Publications on multimorbidity
(Updated on June 23, 2022)

INDEX
- Publications by subject
  1. THEORETICAL & REVIEW ARTICLES AND PROTOCOLS
  2. DEFINITION / CONCEPTUALISATION
  3. CLINICAL AND EPIDEMIOLOGICAL STUDIES
     3.1 Prevalence
     3.2 Aetiology
     3.3 Correlation with biological markers
     3.4 Interactions and patterns
     3.5 Socio-demographic, socio-economic, and psychosocial variables. Lifestyle factors
     3.6 Variables related to hospitalisation or institutionalization
     3.7 Resource utilisation
     3.8 Quality of life and functional level
     3.9 Psychological distress, depression, cognition, mental illnesses
     3.10 Medication
     3.11 Social support
     3.12 Other clinical variables
     3.13 Generalisation of clinical trials / Guidelines
     3.14 Other subjects
  4. ECONOMIC STUDIES
  5. METHODS TO MEASURE MULTIMORBIDITY AND COMORBIDITY
  6. EDITORIALS / OPINION ARTICLES
  7. QUALITATIVE RESEARCH
  8. INTERVENTION IDEAS
  9. OTHERS
     9.1 Physical activity
     9.2 Continuity of care
     9.3 Self-care
     9.4 Medical errors / Medical education
1. THEORETICAL & REVIEW ARTICLES AND PROTOCOLS


10.1136/bmjopen-2021-051810

PONE-D-21-35312 [pii]

PONE-D-20-30664 [pii]


10.1136/bmjopen-2021-057017


10.1016/j.arr.2022.101630

10.1136/bmjopen-2021-055264

PONE-D-21-34388 [pii]

10.1136/bmjopen-2021-049133


Lee ES, Koh HL, Ho EQ, et al. Systematic review on the instruments used for measuring the association of the level of multimorbidity and clinically important outcomes. BMJ Open 2021;11(5):e041219. doi: 10.1136/bmjopen-2020-041219


implementation randomised controlled trial. BMJ Open 2021;11(2):e048350. doi: 10.1136/bmjopen-2020-048350


Gustafson DH, Sr., Mares ML, Johnston DC, et al. A Web-Based eHealth Intervention to Improve the Quality of Life of Older Adults With Multiple Chronic Conditions: Protocol for a Randomized Controlled Trial. JMIR research protocols 2021;10(2):e25175. doi: 10.2196/25175


Measuring multimorbidity beyond counting diseases: systematic review of community and population studies and guide to index choice. BMJ 2020;370:m3668. doi: 10.1136/bmj.m3668


Davis KM, Eckert MC, Shakib S, et al. Development and Implementation of a Nurse-Led Model of Care Coordination to Provide Health-Sector Continuity of Care for People With


Fitzgerald SP, Bean NG, Ruberu RP. A method of decision analysis quantifying the effects of age and comorbidities on the probability of deriving significant benefit from medical treatments. Journal of Comorbidity 2017;7:50–63


Damery S, Flanagan S, Combes G. The effectiveness of interventions to achieve co-ordinated multidisciplinary care and reduce hospital use for people with chronic diseases: study protocol for a systematic review of reviews. Syst Rev. 2015;4:64.


Lupari M, Coates V, Adamson G, Crealey GE. We're just not getting it right'--how should we provide care to the older person with multi-morbid chronic conditions? J Clin Nurs 2011;20.


Iezzoni LI. Multiple Chronic Conditions and Disabilities: Implications for Health Services Research and Data Demands. Health Serv Res. 2010;45(5 Pt 2):1523-40.


2. DEFINITION / CONCEPTUALISATION


3. CLINICAL AND EPIDEMIOLOGICAL STUDIES

3.1 Prevalence


10.3390/ijerph19084726


10.1093/pubmed/fdaa209


10.1017/S146342362200010X


10.1016/j.amjmed.2022.04.010


10.1136/bmjopen-2021-053953


PONE-D-21-32202 [pii]


10.1093/pubmed/fdaa20


10.1038/s41598-021-04256-x [pii]


Corallo B, Proser M, Nocon R. Comparing Rates of Multiple Chronic Conditions at Primary Care and Mental Health Visits to Community Health Centers Versus Private Practice Providers. J Ambul Care Manage 2020;43(2):136-47. doi: 10.1097/JAC.0000000000000324


3.2 Aetiology


3.3 Correlation with biological markers


### 3.4 Interactions and Patterns

Ho HE, Yeh CJ, Wei JC, Chu WM, Lee MC. Trends of Multimorbidity Patterns over 16 Years in Older Taiwanese People and Their Relationship to Mortality. *Int J Environ Res Public Health* 2022;19(6). doi: ijerph19063317 [pii]

10.3390/ijerph19063317


10.1057/s41271-021-00321-x [pii]


10.1007/s11606-021-07198-2 [pii]


10.2196/27146


Ng SK: A two-way clustering framework to identify disparities in multimorbidity patterns of mental and physical health conditions among Australians. Stat Med. 2015;34(26):3444-3460


Wee, H.L., et al., The impact of diabetes mellitus and other chronic medical conditions on health-related Quality of Life: is the whole greater than the sum of its parts? Health & Quality of Life Outcomes, 2005. 3(1): p. 2.

3.5 Socio-demographic, socio-economic, and psychosocial variables. Lifestyle factors


PONE-D-21-38127 [pii]


McCallum M, MacDonald S. "Multimorbidity Plus": a secondary analysis exploring GP work in areas of high socioeconomic deprivation. BJGP Open 2021 doi: 10.3399/BJGPO.2021.0117

Flores TR, Rodrigues A, Neves RG, et al. The Risk of Multimorbidity Associated with Overweight and Obesity: Data from the Brazilian National


Andersen H, Kankaanrantta H, Tuomisto LE, et al. Multimorbidity in Finnish and Swedish speaking Finns; association with daily habits and socioeconomic status - Nordic EpiLung


### 3.6 Variables related to hospitalization


PONE-D-21-18947 [pii]


Swiss Med Wkly. 2022;152:w30135 [pii]


10.1016/j.healthpol.2022.01.004


10.1016/j.jfma.2021.05.029


10.1136/postgradmedj-2020-139361


10.1186/s12877-022-02812-2 [pii]


10.1016/j.surg.2022.02.011


Allen A, Frederick L, Hovey SL. Using Palliative Care Nurses in a Supportive Care Program to Reduce Hospital Utilization for Patients With Multiple Chronic Conditions. J Nurs Care Qual 2021;36(1):79-83. doi: 10.1097/NCQ.0000000000000482


Tran VT, Diard E, Ravaud P. Priorities to improve the care for chronic conditions and multimorbidity: a survey of patients and stakeholders nested within the ComPaRe e-cohort. BMJ Qual Saf 2020 doi: 10.1136/bmjqs-2020-011219


Fernández Miera, M. F. "[Patients with multimorbidity in the hospital setting.][Spanish]." Gac Sanit 2008. **22**: 137-41.


3.7 Resource utilisation


van den Bussche, H., et al., Patterns of ambulatory medical care utilization in elderly patients with special reference to chronic diseases and multimorbidity - Results from a claims data based observational study in Germany. BMC Geriatrics, 2011. **11**: p. 54.


3.8 Quality of life and functional level


10.1007/s11136-021-02951-w [pii]


10.3390/jcm11030656


10.1007/s11136-022-03095-1 [pii]


Klinedinst TC, Terhorst L, Rodakowski J. Multimorbidity groups based on numbers of chronic conditions are associated with daily activity. Chronic Illn 2021:17423953211023964. doi: 10.1177/17423953211023964


Hodek JM, Ruhe AK, Greiner W. Relationship Between Health-Related Quality of Life and Multimorbidity. *Gesundheitswesen.* 2009 Sep 29. [Epub ahead of print]


3.9 Psychological distress, depression, and cognition

Gan DRY, Wister AV, Best JR. Environmental Influences on Life Satisfaction and Depressive Symptoms Among Older Adults with Multimorbidity: Path Analysis Through Loneliness in the Canadian Longitudinal Study on Aging. Gerontologist 2022. doi: 6508998 [pii]


Asante D, Rio J, Stanaway F, Worley P, Isaac V. Psychological distress, multimorbidity and health services among older adults in rural South Australia. *J Affect Disord* 2022;309:453-60. doi: S0165-0327(22)00484-0 [pii]


Meher T, Muhammad T, Gharge S. The association between single and multiple chronic conditions and depression among older population in India: A comparative study between men and women. *Int J Geriatr Psychiatry* 2022;37(1) doi: 10.1002/gps.5639


Tong L, Pu L, Guo X, et al. Multimorbidity study with different levels of depression status. *J Affect Disord* 2021;292:30-35. doi: 10.1016/j.jad.2021.05.039


Tong L, Pu L, Guo X, et al. Multimorbidity study with different levels of depression status. J Affect Disord 2021;292:30-35. doi: 10.1016/j.jad.2021.05.039


Thomeer MB. Multiple Chronic Conditions, Spouse's Depressive Symptoms, and Gender within Marriage. J Health Soc Behav. 2016;57:59-76.


Gallo JJ, Hwang S, Joo JH, Bogner HR, Morales KH, Bruce ML et al: Multimorbidity, Depression, and Mortality in Primary Care: Randomized Clinical Trial of an Evidence-Based Depression Care Management Program on Mortality Risk. J Gen Intern Med. 2015.


3.10 Medication


10.3390/ijerph19063423


PMEDICINE-D-21-02234 [pii]


10.1136/bmjopen-2021-054348


10.1007/s00228-021-03207-9 [pii]


Walsh CA, Cahir C, Bennett KE. Longitudinal Medication Adherence in Older Adults With Multimorbidity and Association With Health Care Utilization: Results From the Irish Longitudinal Study on Ageing. Ann Pharmacother 2020;1060028020937996. doi: 10.1177/1060028020937996


Richardson, K., et al., Variation over time in the association between polypharmacy and mortality in the older population. *Drugs Aging,* 2011. 28: p.:547-60.


Kusek, J.W., et al., Cross-sectional study of health-related quality of life in African Americans with chronic renal insufficiency: the African American Study of Kidney


3.11 Social support


3.12 Other clinical variables


10.1016/j.puhe.2022.01.021

PME0000000 [pii]


10.3390/ijerph19063461


10.1186/s12877-021-02696-8 [pii]

Miller AC, O'Reilly D, Kee F, Cruise S, Young I. Multimorbidity, activity limitation and self-reported health all predict mortality risk, but better measures were required. *J Clin Epidemiol* 2022;144:144-62. doi: S0895-4356(21)00415-7 [pii]

10.1016/j.jclinepi.2021.12.010


10.1016/S2213-8587(22)00033-X


10.1007/s11739-021-02899-2 [pii]


10.1016/j.jclinepi.2022.03.002


10.1016/j.jamda.2022.01.067

PONE-D-21-34987 [pii]


Woo J, Leung J. Multi-morbidity, dependency, and frailty singly or in combination have different impact on health outcomes. *Age (Dordr).* Apr 2014;36(2):923-931.


Landi F et al. Disability, more than multimorbidity, was predictive of mortality among older persons aged 80 years and older. *J Clin Epidemiol.* 2010. 63(7):752-9.


3.13 Generalisation of clinical trials / Guidelines


10.1007/s40520-022-02094-z [pii]


Rothwell, P.M., External validity of randomised controlled trials: "to whom do the results of this trial apply?" Lancet., 2005. 365: p. 82-93.
3.14 Other subjects


Schramm S, Moller SP, Tolstrup JS, Laursen B. Effects of individual and parental educational levels on multimorbidity classes: a register-based longitudinal study in a Danish population. *BMJ Open* 2022;12(2):e053274. doi: bmjopen-2021-053274 [pii]


Tran VT, Diard E, Ravaud P. Priorities to improve the care for chronic conditions and multimorbidity: a survey of patients and stakeholders nested within the ComPaRe e-cohort. BMJ Qual Saf 2021;30(7):577-87. doi: 10.1136/bmjqs-2020-011219


Adams ML. Differences Between Younger and Older US Adults With Multiple Chronic Conditions. Prev Chronic Dis. 2017;14:E76.


Chan CL, You HJ, Huang HT, Ting HW. Using an integrated COC index and multilevel measurements to verify the care outcome of patients with multiple chronic conditions. *BMC Health Serv Res.* 2012;12:405.


Wong A, Boshuizen HC, Schellevis FG, Kommer GJ, Polder JJ. Longitudinal administrative data can be used to examine multimorbidity, provided false discoveries are controlled for. *J Clin Epidemiol* 2011;64(10):1109-17.


4. ECONOMIC STUDIES

Park S, Nam JY. Effects of Changes in Multiple Chronic Conditions on Medical Costs among Older Adults in South Korea. Healthcare (Basel) 2022;10(4). doi: healthcare10040742 [pii]


### 5. METHODS TO MEASURE MULTIMORBIDITY AND COMORBIDITY


Holzhausen M, Fuchs J, Busch M, et al. Operationalizing multimorbidity and autonomy for health services research in aging populations--the OMAHA study. BMC Health Serv Res 2011;11:47.


Charlson, M., et al., Validation of a combined comorbidity index.


Katz, J.N., et al., Can comorbidity be measured by questionnaire rather than medical record review? Medical Care., 1996. 34: p. 73-84.


Ware JE, Bayliss MS, Rogers WH, Kosinski M, Tarlov AR. Differences in 4-year health outcomes for elderly and poor, chronically ill patients treated in HMO and fee-for-service systems. Results from the Medical Outcomes Study. JAMA 1996; 276(13):1039-1047.


6. EDITORIALS / OPINION ARTICLES

Fortin M, Stewart M, Almirall J, Beaupre P. Challenges in Multimorbidity Research: Lessons Learned From the Most Recent Randomized Controlled Trials in Primary Care. *Front Med (Lausanne)* 2022;9:815783. doi: 10.3389/fmed.2022.815783

Tsur AM, Twig G. The actual burden of obesity-accounting for multimorbidity. *Lancet Diabetes Endocrinol* 2022;10(4):233-34. doi: S2213-8587(22)00073-0 [pii]


Zhao D. Key roles of five lifestyle risk factors in the harmful transition from a healthy condition to multimorbidity in the Chinese population. Eur Heart J 2021;42(34):3385-87. doi: 10.1093/eurheartj/ehab516


Ecks S. Depression, Deprivation, and Dysbiosis: Polyiatrogenesis in Multiple Chronic Illnesses. Cult Med Psychiatry 2021 doi: 10.1007/s11013-020-09699-x


Tsai J, King B, Elder J. Multimorbidity and Social Drivers of Homelessness and Health: Introduction to This Special Issue. Med Care 2021;59(Suppl 2):S101-S02. doi: 10.1097/MLR.0000000000001518


Selby K, Chabloz YM, Schwarz J, et al. The multimorbidity dead end: how we got here and possible ways out. Br J Gen Pract 2020;70(701):607-08. doi: 10.3399/bjgp20X713825


Mathew R. Rammya Mathew: Learning to manage multimorbidity. BMJ 2020;368:m871. doi: 10.1136/bmj.m871


Duncan H. Managing multimorbidity: all doctors started as generalists. BMJ 2020;368:m733. doi: 10.1136/bmj.m733

Coughlan C, Watson M. Managing multimorbidity: listening to patients and integrated care. BMJ 2020;368:m713. doi: 10.1136/bmj.m713

Sharpe M. Time to transcend "physical" and "mental" health. BMJ 2020;368:m609. doi: 10.1136/bmj.m609


Whitty CJM, Watt FM. Map clusters of diseases to tackle multimorbidity. Nature 2020;579(7800):494-96. doi: 10.1038/d41586-020-00837-4


Sutherland I, Samadian S. Managing multimorbidity needs time and thought. BMJ 2020;368:m711. doi: 10.1136/bmj.m711


Fortin M. "It-that-must-not-be-named": Addressing patient discomfort with the term multimorbidity. Can Fam Physician 2018;64(12):881-82.


Oliver D. David Oliver: A manifesto for multimorbidity. BMJ 2018;360:k1044. doi: 10.1136/bmj.k1044


Wise J. Patients with multimorbidity need longer GP consultations, says RCGP. BMJ. 2016;355:i5961.


Tinetti ME, Basu J. Research on multiple chronic conditions: where we are and where we need to go. *Med Care.* Mar 2014;52 Suppl 3:S3-6.


Richardson WS, Doster LM. Comorbidity and multimorbidity need to be placed in the context of a framework of risk, responsiveness, and vulnerability. *J Clin Epidemiol.* Mar 2014;67(3):244-246.


Roland M, Paddison C. Better management of patients with multimorbidity. BMJ. 2013;346:f2510


Rudland S, Macey N. Value of a well organised team approach in primary care in managing patients with multimorbidity. BMJ. 2013;346:f3555.


Haggerty JL. Ordering the chaos for patients with multimorbidity. *BMJ.* 2012;345:e5915.


Hawkes N. Better training is needed to deal with increasing multimorbidity. *BMJ.* 2012;344:e3336.


Shepherd DJ. We need a system that accounts for multimorbidity at practice level. *BMJ.* 2012;345:e5464.

Kamerow D. How can we treat multiple chronic conditions? *BMJ.* 2012;344:e1487.


7. QUALITATIVE RESEARCH


10.1136/bmjqs-2021-014372


10.1177/1077558720975543


10.1186/s12875-022-01633-x [pii]


10.1016/j.socscimed.2021.114532


10.3399/BJGP.2021.0529

10.1186/s12875-022-01670-6 [pii]


Boye LK, Mogensen CB, Andersen PT, et al. 'One feels somewhere that one is insignificant in that system' - older multimorbid patients' between lifeworld and system in healthcare. BMC Geriatr 2021;21(1):397. doi: 10.1186/s12877-021-02348-x


Prazeres F, Simoes JA. Key Factors to Consider in Team Meetings when Dealing with Multimorbidity in Primary Care: Results from a Delphi Panel. Cureus 2019;11(6):e4990. doi: 10.7759/cureus.4990


McKenzie KJ, Pierce D, Mercer SW, et al. Do GPs use motivational interviewing skills in routine consultations with patients living with mental-physical multimorbidity? An


Patton DE, Cadogan CA, Ryan C, et al. Improving adherence to multiple medications in older people in primary care: Selecting intervention components to address patient-


van Dongen JJ, de Wit M, Smeets HW, Stoffers E, van Bokhoven MA, Daniels R. "They Are Talking About Me, but Not with Me": A Focus Group Study to Explore the Patient Perspective on Interprofessional Team Meetings in Primary Care. Patient. 2017.


Slightam CA, Brandt K, Jenchura EC, Lewis ET, Asch SM, Zulman DM. "I had to change so much in my life to live with my new limitations": Multimorbid patients' descriptions of their most bothersome chronic conditions. Chronic Illn. 2017:1742395317699448.


Steele Gray C, Khan AI, Kuluski K, et al. Improving Patient Experience and Primary Care Quality for Patients With Complex Chronic Disease Using the Electronic Patient-Reported


de Vos A, Cramm JM, van Wijngaarden JD, Bakker TJ, Mackenbach JP, Nieboer AP. Understanding implementation of comprehensive geriatric care programs: a multiple perspective approach is preferred. *Int J Health Plann Manage.* 2016.


8. INTERVENTION IDEAS


10.1093/fampra/cmac006


Williams K, Markwardt S, Kearney SM, et al. Addressing Implementation Challenges to Digital Care Delivery for Adults With Multiple Chronic Conditions: Stakeholder Feedback in a Randomized Controlled Trial. JMIR Mhealth Uhealth 2021;9(2):e23498. doi: 10.2196/23498


Prados-Torres A, Cura-Gonzalez ID, Prados-Torres JD, et al. MULTIPAP Study: Improving healthcare for patients with multimorbidity. Br J Gen Pract 2020;70(suppl 1) doi: 10.3399/bjgp20X711257


9. OTHERS

9.1 Physical activity


10.1016/j.archger.2021.104577


10.17269/s41997-022-00635-7 [pii]


Loprinzi PD. Sedentary behavior and medical multimorbidity. Physiol Behav. Nov 1 2015;151:395-397.


9.2 Continuity of care


### 9.3 Self-care


9.4 Medical errors / Medical Education


