aged 5-12 years)	**18-64 years old** -150-300 min/wk of moderate-intensity PA or 75-150 min/wk of vigorous-intensity PA -≥2 times/wk of muscle-strengthening PA	**Older adults** -≥30 min/d of moderate-intensity PA on most days (preferably all days) -2-3 times/wk of strength exercises -Some form of stretching every day (even if it is only while watching TV) -Make a specific time each day for balancing exercise (while waiting for kettle to boil)
Start active, Stay active a report on physical activity for health from the four home countries' Chief Medical Officers[11]	**Infants** -floor-based play and water-based activities in safe environments **Pre-school children (who can walk unaided)** -≥180 min/d of PA	**5-18 years old** -≥60 min/d of MVPA -≥3 times/wk of bone- and muscle-strengthening PA	**19-64 years old** -≥150 min/wk of moderate-intensity aerobic PA or ≥75 min/wk of vigorous-intensity aerobic PA or an equivalent MVPA -≥10 min/bout of aerobic PA -for additional health benefits, 150-300 min/wk of PA -≥2 d/wk of muscle-strengthening PA	**65 years old and older** -≥150 min/wk of moderate-intensity aerobic PA or ≥75 min/wk of vigorous-intensity aerobic PA -≥10 min/bout of aerobic PA -≥2 d/wk of muscle-strengthening PA -≥2 d/wk of PA to improve balance and co-ordination (at risk of falling)

Table 1 (Continued)

	Infants and Young children	Children and youth	Adults	Older adults
Exercise and Physical Activity Guide for Health Promotion 2006 To Prevent Lifestyle-related Diseases[12]			Generally, 23 MET-h/wk **Health promotion by PA** -60 min/d (4 km) or 7 h/wk (28 km) of walking or 10,000 steps/d + 2,000-4,000 steps unconsciously taken in daily life **Health promotion by exercises** -50 min/d (350 min/wk) of walking + 60 min/wk (6 km) of brisk walking or 35 min/wk (4 km) of jogging **Reducing visceral fat** -150 min/wk (15 km) of brisk walking or 90 min/wk (11 km) of jogging	

Abbreviation list

PA: physical activity; MVPA: moderate- and vigorous-intensity physical activity; min: minute; h: hour; d: day; MET: metabolic equivalent; km: kilometre; wk: week

Term clarification

Moderate-intensity physical activity[7]: physical activity that induces faster heart beat and harder breathing than normal (able to talk but not sing[19])

Vigorous-intensity physical activity[7]: physical activity that induces much faster heart beat and much harder breathing than normal (not able to say more than a few words without pausing for breath[19])

Metabolic equivalent (MET): 1 MET is the rate of energy expenditure while sitting at rest (oxygen uptake of 3.5 millilitres per kilogram of body weightper minute)[7].

Generally, all guidelines included physical activity for healthy people, besides, the 2008 Physical Activity Guidelines for Americans[7] presented the recommendations for women during pregnancy and the postpartum period, people with disabilities, and people with chronic medical conditions. The recommendations also suggested at least 150 minutes per week of moderate-intensity physical activity, but people with these conditions should do physical activity under the care of health-care providers (as shown in Table 2).

Additionally, type of physical activity is one of the important issues of concern. Aerobic activities are strongly recommended for fitness health and reducing NCDs. Strengthening activity should be considered as a major activity for adults and older adults as well, and balance training is a substantial aspect for older adults who are at risk of falls.

Discussion and recommendations

According to the current guidelines, some guidelines did not include recommendations for some age groups such as infants and young children. It does not mean young children do not need physical activity. All guidelines encouraged people to do physical activity for physical fitness or healthy condition rather than improving excellence in sport performance.

Infants can improve their movement skills and have fun by being active[8]. They can be physically active by playing with their parents, for example, reaching for or grasping balls or toys, playing or

Table 2 Summary of physical activity recommendations for specific groups[7]

Conditions	Recommendations
Women during pregnancy and the postpartum period	-≥150 min/wk of moderate-intensity PA during pregnancy and the postpartum period (for healthy women who are not already highly active or doing vigorous-intensity PA) -Pregnant women who habitually engage in vigorous-intensity PA or are highly active can continue PA during pregnancy and the postpartum period (should discuss with healthcare providers)
People with disabilities	-Same as adults' recommendations (≥150 min/wk of moderate-intensity PA or ≥75 min/wk of vigorous-intensity PA + ≥2 d/wk of strengthening training) -When adults with disabilities are not able to meet the recommendations, they should engage in regular PA according to their abilities and should avoid inactivity -Consultation of healthcare providers might involve amount and type of PA
People with chronic medical conditions	-When adults with chronic conditions do PA according to their abilities, PA is safe -Doing PA should be under the care of healthcare providers

rolling on the floor, and crawling around the home. Young children can get benefits from physical activity, including physical fitness, healthy body weight, and movement skills[8]. They are active by energetic play such as crawling, running, jumping, and dancing.[8]

Older children, youths, adults, and older adults can improve physical fitness and be healthy by doing moderate-intensity or vigorous-intensity aerobic physical activity.[8] Moreover, muscle-strengthening and/or bone-strengthening activities are recommended in these populations. For children and adolescents, climbing and resistance exercises using body weight or resistance bands are muscle-strengthening activities; running and jumping are examples of bone-strengthening activities.[7] In adults and older adults, muscle-strengthening activities are focused on the major muscle groups of the body: legs, hips, back, chest, abdomen, shoulders, and arms.[7] Resistance training is considered as a muscle-strengthening activity. Additionally, balance activities are recommended among older adults with risk of falls. Examples of these exercises include backward walking, toe walking, and standing on one leg.

A guideline[7] in this review mentions about recommendation on physical activity for pregnant women. Physical activity and exercise can improve circulation and reduce complications of pregnancy, for instance, reducing chances of preeclampsia (high blood pressure and protein in the urine during pregnancy) and gestational diabetes.[16] During post-partum period (after baby delivery), physical activity can improve mood, maintain cardiorespiratory fitness, improve weight control, promote weight loss, and reduce depression and anxiety.[17]

The author recommends all people should meet the recommended amount of physical activity and perform the appropriate types of activities. Nevertheless, some people cannot do physical activity without assistance, for instance, an infant cannot be active if his parents are not concerned about the benefits of being physically active.

As mentioned earlier, exercise is only a part of physical activity, so people can be active by doing both exercise and non-exercise activities such as work, travelling (walking or cycling), and recreational activities.[18] The following examples will show the ways to meet the recommended levels of physical activity.

Case 1: *A 42-year-old gentleman is active by daily life activities* (goal: 150 minutes/week of moderate-intensity activity or 75 minutes/week of vigorous-intensity activity and 2 times/week of muscle strengthening activity)

He walks briskly from his house to work-place 10 minutes in mornings and take 10 minutes back home in evenings from Monday to Friday. He does heavy gardening work for 30 minutes on Tuesday and Thursday.

In summary, he does 100 minutes per week of moderate-intensity physical activity from brisk walk (20 minutes per day for 5 days a week) and 60 minutes per week of moderate-intensity physical activity from gardening (30 minutes per day for 2 days a week). He also does 2 times a week of strengthening activity from gardening.

Case 2: *A 35-year-old lady is active by regular exercise* (goal: as same as case 1)

This lady is a former athlete; she wants to keep fit by regular exercise. She runs in the park for 30 minutes on Monday, Wednesday, and Saturday.

She goes to the gym on Thursday and Sunday for weight training.

In summary, she does 90 minutes a week of vigorous-intensity activity (= 180 minutes/week of moderate-intensity activity*) from running, and she performs 2 times a week of strengthening activity from weight training.

*1 minute of vigorous-intensity activity is equal to 2 minutes of moderate-intensity activity

Case 3: *A 67-year-old lady is active by daily life activities and exercise* (goal: as same as case 1 and 2, plus balance training at least 3 times a week)

She is a retired teacher, who lives with her daughter's family. She goes to the park for Tai-Chi with her daughter (while her daughter is running) on Monday, Wednesday, and Saturday. She helps her son-in-law doing gardening work for 30 minutes on Tuesday and Thursday. This lady and her friends meet up every Friday and Sunday and go for walking from six o'clock to a quarter to seven.

In summary, she does 3 times in a week of balance training from Tai-Chi. She has 150 minutes per week of moderate-intensity physical activity (60 minutes from gardening and 90 minutes from walking) and 2 times through a week of strengthening activity from gardening.

Conclusions

All guidelines in this article focus on physical activity recommendations for healthy people. Each guideline has some different detail, and they are issued in different countries. However, the guidelines recommend physical activity for the general population in their countries; they do not indicate any specific ethnicities or genders. Moreover, the WHO guideline is a global instruction for all people. In summary, the current physical activity guidelines recommend that healthy people of all age groups should be active. Infants should be encouraged to do floor-based play. Toddlers and preschool children should do at least 180 minutes per day of physical activity at any intensity. Children (from 5 years old) and youth should do at least 60 minutes per day of moderate- and vigorous-intensity exercise (at least 3 times a week of vigorous-intensity physical activity) and at least 3 days in a week of bone and muscle strengthening activities. Adults should do at least 150 minutes per week of moderate-intensity aerobic physical activity or at least 75 minutes per week of vigorous-intensity aerobic physical activity and include at least 2 times per week of major muscle groups strengthening activities. Older adults (aged 65 years and over) should do the similar physical activity programme as adults, in terms of duration of aerobic and strengthening activities, and also combine at least 3 times a week of balance training for people with high risk of falling.

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