評価対象論文リスト(要因:低栄養、アウトカム:フレイル・サルコペニア)

評価判定日:2024/8/22

(フレイル)

①既存の系統的レビュー・メタ解析・統合解析

1	Artaza-Artabe I, Sáez-López P, Sánchez-Hernández N, Fernández-Gutierrez N, Malafarina V. The relationship between nutrition and frailty: Effects of protein intake, nutritional supplementation, vitamin D and exercise on muscle metabolism in the elderly. A systematic review. Maturitas. 2016;93:89-99.
2	Lorenzo-López L, Maseda A, De Labra C, Regueiro-Folgueira L, Rodríguez-Villamil JL, Millán-Calenti JC. Nutritional determinants of frailty in older adults: A systematic review. BMC Geriatr. 2017;17(1):108. doi:10.1186/s12877-017-0496-2
3	Verlaan S, Ligthart-Melis GC, Wijers SLJ, Cederholm T, Maier AB, De Van Der Schueren MAE. High prevalence of physical frailty among community-dwelling malnourished older adults–a systematic review and meta-analysis. Journal of the American Medical Directors Association. 2017;18(5):374-382.
4	Xu R, Li Q, Guo F, Zhao M, Zhang L. Prevalence and risk factors of frailty among people in rural areas: a systematic review and meta-analysis. BMJ Open. 2021;11(4):e043494. doi:10.1136/bmjopen-2020-043494
5	Wang X, Hu J, Wu D. Risk factors for frailty in older adults. Medicine. 2022;101(34):e30169. doi:10.1097/MD.0000000000030169
6	Qin Y, Hao X, Lv M, Zhao X, Wu S, Li K. A global perspective on risk factors for frailty in community-dwelling older adults: A systematic review and meta-analysis. Archives of Gerontology and Geriatrics. 2023;105:104844. doi:10.1016/j.archger.2022.104844

（フレイル）

■メタ解析、系統的レビュー

Reference			Include study					Category	Cochran-Mantel-Haenszel Test		
Author	Title	Year	Ref No.	First author	Year	n	Age, Years Mean (SD)		DF	Value	P value
Verlaan S, Ligthart-Melis GC, Wijers SLJ, Cederholm T, Maier AB, de van der Schueren MAE.	High Prevalence of Physical Frailty Among Community-Dwelling Malnourished Older Adults-A Systematic Review and Meta-Analysis	2017	19	Beaudart	2015	534	73.5 (6.2)		4	65.274	<.0001
			20	Bollwein	2013	206	83 (75-96)*		2	41.552	<.0001
			24	Eygigor	2015	1126	Not disclosed		4	190.8	<.0001
			29	Jürschik	2014	512	81.2 (5.0)		4	94.566	<.0001
			33	Martinez Reig	2014	678	78.0 (5.7)	prevalence of malnutrition	4	86.938	<.0001
			34	Maseda	2016	749	75.8 (7.2)		4	38.51	<.0001
			36	Papiol	2015	298	80.3 (3.5)		4	18.046	0.0012
			38	Ruiz-Arregui	2013	583	79.5 (7.1)		4	93.555	<.0001
			39	Satake	2015	164	76.4 (6.2)		4	18.74	0.0009
			43	Turusheva	2016	597	74.5 (5.9)		4	53.887	<.0001
								Pooled data	4	628.16	<.0001
								Pooled prevalence of physical frailty and nutritional status;			
								Malnourished			
								Robust	8 (0.1%)		
								Pre-Frail	33 (1%)		
								Frail	87 (2%)		
								At risk of mainutrition			
								Robust	123 (2%)		
								Pre-Frail	469 (9%)		
								Frail	444 (8%)		
								Normal nutritional status			
								Robust	1465 (27%)		
								Pre-Frail	2308 (42%)		
								Frail	510 (9%)		
Wang X, Hu J, Wu D.	Risk factors for frailty in older adults	2022		Moradell	2021	33			Risk ratio (95%CI)	Weight	
				Setiati	2021	888		Malnutrition	3.47 (1.25, 9.58)	5.1	
									2.04 (1.68, 2.48)	94.9	
								Overall	2.11 (1.74, 2.57)	100	
									Mean difference (05% CI)	Weight	
				Arts	2021				0.90 [-0.19, 1.99]	6.7	
				Ayesta	2021				-2.40 [-4.13, -0.67]	2.7	
				Hong	2019				-0.21 [-1.03, 0.61]	11.8	

Kim	2021		0.40 [-0.70, 1.50]	6.6
kume	2021		0.60 [-1.13, 2.33]	2.7
Lee	2014	lower BMI	-2.00 [-3.00, -1.00]	8
Moradell	2021		2.20 [-1.31, 5.71]	0.6
Okamura	2021		-0.30 [-0.80, 0.20]	31.4
Ozsoy	2021		1.48 [-0.25, 3.21]	2.7
Rizka	2021		-1.30 [-2.41, -0.19]	6.5
Valdivieso	2021		0.30 [-1.93, 2.53]	1.6
Xu	2021		-1.50 [-2.15, -0.85]	18.8
		Total	-0.55 [-0.83, -0.27]	100

(サルコペニア)

■メタ解析、系統的レビュー1

Reference			Include study					
Author	Title	Year	First author	Year	Category	Relative risk (95% CI or p)	Weight	**Magnitude of association**
Gao Q, Hu K, Yan C, Zhao B, Mei F, Chen F, Zhao L, Shang Y, Ma Y, Ma B.	Associated Factors of Sarcopenia in Community-Dwelling Older Adults: A Systematic Review and Meta-Analysis	2021	Gao	2015	malnutrition / malnutrition risk	3.53 (1.68, 7.41)	8.73	↑ ↑ ↑
			Sousa-santos	2019		1.86 (1.01, 3.43)	12.86	
			Simsek	2019		8.01 (3.07, 20.89)	5.23	
			Su	2019		0.79 (0.34, 1.87)	6.62	
			Su	2019		4.37 (0.77, 24.78)	1.6	
			Kuo	2019		2.86 (1.13, 7.22)	5.61	
			Kuo	2019		2.79 (0.87, 8.91)	3.56	
			Kuo	2019		3.28 (0.68, 15.91)	1.93	
			Nasimi	2019		2.29 (1.03, 5.09)	7.53	
			Kurose	2020		2.42 (1.04, 5.60)	6.78	
			Wang	2019		5.60 (2.68, 11.71)	8.83	
			Tramontano	2017		3.20 (0.80, 12.40)	2.56	
			Alexandre	2014		3.15 (2.03, 4.89)	24.87	
			Alexandre	2014		11.54 (3.45, 38.59)	3.3	
					Overall	2.99 (2.40, 3.72)	100	
			Tseng	2020	BMI Under weight	2.31 (1.01, 5.33)	8.05	
			Han	2015		1.05 (0.29, 3.82)	5.35	
			Lau	2005		39.10 (11.30, 134.60)	5.59	
			Lau	2005		9.70 (2.80, 33.80)	5.56	
			Wang	2020		15.16 (1.66, 138.51)	2.52	
			Zhang	2018		4.28 (2.25, 8.15)	9.41	
			Mei	2017		5.03 (1.46, 17.32)	5.6	
			Kim	2014		1.57 (1.35, 1.83)	12.34	
			Kim	2014		1.45 (1.17, 1.81)	12.11	
			Nasimi	2019		10.64 (2.20, 51.25)	4.17	
			Tramontano	2017		3.30 (1.00, 11.00)	5.8	
			Momoki	2016		5.93 (1.17, 30.12)	4	
			dos SANTOS	2015		5.14 (1.94, 13.57)	7.11	

			Zhang	2020		2.15 (0.21, 22.35)	2.31	
			da Silva	2016		4.00 (1.00, 15.94)	4.91	
			Pelegrini	2018		5.79 (1.52, 21.40)	5.19	
					Overall	3.78 (2.55, 5.60)	100	↑ ↑ ↑
Kramer CS, Groenendijk I, Beers S, Wijnen HH, van de Rest O, de Groot LCPGM.	The Association between Malnutrition and Physical Performance in Older Adults: A Systematic Review and Meta-Analysis of Observational Studies	2022				Mean difference (95% CI)		
			Chatindiara			2.51 [-0.62, 5.64]	3.4	
			Turusheva			3.97 [1.93, 6.01]	4.9	
			Zhang			4.00 [3.15, 4.85]	6.8	
			Zhang			6.30 [5.06, 7.54]	6.2	
			Johansson			3.80 [1.98, 5.62]	5.3	
			Johansson			7.10 [3.79, 10.41]	3.2	
			Suzana			1.60 [-0.76, 3.96]	4.4	
			Dent			2.40 [-0.78, 5.58]	3.3	
			Goldfarb			3.50 [2.19, 4.81]	6.1	
			Inoue		At risk of	2.70 [0.59, 4.81]	4.8	
			Lecheta		malnutrition	3.40 [1.02, 5.78]	4.4	
			Misu		group, Outcome =	1.00 [-1.19, 3.19]	4.7	
			Ogawa		HGS (kg)	6.60 [4.31, 8.89]	4.5	
			Zhou			6.39 [0.60, 12.18]	1.5	
			Holst			3.50 [1.76, 5.24]	5.4	
			Kaburagi			4.00 [0.92, 7.08]	3.4	
			Chevalier			1.50 [-1.07, 1.93]	7.2	
			Norman			3.74 [-0.10, 7.58]	2.7	
			Pierik			0.30 [-1.39, 1.99]	5.5	
			Pierik			2.80 [0.02, 5.58]	3.8	
			Borkent			3.72 [0.81, 6.63]	3.7	
			Hegendorff			5.44 [3.39, 7.49]	4.9	
					Overall	3.51 [2.72, 4.30]	100	↑ ↑ ↑
			Turusheva			7.39 [0.71, 14.07]	3.5	
			Zhang			4.00 [3.08, 4.92]	10.9	
			Zhang			7.00 [5.68, 8.32]	10.4	
			Ramsey			1.10 [-1.19, 3.39]	8.9	
			Reijnierse			1.49 [-1.63, 4.61]	7.6	
			Wang		Malnourished	6.40 [4.82, 7.98]	10.1	

Dent	Malnourished groups, Outcome = HGS (kg)	7.00 [3.81, 10.19]	7.5	
Goldfarb		6.60 [4.52, 8.68]	9.3	
Inoue		5.90 [3.47, 8.33]	8.7	
Lecheta		-1.90 [-8.10, 4.30]	3.8	
Chevalier		3.50 [1.01, 5.99]	8.6	
Norman		10.63 [6.33, 14.93]	5.8	
Pourhassan		3.00 [-2.14, 8.14]	4.8	
	Overall	4.92 [3.43, 6.41]	100	↑ ↑ ↑
Romero-Ortuno	At risk of malnutrition group, Outcome = TUG (s)	-6.41 [-8.88, -3.94]	13.9	
Lecheta		-0.10 [-2.43, 2.23]	14.2	
Misu		0.17 [-0.26, 0.60]	18	
Schrader		-3.40 [-6.80, 0.00]	11.4	
Kieswetter		-3.30 [-7.24, 0.64]	10.1	
Borkent		-1.38 [-2.95, 0.19]	16.2	
Kocyigit		-4.42 [-6.00, -2.84]	16.1	
	Overall	-2.53 [-4.42, -0.65]	100	
Tramontano	at risk of malnutrition groups, Outcome = SPPB (points)	0.95 [0.89, 1.01]	47	
Goldfarb		1.30 [0.90, 1.70]	27.2	
Ogawa		2.00 [0.84, 3.16]	6.5	
Kieswetter		1.20 [0.45, 1.95]	13.3	
Vahlberg		1.76 [0.54, 2.98]	6	
	Overall	1.20 [0.88, 1.51]	100	—

(サルコペニア)

■横断研究

Reference			Study subjects										
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or deaths	Participant's race	Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	**Magnitude of association**
Kurose S, Nishikawa S, Nagaoka T, Kusaka M, Kawamura J, Nishioka Y, Sato S, Tsutsumi H, Kimura Y.	Prevalence and risk factors of sarcopenia in community-dwelling older adults visiting regional medical institutions from the Kadoma Sarcopenia Study	2020		552	community-dwelling older adults	sarcopenia		japanese	predictors of sarcopenia normal	123	OR(95%CI or p);		age (75years and over), obesity, hypertension, osteoporosis, dementia, anemia (hemoglobin; male: less than 13.0 g/dl, female: less than 12.0 g/dl), certification of long-term care, use of bicycles, number of daily conversations (5 or more people).	↑ ↑ ↑
									malnutrition	429	2.43(1.04-5.60)	0.039		
Tsutsumimoto K, Doi T, Nakakubo S, Kim M, Kurita S, Ishii H, Shimada H.	Association between anorexia of ageing and sarcopenia among Japanese older adults	2020		9496	community-dwelling elderly	sarcopenia	n=379	japanese	without anorexia of ageing	n=61(6.6%)	Ref		sociodemographic factors (age, sex, and education), medical conditions (polypharmacy, hypertension, diabetes, and hyperlipidaemia), lifestyle factors (drinking habit, smoking habit, and physical activity), and neuropsychological factors (cognitive decline and depressive symptoms)	
									with anorexia of ageing	n=318(3.7%)	1.42 (1.06 -1.92)	0.02		
									Lower albumin (vs. 4.2 g/dL or higher)	N/A	1.57 (1.24 - 2.00)	<0.001		↑ ↑