Supplementary Table 1 – Search Strategy

Multimorbidity and health literacy Search Strategy

Pubmed:

(("multimorbidity"[MeSH Terms] OR ("polymorbid"[All Fields] OR "polymorbidity"[All Fields]) OR "Polypathology"[All Fields] OR "pluripathology"[All Fields] OR "multipathology"[All Fields] OR "multicondition"[All Fields] OR (("multiple"[All Fields] OR "multiples"[All Fields]) AND ("chronic disease"[MeSH Terms] OR ("chronic"[All Fields] AND "disease"[All Fields]) OR "chronic disease"[All Fields] OR ("chronic"[All Fields] AND "condition"[All Fields]) OR "chronic condition"[All Fields])) OR (("multiple"[All Fields] OR "multiples"[All Fields]) AND ("chronic disease"[MeSH Terms] OR ("chronic"[All Fields] AND "disease"[All Fields]) OR "chronic disease"[All Fields]))) AND (("health literacy"[MeSH Terms] OR ("health"[All Fields] AND "literacy"[All Fields]) OR "health literacy"[All Fields] OR (("health"[MeSH Terms] OR "health"[All Fields] OR "health s"[All Fields] OR "healthful"[All Fields] OR "healthfulness"[All Fields] OR "healths"[All Fields]) AND ("knowledge"[MeSH Terms] OR "knowledge"[All Fields] OR "knowledge s"[All Fields] OR "knowledgeability"[All Fields] OR "knowledgeable"[All Fields] OR "knowledgeably"[All Fields] OR "knowledges"[All Fields])) OR ("health behaviour"[All Fields] OR "health behavior"[MeSH Terms] OR ("health"[All Fields] AND "behavior"[All Fields]) OR "health behavior"[All Fields]))

Embase: ((multimorbidity/exp OR (polymorbid OR polymorbidity) OR Polypathology OR pluripathology OR multipathology OR multicondition OR ((multiple OR multiples) AND ("chronic disease"/exp OR (chronic AND disease) OR "chronic disease" OR (chronic AND condition) OR "chronic condition")) OR ((multiple OR multiples) AND ("chronic disease"/exp OR (chronic AND disease) OR "chronic disease"))) AND (("health literacy"/exp OR (health AND literacy) OR "health literacy" OR ((health/exp OR health OR "health s" OR healthful OR healthfulness OR healths) AND (knowledge/exp OR knowledge OR "knowledges" OR knowledgeability OR knowledgeable OR knowledgeably OR knowledges)) OR ("health behaviour" OR "health behavior"/exp OR (health AND behavior) OR "health behavior"))))

CINHAL: (((MH multimorbidity+) OR (polymorbid OR polymorbidity) OR Polypathology OR pluripathology OR multipathology OR multicondition OR ((multiple OR multiples) AND ((MH "chronic disease"+) OR (chronic AND disease) OR "chronic disease" OR (chronic AND condition) OR "chronic condition")) OR ((multiple OR multiples) AND ((MH "chronic disease"+) OR (chronic AND disease) OR "chronic disease"))) AND (((MH "health literacy"+) OR (health AND literacy) OR "health literacy" OR (((MH health+) OR health OR "health s" OR healthful OR healthfulness OR healths) AND ((MH knowledge+) OR knowledge OR "knowledge s" OR knowledgeability OR knowledgeable OR knowledgeably OR knowledges)) OR ("health behaviour" OR (MH "health behavior"+) OR (health AND behavior) OR "health behavior"))))

Science direct:

((multimorbidity OR (polymorbid OR polymorbidity) OR Polypathology OR pluripathology OR multipathology OR multicondition OR ((multiple OR multiples) AND ("chronic disease" OR (chronic AND disease) OR "chronic disease" OR (chronic AND condition) OR "chronic condition")) OR ((multiple OR multiples) AND ("chronic disease" OR (chronic AND disease) OR "chronic disease"))) AND (("health literacy" OR (health AND literacy) OR "health literacy" OR ((health OR health OR "health s" OR healthful OR healthfulness OR healths) AND (knowledge OR knowledge OR "knowledges" OR knowledgeability OR knowledgeable OR knowledgeably OR knowledges)) OR ("health behaviour" OR "health behavior" OR (health AND behavior) OR "health behavior"))))

Supplementary Table 1a – PECOS

Participants/population

The review will consider studies that include multiple chronic diseases i.e., at least two or more concurrent chronic disease and health literacy.

Settings

We will include all settings (community, hospital, nursing homes) and types of health care (public, private) among both developed and developing countries. We will perform subgroup analyses according to those settings.

Exposure and comparators

Individuals with multimorbidity whose health literacy is measured will be compared with individuals with multimorbidity whose health literacy is not measured

Outcomes

Studies that quantify the levels of health literacy among multimorbid patients, the association of predisposing factors e.g., demographic, morbidity, health system related etc. among multimorbid individuals.

Supplementary Table 2 – Quality Assessment of Cross-sectional studies

Sl.	Author name and Year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Raw Score	%	Risk of Bias
1.	Abd-Rahim et al. 2021	1	1	1	1	U	1	1	1	7	87.5%	Low
2.	Demir et al. 2022	1	1	1	1	1	1	1	1	8	100.0%	Low
3.	Dinh et al, 2020	1	1	1	1	U	U	1	1	6	75.0%	Low
4.	Dinh et al., 2022	1	1	1	1	1	U	1	1	7	87.5%	Low
5.	Dinh et al., 2023	1	1	1	1	1	U	1	1	7	87.5%	Low
6.	Eton et al., 2019	1	1	1	1	1	1	1	1	8	100.0%	Low
7.	Griese et al., 2022	1	1	1	1	1	1	1	1	8	100.0%	Low
8.	Gurgel do Amaral et al. 2021	1	1	1	1	1	1	1	1	8	100.0%	Low
9.	Hajek et al., 2023	1	1	1	1	U	1	1	1	7	87.5%	Low
10.	Hermans et al., 2021	1	1	1	1	U	U	1	1	6	75.0%	Low
11.	Hopman et al., 2016	1	1	1	1	U	1	1	1	7	87.5%	Low
12.	Hudon et al., 2012	1	1	1	1	U	1	1	1	7	87.5%	Low
13.	Liu et al., 2020	1	1	1	1	1	U	1	1	7	87.5%	Low
14.	Maduka et al., 2020	1	1	1	1	U	1	1	1	7	87.5%	Low
15.	Naik et al.,2011	1	1	1	1	U	1	1	1	7	87.5%	Low
16.	Pedersen et al., 2021	1	1	1	1	1	U	1	1	7	87.5%	Low
17.	Rheult et al., 2021	1	1	1	1	U	1	1	1	8	100.0%	Low
18.	Rheult et al., 2019	1	1	1	1	1	1	1	1	8	100.0%	Low
19.	Schaeffer et al. 2021	1	1	1	1	1	1	1	1	8	100.0%	Low
20.	Selvakumar et al., 2023	1	1	1	1	1	U	1	1	7	87.5%	Low
21.	Shreshta et al., 2018	1	1	1	1	U	1	1	1	7	87.5%	Low
22.	Stomer et al, 2020	1	1	1	1	1	1	1	1	8	100.0%	Low
23.	Ira Suarilah et al., 2021	1	1	1	1	1	1	1	1	8	100.0%	Low
24.	Sun et al., 2022	1	1	1	1	1	1	1	1	8	100.0%	Low
25.	Teles et al. 2021	1	1	1	1	1	1	1	1	8	100.0%	Low
26.	Toci et al., 2015	1	1	1	1	1	1	1	1	8	100.0%	Low
27.	Tomita et al., 2022	1	1	1	1	1	1	1	1	8	100.0%	Low
28.	Wang et al., 2023	1	1	1	1	U	1	1	1	7	87.5%	Low
29.	Wieczorek et al., 2023	1	1	1	1	U	1	1	1	7	87.5%	Low
30.	Woodard et al., 2012	1	1	1	1	1	1	1	1	8	100.0%	Low
31.	Wu et al., 2023	1	1	1	1	1	1	1	1	8	100.0%	Low
32.	Yadav et al., 2020ª	1	1	1	1	U	1	1	1	7	87.5%	Low
33.	Yadav et al, 2020b	1	1	1	U	1	1	1	1	7	87.5%	Low

Q1. Were the criteria for inclusion in the sample clearly defined?
Q2. Were the study subjects and the setting described in detail?
Q3. Was the exposure measured in a valid and reliable way?
Q4. Were objective, standard criteria used for measurement of the condition?
Q5. Were the confounding factors identified?
Q6. Were strategies to deal with confounding factors stated?
Q7. Were the outcomes measured in a valid and reliable way?
Q8. Was appropriate statistical analysis used?

Criteria used to rank the risk of bias

i) ≤49% = high risk of Bias
ii) 50% and 69% = Moderate risk of Bias
iii) Above 70% = low risk of Bias (32 studies)

Supplementary Table 3 – Quality Assessment of RCT studies

Sl.	Author name and Year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Raw Score	%	Risk of Bias
1	Eckman et al., 2012	0	U	1	0	0	U	1	1	1	1	1	1	1	8	61.5%	Moderate

Q1. Was true randomization used for assignment of participants to treatment groups?
Q2. Was allocation to treatment groups concealed?
Q3. Were treatment groups similar at the baseline?
Q4. Were participants blind to treatment assignment?
Q5. Were those delivering treatment blind to treatment assignment?
Q6. Were outcomes assessors blind to treatment assignment?
Q7. Were treatment groups treated identically other than the intervention of interest?
Q8. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?
Q9. Were participants analyzed in the groups to which they were randomized?
Q10. Were outcomes measured in the same way for treatment groups?
Q11. Were outcomes measured in a reliable way?
Q12. Was appropriate statistical analysis used?
Q13. Was the trial design appropriate and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?

Criteria used to rank the risk of bias

i) ≤49% = high risk of Bias
ii) 50% and 69% = Moderate risk of Bias (1 study)
iii) Above 70% = low risk of Bias

Supplementary Table 4 – Quality Assessment of Cohort studies

Sl.	Author name and Year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Raw Score	%	Risk of Bias
1	Friis et al., 2020	1	1	1	1	1	U	1	1	1	U	1	9	81.8%	Low
2	Griva et al., 2020	1	1	1	1	1	1	1	U	1	1	1	10	90.9%	Low

Q1. Were the two groups similar and recruited from the same population?
Q2. Were the exposures measured similarly to assign people to both exposed and unexposed groups?
Q3. Was the exposure measured in a valid and reliable way?
Q4. Were the confounding factors identified?
Q5. Were strategies to deal with confounding factors stated?
Q6. Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?
Q7. Were the outcomes measured in a valid and reliable way?
Q8. Was the follow up time reported and sufficient to be long enough for outcomes to occur?
Q9. Was follow up complete, and if not, were the reasons to loss to follow up described and explored?
Q10. Were strategies to address incomplete follow up utilized?
Q11. Was appropriate statistical analysis used?

Criteria used to rank the risk of bias
i) ≤49% = high risk of Bias
ii) 50% and 69% = Moderate risk of Bias
iii) Above 70% = low risk of Bias (1 study)

Supplementary Table 5 – Quality Assessment of Quasi-experimental studies

Sl.	Author name and Year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Raw Score	%	Risk of Bias
1	Yeung et al. 2017	1	1	1	1	0	1	1	1	1	8	88.9%	Low

Q1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?
Q2. Were the participants included in any comparisons similar?
Q3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?
Q4. Was there a control group?
Q5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?

Q6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?
Q7. Were the outcomes of participants included in any comparisons measured in the same way?
Q8. Were outcomes measured in a reliable way?
Q9. Was appropriate statistical analysis used?

Criteria used to rank the risk of bias
i) ≤49% = high risk of Bias
ii) 50% and 69% = Moderate risk of Bias
iii) Above 70% = low risk of Bias (1 study)

Supplementary Table 6 – Quality Assessment of Qualitative studies

Sl.	Author name and Year	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q1 0	Raw Score	%	Risk of Bias
1	Matima et al., 2018	1	1	1	1	1	U	U	1	1	1	8	80.0%	Low
3	Rheult et al., 2021	1	1	1	1	1	1	1	1	1	1	10	100.0 %	Low
4	Stømer et al., 2020	1	1	1	1	1	U	U	1	1	1	8	80.0%	Low

Q1. Is there congruity between the stated philosophical perspective and the research methodology?
Q2. Is there congruity between the research methodology and the research question or objectives?
Q3. Is there congruity between the research methodology and the methods used to collect data?
Q4. Is there congruity between the research methodology and the representation and analysis of data?
Q5. Is there congruity between the research methodology and the interpretation of results?
Q6. Is there a statement locating the researcher culturally or theoretically?
Q7. Is the influence of the researcher on the research, and vice- versa, addressed?
Q8. Are participants, and their voices, adequately represented?
Q9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?
Q10. Do the conclusions draw in the research report flow from the analysis, or interpretation, of the data?

Criteria used to rank the risk of bias
i) ≤49% = high risk of Bias
ii) 50% and 69% = Moderate risk of Bias
iii) Above 70% = low risk of Bias