



Original Article

Clinical profile and main comorbidities of Spanish adults with Down syndrome



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ARTICLE INFO

Article history:

Received 2 February 2015

Received in revised form 29 March 2015

Accepted 3 May 2015

Available online 27 May 2015

Keywords:

Down syndrome

Comorbidity

Hypothyroidism

Dementia

Obesity

ABSTRACT

Background: The life expectancy of adults with Down syndrome (DS) has significantly increased in the last decades. We aim to describe the main demographic and clinical characteristics of a cohort of adults with DS, and analyse their differences according to age and gender groups.

Methods: Cross-sectional study of 144 adults with DS from the outpatient clinic of a tertiary care hospital in Madrid, Spain, recruited between February 2012 and March 2013. Demographic data (age, gender, living situation, caregivers, and working situation), clinical conditions, prior medications, and laboratory data were measured and compared between groups.

Results: Adults with DS were 35 ± 12 years old (range 17–65), and 51% were males. Most subjects lived with their families (112, 78%), and parents were the main caregivers in 73% of cases. However, older adults with DS lived more frequently in residential facilities. Each subject presented an average of 5 ± 2 clinical problems. Eye (117 adults, 81%), skin (86, 60%), thyroid (81, 56%), gastrointestinal (73, 51%), and psychopathological disorders (58, 40%) were amongst the most frequent clinical conditions of adults with DS. Cataracts (14, 61%), keratoconus (4, 17%), dementia (11, 48%), and seizures (6, 26%) were more frequent amongst individuals with DS over 50 years ($p < 0.001$ for the comparisons). No relevant differences were found between genders. The medications most frequently prescribed were levothyroxine (70 subjects, 48.6%), vitamin D (50, 34.7%), antidepressants (32, 22%), and antipsychotics (31, 21.5%).

Conclusions: Adults with DS present a wide spectrum of potentially treatable medical conditions, making specially-trained multidisciplinary teams a dire need for this population.

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1. Introduction

Down syndrome (DS) is the most frequent chromosomal disorder in live newborns, and the first cause of genetic intellectual disability in Western countries [31]. In most cases DS is caused by a trisomy in chromosome 21, although Robertsonian translocations and mosaicisms have also been described [5]. Its incidence is estimated at 14.5 per 10,000 live births in the United States [26], and may vary depending on the use of prenatal diagnostic procedures, maternal age, gestational timing of diagnosis, and case loss due to termination of pregnancy [19]. The increased availability of prenatal screening protocols has led to a 7- to 9-fold increase in the rates of gestational diagnosis of DS [22]. The growing maternal age at conception is also directly related to the rising incidence of DS diagnoses, which has been established at

approximately 1/800 newborns amongst women aged 30–34, but only at 1/50 amongst women over 45 [12]. However, the global life birth prevalence of DS has remained stable due to a parallel increase in losses due to termination of pregnancy [4].

Since the 1980s, the improved survival of children with DS has resulted in a dramatically improved life expectancy for this population. The median age at death of US adults with DS rose from 25 years in 1983 to 49 years in 1997 [36]. Nowadays this life expectancy has reached the seventh decade of life for many elderly adults with DS [2]. This increase has been related to significant medical advances in recent decades, such as improvements in cardiac surgery, prevention of childhood infections, broader access to standard care, and a better global psycho-social support for the DS population [13]. There is nevertheless a substantial gap of information concerning the ageing process of individuals with DS. Premature ageing has been observed in this population, both at the cellular and the clinical levels [17]. Shorter leukocyte telomere length [34] and an increase in oxidative stress due to an over-expression of superoxide dismutase and cystathionine beta synthase account for this phenomenon [27]. Some, but not all body systems exhibit signs of premature ageing, and, while longevity in people with DS has improved appreciably, age-specific risk for mortality is considerably increased compared with other people with intellectual

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disabilities [38]. Prior approaches to the description of the distinct clinical profile of adults with DS were based either on population studies based on death certificate diagnoses, or hospital admission diagnoses [11,16,39], or on retrospective series focused on a particular set of disorders (ophthalmologic disorders, cardiovascular disorders, cognitive impairment, celiac disease, etc.), leading occasionally to contradictory conclusions [23,24,32,33,37]. These methodological issues do not permit to reach “practical solutions which (...) provide concrete solutions applicable to the health care, early attention, education, social and labour integration of persons with Down syndrome” [7]. However, most studies point out that adults with DS pose unique clinical problems, that differ from those of the general population [15,18]. Therefore, the present work aims to describe the main social, clinical and laboratory characteristics of a cohort of adults with DS and to analyse their differences according to age and gender groups.

2. Material and methods

2.1. Study design

The study was conducted at a tertiary care hospital in Madrid, Spain which provides service to an approximate population of 350,000 persons. Established in 2005, this is the only Adult Down Syndrome reference outpatient unit of its kind in Madrid. Over 600 adults with DS have been attended since its inception, which account for approx. 10–15% of the estimated prevalence of DS in Madrid (Fig. 1).

We performed a cross-sectional study of 144 adults with DS (range 17–65 years). Subjects were consecutively selected at their first visit to the unit. The recruitment period ran from February 2012 to March 2013. The study was conducted in accordance with the provisions of the Declaration of Helsinki and Good Clinical Practice guidelines. The local institutional review board approved the study protocol and waived the need for informed consent owing to the lack of intervention

and the retrospective nature of the study. Patient data protection and confidentiality were ensured according to the most recent Spanish data protection legislation.

2.2. Measurements and variables

The following variables were collected in all study subjects: age (years), gender, living situation (family, nursing home, group home, independent, etc.), main caregiver (parents, siblings, residential facilities, etc.), and working situation (full work, occupational centre, day centre, etc.); as well as the following anthropometric variables: height (cm), weight (kg), and BMI (kg/m^2). Height was measured with a stadiometer to the nearest centimetre, and weight was measured on a calibrated balance beam scale to the nearest 0.5 kg.

Medical records were systematically reviewed to obtain the following clinical variables: a) cardiovascular risk factors: blood pressure (mmHg) and heart rate (bpm) were determined with a validated oscillometric device (OMRON M-6 comfort, or OMRON 711 automatic models, OMRON Healthcare, Vernon Hills, Illinois, USA) in accordance with ESH/ESC guidelines [20], family history of cardiovascular disease, dyslipidemia and/or metabolic syndrome according to modified ATPIII criteria [25], diabetes mellitus, defined with the most recent American Diabetes Association criteria [1], hyperuricemia, hours of physical activity (per week), and tobacco or alcohol consumption; b) ophthalmologic disorders: cataracts, keratoconus, and/or refraction disorders; c) ENT disorders: recurrent acute otitis media, amygdalotomy, and/or adenoidectomy; d) dermatologic disorders: seborrheic dermatitis, alopecia areata, acne or recurrent folliculitis; e) thyroid disorders: hypo- or hyperthyroidism; f) cardiac disorders, incl. congenital defects and surgical corrections; g) neurologic disorders: dementia (based on ICD-9 criteria, adapted to the population with Down syndrome [21]) and/or seizures; h) psychiatric disorders: anxiety, depression, aggressiveness, obsessive-compulsive disorder, and/or grooves (also based on the adapted version of ICD-9 criteria by McGuire & Chicoine [21]); i) skeletal disorders: osteoarthritis, atlantoaxial subluxation, and/or hallux valgus; and j) gastrointestinal disorders: celiac disease, gastroesophageal reflux disease, constipation, and/or HBV infection. We also collected all relevant medications, which included lipid-lowering agents, antidiabetic drugs, anxiolytics, antidepressants, antipsychotics, antiepileptics, non-steroidal anti-inflammatory drugs, levothyroxine, vitamin supplements, and proton-pump inhibitors. All participants underwent a fasting blood test after a minimum 10-hour overnight fast as part of their routine clinical evaluation, which included a complete blood count and several biochemical parameters. A Roche/Hitachi modular-D analyser was used to determine the levels of glucose (mg/dL), creatinine (mg/dL), TSH (mU/mL), free T4 (ng/dL), total cholesterol (mg/dL), high-density lipoprotein (HDL) cholesterol (mg/dL), low-density lipoprotein (LDL) cholesterol (mg/dL), triglycerides (mg/dL), uric acid (mg/dL), folic acid (ng/mL), vitamin B12 (pg/mL), intact PTH (pg/mL), and 25-OH-vitamin D (ng/mL) levels.

2.3. Statistical analysis

Data were processed using SPSS software (SPSS 20.0.0, IBM Corp., Armonk, NY, USA). Subjects were classified into groups according to age (under 30, 30–39, 40–49, and over 50 years). We also performed a gender-stratified analysis in the whole sample, and according to age groups. We compared the social situation, the prevalence of different clinical comorbidities, and the use of medication between groups. Qualitative results are presented as absolute frequencies (percentages), whereas quantitative results are presented as mean $\pm$ standard deviation (SD). A χ^2 test (with Yates correction when applicable) was used to evaluate statistical significance in the comparison of categorical variables. Quantitative variables were analysed using ANOVA, with Bonferroni correction when necessary. All statistical tests were two-tailed. Results with $p < 0.05$ were considered significant.

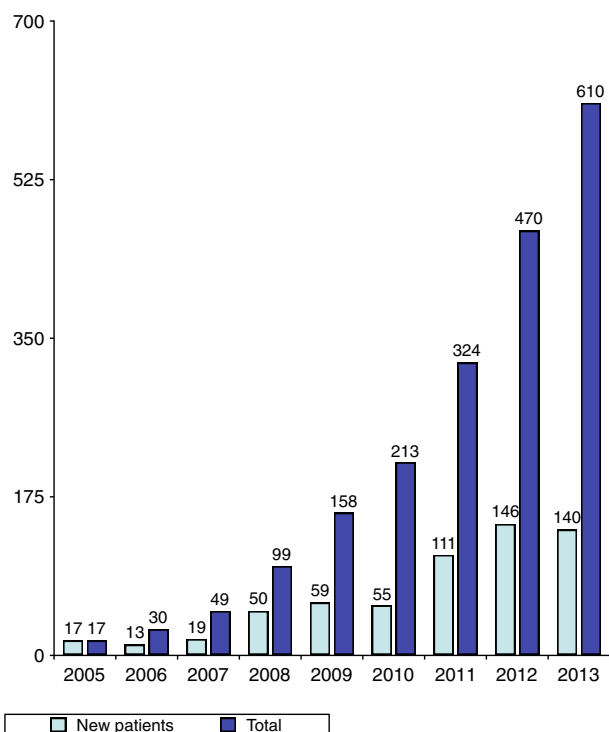


Fig. 1. Demographic evolution of the Adult Down Syndrome Outpatient Unit since its inception (in patients/year).

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