

Please try to limit your response to no more than 3,000 words, and return the completed form by Wednesday 30 November to Dr Rachel Brown: Rachel.Brown@acmedsci.ac.uk (+44 (0)20 3141 3223).

If you have any questions or would like to respond but are unable to meet this deadline, please do not hesitate to contact Rachel who will be happy to provide more information.

Thank you in advance for your contribution to this project.

* *Mandatory fields*

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* Is this input submitted as an organisational or individual response? **Individual**

* Are you happy for your response to be published by the Academy? **Yes**

Definitions

1. There is no standard definition of 'multimorbidity' - various different definitions are used. Which definitions (or aspects of definitions) do you think are most helpful to efforts to describe and understand multimorbidity?

Please provide references for any published research, and highlight any other initiatives related to multimorbidity that the Academy may be interested in.

Current definitions

Most frequently definitions are based on the enumeration of individual problems. Of these, the simplest are those that consider multi-morbidity to be the 'coexistence of one or more long-term conditions'. Valderas et al (2009) have reviewed the multiple conceptualisations of co-morbidity in the literature. The key differentiation between co-morbidity and multi-morbidity by this account is that conceptualisations of multi-morbidity do not consider one diagnosis to be the "primary" or "index" condition that a person is suffering from, and thus gives equal weight to all diagnoses.

This approach is useful for epidemiological work as data collection is simple and straightforward; but it does not account for the ‘complexity’ inherent in multi-morbid conditions—the individual constituents and their interaction with each other and the environment cannot be understood merely by analysing the components. Stable multi-morbidity exists only when all conditions are long-standing, but this conceptualisation does not account for the fact that acute and subacute conditions may contribute significantly to the overall burden.

In the field of mental health, the traditional approach has been to consider ‘Dual diagnosis’ ie the presence of physical and mental illness in the individual patient. Various studies have established that this may be due to a patient’s reaction to illness; common risk factors contributing to physical and mental ill-health; consequences for physical health and treatment-seeking due to mental ill-health; or the genuine co-morbidity. As with all theoretical systems, such an approach is subject to criticism as being reductionist and ignoring complex interactions in the individual patient. However, it is provided as an example of a potential approach that includes the relationship between the constituent elements, into the definition itself.

Current knowledge base

When answering these questions, please consider both national and international populations of high, middle, and low income countries. Please provide examples and case studies to illustrate your arguments where appropriate. Please provide references for any published research.

2. What are the key data, and what data sources exist, on the prevalence, burden (including costs and impact on health systems) and determinants of multimorbidity? Are there significant gaps in such data and, if so, what are they?

Epidemiology (prevalence and determinants)

The prevalence of multi-morbidity is variable, depending on the definition and the disorders included for assessment; and the setting in which the study is conducted. Most frequently, studies have been conducted in primary care, and prevalence has ranged widely between 17% and 90%.

Cross-sectional assessments have consistently demonstrated a number of factors that have been repeatedly associated with multi-morbidity, including older age (in some studies, over half of older adults have 3 or more health conditions on average); poor functional status; decreased quality of life.

For this reason, the WHO Study on Global Ageing and Adult Health (SAGE) is particularly important. This is an ongoing multi-country longitudinal study of subjects over the age of 65. From the first wave, we have data that demonstrates the effects of multi-morbidity on activities of daily living, self-reported health and quality of life, with the finding that each diagnosis can contribute either in an additive or a supra-additive fashion to morbidity. The limitations of this study are the number of chronic conditions that were included for assessment, which were limited to angina pectoris, arthritis, asthma, low visual acuity, chronic lung disease, diabetes, stroke, hypertension and depression. Thus, findings are likely to be an underestimate of the true burden of all-cause multi-morbidity in the population.

Burden of multi-morbidity

Known to be associated with multi-morbidity:

1. Low individual and medical care
2. More frequent, longer hospitalizations
3. Higher healthcare costs
4. Increased use of polypharmacy

Gaps in knowledge

The important gaps in this knowledge include the absence of longitudinal studies that document the incidence of multi-morbidity in high-risk populations. Multi-site studies that assess multi-morbidity in patients of differing ages, in different care settings, and with diverse risk factors, would provide robust epidemiological data on the prevalence and determinants of multi-morbidity. Such studies are currently available from developed countries, and have contributed significantly to our understanding of multi-morbidity. However, the patterns of multi-morbidity and the relationships between these may be significantly different in developing countries. This is likely because the patterns of environmental and contextual risk factors in developing countries, are significantly different (as demonstrated by recent publications from the Global Burden Diseases Study).

Although validated instruments are available for the assessment of multi-morbidity (reviewed by Valderas et al,2009), these instruments are not part of routine practice, and rely on differing conceptualisations of co-morbidity. Such case complexity indices need to be refined for use in routine practice.

3. What are the key data, and what data sources exist, on the prevention of multimorbidity? Are there significant gaps in such data and, if so, what are they?

There is limited empirical research on preventive strategies for multi-morbidity. However, epidemiological data suggests that high-risk groups can be clearly defined, and that patterns of multi-morbidity may be influenced by the presence of common risk factors. For example, increased body weight contributes to multiple chronic health conditions, and has been shown to contribute substantially to the rates of multi-morbidity in primary care. As these risk factors are quite often similar, related to lifestyle factors, and modifiable, preventive strategies may focus on these. However, at present we do not have data on the quantitative contributions of most of these risk factors or their relative importance; the mechanisms whereby multi-morbidity develops over time; and the efficacy of intervention.

4. What are the key data, and what data sources exist, on the management of multimorbidity? Are there significant gaps in such data; if so, what are they?

The term 'management' here could refer to clinical interventions designed to specifically treat patients with multimorbidity as well as strategies for the delivery of healthcare services patients with multimorbidity. The term also refers to a wide range of management approaches that may differ by the specific diseases that co-exist.

The epidemiology of multi-morbidity, and its effects upon patients and the healthcare system, are well-documented, particularly in the western world. However, in the management of multi-morbidity, a number of problems have been identified.

1. Clinical guidelines are usually for isolated disorders, and not for the problems in management of multi-morbid conditions
2. Clinicians report reduced competence in managing the comorbid conditions, having to rely on either consultation models for care to be advised by alternative specialists, or on the basis of multiple referrals from primary care. This contributes to increased cost of care, admissions, and attrition from treatment
3. Multi-morbidity is associated with complex treatment regimens, and poor adherence with overall treatment.

Looking forward

5. What should the definition of 'multimorbidity' be? How would this definition improve research and/or treatment?

A good definition of multi-morbidity will convey the complexity of the clinical situation accurately. This complexity is contributed by a number of factors, including the presence of multiple illnesses, patients' understanding of illness and preferences for treatment, doctors' conceptualization of illness and the way healthcare is organized. A comprehensive assessment of multi-morbidity would describe the interplay of all these factors, and should not exclude them by merely focussing on the presence of illnesses or their severity. One approach to do so is to include additional assessments of functional status, self-reported health, or quality of life.

For example, the operationalised definition could include the numbers and types of interventions required, the medical disciplines that are called upon for management, the number of hospital admissions, the number of medications required, functional status, patients' self-perceived health. Theoretical factors that have been considered include whether the conditions are within the same diagnostic grouping or not. A conceptualisation that includes these aspects would be useful because it would not just catalogue the multiple illnesses, but would provide information to help treatment targets and modalities.

6. What are the priorities for research about the prevalence, burden and determinants of multimorbidity?

1. **The development of instruments that rely on a robust definitions and are suitable for routine administration.** Such instruments should be able to capture the overall burden of illness in an efficient metric, account for individual illness severity and prioritization for care, and be sensitive to changes over time
2. **Establishing case registry systems for multi-morbidity:** in high-risk populations, a registry-based approach may be useful for prospective studies. This may be easier to do in low-resource settings, particularly where standardized data collection is not routine.
3. **Strengthening routine data collection and reporting systems to collate data on multi-morbidity.** The standardisation of data collection systems to record diagnoses in a systematic fashion could help to analyse prognosis of comorbidity in routine care.

7. What are the priorities for research about the prevention of multimorbidity?

Primary Prevention:

The first and foremost priority is the identification of patients who are at a high risk of multi-morbidity, either because of personal factors (such as age, access to healthcare, presence of common risk factors), illness factors (chronic, disabling illnesses, those that are significantly associated with poor functional outcome, or those associated with chronic pain, which are factors specifically associated with increased mental morbidity) or contextual factors (low socio-economic status, environmental risks, healthcare organization).

For universal prevention strategies, the role of general measures such as healthy lifestyle and dietary practices may be useful, although these have not been systematically studied in relation to this outcome (ie the prevention of additive physical or mental morbidity).

For patients with established multi-morbidity

A third approach involves the early identification of patients with multi-morbidity, with the aim of reducing the time spent with an additional medical diagnosis. This would involve holistic healthcare strategies where all conditions are systematically assessed, documented, and feature in the care plan.

Further research is required particularly towards the optimal organization of healthcare services to make them efficient for the management of multiple illnesses. This is especially important for geriatric care, as multiple infective, non-communicable diseases, and social factors may be responsible for the final outcome of multi-morbidity.

8. What are the priorities for research about the management (as defined above) of patients with multimorbidity?

Various studies have suggested the following general approaches to the management of patients with multi-morbidity (Caughey and Roughead, 2011; Sinott et al, 2013). However, these have not been formally tested for efficacy. Suggested approaches include

1. Studies that pilot interventions for management, particularly integrated management models in primary care settings
2. Task shifting interventions, with training of healthcare workers in the management of risk factors and routine care for those with multi-morbidity
3. Move towards patient-defined outcomes rather than disease-specific care

9. What should be the strategic response of both national and international research funders and agencies be to multimorbidity?

1. Surveillance and routine data collection
2. Systematic monitoring of outcomes
3. Piloting of interventions that are specifically targeted towards reducing multi-morbidity, with scale-up included from the beginning
4. Training of medical professionals in the management of multi-morbidity
5. Consideration of multi-morbidity (particularly common features) while framing guidance in the management of individual illnesses, especially those that are known to be associated with physical and mental co-morbidity, eg. Those that affect the elderly at a greater frequency, those that are associated with poor long-term outcomes, and those that have significant concomitant
6. Pilot programmes in the reorganization of healthcare services for high-risk populations, towards ameliorating multi-morbidity.
7. Eliminating sources of iatrogenic complications in multi-morbidity and push towards safe prescribing.
8. Improved funding for multi-morbidity

Selected Bibliography

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