EDITORIAL

Disability in older people – indicators, process and outcomes

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This special edition was conceived to illustrate the wide-ranging work of the International Network on Health Expectancy and the Disability Process (REVES) and in particular its applicability for those involved in providing care at both population and individual levels. First we will briefly describe the reasons behind the development of the REVES network and the hypotheses in the relationship between mortality and disability under discussion at that time. In addressing these hypotheses it became clear that REVES could provide a role in the harmonization of both measurement of disability and calculation methods for health expectancies. The growth of longitudinal studies led to a deeper understanding of the disablement process in older people and we shall describe the main models, as an introduction to three of the papers in this edition, but also the development of new classifications such as the International Classification of Functioning, Disability and Health (ICF) and the new initiatives to harmonize European health status measures. Finally we shall speculate briefly on the issues that we will have to face in the future with the ageing of developing countries and, for low mortality countries, the emergence of frail and extremely old subpopulations in substantial numbers.

History of REVES

The International Network on Health Expectancy (REVES) began with an inaugural meeting in Quebec City, Canada in 1989 where a small group of researchers came together with the idea to promote and harmonize research on active life expectancy within and across countries. The rationale for studying population health indicators such as health expectancy was to address the opposing views on the future health of older people alongside the falling mortality rates and increasing longevity that developed countries were experiencing. The pessimistic view was that if people lived longer they would be more likely to succumb to the chronic degenerative conditions such as Alzheimer’s disease, whose prevalence increases exponentially with age, resulting in a pandemic of chronic diseases and disabilities [1, 2]. On the other hand, optimists thought that through the modification of health behaviours it might be possible to compress morbidity into a short time before death [3]. Intermediate scenarios included dynamic equilibrium [4], where disability as a whole might increase but severe disability might reduce; or a postponement of all morbid events (diseases, disabilities and mortality) at older ages [5]. Health expectancy, or in these cases disability-free life expectancy, are very relevant because they extend the concept of life expectancy to morbidity and disability and hence can simultaneously assess the evolution of mortality, morbidity and disability. Being independent of the size and age structure of populations, health expectancies allow direct comparison of the different groups that make up populations (e.g. sexes, socio-professional categories, regions or countries) as well as estimating changes over time.

A method for calculating health expectancies using prevalence data and population life tables was first published in 1971 [6]. This method remains the principal one in use today, particularly in developing countries where longitudinal studies are few and relatively new, for instance Mexico (see Reyes et al., this issue). Sullivan’s method is also useful for comparing regions within a country, since mortality data is often available at this level, as illustrated by Minicucci’s analysis of regional differences in DFLE within Italy (see Minicucci, this issue).
The Sullivan method does not explicitly use transition rates into and out of the health states although if these transitions are stable over time or evolve regularly (like disability), the Sullivan method provides a good approximation to the true period estimate \([7, 8]\). However the advantages of the method are that cross-sectional prevalence data are more generally available and it is therefore most useful for studying long term trends. In addition, the methodology is simple and robust.

As more longitudinal studies were set up, further methods of calculating health expectancies developed. As early as the 1970s, various authors began to explore models capable of handling not only transitions out of the initial state but also moves back into this state (for example \([9]\)). In the field of health and disability, there have been a number of estimates of active and disability-free life expectancies published for different populations, some of these papers focusing on the methodological issues \([10 – 14]\). The most recent papers have considered the impact of diseases such as diabetes \([15]\) and Alzheimer’s disease \([16]\) on disability-free life expectancy, the former utilizing more sophisticated modelling of the transitions into and out of disability through new software\([17]\). This software supplies a measure of precision on the estimates of disability-free life expectancy, hitherto lacking, and was developed through a project that established a European offshoot of the REVES network, Euro-REVES. Differentials in active life expectancy between socio-economic groups in China are reported in this issue using the software (see Kaneda and Zimmer, this edition).

**Understanding the disablement process**

Creating a harmonized measure of disability to enable comparisons between countries requires us to understand the disablement process at a basic level. But to make health monitoring relevant to politicians and to those providing health and social care and in order to develop interventions to impact earlier in the disablement process and to extend active life, we need to appreciate the possible routes through disablement with ageing and the factors that precipitate them. Because of this, a strong strand of work has developed within REVES.

The most comprehensive model of the disablement process \([18]\) built on earlier models \([19 – 21]\), and distinguished between four phenomena in the pathway: active pathology or disease, impairments (defined as anatomical, physiological, intellectual or emotional abnormalities or losses), functional limitations (physical, emotional and mental) and finally disability. Diseases were included in a review of risk factors for functional decline \([22]\) but this aspect has also been recently updated \([23]\) and Mariotti (this issue) estimates the impact of one chronic disease, stroke, on disability adjusted life years (DALYs), where the different disability severity levels are weighted and then combined to give a single value.

Other models of the disablement process have further differentiated the disability category, placing activity restriction (defined as any restriction or lack, resulting from an impairment, of ability to perform an activity in the manner or within the range considered normal for a human being) between functional limitation (difficulty in performing basic movements, actions or tasks that can lead, in combination, to the performance of an activity) and handicap (or social disadvantage limiting or preventing the fulfilment of a normal role) \([24, 25]\). This results in a framework for the disablement process with five levels: disease, disorder or injury; impairment; functional limitation; activity restriction and handicap, although the underlying conceptual framework within the ICIDH was not well understood and there has been much confusion in the uses of the levels and the resulting comparisons of prevalence of disability \([26]\). In this issue three further papers in different European populations have attempted to explain movement between the levels of the disablement process with the role of impairments on activity restriction (see Jagger et al, this issue), a classification of the course of functional limitation and the diseases associated with them (see Deeg et al, this issue) and the role of diseases and impairments as well as socio-economic and health service utilization factors extraneous to the disablement process, on activity restriction (see Peres et al, this issue). Crucially, the

**Harmonization of measurement as well as methods**

By 1999, estimates of disability-free life expectancy were available for 49 countries, including some countries with two or more points in time, providing an indication of whether the extra years of life lived were in good or poor health. The major stumbling block to comparing these estimates was the wide variety of measures of disability used, including differences within countries over time. We shall at present ignore the inconsistencies that can arise from different survey designs (for instance single stage or multi-stage samples, presence or absence of filter questions) and concentrate simply on the definition of disability. However, another important issue in the comparison of DFLE estimates is the calculation method used. Even when the same method is used (for instance the Sullivan method), there may be variations in the final age group used and whether and how the institutional population and their disability is estimated and included.
latter two papers include recovery as well as onset; though recovery from disability declines with age, disability is not an absorbing state exited only by death and knowledge of factors that aid or hinder recovery are again key to the development of effective interventions.

Terms such as handicap had negative connotations for people with disabilities and newer systems have tried to avoid these. In particular Euro-REVES contributed to debates surrounding the replacement of the International Classification of Impairment, Disability and Handicap (ICIDH) [24] by the International Classification of Functioning, Disability and Health (ICF) [27] through its differentiation of limitation at the body level (functional limitations) with those at the level of the person ability to carry out tasks or activities (activity restriction) [28]. Use of the ICF in practice has already been described within this journal [29, 30]. Other recently developed instruments have been similarly focussed and have also recognized that reduced frequency of undertaking and task modification can be early precursors to activity restriction [31, 32].

Future developments

As can be seen from this special edition, the work of the REVES network has been integral to research at both the population level, in terms of health indicators such as health expectancy, as well as at a more individual level, in understanding what characterizes and predisposes to disability onset. For developed countries, the agenda will be to translate this research into effective monitoring systems that enable true comparisons between countries and thus an exchange of knowledge on how the environment and health systems advantage or disadvantage. Such whole system impacts are impossible to evaluate through the usually preferred designs such as randomized controlled trials, but comparison of different countries, or indeed regions within countries could provide useful evidence. A further growing issue is the emergence of extremely old subpopulations like centenarians, who are increasing within the developed world at a remarkable rate but who are a frail and vulnerable group with high care needs [33, 34]. For developing countries that are currently early on in the demographic transition and therefore the ageing of their populations, the current needs are very different, as it is here where data quality is often problematic. The growing number of researchers from such countries into the REVES network and the birth of new subnetworks such as Asia-REVES [35] will further enrich research on health expectancy and the disablement process in ensuring that current methods, measures and terminology are apposite to the ageing process worldwide.

References


