Research in Developmental Disabilities 34 (2013) 276–285

Contents lists available at SciVerse ScienceDirect

Research in Developmental Disabilities

Clinical measures are feasible and sensitive to assess balance and gait capacities in older persons with mild to moderate Intellectual Disabilities

Lotte Enkelaar [a,*], Ellen Smulders [a], Henny van Schrojenstein Lantman-de Valk [b], Vivian Weerdesteyn [a,c], Alexander C.H. Geurts [a,c]

[a] Radboud University Medical Centre, Nijmegen Centre for Evidence Based Practice, Department of Rehabilitation, Nijmegen, The Netherlands
[b] Radboud University Medical Centre, Nijmegen Centre for Evidence Based Practice, Department of Primary and Community Health Care, Nijmegen, The Netherlands
[c] Sint Maartenskliniek, Research, Development & Education, Nijmegen, The Netherlands

ARTICLE INFO

Article history:
Received 4 April 2012
Received in revised form 20 August 2012
Accepted 20 August 2012
Available online 15 September 2012

Keywords:
Intellectual Disabilities
Balance
Gait
Clinical measures

ABSTRACT

Mobility limitations are common in persons with Intellectual Disabilities (ID). Differences in balance and gait capacities between persons with ID and controls have mainly been demonstrated by instrumented assessments (e.g. posturography and gait analysis), which require sophisticated and expensive equipment such as force plates or a 3D motion analysis system. Most physicians and allied healthcare professionals working with persons with ID do not have such equipment at their disposal, so they must rely on clinical tests to determine whether balance and gait are affected. The aim of this study was to investigate whether existing clinical balance and gait tests are feasible in older persons with mild to moderate ID and to examine whether these tests are able to show limitations in balance and gait capacities in the ID population compared to age-matched peers in the general population. Furthermore, it was aimed to identify the most important determinants of balance and gait disability in persons with the ID. A total of 76 older persons with mild to moderate ID (43 male, mean age 63.1 ± 7.6 years) and 20 healthy controls (14 male, mean age 62.2 ± 5.6 years) participated. Balance and gait abilities were assessed with the Berg Balance Scale (BBS), the Functional Reach test (FR), the Timed Up and Go Test (TUGT), the timed Single Leg Stance (SLS) and the Ten Metre Walking Test (TMWT). Our study showed that it is feasible to conduct standard clinical balance and gait tests in older persons with mild to moderate ID. Balance and gait performance of persons with ID is substantially worse compared to older persons of the general population. Age, number of co-morbidities, Body Mass Index (BMI), body sway and fear of falling are associated with balance and gait performance in persons with ID. These factors might help in the selection of subjects to be monitored on their balance and gait capacities.

1. Introduction

Mobility limitations are common in persons with Intellectual Disabilities (ID), with a reported prevalence of up to 63% (Cleaver, Hunter, & Ouellette-Kuntz, 2009). Mobility is the activity of moving from one place to another and is depending upon a person's body functions, structures and capacities, with balance and gait being two key aspects (World Health Organization, 2001). Hence, limitations in balance and gait capacities can be expected to be common in

* Corresponding author at: Radboud University Medical Centre, Nijmegen Centre for Evidence Based Practice, Department of Rehabilitation (898), P.O. Box 9101, 6500 HB Nijmegen, The Netherlands. Tel.: +31 24 366 8426; fax: +31 24 361 9839.
E-mail address: l.enkelaar@reval.umcn.nl (L. Enkelaar).

0891-4222/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.ridd.2012.08.014

this population as well. Indeed, a recent review (Enkelaar, Smulders, van Schrojenstein Lantman-de Valk, Geurts, & Weerdesteyn, 2012) has shown that in persons with ID balance and gait capacities are affected compared to their age-matched peers. For instance in laboratory assessments, persons with ID demonstrate greater postural instability than their age-matched peers during both quiet standing and walking as indicated by increased and more variable body sway. These balance problems start at a young age and remain present during the entire lifespan of persons with ID, with a relatively early occurrence of age-related decline (Enkelaar et al., 2012). Because mobility problems have been identified as the most important risk factors for falls, specifically elderly persons with ID might have an increased fall risk (Speechley, 2011).

Differences in balance and gait capacities between persons with ID and controls have mainly been demonstrated by instrumented assessments (e.g. posturography and gait analysis), which require sophisticated and expensive equipment such as force plates or a 3D-motion analysis system. Most physicians and allied healthcare professionals working with persons with ID do not have such equipment at their disposal, so they must rely on clinical tests to determine whether balance and gait are affected. In clinical practice, frequently used clinical balance and gait tests are the Berg Balance Scale (BBS), the Functional Reach test (FR), the Timed Up and Go Test (TUGT), the Single Leg Stance (SLS), and the Ten Metre Walking Test (TMWT) (Berg, Wood-Dauphinee, Williams, & Maki, 1992; Bohannon, 1994, 1997; Duncan, Weiner, Chandler, & Studenski, 1990; Podsiadlo & Richardson, 1991).

These clinical tests have been used in previous studies on balance and gait capacities in persons with ID (Hale, Bray, & Littmann, 2007; Kokubun et al., 1997; Lahtinen, Rintala, & Malin, 2007). A limitation, however, was that it can be rather cumbersome to conduct such tests in this population. For instance, in the study by Hale et al. (2007) only a small number of participants were able to complete an assessment involving several clinical balance and gait tests, which was mainly due to the fact that the participants did not understand the instructions. This poor feasibility may be related to the study population which consisted of persons with profound ID (Hale et al., 2007). It remains unknown, however, whether these common clinical balance and gait tests are feasible in persons with mild to moderate ID.

Another limitation of the previous studies on balance and gait in persons with ID is that they did not investigate the influence of different etiological diagnoses on balance and gait functioning. Studies either targeted a specific ID subgroup (Down syndrome, DS) or did not differentiate in etiological diagnosis. As two studies have demonstrated that persons with DS had poorer balance and gait capacities compared to a general group of persons with ID (Dellavia, Pallavera, Orlando, & Sforza, 2009; Kokubun et al., 1997), etiological diagnosis may be one of the determinants contributing to balance and gait limitations. Hence, it has yet to be investigated which determinants contribute to balance and gait limitations in the general ID population. Furthermore, it has to be determined whether clinical tests can also demonstrate balance and gait deficits in the general ID population compared to controls, similar to the results obtained with instrumented assessments (Galli et al., 2007; Kokubun et al., 1997; Webber, Virji-Babul, Edwards, & Lesperance, 2004).

The aim of the present study was threefold. First, we aimed to identify whether it is feasible to conduct a comprehensive set of frequently used clinical balance and gait tests in older persons with Intellectual Disabilities (ID). The second purpose of the study was to compare balance and gait capacities between persons with ID and their age-matched peers in the general population. The general hypothesis was that persons with ID will perform worse on the clinical balance and gait tests compared to their peers. Third, we aimed to identify possible determinants that might contribute to balance and gait performance. The results of this study may help professionals to select appropriate tests for assessing balance and gait capacities in this population, which in turn will serve as the basis for determining treatment goals.

2. Methods

2.1. Participants

Persons with ID were recruited from three service providers for persons with ID in the Netherlands. The involved service providers had different types of living facilities available for persons with ID: community based group homes, campus facilities and independent living situations with ambulatory support. The participants had to be at least 50 years with mild (IQ 70-50) to moderate (IQ 50-35) ID (World Health Organization, 2010). They had to be able to walk independently for at least 10 m and to understand simple instructions. Since this study was part of a prospective study on fall risk, persons with epilepsy were excluded. The rationale for this exclusion was that a fall as a result of an epileptic seizure has a different cause than falling related to ID and ageing.

Persons with ID older than 50 years were selected from the service providers database and were screened by physicians, allied health professionals, and caregivers on all in- and exclusion criteria. In the case of eligibility, an information letter with text and pictures adjusted to the individual intellectual level was sent to the participants and their caregivers. The legal representative also received an information letter. These letters contained information about the study as well as a reply form of interest. After obtaining this information, the primary researcher (LE) made a home visit to each person who had indicated interest in the study. During this visit a final check of the in- and exclusion criteria was done, additional information about the study was given on request, and the informed consent form was signed. If participants had a legal representative, written informed consent was obtained from this person as well.