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Original Article

Prevalence and structure of multiple chronic conditions in Lithuanian population and the distribution of the associated healthcare resources

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ABSTRACT

Background: Chronic multiple conditions have become a major threat to the world's healthcare systems within the last years.
Objective: To estimate the prevalence and structure of chronic conditions in Lithuania and to analyse the utilisation of healthcare resources striving to manage patients with multimorbidity.
Methods: It was based on the National Health Insurance Fund (NHIF) database, that covered the period from January, 2012 to June, 2014 and included 452,769 subjects. The prevalence of multimorbidity in Lithuania, the structure of chronic diseases within the age and gender groups as well as the association between multimorbidity and facilities usage were analysed.
Results: The prevalence of chronic diseases in adult Lithuanian population was 17.2%, where 94.6% (N = 428 430) of the chronically diseased subjects had >1 chronic condition. The number of chronic conditions increased with the age, especially at the age of 45–54 years, and male gender ($p < 0.001$). 10% of patients had at least 2 chronic diseases at the age of 45 and over.
Multimorbidity accounted for 258,761 additional bed days per year nationally and 61% increase in the 30-day readmission rate. Primary care and outpatient visits per 1000 population were 2.1 times more prevalent and home visits were 9.6 times more frequent in multimorbid patients compared to a single chronic disease.
Conclusions: Multimorbidity and its increasing prevalence among the younger patients will put additional strain on healthcare resources at an earlier stage by increasing admission, readmission rates and vastly increasing primary care contacts.

1. Introduction

Chronic multiple conditions have become a major threat to the world's healthcare systems within the last years [1–3]. Multimorbidity, defined as the coexistence of two or more chronic conditions in the same person at one point in time, increases overall mortality and requires significant financial and human resources [4–7]. According to the information of the National Institute of Hygiene, in 2013 chronic diseases accounted for 83% of all deaths in Lithuania with the highest prevalence of cardiovascular diseases by 56% and cancer — by 19%. Although mortality data are available, knowledge on the prevalence and patterns of multimorbidity, stratified by age and gender, is vital to provide high-quality healthcare adapted to the patients' needs [8]. Studies from different countries and healthcare settings have shown an increasing prevalence of multimorbidity with age, with some minor variations between the studies likely due to different study designs and patient populations [9–13]. This trend clearly identifies a demand of a widely accepted structured healthcare approach in the described patient group. Everyday medical practice, based on clinical guidelines traditionally concentrates on a single chronic disease, which might not necessarily be the best practice when applied to patients with multimorbidity [3,6]. The use of many different healthcare resources in an attempt to manage individual diseases may become duplicative, inefficient and sometimes unsafe for a patient because of poor coordination and healthcare integration.

In the past decade, multimorbidity data were collected in different ways across studies and countries: interviews, self-reports, medical records' reviews, clinical examinations or analysis of administrative databases, that were developed in the past decades in the most European countries to monitor the utilisation of primary and secondary healthcare resources [12]. The National Health Insurance Fund under the Ministry of Health (hereinafter — NHIF) is a public institution that provides Compulsory Health Insurance Fund management services in Lithuania. The NHIF administrative information system and the database were used as a primary information source for the study database, allowing the performance of a more detailed analysis of a chronic disease burden on the Lithuanian healthcare system and to better understand the chronically diseased patient group.

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The aims of our study were:

- To analyse the structure of the selected chronic conditions in the age and gender groups of patients with at least one chronic disease; to identify 10 most frequent chronic conditions and to assess the distribution of diseased people with single and concurrent chronic conditions.
- To estimate the prevalence of chronic conditions in the Lithuanian population in different age and gender groups.
- To assess the utilisation of health care resources for the management of multimorbidity.

The data from the national database were requested in the context of the project "*The Joint Action on Chronic Diseases and Promoting Healthy Ageing Across the Life Cycle* (*JA-CHRODIS*)" co-funded by the European Union.

2. Methods

2.1. Definition of the selected chronic conditions and multimorbidity

As there is no standard list of chronic conditions available, the data from other studies on multimorbidity report from 4 to 102 chronic conditions or diseases whenever the choice is based on facilities available [14–18]. We have followed a reduced chronic diseases list used by Barnett et al. and involved chronic diseases with the highest prevalence and the highest impact on a patient [3]. There were 32 chronic conditions selected and associated with the diagnostic codes of the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) (Table 1). Some chronic conditions have been allocated multiple codes meaning different diseases. Clinically it is very unlikely that the same person would have two different diseases coded under the same chronic condition, however in some cases it is possible to suffer from one disease and have related complications (for example, type 2 diabetes with diabetic nephropathy and diabetic neuropathy would be coded E11.2 and E11.4 and fall under "diabetes"). In such a case, a patient was classified as having one disease to avoid false duplication.

Multimorbidity was defined as the coexistence of two or more diseases from the 32 chronic conditions in the same person in the described period of time.

Table 1
The list of the selected chronic conditions associated with ICD-10-AM diagnostic codes.

	Chronic conditions with ICD-10-AM diagnostic codes
1	Cancer C00–C96
2	Anaemia D50
3	Hypothyroidism E02; E03; E89.0
4	Diabetes E10.0–E10.9; E11.0–E11.9
5	Obesity E66
6	Dyslipidaemia E78
7	Dementia F00.0–F00.9; G30.0–G30.9; F01.0–F01.9; F02.0–F02.8; F03
8	Mental disorders F20.0–F20.9; F30.0–F39; F40.00–F40.9; F41.0–F41.9; F42.0–F42.9; F43.0–F43.9
9	Parkinson's disease G20
10	Multiple sclerosis G35
11	Epilepsy G40.00–G40.91
12	Sleep apnoea G47.3
13	Back pain G54.1; G54.4; G55.1; M51
14	Glaucoma H40–H42
15	Blindness H53–H54
16	Hearing loss H90.0– H90.8; H91.0–H91.9
17	Hypertension I10–I15
18	Ischaemic heart disease I20–I25
19	Arrhythmias I44–I49
20	Heart failure I50.0–I50.9
21	Intracranial bleeding I61–I62
22	Stroke I63–I64; I69
23	Chronic obstructive pulmonary disease J44.0–J44.9; J96
24	Asthma J45.0–J45.9
25	Inflammatory bowel disease K50; K51
26	Psoriasis L40.0–L40.9
27	Rheumatoid arthritis M05–M06
28	Gout M10.0–M10.99
29	Osteoarthritis M15–M19
30	Systemic lupus erythematosus M32
31	Osteoporosis M80–M82
32	Renal failure N18–N19

2.2. Data source and data extraction

There were two data samples collected:

1) Data from the Lithuanian NHIF database, covering the period from the 1st of January, 2012 to the 30th of June, 2014. The NHIF database was established in 1999, seeking to reimburse healthcare institutions for the healthcare services provided from the National Health Insurance Fund, as well as for statistical needs. The system is used for the management, storage, exchange, analysis and reporting of all the services provided by healthcare institutions. The national database contains demographic data and entries on the primary and secondary healthcare services provided, emergency and hospital admissions, and prescriptions of reimbursed medications for chronic diseases. These data are entered at local healthcare institutions, and transferred to regional state health insurance offices for verification and approval. Personal based information allows the elimination of duplication of diseases and some other errors in data registration. The database encompasses about 98% of inpatient cases and 90% of outpatient visits (up to 100% of primary health care visits) in Lithuania, covering the entire territory of the country and having about 7000 users working with the system.
   Data exporter software was used to extract the following data: demographic information (gender, age, place of residence) of people, diagnosed with at least one of 32 chronic conditions (Table 1); the use of primary and secondary healthcare services (overall and home visits, hospitalisations, rehospitalisations within 30 days, length of hospital stay); prescriptions of reimbursed medications for chronic diseases.
   The anonymised information was uploaded on the JA-CHRODIS project server. Further analysis of the anonymised data was allowed according to the Lithuanian data protection regulation without explicit consents of the patients.
   Proportion of people with one and with multiple — 2, 3, 4, 5 and more — chronic conditions was calculated within the group. The rates of hospital admissions, readmissions within 30 days from discharge, primary care and home visits were calculated and compared in multimorbid and single chronic disease patients. Distribution of chronic conditions was assessed in the gender and age groups, where the patient's age was defined as the age in the year of data extraction and was classified into 8 categories: from 18 to 24 years, from 25 to 34 years, from 35 to 44 years, from 45 to 54 years, from 55 to 64 years, from 65 to 74 years, from 75 to 84 years, and aged 85 years and over.
   There were top 10 most prevalent chronic conditions identified within the group and the proportion of diseased patients with one top 10 condition and 1, 2, 3 and more concurrent disorders calculated.
2) The official demographic data on the overall number of inhabitants of Lithuania at the end of 2014 were obtained from the Lithuanian Department of Statistics — a public authority coordinating official statistics in the country that participates in developing and implementing public policy in the field of organisation and methodology of statistics assigned to the Minister of Finance. All inhabitants were classified into the same age groups as provided earlier, which enabled the estimation of the prevalence of the single chronic disease and multimorbidity in the whole population and in different