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Physical fitness in older people with ID—Concept and measuring instruments: A review☆

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ABSTRACT

A certain level of physical fitness is a prerequisite for independent functioning and self-care, but the level of physical fitness declines with ageing. This applies to older adult with intellectual disabilities too, but very little is known about their actual level of physical fitness. This lack of knowledge is partly caused by a lack of suitable instruments to measure physical fitness in this group, but the search for and choice of instruments depends on the operationalisation of the concept physical fitness for specific this target population. In this article the advantages of two known definitions of physical fitness are combined, leading to a combination of seven components to describe physical fitness in older adults with intellectual disabilities: coordination, reaction time, balance, muscular strength, muscular endurance, flexibility and cardio-respiratory endurance.

A literature search for all instruments to measure any of these components resulted in a large number of available instruments. These instruments were evaluated according criteria of functionality, reliability and feasibility in this target population. The aim of this article was to propose a selection of instruments which complied with these criteria and creates possibilities for widespread use and sharing and/or pooling of data. The proposed selection of tests to measure physical fitness in older adults with intellectual disabilities is: Box and Block test, Reaction time test with an auditive and visual signal, Berg balance scale, Walking speed comfortable and fast, Grip strength with a hand dynamometer, 30 s chair stand, modified back saver sit and reach and the 10 m incremental shuttle walking test.

1. Introduction

1.1. Background

Physical fitness describes how 'fit' a person physically is to cope with the demands set by his/her environment. For older adults to continue living independently, these demands include activities of daily life (ADL) and instrumental activities of daily life (IADL) (Bouchard & Shephard, 1994). ADL are activities necessary for self-care, like eating or bathing. IADL cover activities necessary for independent living, like cleaning, cooking or doing groceries (Rosen, Sorkin, Goldberg, Hagberg, &

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Katzel, 1998). These demands are not different for older people without or with intellectual disabilities. To execute these activities, and maintain living independently, a certain level of physical fitness is required (Bouchard & Shephard, 1994; Mahoney & Barthel, 1965). For people with physical fitness levels below this required level, it is often necessary to relocate to a care-facility.

The level of fitness declines with ageing (Bouchard, Shephard, & Stephens, 1994; Physical Activity and Health. A report of the Surgeon General. Older Adults, 1996). Primary ageing is the natural ageing process in the body itself, which decreases the physical fitness directly. Secondary ageing includes all changes influenced by the primary ageing process, such as age-related health conditions and lower activity levels. These changes further reduce physical fitness (Fleg et al., 2005).

Older adults with intellectual disabilities (ID) experience a similar primary and secondary ageing process as older adults without ID (Graham & Reid, 2000), but this group has some additional risk factors for low levels of physical fitness. Low levels of physical activity in younger adults with ID suggest a low level of physical fitness at a young age, probably at older age as well (Temple, Frey, & Stanish, 2006). Secondly, this group has high prevalences of sensory conditions and motor conditions, often leading to secondary arthritis, which influence physical fitness negatively (Evenhuis, Theunissen, Denkers, Verschuure, & Kemme, 2001; van Schrojenstein Lantman-de Valk et al., 1997). With these differences in the secondary ageing process, older adults with ID are probably at an even higher risk of not meeting the physical demands set by the environment to live as independently as possible than older adults without ID. Because their intellectual disability already causes some degree of dependence on others, one could argue that the role of physical fitness in living as independently as possible, is even more important than in older people without ID.

Research of the last decade has shown that the secondary ageing process can be partly slowed down or reversed by physical activity (Buchman, Boyle, Wilson, Bienias, & Bennett, 2007), but more information about the actual physical fitness levels of older people with ID is necessary to apply this knowledge usefully to this group. However, to our best knowledge, there is no information available concerning reliable and feasible instruments to measure physical fitness in older adults with ID. The aim of this article was to propose a selection of instruments to measure physical fitness in older adults with ID which is functional, reliable and feasible, to create possibilities for widespread use and comparing, sharing and/or pooling of data.

1.2. Theoretical framework

First, we need to describe physical fitness for older people. In this paper, physical fitness is related to ADL and IADL, since these activities are a prerequisite for self-care and independent living.

Despite different opinions on the exact dimensions and components of the concept physical fitness, there is consensus about the multidimensional nature of physical fitness (Pate, 1988).

The American College of Sports Medicine uses the definition of physical fitness of the U.S. Centers for Disease Control and Prevention (ACSM, 2005): "Physical fitness is a set of attributes that people have or achieve that relates to the ability to perform physical activity." Furthermore the U.S. Centers for Disease Control and Prevention offer a distinction between health-related components and athletic ability (or performance-related) components: "The health-related components are more important to public health than the athletic ability components" but "operational definitions of physical fitness vary with the interest and need of the investigators" (U.S. Centers for Disease Control and Prevention).

The health-related and performance-related components of physical fitness according to the U.S. Centers for Disease Control and Prevention are shown in Table 1.

For independent functioning, looking only at health-related components is too limited to describe physical fitness. Activities of daily life can be as much as a performance for one person as a sports match for another person. This is why performance-related components also play a role in independent functioning in older adults, although not all of the components mentioned in Table 1 are equally relevant. Speed is not necessary to perform activities of daily life, and neither is power (maximal strength output in one short interval). Balance encompasses a static and dynamic component and therefore agility (ability to turn quickly) as a separate component is less relevant. Thus, the operation of physical fitness of the U.S. Centers for Disease Control and Prevention is constructive, specific and measurable, but lacks any clustering of related components.

To achieve clustering of the remaining relevant components, Bouchard et al. (1994) provide a useful classification. According to these authors, health-related fitness refers to those components of fitness that are affected favorably or unfavorably by habitual physical activity and relate to health status (Bouchard & Shephard, 1994).

Table 1
Health-related and performance-related components of physical fitness according to U.S. Centers for Disease Control and Prevention.

Health-related components	Performance-related components
Cardiorespiratory fitness	Balance
Body composition	Reaction time
Flexibility	Coordination
Muscular strength	Agility
Muscular endurance	Speed
	Power