

# Designing and Validating a Multimorbidity Assessment Questionnaire for a Rural Indian Community

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## ARTICLE CYCLE

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## ABSTRACT

**Introduction:** Multimorbidity, has received its undue attention in the recent years, because of its hidden impact on the patients and their families, especially in environments with little resources. There is no data available on the prevalence of multimorbidity (for both oral and systemic) in Uttarakhand to the best of our knowledge. The aim of this study is to develop a multimorbidity questionnaire in a rural Indian community. **Methods:** The pilot study was conducted in Kurkawala, Dehradun, Uttarakhand, India in February 2023. **Results:** Our sample had mean age of 46 years, with 54.2% females. 88.5 % of the participants were found to be with any morbidity, whereas 31.5% participants were found to be with only oral morbidity. 57.9% participants were found with Oral Morbidities along with One systemic Morbidity followed by 21.1% participants with Oral Morbidities along with Two systemic Morbidities. 25.8% participants were found to have with both Hypertension and Oral Conditions, followed by Acid peptic disease and Any Chronic Bone/Joint Disease; Any Neurological and/or Psychiatric Disorders (19.4% respectively). **Discussion:** Developing a stronger evidence base of the knowledge of risk factors and their determinants as well as implementing proven effective strategies (both at individual as well as societal level) for multimorbidity risk reduction hold the key to lower multimorbidity burden and improve quality of life globally. **Conclusion:** Our findings show that this questionnaire is a reliable and trustworthy way to assess multimorbidity in a community setting with a range of chronic illnesses (both systemic and oral).

## KEYWORDS

Multimorbidity; Rural; Oral health; Community; Questionnaire

## INTRODUCTION

Multimorbidity, has received its undue attention in the recent years, because of its hidden impact on the patients and their families, especially in environments with little resources(1). Described as having at least two co-existing illnesses in one person by the World Health Organisation in 2016(1), multimorbidity has gained its popularity more recently after getting added in the PubMed database in the year 2018(2). Prevalence estimates from a comprehensive evaluation of 39 observational studies conducted in 12 countries ranged from approximately 13% to 95%(3). Similar varied findings, were reported by another systematic review ranging from 13% to 72%

(English- and French-language articles published between 1980 and September 2010 were included)(4). Although some of these variances capture the actual change in the prevalence of multimorbidity, these variations can also be attributed to definitional discrepancies.

This increasing burden is also reflected in the Indian population at 7.2% (2022)(5). The etiology responsible for multi-morbidity is complex and interrelated, involving various behavioural risk factors and morbidities(6). Patients typically experience multiple risk factors in unique combinations often resulting in multiple conditions at different time points. Multiple interrelated morbidities are also contributing to the growing

problem of multimorbidity. One such morbidity is oral health, often ignored as a part of overall health(7). Most oral health problems are permanent, but take a long time to develop and contribute to a major burden of diseases in India. The creation of a successful, person-centred strategy for managing multimorbidity is important, especially in the underserved rural areas where almost 70% of Indians reside.(8). Most studies on the prevalence of multimorbidity globally (both oral and systemic) are focused on older populations, while data from younger adults and Low Middle-Income Countries such as India is much more limited. Data identifying the most common clusters of conditions (both oral and systemic) in populations and subgroups is also limited (9,10). There is no data available on the prevalence of multimorbidity (for both oral and systemic) in Uttarakhand to the best of our knowledge. We undertook a study to address the aforementioned knowledge gap. The aim of the study was to a) Design and Develop the questionnaire to check: its local acceptability, layout, translation and sequencing of questions b) The time needed for questionnaire administration c) Any perceived difficulties in understanding and answering questions by the participants. d) To collect accurate information from respondents.

## MATERIAL & METHODS

The pilot study was conducted in Kurkawala, Dehradun, Uttarakhand, India in February 2023, with Hindi as the medium of instruction. We used an iterative procedure to construct a comprehensive tool to examine multimorbidity in a rural community in India.

### Development of the Questionnaire

**Selection and Development of the Sections:** The sections were selected by the research team through literature review and consultation with an expert group. The sections for the questionnaire were taken from pre-validated questionnaires.

**Section 1:** Core Demographic and House Hold Material Possessions: NFHS (National Family Health Survey)(11); **Section 2:** Behavioural Characteristics: WHO STEPS(12), WHO GPAQ(13) and Oral Health Survey (Basic Methods) 5th Edition(14); **Section 3:** Multimorbidity and Self-Reported Quality of Life LASI questionnaire(15) and NFHS (National Family Health Survey) Questionnaire(11); **Section 4:** Utilization and Access to Health and Dental Health Care: Oral Health Survey (Basic Methods) 5th Edition(14) and the WHO Oral Health Assessment Form for Adults, 2013 for oral health outcomes.

**Multimorbidity:** We created a comprehensive list of all the chronic illnesses that are frequently found in the community. In order to make the

questionnaire locally relevant, a desk review was done of the studies from Uttarakhand and India. Six senior academics were given access to the draft list and were asked to evaluate it and add any other diseases. Lastly, the Multimorbidity section (adapted from LASI Questionnaire) was updated to include a consolidated list of ten conditions. The question was phrased as “*Has any health professional ever told you that you have...?*”. We used Hindi as the local language that could be understood by individuals without any prior medical knowledge.

**Translation and Cultural Adaptation:** To guarantee the accuracy of the translation, we adhered to the regular procedure. Independent translators carried out the primary forward translation from English into Hindi, the local language. Back translation was also done for the same.

Two laypeople who were fluent in both languages then assessed the original translation for authenticity. After discussing any discrepancies between the translated versions with the research team, the principal translator came to a consensus.

**Content and Face Validity:** The content and face validity of the questionnaire was established with the help of a group of experts. The experts were asked to give their inputs on the way questions were asked, perceived difficulty in understanding a particular question or responses, sequencing of the questions and whether anything important has been missed in the questionnaire.

### Pilot of the Questionnaire

**The Conduct of Pilot Study:** The residents of cluster mainly belonged to the economically weaker sections of the society. Wage employment was the main means of livelihood in addition to farming for most of the male members while most of the females worked as homemakers. The entire process of interview and clinical examination took 20 - 25 minutes for each participant (after taking informed consent). It took us two weeks to interview and examine the thirty-five participants for our pilot study.

**Changes in the Questionnaire:** Based on the comments of the interviewers, feedback from the respondents of pilot study and the lessons learnt while implementing the pilot study in the population, changes were made in the tool. We included broad “*systems*” for some of the diseases for better answers from the participants as they were not able to tell the correct name of the disease.

There were no major problems in the other sections of the questionnaire which the interviewers noticed while administering, except for some minor errors.

**Ethics:** Ethical approval for this study was obtained from the Swami Rama Himalayan University

(SRHU/HIMS/ETHICS/2022/240). Written informed consent was obtained from each participant. Participants from whom consents could not be obtained were dropped from the study sample.

**RESULTS**

**Sample Characteristics:** Our sample had mean age of 46 years, with 54.2% females. Majority of the population was illiterate (37.1%) followed by senior secondary (17.1%) (11th to 12th Standard) pass. Majority of the participants rated their health as good (62.9%) followed by fair (22.9%).

**Prevalence of Morbidity:** 88.5 % of the participants were found to be with any morbidity, whereas 31.5% participants were found to be with only oral morbidity and one participant was found to be with only systemic morbidity. 54.2% of the participants were found with both oral and systemic morbidity. From the participants with oral and systemic morbidity (n =19), 57.9% participants were found with Oral Morbidities along with One systemic Morbidity followed by 21.1% participants with Oral Morbidities along with Two systemic Morbidities. (Table 1)

**Self-reported Systemic and Oral Morbidities:** 25.8% participants were found to be with both Hypertension and Oral Conditions, followed by Acid peptic disease and Any Chronic Bone/Joint Disease; Any Neurological and/or Psychiatric Disorders (19.4% respectively).

**Self-Rated Health and Morbidities (Oral and Systemic Diseases):** 6.5% of the participants with only oral morbidity rated their overall health as excellent with none of the participants describing it as fair or poor. The participant with only systemic morbidity rated his/her health as fair. 35.5% participants with both Oral and Systemic Morbidity rated their overall health as good, whereas 22.6% rated it as fair. (Table 2)

**Internal Reliability:** The section on the Multimorbidity had an unstandardized Cronbach’s alpha of 0.6059 Multimorbidity (10 items), which is interpreted as acceptable.

**Table 1: Prevalence of Morbidity**

Characteristics	Total (N = 35) n (%)
Participants with No Morbidity	4 (11.5)
Participants with any Morbidity	31 (88.5)
Participants with only Oral Morbidity	11 (31.5)
Participants with only Systemic Morbidity	(2.8)
Participants with Oral and Systemic Morbidity (Multimorbidity)	19 (54.2)

**Table 2: Self-rated health among multimorbid participants with and without oral and systemic morbidity. N = 31**

Self-Rated Health	Participants with Oral Morbidity (n = 11)	Participants only with Systemic Morbidity (n = 1)	Participants only with Oral and Systemic Morbidity (Multimorbidity) (n = 19)
Excellent	2 (6.5)	0	0
Very Good	1 (3.2)	0	1 (3.2)
Good	8 (25.8)	0	11 (35.5)
Fair	0	1 (3.2)	7 (22.6)
Poor	0	0	0

**DISCUSSION**

Research as well as day to day clinical treatment may benefit from the knowledge about prevalence and composition of multimorbidity. Multimorbidity appears to affect a significantly wider segment of the population and is not limited to the elderly (16). Oral health diseases and other NCDs share common risk factors but are often ignored at the individual and community level (17).

The multimorbidity epidemic is being accelerated by economic and cultural globalisation. Developing a stronger evidence base of the knowledge of risk factors and their determinants as well as implementing proven effective strategies (both at individual as well as societal level) for multimorbidity risk reduction hold the key to lower multimorbidity burden and improve quality of life globally (18). Most of the estimates done up to date on multimorbidity are estimated from national data sets and surveys across the globe (19). There is still lack of primary data at the community level (20).

**CONCLUSION**

In summary, our tool effectively identifies risk factors, self-rated health and access to health care in addition to Multimorbidity, including dental care. By recognizing individuals with multiple chronic conditions, limited access to care, or a poor perception of their health, healthcare providers can implement targeted interventions, such as case management, health education, and social support services. This proactive approach can lead to improved health outcomes, reduced healthcare costs, and a more equitable distribution of healthcare resources within the community.

**RECOMMENDATION**

To effectively combat the significant burden of multimorbidity and improve the well-being of individuals and families, we must prioritize building

a robust, holistic evidence base. This requires in-depth, interdisciplinary research into the complex interplay of risk factors and determinants that contribute to co-occurring chronic conditions, including the often-overlooked but critical role of oral health. By understanding these multifaceted factors – encompassing behavioral, social, environmental, and oral health dimensions – we can develop and implement targeted, person-centered prevention and management strategies

#### LIMITATION OF THE STUDY

Our questionnaire has some limitations, such as we did not gather information on undiagnosed diseases, which can often result in ignorance of milder form of diseases by the participants. The study also acknowledges that information gathered on the diagnosis of the diseases may not be fully accurate due to the inherent limitation of recall bias. We recommend further validation of the developed multimorbidity questionnaire, in larger, more diverse populations, to insure its effectiveness as a screening tool.

#### RELEVANCE OF THE STUDY

There is no primary data available on the prevalence of multimorbidity (for both oral and systemic) in Uttarakhand to the best of our knowledge. We undertook a study to address the aforementioned knowledge gap.

#### AUTHORS CONTRIBUTION

All authors have contributed equally.

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Nil

#### CONFLICT OF INTEREST

There are no conflicts of interest.

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#### DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

#### REFERENCES

1. Multimorbidity Technical Series on Safer Primary Care Multimorbidity: Technical Series on Safer Primary Care. 2016. <https://www.who.int/publications/i/item/9789241511650>
2. Tugwell P, Knottnerus JA. Multimorbidity and Comorbidity are now separate MESH headings. *J Clin Epidemiol.* 2019;105:vi–viii.
3. Violan C, Foguet-Boreu Q, Flores-Mateo G, Salisbury C, Blom J, Freitag M, Glynn L, Muth C, Valderas JM. Prevalence, determinants and patterns of multimorbidity in primary care: a systematic review of observational studies. *PLoS One.* 2014 Jul 21;9(7):e102149
4. Fortin M, et al. A Systematic Review of Prevalence Studies on Multimorbidity: Toward a More Uniform Approach. *Ann Fam Med.* 2021;10(2),142–151.
5. Prenissl J, De Neve J-W, Sudharsanan N, Manne-Goehler J, Mohan V, Awasthi A, et al. Patterns of multimorbidity in India: A nationally representative cross-sectional study of individuals aged 15 to 49 years. *PLOS Glob Public Health.* 2022;2(8): e0000587.
6. Skou ST, Mair FS, Fortin M, Guthrie B, Nunes BP, Miranda JJ, et al. Multimorbidity. *Nat Rev Dis Primers.* 2022;8(1):48.
7. Watt RG, Serban S. Multimorbidity: a challenge and opportunity for the dental profession. *Br Dent J.* 2020 Sep 1;229(5):282.
8. Multimorbidity- A major health challenge of 21st century. The George Institute for Global Health. 2024. Available from: <https://www.georgeinstitute.org.in/philanthropic-opportunities/multimorbidity-a-major-health-challenge-of-21st-century>
9. Sinha A, Kerketta S, Ghosal S, Kanungo S, Pati S. Multimorbidity Among Urban Poor in India: Findings From LASI, Wave-1. *Front Public Health.* 2022 Jun 2;10:881967.
10. Ghosal S, Sinha A, Kerketta S, Acharya AS, Kanungo S, Pati S. Oral health among adults aged ≥45 years in India: Exploring prevalence, correlates and patterns of oral morbidity from LASI wave-1. *Clin Epidemiol Glob Health.* 2022; 18:101177.
11. International Institute for Population Science. National Family Health Survey: Questionnaire. Available from: <https://rchiips.org/nfhs/>
12. World Health Organisation. Standard STEPS Instrument. Available from: <https://www.who.int/publications/m/item/standard-steps-instrument>
13. World Health Organisation. Global physical activity questionnaire (GPAQ). Available from: <https://www.who.int/publications/m/item/global-physical-activity-questionnaire>
14. Petersen, Poul Erik, Baez, Ramon J & World Health Organization. Oral health surveys: basic methods, 5th ed. World Health Organization. 2013. Available from: <https://iris.who.int/handle/10665/97035>
15. International Institute for Population Sciences (IIPS). Longitudinal Ageing Study in India (LASI). Available from: <https://www.iipsindia.ac.in/lasi>
16. Agborsangaya CB, Lau D, Lahtinen M, Cooke T, Johnson JA. Multimorbidity prevalence and patterns across socioeconomic determinants: a cross-sectional survey. *BMC Public Health.* 2012 ;12:201
17. Wolf TG, Cagetti MG, Fisher JM, Seeberger GK, Campus G. Non-communicable Diseases and Oral Health: An Overview. *Frontiers in Oral Health.* 2021;2:725460.
18. Academy Of Medical Sciences. Multimorbidity: a priority for global health research. 2018. Available from: <https://acmedsci.ac.uk/file-download/8222577>
19. Chowdhury SR, Chandra Das D, Sunna TC, Beyene J, Hossain A. Global and regional prevalence of multimorbidity in the adult population in community settings: a systematic review and meta-analysis. *EClinicalMedicine.* 2023;57:101860.
20. Varanasi R, Sinha A, Bhatia M, Nayak D, Manchanda RK, Janardhanan R, Lee JT, Tandon S, Pati S. Epidemiology and impact of chronic disease multimorbidity in India: a systematic review and meta-analysis. *J Multimorb Comorb.* 2024; 14:26335565241258851.