



Multimorbidity in primary care: Prevalence and trend over the last 20 years

Annemarie A. Uijen & Eloy H. van de Lisdonk

To cite this article: Annemarie A. Uijen & Eloy H. van de Lisdonk (2008) Multimorbidity in primary care: Prevalence and trend over the last 20 years, The European Journal of General Practice, 14:sup1, 28-32, DOI: [10.1080/13814780802436093](https://doi.org/10.1080/13814780802436093)

To link to this article: <https://doi.org/10.1080/13814780802436093>



Published online: 11 Jul 2009.



Submit your article to this journal [↗](#)



Article views: 2238



Citing articles: 173 [View citing articles ↗](#)

ORIGINAL ARTICLE

Multimorbidity in primary care: Prevalence and trend over the last 20 years

ANNEMARIE A. UIJEN & ELOY H. VAN DE LISDONK

Department of General Practice, Radboud University Nijmegen Medical Centre, Nijmegen, the Netherlands

Abstract

Objective: To determine the prevalence of multimorbidity in primary care, by age, sex, and socio-economic class, and to analyse the trend in multimorbidity over the last 20 years. **Methods:** We performed an observational study using data from the Continuous Morbidity Registration (CMR) Nijmegen. This registration includes approximately 13 500 enlisted patients. To study the distribution of multimorbidity by age, sex, and socio-economic class, we analysed all patients enlisted in the CMR in 2005. To analyse the trend of multimorbidity over time, we studied the prevalence of multimorbidity from 1985 to 2005. **Results:** We found that increasing age, female sex, and low socio-economic class are associated with an increasing number of patients with multimorbidity. The prevalence of chronic diseases doubled between 1985 and 2005. The proportion of patients with four or more chronic diseases increased in this period by approximately 300%.

Conclusion: The increasing amount of multimorbidity in primary care as well as the increasing number of chronic diseases per patient leads to more complex medical care. The general practitioner needs guidelines focusing on multimorbidity to support this care. The registration of chronic diseases by the general practitioner will become more complex and time-consuming.

Key words: *Multimorbidity, primary care, prevalence, chronic disease*

Introduction

Multimorbidity, defined as the co-existence of two or more chronic conditions, is a relevant and clinically important topic, particularly in primary care where many of these patients are managed. Multimorbidity is associated with increased medical consumption and restriction of life expectancy (1–3). Moreover, it complicates diagnosis and therapy (4): in the case of multimorbidity, it can be difficult to unravel whether new symptoms presented by the patient belong to one of the patient's prevalent diseases or indicate a new (chronic) disease. Moreover, difficulties may arise if non-pharmacological or pharmacological therapies for a chronic disease interact negatively with or even counteract the therapeutic measures of another prevalent disease.

The number and diversity of articles on multimorbidity are scarce (5). Little is known about the prevalence of multimorbidity in primary care. In the

Netherlands, Schellevis et al. studied five chronic conditions: hypertension, diabetes mellitus, chronic ischaemic heart disease, chronic respiratory disease, and osteoarthritis of the knee and/or hip (6). They found that, in patients aged 65 years and older, about 15% suffer from more than one of these five chronic diseases. Van den Akker et al. found that the prevalence of multimorbidity in primary care patients increased from 10% among 10–19-year-olds to up to 78% in patients aged 80 years and over (7). They included all medical problems under the attention of the general practitioner (GP) over a long period of time, so that not only chronic diseases were included.

Primary care research networks are excellent for the study of multimorbidity (8). One of the oldest primary care research networks in the Netherlands is the Continuous Morbidity Registration (CMR) Nijmegen. This network registers all morbidity of enlisted patients from 1971 onwards. We use this

network to focus on multimorbidity of chronic diseases. In this paper, we address the following research questions:

- What is the proportion of patients in primary care with multimorbidity, according to age, sex, and socio-economic class?
- Does the prevalence of multimorbidity show a trend over the last 20 years?

Patients and methods

Patients

We performed an observational study in the Nijmegen primary care research network, using data from the CMR Nijmegen. This register includes four practices (10 GPs), with approximately 13 500 enlisted patients. The population in this network, partly urban and partly semi-urban, is representative of the general Dutch population in terms of age, sex, and socio-economic class. The data recording reflects the Dutch healthcare system, in which all patients are listed under a personal GP to obtain medical care. GPs treat the large majority of presented health problems, and refer less than 9% of presented cases to secondary medical care. Diagnoses made by specialists after referral are reported back to the GP and entered into the database.

Definition of chronic disease

According to a definition from 1957, the term chronic disease comprises “all impairments or deviations from normal which have one or more of the following characteristics: are permanent; leave residual disability; are caused by nonreversible pathological alteration; require special training of the patient for rehabilitation; may be expected to require a long period of supervision, observation or care” (9). In the CMR, chronic diseases are divided into obligatory and conditionally registered chronic diseases. Obligatory registered chronic diseases, such as dementia and chronic obstructive pulmonary disease (COPD), are diseases that, once diagnosed, are automatically coded as a lifelong chronic disease, because it is expected that there will be some contact with a physician in connection with the disease at least once a year for the rest of the patient’s life (e.g., prescription of chronic medication, treatment of relapses). Conditionally registered chronic diseases, such as depression and asthma, refer to chronic diseases for which medical attention may be discontinued after some years. Chronic diseases that do not have their own ICHPPC-2 def. code (International

Classification of Health Problems in Primary Care, third edition) (10) but are coded as belonging to a category gathering together certain rare chronic and acute diseases are not included in our study, because they cannot be separated from rare acute conditions. As the prevalence of almost all chronic diseases in this category is less than 0.1 per 1000 patients per year, the impact of their absence upon the prevalence figures for chronic conditions is negligible.

Analysis

We studied the prevalence of multimorbidity of chronic conditions. Patients are classified as having 0, 1, 2, 3, or ≥ 4 chronic diseases. We analysed all patients enlisted in the CMR in 2005 in order to study the distribution of multimorbidity by age, sex, and socio-economic class. Chronic conditions that were diagnosed for the first time in the year of investigation (2005) were not included. We used seven age categories, according to the standard age categories as defined by the world organization of family doctors (Wonca) (10). To define socio-economic class, patients were classified according to their profession. The Dutch Central Bureau for Statistics rates every profession. In the CMR, these ratings are clustered into three categories: low, middle, and high socio-economic class.

To analyse the trend of multimorbidity over time, we studied the prevalence of multimorbidity from 1985 to 2005. We separately studied the prevalence of obligatory and conditionally registered chronic diseases. We also analysed the trend of having 0, 1, 2, 3, and ≥ 4 chronic diseases per patient over time. We standardized the data to the age and sex distribution of the study population in 2000, so ageing of the population has no influence on the results.

Results

In 2005, the registered morbidity was based upon 13 584 patient years. Figures 1 and 2 show detailed information concerning the distribution of the number of chronic diseases in 2005 per patient by age, for men and women. Below the age of 15 years, approximately 10% of the patients were known to their GP as having at least one chronic disease. This percentage increased to more than 90% in patients older than 75 years. The proportion of patients without any chronic disease decreased from 25 years of age on, with a factor of approximately two per age category. Multimorbidity of four or more chronic diseases was prevalent in about 7% of patients aged 45–64 years old, increasing to approximately 30% among 65–74-year-olds, and increasing further to

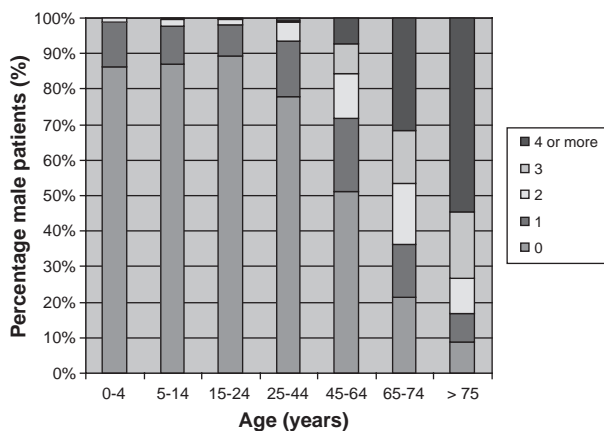


Figure 1. Distribution of the number of chronic diseases per male patient by age (2005).

approximately 55% among patients aged ≥ 75 years. Above the age of 15 years, the proportion of patients with one or more chronic disease was higher among women than men. This difference was highest among patients aged 25–64 years old (8–9%). In patients aged 65 years and above, this difference was less than 2%.

Figure 3 shows the multimorbidity of chronic diseases by socio-economic class, standardized for age and sex. The lower the socio-economic class, the higher is the number of patients with multimorbidity. Patients in the high socio-economic class are more likely to have no chronic diseases.

Figure 4 shows the trend in registration of the obligatory and conditionally registered chronic diseases over the period 1985–2005. The number of registrations of obligatory registered chronic diseases increased more than twofold in this period (from 685 to 1608 registrations of chronic diseases). The registration of conditionally registered chronic diseases also doubled (from 4215 to 8790 registrations of chronic diseases).

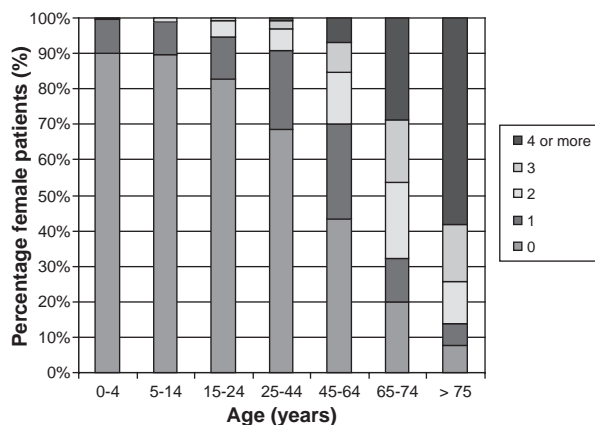


Figure 2. Distribution of the number of chronic diseases per female patient by age (2005).

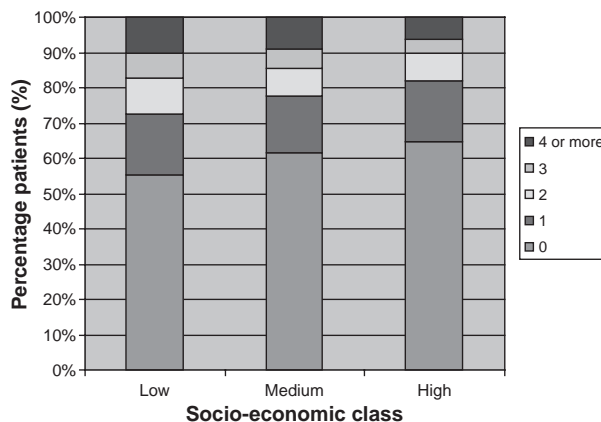


Figure 3. Number of chronic diseases by socio-economic class (2005), standardized for age and sex.

Trends in the number of chronic diseases per patient over the period 1985–2005 are shown in Figure 5. Because the proportion of patients with 1, 2, or 3 chronic diseases remained relatively stable, we merged those lines in the figure, but we will describe them separately below. The proportion of patients without any chronic disease decreased from 70% to 63% of the population. The proportion of patients with one chronic disease was stable (only 1% decrease between 1985 and 2005); those with two chronic diseases increased (from 6.7% to 8%), as did those with three chronic diseases (from 3% to 5%). Remarkable is the almost threefold increase in the proportion of patients with four or more chronic diseases, from 2.6% in 1985 to 7.5% in 2005. Having four or more chronic diseases was an exception in 1985, whereas nowadays it is as common as having two or three chronic diseases.

Discussion

We found that increasing age, female sex, and low socio-economic class are associated with an

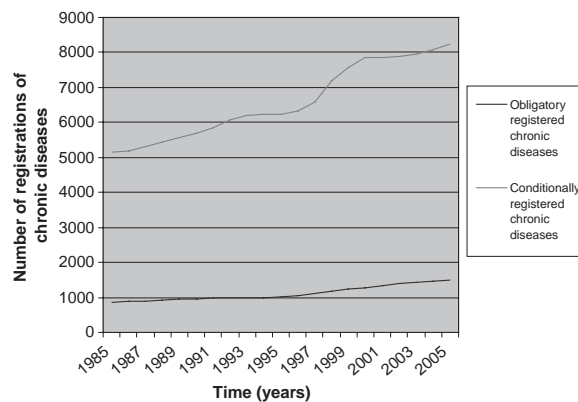


Figure 4. Trend in registrations of obligatory and conditionally registered chronic diseases (1985–2005), standardized for age and sex distribution in 2000.

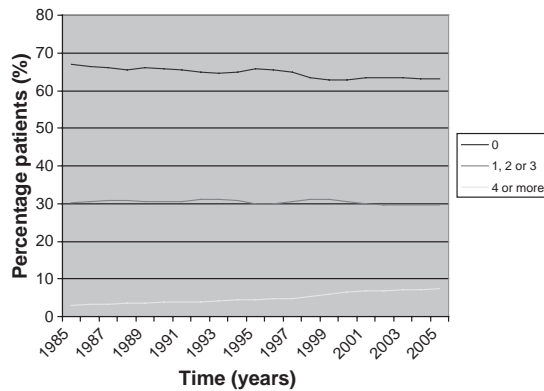


Figure 5. Trends in the number of chronic diseases per patient (1985–2005), standardized for age and sex distribution in 2000.

increasing number of patients with one or more chronic diseases. About 55% of patients aged 75 years or older have four or more chronic diseases. Below the age of 15 years, about 10% of patients are already known to their GP as having at least one chronic disease. We find this remarkable because we expected this to be a healthy group. Further research is needed to find out which chronic diseases are most prevalent in this group.

Further, we found that the prevalence of chronic diseases doubled between 1985 and 2005. In this period, the proportion of patients with one and two chronic diseases remained relatively stable, those with three chronic diseases increased by approximately 60%, and those with four or more chronic diseases increased by approximately 300%. These changes coincide with a decrease of patients without any chronic disease of approximately 10%. Therefore, a growing number of patients are nowadays in need of medical intervention, monitoring, and control.

Our study is based on robust data from a longitudinal database that has been operational since 1971, has never changed its classification of morbidity, connects the definitions of diseases to ICHPPC-2 def., and is supported by monthly training for the participating GPs with respect to diagnostic criteria (11). Therefore, the increase found in the prevalence of multimorbidity is unlikely to be due to the effects of starting registration, untrained GPs, or a change in classification, definitions, or coding rules. The total population in the four practices increased by 14% between 1985 and 2006, from 12 146 to 13 850 patients. However, the increasing multimorbidity over time is not a result of changes in the proportion of older patients in the population, as we standardized our data to the year 2000. The increase in the prevalence of chronic diseases may be the result of increased public attention to chronic diseases and campaigns that have been set up in these practices to

promote early detection (for example, for hypertension [1975] and diabetes [2000]). It may also be the result of recent explicit attention to cardiovascular disease management, the assessment of risk profiles, and the better monitoring of these patients. Moreover, we assume a real effect of rising prevalence of chronic diseases in the population. More effective treatment and longer survival will also increase the prevalence of chronic diseases.

We compared the results of our study with non-Dutch studies concerning the prevalence of multimorbidity in primary care. Fortin et al. studied a sample of 980 adults in Canada (12). The proportion of patients with two or more chronic conditions increased with age, but, in contrast to our findings, was already approximately 68% in the age group 18–44 years and increased to almost 100% in the oldest age groups. The included chronic conditions defined according to the World Health Organization as “health problems that require ongoing management over a period of years or decades” probably comprise more than our more limited list of chronic diseases. Macleod et al. studied comorbidity and socio-economic deprivation in the UK (13). Our finding of greater multimorbidity in patients having a lower socio-economic class corresponds with the outcome of this study.

We identified certain limitations of the study. Because we did not include all chronic diseases, our findings may be underestimated. As we argued above, this effect will be negligible as the prevalence of excluded chronic diseases is low. We did not include patients who live in a nursing home. These patients are not under the regular care of a GP, so they are not included in the CMR database. These relatively old and ill patients probably have one or more chronic diseases, so we may have underestimated the increase in multimorbidity with increasing age. There may be some misclassification in socio-economic class, as it is based upon the patient’s profession at the time the patient entered the CMR. Changes in profession may lead to changes in socio-economic class. This will often be a change from the lower to the higher socio-economic class, which may lead to an underestimation of the amount of multimorbidity in the low socio-economic class: people from the higher socio-economic class are still classified in the lower class but may have a lower prevalence of chronic diseases corresponding with the prevalence of chronic diseases in the higher socio-economic class. This underestimation, however, will be minimal, as the socio-economic class of most people does not change over time.

This study emphasizes the need to develop guidelines that focus on the management and control of patients with multimorbidity in primary care.

Guidelines and disease management programmes are mostly concerned with one chronic condition. Considering the increasing amount of multimorbidity in primary care as well as the increasing number of chronic diseases per patient, the development of guidelines focusing on multimorbidity is needed in order to help GPs cope with the rising complexity of care. We therefore have to investigate what combinations of chronic diseases frequently occur among patients with multimorbidity, so that research can be conducted concerning the diagnosis and treatment of chronic disease in the case of multimorbidity. Primary care research networks are an excellent resource for this kind of research.

This study also underlines the importance of the careful and precise registration of chronic diseases by the GP. Without this, the general practitioner may forget to take into account other comorbid diseases when treating a chronic condition. The registration of chronic diseases is a complex and time-consuming task, but one that helps to make transparent the comprehensive reality of multimorbidity.

Conclusion

We conclude that our findings urge GPs to prepare for a future with more complex medical care, university curricula to teach medical students about multimorbidity, and researchers to double their efforts to unravel valid diagnostic procedures and effective treatments for patients with multimorbidity.

References

1. Flocke SA, Frank SH, Wenger DA. Addressing multiple problems in the family practice office visit. *J Fam Pract* 2001;50:211–6.

2. Librero J, Peiro S, Ordinana R. Chronic comorbidity and outcomes of hospital care: length of stay, mortality, and readmission at 30 and 365 days. *J Clin Epidemiol* 1999;52:171–9.
3. Westert GP, Satariano WA, Schellevis FG, van den Bos GA. Patterns of comorbidity and the use of health services in the Dutch population. *Eur J Public Health* 2001;11:365–72.
4. Cheng HY. Effect of coexisting diseases on the treatment of unrelated disease needs more studies. *J Am Geriatr Soc* 2006;54:1145.
5. Fortin M, Lapointe L, Hudon C, Vanasse A. Multimorbidity is common to family practice: is it commonly researched? *Can Fam Physician* 2005;51:244–5.
6. Schellevis FG, Velden van der J, Lisdonk van de EH, Eijk van JT, Weel van C. Comorbidity of chronic diseases in general practice. *J Clin Epidemiol* 1993;46:469–73.
7. Akker van den M, Buntinx F, Metsemakers JF, Roos S, Knottnerus JA. Multimorbidity in general practice: prevalence, incidence, and determinants of co-occurring chronic and recurrent diseases. *J Clin Epidemiol* 1998;51:367–75.
8. Lisdonk van de E, Weller D. Primary care research networks. In: Jones R, Britten N, Culpepper L, Gass D, Grol R, Mant D, et al. editors. *Oxford textbook of primary medical care*. Oxford: Oxford University Press; 2004.
9. Commission on chronic illness. *Chronic illness in the United States. Volume I. Prevention of chronic illness*. Cambridge, MA: Harvard University Press; 1957.
10. Wonca. *ICHPPC-2-def. Third edition*. Oxford: Oxford University Press; 1984.
11. Weel van C. Validating long term morbidity recording. *J Epidemiol Community Health* 1995;49 Suppl 1:29–32.
12. Fortin M, Bravo G, Hudon C, Vanasse A, Lapointe L. Prevalence of multimorbidity among adults seen in family practice. *Ann Fam Med* 2005;3:223–8.
13. Macleod U, Mitchell E, Black M, Spence G. Comorbidity and socioeconomic deprivation: an observational study of the prevalence of comorbidity in general practice. *Eur J Gen Pract* 2004;10:24–6.