

Multimorbidity is common to family practice

Is it commonly researched?

Martin Fortin, MD, MSc, CCMF Lise Lapointe, MA
Catherine Hudon, MD, CCMF Alain Vanasse, MD, PhD, CCMF

ABSTRACT

OBJECTIVE Family physicians often have to care for patients with several concurrent chronic conditions (multimorbidity or comorbidity). Consequently, they need to inform themselves by reading indexed publications on multimorbidity. This study aimed to assess how well the concept of multimorbidity was covered in the medical literature. Objectives were first, to quantify the literature on multimorbidity (or comorbidity) and to compare the number of publications on it with the number of publications on three common chronic conditions (asthma, hypertension, and diabetes), and second, to describe the articles on multimorbidity.

DESIGN Bibliometric study.

METHOD We consulted MEDLINE for the reference period 1990 to the end of 2002. The term “multimorbidity” and its various spellings was used as the search term. Comorbidity, asthma, hypertension, and diabetes were searched for using their respective MeSH terms. For comparison purposes, prevalence data were taken from published sources. Abstracts of articles relating to multimorbidity were reviewed and their content analyzed.

MAIN OUTCOME MEASURES Number and type of articles.

RESULTS Multimorbidity has a prevalence of 60% among people aged 55 to 74. This prevalence is much higher than that of asthma (6.5%), hypertension (29.6%), and diabetes (8.7%). Few articles in the medical literature deal specifically with multimorbidity (or comorbidity), however. For each article on multimorbidity, there are 74 on asthma, 94 on hypertension, and 38 on diabetes. Content analysis of abstracts of articles on multimorbidity revealed a high proportion of epidemiologic studies (50.0%) followed by validation studies (22.4%) and opinion pieces (11.8%). The few experimental studies on multimorbidity were not done in primary care settings.

CONCLUSION This study shows that the prevalence of multimorbidity is not matched by the number of indexed publications on it in the medical literature. To date, the number and diversity of articles on multimorbidity are both insufficient to provide scientific background for strong evidence-based care of patients affected by multiple concurrent chronic conditions. Research is needed to increase knowledge and understanding of this important clinical topic.

EDITOR'S KEY POINTS

- This study described the prevalence of multimorbidity as a research subject in comparison with the prevalence of research on three common chronic conditions: asthma, hypertension, and diabetes.
- Among people aged 55 to 74, multimorbidity has a prevalence of about 60% compared with about 7% for asthma, about 30% for hypertension, and about 9% for diabetes. Only 3% of the articles on multimorbidity were concerned with primary care.
- There is a large discrepancy between the prevalence of multimorbidity in the population and the number of research studies devoted to it, especially in primary care. The scientific basis for managing multimorbidity, therefore, appears to be weak.

This article has been peer reviewed.

Full text available in English at www.cfpc.ca/cfp

Can Fam Physician 2005;51:244-245.

With technologic advances and improvements in medical care, an increasingly large number of patients survive medical conditions that used to be fatal. This fact combined with the aging of the population means that a growing proportion of primary care patients have multiple concurrent medical conditions. The term “multimorbidity” means several concurrent medical conditions within one person.¹

According to a survey done in Quebec in 1998,² 30% of the population reported suffering from more than one chronic health problem, and the percentage increased with age.^{1,3-5} In the United States, the prevalence of multimorbidity among those 65 and older has been estimated at 65%.⁶ Half the patients with chronic diseases have more than one.⁷ Family physicians have to manage these patients.⁸⁻¹⁰ Numerous pharmacologic treatments, practice guidelines, and educational programs have been developed for managing chronic diseases. With a few exceptions, the interventions address isolated chronic conditions and take little account of the multimorbidity experienced by most patients.^{11,12} Although some health departments have strategic plans¹³ that include objectives for managing vulnerable, elderly, or fragile patients, there are as yet no guidelines or intervention programs in Canada for patients with multiple medical conditions.

When researchers look at multimorbidity in relation to the main condition under study, they use the term comorbidity.¹⁴ Most clinical trials exclude patients presenting with comorbidity. Randomization usually ensures an equal distribution of residual comorbidities; an unequal distribution must be taken into account in the analysis. Multimorbidity appears to limit the generalizability of research results and might be one of the reasons practice guidelines are not followed, as is frequently the case in current practice.^{15,16}

In view of the growing importance of multimorbidity in family practice, this study was designed to assess the presence of the concept of

multimorbidity in the medical literature through a bibliometric analysis. The study had two main objectives: first, to compare the number of publications indexed in MEDLINE focusing on multimorbidity or comorbidity with the number of publications on three common chronic medical conditions (asthma, hypertension, and diabetes). These three medical conditions were chosen because of their comparable chronic nature and high prevalence in primary care. The second objective was to describe the articles relating to multimorbidity using health research typology and general characteristics. To our knowledge, no such study has been published to date on this topic.

METHODS

Bibliometry is a research method used in library and information science. It can be used to ascertain scientific activity quantitatively and qualitatively. Its applications include tracking the evolution of research topics in the literature. Bibliometric studies classify and count occurrences in databases.¹⁷ Bibliometric techniques are often used to assess the presence of particular topics in the medical literature.¹⁸⁻²⁰

Data sources

For this study, we consulted the MEDLINE database with the Ovid search engine for the reference period 1990 to the end of 2002. Since the term multimorbidity does not have an equivalent in the database's thesaurus (Medical Subject Headings [MeSH]), it was used as a key word (or text word) with its various spellings. Comorbidity was searched using its MeSH term. For comparative purposes, asthma, hypertension, and diabetes were searched using their respective MeSH terms. The modifier “focus” was used with all MeSH terms to target documents in which the subject heading is considered the main point of the article. This simple strategy allows comparison between subjects, which was the purpose of this study. This modifier cannot be used when a term is searched as a

key word. Only studies on human subjects were selected. To target the literature relating specifically to primary care, the following terms were used: general practice, family practice, and family medicine, as suggested by Rosser.²¹ Those terms were linked with the Boolean indicator “or” and with the main search terms using the indicator “and.”

Prevalence data were gathered from the 1998 Quebec Health Survey² and Statistics Canada (available at www.statcan.ca). The Quebec Health Survey was the only accessible source of data on the prevalence of multimorbidity in Canada. Statistics Canada data were used to measure the prevalence of asthma, hypertension, and diabetes in Canada.

Analyses

We compared the concept of multimorbidity with the three chronic conditions as to prevalence and number of articles published on them. We calculated the proportion of articles relating to primary care.

For the type and characteristics of the publications on multimorbidity, we reviewed the abstracts and analyzed the content using predetermined categories: type of publication and actual content of the abstract. A total of 353 articles were identified by the research strategy. Two authors (M.F. and L.L.) independently evaluated the first 30 abstracts. Controversial cases were discussed. After standardization, one author (L.L.) analyzed the remaining abstracts. Difficulties encountered during the classification were discussed by all the authors to obtain consensus.

Comparative analyses were done using SPSS version 8. Fisher’s exact test and the chi-square test were used bilaterally to compare proportions of publications on each topic.

RESULTS

Table 1 shows prevalence data on asthma, hypertension, and diabetes and compares them with prevalence data on multimorbidity. Multimorbidity had the highest prevalence, followed by hypertension. We found few articles in the medical literature dealing specifically with multimorbidity or comorbidity, but we found a great many articles on asthma, hypertension, and diabetes. For each article published on multimorbidity or comorbidity, 74 were published on asthma, 94 on hypertension, and 38 on diabetes. These differences, even if smaller for articles specific to primary care, are still substantial.

Table 2 shows the various categories of articles based on qualitative analysis of the abstracts. Articles found to be unrelated or unclassifiable were eliminated. An article was considered unclassifiable if the abstract was missing, and unrelated if the abstract showed no indication that the article dealt with multimorbidity or comorbidity. Only 42 articles (27.6%) identified a primary care context, and most of these (59.4%) were epidemiologic studies. We found no articles evaluating primary care interventions for managing or following up patients with multimorbidity. Articles relating to multimorbidity in primary care did not have significantly different

Table 1. Prevalence of certain clinical conditions and number of articles about them published between 1990 and 2002

CONDITIONS	PREVALENCE* (%)	NO. OF PUBLISHED ARTICLES	NO. OF ARTICLES ON PREVALENCE	NO. OF ARTICLES ON OTHER THREE CONDITIONS VS NO. ON MULTIMORBIDITY	NO. OF ARTICLES RELATING TO PRIMARY CARE	% OF ARTICLES RELATING TO PRIMARY CARE [†] (P VALUE)
Multimorbidity	60.02	353	6	1:1	10	2.8
Asthma	6.5 [‡]	26 174	4027	74:1	436	1.7 (P = .09)
Hypertension	29.6 [‡]	33 198	1122	94:1	439	1.3 (P = .014)
Diabetes	8.7 [‡]	13 575	1560	38:1	302	2.2 (P = .4)

*Among people aged 55 to 74 years.

[†]P value, chi-square, 1 df.

[‡]Data from Statistics Canada, 1998-1999 (available at www.statcan.ca).

Table 2. Classification of articles on multimorbidity

CATEGORY OF ARTICLE	GENERAL RESEARCH NO. (%)	PRIMARY CARE NO. (%)	OTHER NO. (%)	P VALUE*
Unclassifiable	61 [†]	0	0	NA
Unrelated	140 [†]	7 [†]	133 [†]	<.001
Literature reviews	12 (7.9)	2 (4.8)	10 (9.1)	.304
Basic research	1 (0.7)	0	1 (0.9)	.724
Epidemiologic studies	76 (50.0)	25 (59.5)	51 (46.4)	.102
Experimental studies [‡]	7 (4.6)	0	7 (6.4)	.098
Pharmaco-economic research	4 (2.6)	1 (2.4)	3 (2.7)	.694
Validation studies	34 (22.4)	7 (16.7)	27 (24.5)	.207
Editorials and opinion pieces	18 (11.8)	7 (16.7)	11 (10.0)	.193
TOTAL	152 (100)	42 (100)	110 (100)	NA

NA—not applicable.

*Comparison between primary care and other care: Fisher's exact test.

[†]Not included in the total.

[‡]Clinical evaluation or therapeutic intervention studies.

classifications from those relating to the three other conditions.

Table 3 shows characteristics of the selected articles. Nearly 20% of the articles were published in languages other than English or French. A substantial number of published studies included or focused on elderly patients. Prevalence was estimated in 10 articles on primary care, but their definitions of multimorbidity were somewhat incomplete or unusual. The consequences of multimorbidity in a primary care context were addressed in most studies using various outcome measures including quality of life, length of hospitalization, mortality, and functional autonomy.

DISCUSSION

Despite the high prevalence of multimorbidity in the general population, few articles focus on multimorbidity or

comorbidity in the general medical literature or in the literature dealing more specifically with primary care. In contrast, many publications focus on asthma, hypertension, and diabetes. Although clinical studies of these conditions probably included

Table 3. Characteristics of articles on multimorbidity: N = 152.

CHARACTERISTICS	GENERAL NO. (%)	PRIMARY CARE NO. (%)	OTHER NO. (%)	P VALUE*
Written in English or French	124 (81.6)	34 (81.0)	90 (81.8)	.535
Location of population studied				.015 [†]
• North America	63 (41.4)	14 (33.3)	49 (44.5)	
• Europe	56 (36.8)	21 (50.0)	35 (31.8)	
• Other	33 (21.7)	7 (16.7)	26 (23.6)	
Age of population studied (y)				
• Not defined	83 (54.6)	14 (33.3)	69 (62.7)	NA
• 0 to 18	1 (0.7)	0	1 (0.9)	
• 19 to 64	4 (2.6)	1 (2.4)	3 (2.7)	
• 65 and older	55 (36.2)	25 (59.5)	30 (27.3)	
• Adults of any age	9 (5.9)	2 (4.8)	7 (6.4)	
Prevalence data given	15 (9.9)	10 (23.8)	5 (4.5)	.001
Causes of multimorbidity given	5 (3.3)	3 (7.1)	2 (1.8)	.13
Consequences of multimorbidity given	78 (51.3)	26 (61.9)	52 (47.3)	.076
Comorbidity as a secondary variable given	37 (24.3)	7 (16.7)	30 (27.3)	.124
Used a comorbidity index	48 (31.6)	9 (21.4)	39 (35.5)	.069
TOTAL	152 (100)	42 (100)	110 (100)	NA

NA—not applicable.

*Comparison between primary care and other care: Fisher's exact test except where otherwise indicated.

[†]chi-square, 2 df.

patients with multimorbidity, these studies would not have been identified by our search strategy. The proportion of primary care articles is similar for all four topics, although the number of articles on multimorbidity is much lower. In view of the high prevalence of multimorbidity, this is a cause for concern. It suggests that family physicians do not have access to enough information on caring for most of their patients.

Type of articles

From our analysis of the abstracts, we identified 42 articles relating to primary care (**Tables 2 and 3**); with the exhaustive strategy suggested by Rosser and associates,²¹ we identified only 10 (**Table 1**). We suggest caution when using this strategy because it might lack sensitivity. Classification of articles following content analysis showed that there is little diversity in publications. The greater number of epidemiologic studies implies, however, that multimorbidity is a growing concern for many researchers. Given the small number of indexed articles on multimorbidity, we cannot draw any conclusions about trends in publication over time. The fact that about one quarter of the articles were published during the last 2 years suggests a growing interest in this subject.

Characteristics of articles

When we look at the characteristics of the published articles in more detail (**Table 3**), we note that in 37 articles (seven in primary care), multimorbidity or comorbidity is not the primary focus but a secondary variable, which again reduces the amount of evidence on this subject.

Given the small number and lack of diversity of published articles about multimorbidity in the context of primary care, researchers and policy makers might wish to review their priorities. Research on elderly patients must continue, but middle-aged adults should be the focus of specific research efforts. Measuring the prevalence of multimorbidity in the population must be improved with the use of reliable indicators, validated in primary care.²²

Quantitative studies on multimorbidity must be done in primary care using relevant outcome measures that could eventually be used in intervention studies.^{23,24} Qualitative studies must also be undertaken²⁵ to develop a better understanding of multimorbidity from many perspectives, such as patients, caregivers, and health care workers.

Future research

Other information can arise from specific research into questions about causality. Is there a predisposition to acquire apparently unrelated diseases? To date, very few studies have addressed this question. The serious consequences and resulting health care burden require that more research be done to develop knowledge and understanding of multimorbidity. Primary care practices offer an ideal setting because of the diversity of patients and medical conditions they deal with every day. Studying family physicians' patient populations from the perspective of multimorbidity is an innovative approach.

Future directions for studies include accurate measurement of multimorbidity and its various effects in the context of family practice, and later, proposing interventions. Special attention must be paid to including patients with comorbidity in clinical trials (providing their safety can be ensured). Adding the term "multimorbidity" to the MEDLINE database thesaurus should also be suggested to the relevant authorities in order to make literature reviews on this topic more effective.

Limitations


The main limitation of this type of study resides in its inability to find all the available documents. We consulted only MEDLINE and used only the Ovid search engine. Looking for articles in other databases or with other search engines might have generated more matches, but it is unlikely that more matches would have altered our findings substantially.

Our research strategy might also have limited the number of articles retrieved. The absence of a MeSH term for multimorbidity, a potentially limiting factor, has been partly circumvented by

researching this term as a key word. Not being able to use the “focus” modifier with this strategy might have increased the number of articles on multimorbidity retrieved, but seemingly had little effect because the number of articles found was negligible. A research strategy using key words instead of MeSH terms would have identified more articles on comorbidity, asthma, hypertension, and diabetes. It would have had better sensitivity, but worse specificity without the “focus” modifier. We think that articles focusing on multimorbidity or comorbidity as a distinct entity would have been identified by the strategy we used. Various strategies were tested during this study; the one we used appeared to be the most accurate.

Finally, content analysis was limited to the abstracts of the articles found. Analyzing the complete articles might have increased the accuracy of the evaluation but would not have changed the number of articles found.

Conclusion

This study points up the mismatch between the prevalence of multimorbidity in the population and the number of articles published on it and indexed in MEDLINE. To date, the number and diversity of articles available on multimorbidity are insufficient to provide a strong scientific basis for evidence-based care of patients affected by multiple concurrent chronic medical conditions. It is essential to increase primary care research on multimorbidity in order to develop a better understanding of this important topic. 

Acknowledgment

This study was realized with the support of the Department of Family Medicine at Sherbrooke University in Chicoutimi, Que.

Contributors

Dr Fortin was responsible for concept and design of the study; was involved in data collection, analysis, and interpretation; and drafted the article. Ms Lapointe contributed to data acquisition and analysis. Dr Hudon contributed to concept and design of the study and to

critically revising the manuscript. Dr Vanasse contributed to design of the study, to interpretation of data, and to critically revising the manuscript. All the authors approved the final version of the article.

Competing interests

None declared

Correspondence to: Dr Martin Fortin, Unité de Médecine de Famille, 305 St-Vallier, Chicoutimi, QC G7H 5H6; e-mail martinfortin@videotron.ca

References

1. Van den Akker 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.
2. Daveluy C, Pica L, Audet N, Courtemanche R, Lapointe F. *Enquête sociale et de santé 1998*. 2nd ed. Quebec city, QC: Institut de la statistique du Québec; 2000.
3. Knottnerus JA, Metsemakers JF, Höppener P, Limonard C. Chronic illness in the community and the concept of “social prevalence.” *Fam Pract* 1992;9(1):15-21.
4. Schellevis FG, van der Velden J, van de Lisdonk E, van Eijk JT, van Weel C. Comorbidity of chronic diseases in general practice. *J Clin Epidemiol* 1993;46:469-73.
5. Metsemakers JF, Höppener P, Knottnerus JA, Kocken RJ, Limonard CB. Computerized health information in the Netherlands: a registration network of family practices. *Br J Gen Pract* 1992;42(356):102-6.
6. Wolff JL, Starfield B, Anderson G. Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Arch Intern Med* 2002;162(20):2269-76.
7. Hoffman C, Rice D, Sung HY. Persons with chronic conditions. Their prevalence and costs. *JAMA* 1996;276(18):1473-9.
8. Commission d'étude sur les services de santé et les services sociaux. *Les solutions émergentes. Rapport et recommandations*. Quebec city, QC: Gouvernement du Québec; 2000.
9. Starfield B, Lemke KW, Bernhardt T, Folds SS, Forrest CB, Weiner JP. Comorbidity: implications for the importance of primary care in “case” management. *Ann Fam Med* 2003;1(1):8-14.
10. Flocke SA, Frank SH, Wenger DA. Addressing multiple problems in the family practice office visit. *J Fam Pract* 2001;50(3):211-6.
11. Bodenheimer T. Disease management: promises and pitfalls. *N Engl J Med* 1999;340(15):1202-5.
12. Holman H, Lorig K. Patients as partners in managing chronic disease. Partnership is a prerequisite for effective and efficient health care. *BMJ* 2000;320(7234):526-7.
13. Ministère de la santé et des services sociaux. *Plan stratégique 2001-2004 du Ministère de la santé et des services sociaux*. Quebec city, QC: Gouvernement du Québec; 2001.
14. Van den Akker M, Buntinx F, Roos S, Knottnerus JA. Comorbidity or multimorbidity: what's in a name? A review of the literature. *Eur J Gen Pract* 1996;2:65-70.
15. Oliveria SA, Lapuerta P, McCarthy BD, L'Italien GJ, Berlowitz DR, Asch SM. Physician-related barriers to the effective management of uncontrolled hypertension. *Arch Intern Med* 2002;162(4):413-20.
16. Cabana MD, Rand CS, Powe NR, Wu AW, Wilson MH, Abboud PA, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA* 1999;282(15):1458-65.
17. Institut Pasteur. *Initiation à la bibliométrie*. Paris, France: Institut Pasteur; 2002. Available at: <http://www.pasteur.fr/infosci/biblio/formation/metrie/>. Accessed 2003 April 14.
18. Mallik M, Rafferty AM. Diffusion of the concept of patient advocacy. *J Nurs Scholarsh* 2000;32(4):399-404.
19. Al-Shahi R, Will RG, Warlow CP. Amount of research interest in rare and common neurological conditions: bibliometric study. *BMJ* 2001;323(7327):1461-2.
20. Glazier R, Fry J, Badley E. Arthritis and rheumatism are neglected health priorities: a bibliometric study. *J Rheumatol* 2001;28(4):706-11.
21. Rosser WW, Starkey C, Shaughnessy R. The pond is wider than you think! Problems encountered when searching family practice literature. *Can Fam Physician* 2000;46:103-8.
22. Van den Akker M, Buntinx F, Roos S, Knottnerus JA. Problems in determining occurrence rates of multimorbidity. *J Clin Epidemiol* 2001;54:675-9.
23. Grumbach K. Chronic illness, comorbidities, and the need for medical generalism. *Ann Fam Med* 2003;1(1):4-7.
24. Rosen AK, Reid R, Broemeling AM, Rakovski CC. Applying a risk-adjustment framework to primary care: can we improve on existing measures? *Ann Fam Med* 2003;1(1):44-51.
25. Bayliss EA, Steiner JF, Fernald DH, Crane LA, Main DS. Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Ann Fam Med* 2003;1(1):15-21.