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REVIEW

Dionisie et al: Vitamin D's role in adult depression

Vitamin D and depression in adults: A systematic review

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Table S1. MINORS score of included studies (methodological quality assessment of the included studies)

Article		Total Score	Item											
			1	2	3	4	5	6	7	8	9	10	11	12
1	Albolushi T et al. Nutrients. 2022	24	2	2	2	2	2	2	2	2	2	2	2	2
2	Almeida OP et al. Maturitas. 2015	24	2	2	2	2	2	2	2	2	2	2	2	2
3	Anuroj K. East Asian Arch Psychiatry. 2022	21	2	1	2	2	2	2	2	1	2	2	2	1
4	Belzeaux R et al. J Affect Disord. 2018	23	2	2	1	2	2	2	2	2	2	2	2	2
5	Bigman G. Nutr Neurosci. 2022	22	2	2	1	2	2	1	2	2	2	2	2	2
6	Black LJ et al. Aust N Z J Psychiatry. 2014	24	2	2	2	2	2	2	2	2	2	2	2	2
7	Bouloukaki I et al. Fam Pract. 2022	23	2	2	1	2	2	2	2	2	2	2	2	2
8	Briggs R et al. J Am Med Dir Assoc. 2019	24	2	2	2	2	2	2	2	2	2	2	2	2
9	Brouwer-Brolsma EM et al. Eur J Nutr. 2013	23	2	2	1	2	2	2	2	2	2	2	2	2
10	Brouwer-Brolsma EM et al. J Am Med Dir Assoc. 2013	21	2	1	2	2	2	2	0	2	2	2	2	2
11	Ceolin G et al. Nutr J. 2020	22	2	2	1	2	2	2	1	2	2	2	2	2
12	Chan R et al. J Affect Disord. 2011	23	2	2	2	2	2	2	1	2	2	2	2	2
13	Chen L et al. Nutrients. 2020	20	2	1	2	2	2	1	2	1	2	2	2	1
14	Collin C et al. Eur J Nutr. 2017	22	2	1	1	2	2	2	2	2	2	2	2	2
15	de Koning EJ et al. Am J Geriatr Psychiatry. 2018	23	2	2	2	2	2	2	1	2	2	2	2	2
16	de Oliveira C et al. J Gerontol A Biol Sci Med Sci. 2018	23	2	2	1	2	2	2	2	2	2	2	2	2
17	Di Gessa G et al. Sci Rep. 2021	23	2	2	2	2	2	2	1	2	2	2	2	2
18	Elstgeest LEM et al. Eur J Endocrinol. 2018	22	2	2	2	2	2	2	0	2	2	2	2	2
19	Fashanu OE et al. BMC Neurol. 2019	21	2	2	1	2	2	2	0	2	2	2	2	2
20	Goltz A et al. Neuropsychobiology. 2017	19	1	1	1	2	2	2	2	1	2	2	2	1
21	Grudet C et al. Compr Psychoneuroendocrinol. 2022	22	2	1	2	2	2	2	2	2	1	2	2	2
22	Hoang MT et al. Mayo Clin Proc. 2011	23	2	2	1	2	2	2	2	2	2	2	2	2

23	Hoogendijk WJ et al. Arch Gen Psychiatry. 2008	23	2	2	1	2	2	2	2	2	2	2	2	2
24	Huang X et al. Int J Environ Res Public Health. 2018	22	2	1	1	2	2	2	2	2	2	2	2	2
25	Imai CM et al. J Nutr Sci. 2015	24	2	2	2	2	2	2	2	2	2	2	2	2
26	Jääskeläinen T et al. Br J Nutr. 2015	23	2	2	1	2	2	2	2	2	2	2	2	2
27	Jaddou HY et al. Eur Arch Psychiatry Clin Neurosci. 2012	22	2	2	2	2	2	2	2	1	2	2	2	1
28	Jin Y et al. J Obes Metab Syndr. 2017	24	2	2	2	2	2	2	2	2	2	2	2	2
29	Jovanova O et al. Acta Psychiatr Scand. 2017	23	2	2	1	2	2	2	2	2	2	2	2	2
30	Kerr DC et al. Psychiatry Res. 2015	19	2	1	2	2	2	1	2	1	1	2	2	1
31	Kim SH et al. Public Health Nutr. 2020	22	2	2	1	2	2	1	2	2	2	2	2	2
32	Kjærgaard M et al. Psychiatry Res. 2011	18	0	2	1	1	2	2	0	2	2	2	2	2
33	Kwon SI et al. Ann Occup Environ Med. 2015	24	2	2	2	2	2	2	2	2	2	2	2	2
34	Lapid MI et al. Clin Interv Aging. 2013	22	2	2	1	2	2	2	1	2	2	2	2	2
35	Lee DM et al. J Psychopharmacol. 2011	23	2	2	1	2	2	2	2	2	2	2	2	2
36	Li P et al. J Affect Disord. 2022	21	2	2	1	2	2	2	2	1	2	2	2	1
37	Milaneschi Y et al. Mol Psychiatry. 2014	23	2	2	1	2	2	2	2	2	2	2	2	2
38	Milaneschi Y et al. Transl Psychiatry. 2019	20	1	1	2	1	2	1	2	2	2	2	2	2
39	Milaneschi Y et al. J Clin Endocrinol Metab. 2010	24	2	2	2	2	2	2	2	2	2	2	2	2
40	Mizoue T et al. J Nutr. 2015	24	2	2	2	2	2	2	2	2	2	2	2	2
41	Moy FM et al. Public Health Nutr. 2017	23	2	1	2	2	2	2	2	2	2	2	2	2
42	Nanri A et al. Eur J Clin Nutr. 2009	24	2	2	2	2	2	2	2	2	2	2	2	2
43	Pan A et al. J Affect Disord. 2009	21	0	2	2	1	2	2	2	2	2	2	2	2
44	Rabenberg M et al. J Affect Disord. 2016	23	2	2	1	2	2	2	2	2	2	2	2	2
45	Rhee SJ et al. Front Psychiatry. 2020	22	2	2	1	2	2	1	2	2	2	2	2	2
46	Sahasrabudhe N et al. J Nutr. 2020	23	2	1	2	2	2	2	2	2	2	2	2	2
47	Schaad KA et al. J Int Soc Sports Nutr. 2019	21	2	1	1	2	2	1	2	2	2	2	2	2
48	Sherchand O et al. Psychiatry Res. 2018	18	1	2	1	2	2	1	2	1	1	2	2	1

49	Shin YC et al. J Psychosom Res. 2016	23	2	2	1	2	2	2	2	2	2	2	2	2
50	Song BM et al. J Affect Disord. 2016	24	2	2	2	2	2	2	2	2	2	2	2	2
51	Sotoudeh G et al. Ann Gen Psychiatry. 2020	23	2	2	2	2	2	1	2	2	2	2	2	2
52	Stewart R et al. Psychosom Med. 2010	23	2	2	1	2	2	2	2	2	2	2	2	2
53	Terock J et al. Brain Behav. 2020	24	2	2	2	2	2	2	2	2	2	2	2	2
54	Toffanello ED et al. J Gerontol A Biol Sci Med Sci. 2014	22	2	2	1	2	2	2	1	2	2	2	2	2
55	van den Berg KS et al. Int J Geriatr Psychiatry. 202	23	2	2	2	2	2	2	1	2	2	2	2	2
56	van den Berg KS et al. J Psychosom Res. 2016	24	2	2	2	2	2	2	2	2	2	2	2	2
57	Vidgren M et al. J Nutr Health Aging. 2018	23	2	2	1	2	2	2	2	2	2	2	2	2
58	Wainberg M et al. Transl Psychiatry. 2021	22	1	2	1	2	2	2	2	2	2	2	2	2
59	Williams JA et al. J Gerontol A Biol Sci Med Sci. 2015	24	2	2	2	2	2	2	2	2	2	2	2	2
60	Yao Y et al. BMC Geriatr. 2018	23	2	2	1	2	2	2	2	2	2	2	2	2
61	Zhang Z et al. Nutrients. 2021	23	2	2	1	2	2	2	2	2	2	2	2	2
62	Zhao G et al. Br J Nutr. 2010	24	2	2	2	2	2	2	2	2	2	2	2	2
63	Zhu DM et al. Front Psychiatry. 2019	19	2	1	1	2	2	1	2	1	2	2	2	1
64	Arathimos R et al. Transl Psychiatry. 2021	23	2	2	1	2	2	2	2	2	2	2	2	2
65	Voshaar O et al. Transl Psychiatry 2014	24	2	2	2	2	2	2	2	2	2	2	2	2
66	Köhnke C et al. Nutr Neurosci 2022	24	2	2	2	2	2	2	2	2	2	2	2	2

Items: 1. A clearly stated aim; 2. Inclusion of consecutive patients; 3. Prospective collection of data; 4. Endpoints appropriate to the aim of the study; 5. Unbiased assessment of the study endpoint; 6. Follow-up period appropriate to the aim of the study; 7. Loss to follow up less than 5%; 8. Prospective calculation of the study size; 9. An adequate control group; 10. Contemporary groups; 11. Baseline equivalence of groups; 12. Adequate statistical analyses.

0 = not reported; 1 = reported but inadequate; 2 = reported and adequate.

The global ideal score is 16 for non-comparative studies and 24 for comparative studies.

Table S2. MMAT score of included studies (risk of bias assessment)

Article		Study design	Criteria				Risk of bias score
			1	2	2	4	
1	Albolushi T et al. Nutrients. 2022	Cross-Sectional	Y	Y	Y	Y	****
2	Almeida OP et al. Maturitas. 2015	Cross-Sectional	Y	Y	Y	Y	****
3	Anuroj K. East Asian Arch Psychiatry. 2022	Cross-Sectional	Y	N	Y	Y	***
4	Belzeaux R et al. J Affect Disord. 2018	Case-Control	Y	C	C	Y	**
5	Bigman G. Nutr Neurosci. 2022	Cross-Sectional	Y	Y	Y	Y	****
6	Black LJ et al. Aust N Z J Psychiatry. 2014	Cross-Sectional	Y	Y	Y	Y	****
7	Bouloukaki I et al. Fam Pract. 2022	Cohort	N	N	Y	Y	**
8	Briggs R et al. J Am Med Dir Assoc. 2019	Cohort	Y	Y	Y	Y	****
9	Brouwer-Brolsma EM et al. Eur J Nutr. 2013	Cross-Sectional	N	Y	Y	Y	***
10	Brouwer-Brolsma EM et al. J Am Med Dir Assoc. 2013	Cohort	Y	Y	Y	C	***
11	Ceolin G et al. Nutr J. 2020	Cross-Sectional	Y	Y	Y	C	***
12	Chan R et al. J Affect Disord. 2011	Cohort	C	Y	Y	C	**
13	Chen L et al. Nutrients. 2020	Cross-Sectional	Y	Y	C	C	**
14	Collin C et al. Eur J Nutr. 2017	Cross-Sectional	Y	Y	Y	C	***
15	de Koning EJ et al. Am J Geriatr Psychiatry. 2018	Cross-Sectional	C	Y	Y	Y	***
16	de Oliveira C et al. J Gerontol A Biol Sci Med Sci. 2018	Cross-Sectional	C	Y	Y	Y	***
17	Di Gessa G et al. Sci Rep. 2021	Cross-Sectional	Y	Y	Y	Y	****
18	Elstgeest LEM et al. Eur J Endocrinol. 2018	Cross-Sectional	Y	Y	Y	Y	****
19	Fashanu OE et al. BMC Neurol. 2019	Cohort	C	Y	Y	Y	***
20	Goltz A et al. Neuropsychobiology. 2017	Case-Control	Y	Y	Y	C	***
21	Grudet C et al. Compr Psychoneuroendocrinol. 2022	Cross-Sectional	Y	Y	Y	C	***
22	Hoang MT et al. Mayo Clin Proc. 2011	Cross-Sectional	Y	Y	Y	N	***

23	Hoogendijk WJ et al. Arch Gen Psychiatry. 2008	Cross-Sectional	Y	Y	Y	Y	****
24	Huang X et al. Int J Environ Res Public Health. 2018	Cross-Sectional	Y	Y	Y	N	***
25	Imai CM et al. J Nutr Sci. 2015	Cross-Sectional	N	Y	Y	N	**
26	Jääskeläinen T et al. Br J Nutr. 2015	Cohort	Y	Y	Y	N	***
27	Jaddou HY et al. Eur Arch Psychiatry Clin Neurosci. 2012	Cohort	Y	Y	Y	Y	****
28	Jin Y et al. J Obes Metab Syndr. 2017	Cross-Sectional	Y	Y	Y	N	***
29	Jovanova O et al. Acta Psychiatr Scand. 2017	Cross-Sectional	Y	Y	Y	Y	****
30	Kerr DC et al. Psychiatry Res. 2015	Cross-Sectional	Y	Y	Y	Y	****
31	Kim SH et al. Public Health Nutr. 2020	Cross-Sectional	Y	Y	Y	Y	****
32	Kjærgaard M et al. Psychiatry Res. 2011	Cross-Sectional	Y	Y	N	N	**
33	Kwon SI et al. Ann Occup Environ Med. 2015	Cross-Sectional	Y	Y	Y	N	***
34	Lapid MI et al. Clin Interv Aging. 2013	Cross-Sectional	Y	Y	Y	N	***
35	Lee DM et al. J Psychopharmacol. 2011	Cross-Sectional	Y	Y	Y	N	***
36	Li P et al. J Affect Disord. 2022	Cross-Sectional	Y	Y	Y	N	***
37	Milaneschi Y et al. Mol Psychiatry. 2014	Cohort	Y	Y	Y	N	***
38	Milaneschi Y et al. Transl Psychiatry. 2019	Cross-Sectional	Y	Y	Y	N	***
39	Milaneschi Y et al. J Clin Endocrinol Metab. 2010	Cross-Sectional	Y	Y	Y	N	***
40	Mizoue T et al. J Nutr. 2015	Cross-Sectional	Y	Y	Y	N	***
41	Moy FM et al. Public Health Nutr. 2017	Cross-Sectional	Y	Y	Y	N	***
42	Nanri A et al. Eur J Clin Nutr. 2009	Cross-Sectional	Y	Y	Y	C	***
43	Pan A et al. J Affect Disord. 2009	Cross-Sectional	N	Y	Y	N	**
44	Rabenberg M et al. J Affect Disord. 2016	Cross-Sectional	Y	Y	Y	Y	****
45	Rhee SJ et al. Front Psychiatry. 2020	Cross-Sectional	Y	Y	Y	N	***
46	Sahasrabudhe N et al. J Nutr. 2020	Cohort	N	Y	Y	Y	***

47	Schaad KA et al. J Int Soc Sports Nutr. 2019	Retrospective cohort	Y	Y	Y	N	***
48	Sherchand O et al. Psychiatry Res. 2018	Cross-Sectional	Y	Y	Y	N	***
49	Shin YC et al. J Psychosom Res. 2016	Cross-Sectional	N	Y	Y	N	**
50	Song BM et al. J Affect Disord. 2016	Case-Control	N	Y	C	N	*
51	Sotoudeh G et al. Ann Gen Psychiatry. 2020	Cohort	Y	Y	Y	N	***
52	Stewart R et al. Psychosom Med. 2010	Cross-Sectional	Y	Y	Y	N	***
53	Terock J et al. Brain Behav. 2020	Cohort	Y	Y	Y	N	***
54	Toffanello ED et al. J Gerontol A Biol Sci Med Sci. 20Y4	Cross-Sectional	Y	Y	Y	N	***
55	van den Berg KS et al. Int J Geriatr Psychiatry. 202	Cross-Sectional	Y	Y	Y	N	***
56	van den Berg KS et al. J Psychosom Res. 2016	Cross-Sectional	Y	Y	Y	Y	****
57	Vidgren M et al. J Nutr Health Aging. 2018	Case-Control	Y	Y	Y	Y	****
58	Wainberg M et al. Transl Psychiatry. 2021	Cohort	Y	Y	Y	N	***
59	Williams JA et al. J Gerontol A Biol Sci Med Sci. 2015	Cross-Sectional	Y	Y	Y	N	***
60	Yao Y et al. BMC Geriatr. 2018	Cross-Sectional	Y	Y	Y	N	***
61	Zhang Z et al. Nutrients. 202Y	Cross-Sectional	Y	Y	Y	N	***
62	Zhao G et al. Br J Nutr. 2010	Cross-Sectional	Y	Y	Y	C	***
63	Zhu DM et al. Front Psychiatry. 2019	Cross-Sectional	Y	Y	Y	Y	****
64	Arathimos R et al. Transl Psychiatry. 2021	Cross-Sectional	Y	Y	Y	N	***
65	Voshaar O et al. Transl Psychiatry 2014	Cross-Sectional	Y	Y	Y	Y	****
66	Köhnke C et al. Nutr Neurosci 2022	Cohort	Y	Y	Y	Y	****

Criteria: 1. Are participants (organizations) recruited in a way that minimizes measurements appropriate (clear origin, or validity known, or standard instrument; and absence of contamination between groups when appropriate) regarding the exposure/intervention and outcomes? 3. In the groups being compared (exposed vs. nonexposed; with intervention vs. without; cases vs. controls), are the

participants comparable, or do researchers take into account (control for) the difference between these groups? 4. Are there complete outcome data (80% or above), and, when applicable, an acceptable response rate (60% or above), or an acceptable follow-up rate for cohort studies (depending on the duration of follow-up)?
Y: yes; N: no; C: Can't tell
*: 25% of criteria are met; **: 50% of criteria are met; ***: 75% of criteria are met; ****: 100% of criteria are met.
* (25%) indicates a high risk of bias while **** (100%) indicates a low risk of bias.