Disability and dementia trends under a life course perspective

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Introduction

There is agreement that in high income countries, severe disability has being postponed but there is scarce information for the very old age group, those beyond 85 years of age. Disability trends are generally decreasing but less so in countries where disability had been already low, such as the Netherlands[1] or even increasing in Sweden, where severe disability had decreased between 1980 and 1990[1]. Little information on disability trends is available in low and middle income countries where populations have aged in very different conditions and usually amidst social and economic adversity.

A lifecourse perspective is needed to interpret disability survey results and allows to take into account the conditions of life of specific birth cohorts[2]. In addition, historical events have shapedsocial and economic conditions influencing exposures to chronic disease risk factors, which in turn have changed the risk of chronic diseases throughout the life course of individuals

Using a life course perspective, the aim of this text is to review the current debate on population disability trends in high income countries. We propose, first, that the concepts and methods of life course epidemiology can increase our understanding of population health and disability trends in a world undergoing rapid demographic, social and economic transformation. Second, we use the available evidence from three studies in Spain to argue that country level factors, beyond individual health factors, may underline the observed disability trends by modifying the average risk of disability in the population. Last, we examine the opportunities for dementia prevention and how mass preventive intervention can alter the magnitude of the announced epidemic of dementia. We conclude that there is a real potential to change the relationship between chronological age and incidence of chronic diseases and disability by reducing poverty and violence exposures from childhood to old age, increasing healthy behaviours along the life courseand warranting access and coverage to good prevention and management of chronic diseases in old age.

Current disability burden.

The recently published Global Burden Disease 2013 report illustrates the challenges that increasing trends of multimorbidity and disability pose to the health systems of all countries, including high income countries[3]. We are told that population growth and population aging are the driving forces of the increases in prevalence of chronic diseases and particularly diabetes. The number of people with neurological, respiratory and musculoskeletal conditions is increasing in high income countries and particularly in Europe. We are also warned that the first leading cause of years lived with disability in Spain is diabetes, followed by back and neck pain, major depressive disorders, falls, hearing impairment, migraines, other musculoskeletal disorders (osteoporosis and osteomyelitis and associated fractures), chronic obstructive pulmonary disease and anxiety. Main killers, cardiovascular disease and cancer, are not listed here.

Due to improved treatments, mortality is decreasing faster or increasing slower than prevalence of disease. For instance, for diabetes in Europe, age standardised prevalence rates increased by

43% globally while mortality increased only 9% in the period between 1990 and 2013. What would be the comparable figures for Spain, where diabetes has become the leading cause of years with disability? In addition, back pain and neck pain are disputing the second and third places of the list and competing with major depressive disorders. Respiratory chronic conditions, such as COPD and asthma are located in the list just prior to anxiety. Thus, the Global Burden of Disease report ranks disability causes in different European countries and emphasizes the importance of diabetes, muscular-skeletal conditions, mental health and respiratory chronic conditions. To complete the picture, hearing impairment is clearly listed as the sensory deficit responsible for more disability years.

Examining disability by age groups in those high income countries of the world, we are told that only 0,03% of those over 80 years of age are free of sequelae from the diseases considered in the GBD; 10% had between 1 and 4 sequelae, 64.6% had between 5 and 9 sequelae and 25.1% had 10 or more sequelae. Since prevalence of chronic conditions increases with age and the population distribution of ages shifts to older ages, there is been an increase of 52% in the number of people with 10 or more sequelae between 1990 and 2013. Due to the higher life expectancy of women, there were 1.4 more times women than men with 10 or more sequelae.

These results give a good summary of the burden of disability in Europe. We conclude that, compared with findings from previous GBD reports, we have an increasingly older population with selected chronic conditions (diabetes, musculoskeletal conditions, chronic respiratory disease, mental diseases and hearing impairment) leading to multiple sequelae and disability. More women than men are affected by multiple sources of disability.

What does a life course perspective contribute to understanding these trends?

The above figures correspond to a static view, a photograph. The picture we have drawn corresponds to certain birth cohorts, who were born and have lived through the twentieth century and who have been exposed to the living conditions in Europe between the first and second world war (or the Spanish Civil War), the post-war period with the development of the Welfare States, the establishment of universal old age pensions and health coverage through National Health Systems and the recent advance of neoliberalism, the successive economic crises of the last quarter of the twentieth century, and the current austerity measures curtailing the Welfare State, and imposed to face the last and more profound economic and social crises of 2008-2013.These experiences have shaped the health and function of the population of older adults at different stages of their life course.

Epidemiologic studies of older adults, conducted mostly in Europe and in North America, have repeatedly shown the strong effects of childhood socioeconomic status and early life social adversity on physical function and disability in old age. In addition, adulthood and old age adversity have been shown to have cumulative effects on physical function in old age[4-6]. Disability trends need to take into account the strong influence of the social and economic conditions during the life course on the patterns of chronic diseases and disability in old age. In spite of this evidence, we are unaware of current disability predictive models that have integrated a life course perspective.

Disability trends in old age in Spain: three studies with different designs and some contradictory findings.

Three epidemiologic studies have analyzed the disability trends in the period around the turn of the century. We will describe them briefly and we will try to draw conclusions in spite of apparently diverging results.

The first study compares prevalence estimates of severity of disability in the basic activities of daily living (ADL) or in mobility using the Spanish National Disability, Impairments and handicap surveys of disability conductedby the National Institute of Statistics in 1986 and 1999. Findings show that age standardized ADL disability prevalence increased slightly for men (0.5%) and for women (1.8%) but age standardized mobility disability declined from 28% to 15% in men and from 37% to 25% in women. This very impressive decline in mobility disability would lead us to believe in an optimistic future. Although these figures are based on surveys and do not give us information on individual changes through time, they suggest thatdisability is being postponed to advanced ages and the number of years lived with disability is decreasing at the individual level[7]: the proportion of disability free life expectancy increased both in men and women over 65 years of age between 1986 and 1999.

The second study is a longitudinal study of a representative sample of older adults living in Leganes, a city in the Madrid Metropolitan Area. In the Aging in Leganes study, subjects were followed for 6 years and a clear postponement of the onset of both ADL and lower functional limitations related to mobility was observed when comparing birth cohorts. Thus, people who were 70 years old in 1993 had the same prevalence of ADL disability than those 76 years old in 1999. Since institutionalization in the Leganes population in that period was negligible, these results support a postponement of disability in successive cohorts. Postponement could be related to the improvement in the conditions of life (socioeconomic, nutrition, education, gender equality and work) of different cohorts and to the increased access and quality of health services for chronic diseases management following the 1986 legislation toestablish the National Health System[8].

The third publication is based on data from Barcelona Health Surveys of 1986, 2000 and 2006. Results on the older population of this city do not show a decrease in the overall ADL disability prevalence rates in the population over 65 between 1986 and 2006 but an increase (particularly in older women) which iscompletely explained by population aging, that is the increase in the number of very old women[9]. Age-adjusted prevalence of disability in men went from 28% to 31% in men and from 46% to 53% in women between 1986 and 2006 and these increases were observed for almost all items in the ADL scale.

Using a life course perspective, we advance an explanation for the disagreement between the results of the Barcelona study and the previous studies based on national surveys or a local cohort. The older population of the city of Barcelona has on average a better socioeconomic situations than the average of the national population or the Leganes cohort. Even if education is just one dimension of socio-economic status, education levels may be used to support this argument. In 1993, at baseline, 72.3% of men and 85.8% of women in the Leganes study sample had less than primary education. These figures are much higher than the corresponding figure for the sample in the Barcelona survey: 42.3% of men and 67.3% of women. In 1992, the distribution of Leganes older adults was very close to that of the Spanish population of similar age. While education is only one possible marker of socio-economic status, the maximum level

of education attained is strongly determined by early childhood social and economic environment. While most older adults in the Leganes cohort had a rural and poor upbringing, Barcelona older adults have more varied origins. Therefore, we propose that the improvement of living conditions in Spain during the second half of the XXth century, and in particular for the Leganes study participants, would have led to the observed decline in mobility disability (and also in ADL disability, according to the Leganes cohort[8]) while for older adults living in Barcelona[9], socioeconomic changes have been less marked both at the individual as at the societal level, with little or no change in ADL disability.

Opportunities for dementia prevention and mass prevention interventions through a life course perspective.

In recent years the ability to prevent dementia has been recognized. In fact, seven modifiable factors for dementia can explain more than half of dementia cases in the world population[10, 11]. This list of 7 factors is not complete since it does not include other known factors related to social networks[12] andnutrition[13]. Most of opportunities for prevention lay on modification of these risk factors and would imply modifying social conditions (improving education and social participation), behavioral factors (reducing physical inactivity and smoking) or improving the clinical management of well-known chronic conditions (hypertension, diabetes, depression and obesity). Several clinical trials are ongoing in Europe and North America to assess the efficacy of modifying these factors to reduce dementia risk but our knowledge on the etiology of dementia already supports preventive population interventions from childhood to old age. Cognitive decline should be considered more as an age –related condition that can be postponed than as a disease entity susceptible of therapeutic intervention in old age[14]. Here again, the potential to change the relationship between dementia and old age rests on our ability to modify risk factors prevalence along the life course.

Conclusion

Disability trends have been observed and predicted based on current and past patterns of chronic diseases. However, the potential to change these trends lays on our ability to modify risk factors along the life course, both for physical and cognitive decline and age-related disability and dementia. Known risk factors include early child social and economic adversity, lifelong education, income and social participation, healthy behaviours and good quality management of chronic conditions in adulthood and old age. We have accumulated enough scientific knowledge to pass to action and to assert that prevention of physical disability and dementia requires a strong political will to reduce poverty and violence during the life course and to promote good health behaviors since childhood to old age.

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