Time trends in 20 years of medication use in older adults: Findings from three elderly cohorts in Stockholm, Sweden

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ABSTRACT

New drugs and expanded drug indications are constantly being introduced. Welfare states strive to provide equity in drug treatment for all of its citizens and today's healthcare systems spend financial resources on drugs for the elderly in a higher rate than for any other age group. Drug utilization in elderly persons has an impact in health and wellbeing in older people.
The purpose of the research: It was to describe the changes in medication use including people aged 78 years and over regardless of residence and other characteristics over 20 years.
Materials and methods: The study population consisted of 4304 participants in three population-based cross-sectional surveys conducted in the Kungsholmen area of central Stockholm, Sweden. The participant's current drug utilization was reviewed by physicians following standardized protocols. Data were statistical analyzed. Logistic regression models was used to estimate odds ratios and 95% confidence intervals for use of analgesics and psychotropic drugs in the cohorts of 2001 and 2007, controlling for age, gender, education and cognition.
The principal results and major conclusions: Results shows that the prevalence of medication use and polypharmacy in older adults has increased dramatically the late 1980s to the 2000s in central Stockholm, Sweden. In particular, the use of analgesics increased significantly, while some drug groups decreased, i.e., antipsychotics. Women used more medication than men in all three cohorts. Older adults living in service buildings used the largest amount of drugs in 1987, whereas those living in institutions were the most frequent users in 2001 and 2007.

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1. Introduction

The aging of the populations started several decades ago and is now a global phenomenon (Christensen, Doblhammer, Rau, & Vaupel, 2009). The Organisation for Economic Co-operation and Development [OECD] reported in 2013 that, for the first time, average life expectancy exceeded 80 years across OECD countries (OECD, 2013). With ageing follows increased prevalence of medical conditions that require treatment of large population groups (Fors, Lennartsson, Agahi, Parker, & Thorslund, 2013). There is a strong association of multi-morbidity, defined as coexistence of a number of chronic diseases in the same individual, with increasing age (Barnett et al., 2012). New drugs and expanded drug indications are constantly being introduced (Nobili, Franchi, & Pasina, 2011; Franchi, Tettamanti, & Pasina, 2014). Welfare states strive to provide equity in drug treatment for all of its citizens (Haider et al., 2008a) and today's healthcare systems spend financial resources on drugs for the elderly in a higher rate than for any other age group.

Use of prescription medications continues to grow as a result of an increasing demand for medications available to treat chronic ageing related diseases (OECD, 2013; Linjakumpu et al., 2002a). In Sweden more than 40% of the population aged 77+ years use more than 5 drugs concurrently (Haider, Johnell, Thorslund, & Fastbom, 2008). Concurrent use of many drugs (polypharmacy) (Gnjidic, Hilmer, & Blyth, 2012) is common in older adults (Johnell & Fastbom, 2012) and is a risk factor for adverse drug reactions and drug–drug interactions (DDIs) (Linjakumpu et al., 2002a; Johnell &

Fastbom, 2012; Guthrie et al., 2011; Haider, Johnell, Thorslund, & Fastbom, 2007). In addition, due to altered pharmacokinetics and pharmacodynamics in old age, elderly patients are particularly sensitive to drugs and at increased risk of adverse drug reactions (Fick et al., 2003; Fux, Greiner, Geldmacher, Morike, & Gleiter, 2006; Shi, Morike, & Klotz, 2008). Polypharmacy have also proven to be associated with unplanned re-hospitalisation (Wimmer, Dent, & Bell, 2014; Wimmer, Dent, & Visvanathan, 2014).
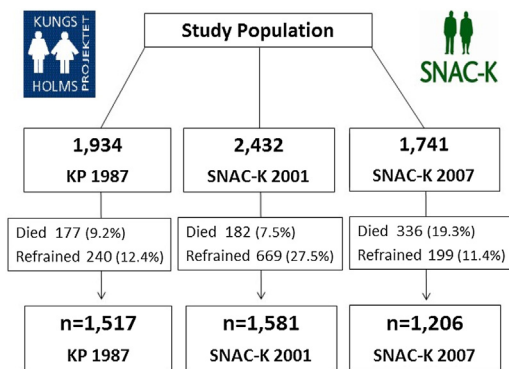
Pain is particularly common in older adults affecting more than half of the older population, and up to 80% of nursing home residents (Gibson, 2007). Helme and Gibson indicate that pain is a result of degenerative disease coupled with leg and foot disorders, and that older women have higher prevalence rates of pain then coeval men (Helme & Gibson, 2001). Further, higher somatic disease burden contributes to higher severity of mood symptoms and late-life depression (Hegeman, de Waal, Comijs, Kok, & van der Mast, 2014). Impairments and other consequences of somatic disease increase the risk of depression, which is most evident among adults aged between 60 and 70 years (Verhaak, Dekker, de Waal, van Marwijk, & Comijs, 2014). It has been suggested that in 2020, depression will be second to heart disease as measured by disability-adjusted life years (Chapman & Perry, 2008). Linja-kumpu et al. (2002b) have reported the use of psychotropics as most prevalent among women aged 85+ years. Cumming and Le Couteur (2003) stated that all types of psychotropics were associated with at least a 50% increased risk of all hip fractures. With advancing age, regardless of gender, older adults continues to live in their own home while suffering from daily pain, the concomitant use of analgesic and psychotropic drugs will become even more prevalent (Hartikainen, Mantyselka, Louhivuori-Laako, Enlund, & Sulkava, 2005).

The objectives of the present study were to explore changes in medication use, particularly with respect to polypharmacy and the use of analgesics and psychotropics, over a period of 20 years among three cohorts of older adults aged ≥78 years, including persons living in their own homes or in institutions.

2. Methods

2.1. Study population and study design

The study population consisted of 4304 participants in three population-based cross-sectional surveys conducted in the Kungsholmen area of central Stockholm, Sweden: the Kungsholmen Project (KP) in 1987 and the Swedish National study on Aging and Care in Kungsholmen (SNAC-K) in 2001 and 2007 (Fig. 1).

Fig. 1. Study population, drop out according to cause and examined participants in the KP cohort (1987) and the SNAC-K cohorts (2001 and 2007).

KP was a community-based cohort study on aging and dementia targeting all inhabitants in the Kungsholmen district aged ≥75 years in October 1987 (born in 1912 or earlier), living either at home or in institution (baseline $n = 1810$). The project design has been described in detail elsewhere (Fratiglioni, Viitanen, Backman, Sandman, & Winblad, 1992).

The Swedish National study on Aging and Care (SNAC) is a national longitudinal study on aging and care, ongoing in four different geographical areas of Sweden. Participants were randomly selected from the population of adults aged 60+ years living at home or in institution in the Kungsholmen district in 2001 (baseline $n = 3363$) (Lagergren, Fratiglioni, & Hallberg, 2004). Data derived from structured interviews by trained nurses, clinical examinations by physicians, and psychological testing, all following standardized protocols (Fratiglioni et al., 1992; Lagergren et al., 2004).

Data were derived from KP baseline in 1987–1989, SNAC-K baseline in 2001–2003, and SNAC-K follow-up in 2007–2009. As the KP included people aged ≥75 years, only participants from SNAC-K in the same age range were included. As it took approximately two years to examine the population at each survey, people aged 77–79 years would be included in the 78 year age group; people aged 80–82 years would be included in the 81 year age group etc.

Studies were approved by the Ethics Committee of the Karolinska Institutet and the Regional Ethical Review Board in Stockholm, Sweden. All participants (or a proxy in case of cognitively impaired persons) provided written informed consent.

2.2. Study variables

All variables were collected during the examination and/or through an interview with the participant's next-of-kin or a close informant.

Sociodemographic characteristics were age, gender, marital status and education.

Living situation included living at home (living alone or together with someone), in service building (individual apartments with communal facilities staffed around the clock), or in institution.

Cognitive function was measured by the Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975) administered by registered nurses or by physician. The test gives a maximum of 30 points, where cognitive impairment was defined as having a score below 25 (Fratiglioni, Grut, & Forsell, 1991).

Medication use was collected by the physician. Participants were asked to bring a list of current regularly and as needed used drugs. Drug prescriptions and medical containers were inspected where possible. Both prescribed and over-the-counter drugs were recorded. Drugs taken daily or at regular intervals were defined as being in regular use. When information could not be provided (e.g., due to cognitive impairment), a relative or a close informant supplied information. For persons living in institution information on drug utilization was collected from medical records. Drugs were classified according to the Anatomical Therapeutic Chemical (ATC) Classification system, as recommended by the World Health Organization (WHO, 2013). We analyzed the use of drugs, and in particular analgesics (N02A-B) and psychotropics (N05A-C and N06A). Polypharmacy was defined as concurrent use of five or more drugs (Haider, Johnell, Weitoft, Thorslund, & Fastbom, 2009).

2.3. Statistical methodology

Differences between participants in the three surveys in sociodemographic characteristics, living situation, and cognition, were compared using chi-square tests for categorical variables and analysis of variance for continuous variables. Age- and gender-