



Assessing polypharmacy in the general older population: Comparison of findings from a health survey and health insurance data

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Introduction Polypharmacy (i.e. the use of multiple drugs administered to the same patient) is common in the older population and an important public health problem. Usually polypharmacy measures are based on billing data, and only reimbursed medicines are considered. In Belgium, however, polypharmacy is also assessed through a systematic recording of all medicines used in the past 24 hours among respondents of the national Health Interview Survey (HIS). This method has two major advantages. First, it is based on actual use of medicines, not on the prescription of medicines. Moreover, it also takes into account non-reimbursed medicines, such as e.g. benzodiazepines. The method also has disadvantages. It is based on a population sample, hence a selection bias is possible. Furthermore, the completeness of the information depends on the willingness of respondents to show to the interviewer all medicines that were used in the past 24 hours. Finally, the method does not allow taking into account the chronicity and the volume of the use of medicines. In this study a HIS based polypharmacy indicator was compared with a similar indicator based on health insurance data.

Methods Data from the Belgian HIS 2008 were linked with data from the Belgian mandatory health insurance. Only the population of 65 years and older was considered ($n = 2722$). From both data sources an indicator was created with 3 categories: no polypharmacy (0–4 medicines), polypharmacy (5–8 medicines) and excessive polypharmacy (9+ medicines). Information on the date of dispensary of the medicine, the number of packages supplied, the quantity per package and the daily defined dose were used to define an active medicine in the health insurance database on the date of the interview. To assess the selection bias an indicator was created from a completely random sample of the health insurance ($n = 46,376$). For each individual in this sample, polypharmacy was calculated at a random date in 2008 in the same way as in the linked HIS sample. Determinants of polypharmacy were explored through a generalized ordered logit model. Agreement between the HIS and the insurance-based indicator was assessed with kappa statistics and a conditional logistic regression model.

Results The insurance-based estimates for polypharmacy and excessive polypharmacy were, respectively, 25% and 4.4% in the HIS sample, and 23% and 4.2% in the random health insurance sample. The HIS based method yielded estimates of respectively 25% and 8.4%. Age, suffering from a chronic disease, region, number of contacts with a general practitioner and a hospitalisation in the past year were significantly associated with polypharmacy, regardless of the measurement method. Educational attainment was only a significant determinant of the HIS based polypharmacy indicator. The weighted kappa, assessing the agreement between the indicators calculated by both methods, was 0.369 (95% confidence interval [95% CI] 0.363–0.397). The odds of classifying excessive polypharmacy and polypharmacy versus no polypharmacy was 1.38 (95% CI: 1.08–1.76) times higher for the HIS than for the insurance-based indicator. For excessive polypharmacy versus polypharmacy and no polypharmacy this was 2.56 (95% CI: 1.55–4.23) times.

Conclusions The HIS based method yielded higher rates of polypharmacy in the general older population than an indicator based on billing data. This higher rate was not the result of a selection bias but could have been due to the fact that the HIS based method also takes into account non-reimbursed medicines. As a HIS based indicator considers medicines that are actually consumed, rather than those that are prescribed, it is a more relevant indicator from a public health perspective. Although the systematic collection of information on medicines that are taken during a national health survey increases the burden of the fieldwork, it is an added value for the assessment of polypharmacy in the general population.

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Multichannel sequence analysis: An innovative method to study patterns of care pathways. Application to multiple sclerosis based on French Health Insurance data

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Introduction Multiple sclerosis (MS) is a chronic neurological disease starting in young adulthood and leading to disability on the long-term. Persons with MS (PwMS) require multidisciplinary care involving general practitioners (GPs), neurologists as well as specialists of disability symptoms (frequently, physical medicine and rehabilitation physician, urologist, and ophthalmologist). The coordination and succession of these interventions constitute the care pathway of a patient. Even if a care pathway is unique for each patient, patterns of pathway can emerge. Identification of such patterns may be helpful for optimizing comprehensive care for PwMS and understanding variations within practices (if any). There is a current lack of statistical or epidemiological methods allowing for identification of such patterns. Therefore, we propose an innovative method, which is derived from social sciences: the multichannel sequence analysis (MCSA).

Methods An exhaustive study population was formed of the prevalent PwMS in the French national health insurance databases (97% of French population covered), who were alive on January 1st, 2010 ($N = 73,619$) and who did not die over the 2010–2015 period ($N = 69,831$). PwMS were identified thanks to a three-criterion algorithm using diagnoses of hospital admissions, MS-specific disease-modifying therapies and MS long disease duration status. Because of computational resources, a random sample of 35,000 PwMS has then been selected to apply MCSA. Care consumptions of interest considered on a 6-month time unit basis were: consultations with GPs, private neurologists and specialists of disability symptoms, and length of hospital stay(s) for MS (main or related diagnosis coded G35 according to International Classification of Diseases, 10th version). MCSA permits to consider several dimensions of the individual care pathway simultaneously. Indeed each individual was associated with several distinct but synchronized sequences, the so-called channels, each tapping a distinct aspect (each healthcare professional here) of the global pathway. All multichannel care pathways were compared two-by-two leading to a matrix of dissimilarities, which was then used in a hierarchical agglomerative clustering using Ward's criterion. The typology was then described based upon the simultaneous interpretation of each channel of the trajectory.

Results The sex-ratio F:M of the study population ($N = 35,000$) was 2.6 with a median age of 49 years in 2010. In total, the median number of visits with GPs, neurologists, and specialists of disability symptoms were 4.8, 0.2, 0.2 visits per year, respectively. MCSA revealed a 5-cluster typology of care consumption. A first group ($n = 3965$, 11.3%) corresponded to young patients (median age of 43 years in 2010) having in median 5.3 visits with GPs per year and 6.3 days of hospital stays per year. The 11,690 patients (33.4%) in the second group were older with a moderate contact with GPs (5.2 visits per year). The main characteristic of the third group ($n = 11,696$, 33.4%) was their routine follow-up by private neurologists (1.8 visits per year in median). The fourth group ($n = 2437$, 7.0%) included the oldest patients (median age of 55 years in 2010) having a very high contact with GPs (15 visits per year) probably because of comorbidities and a progressive or evolved MS disease. The 5212 patients in the fifth group (14.9%) had a lack of care consumption during the study period with in median 0.0 visits with each specialist considered in the analysis.

Conclusions Using a pioneer and easy-to-use method, this study highlights for the first time five different patterns of care pathways of PwMS in France. To get a more accurate examination of the care pathways, paramedical care (especially nurses and physiotherapists) is going to be included as a channel in the analysis. In our opinion, MCSA is a promising way to study care pathways and deserves consideration in epidemiology.