Appendix 2. Methodological quality assessment of included studies

The criteria for the methodological quality assessment is given in two parts. Part A lists the criteria and indicates whether each criterion addresses internal validity (V) or informativeness (I) or both. Part B gives the method of scoring each criterion. All items are scored into four categories: + positive (met criterion, design or conduct adequate); – negative (did not meet criterion, design or conduct inadequate); ? unclear if met (item insufficiently described); NA (not applicable). A methodological quality assessment score was calculated by summing the number of criteria met (+), divided by the applicable number of criteria, multiplied by 100 to generate a percentage. Studies with methodological assessment scores over 60% are considered high quality.

Criteria – Part A		V/I
Study design		
a.	Prospective cohort/RCTs study was used	V
b.	The percentage of withdrawals ≤ 20%	V
c.	Information about completers vs withdrawals	I
d.	Duration of the study reported (date of start and completion)	I
Study population		
e.	Description of relevant inclusion and exclusion criteria for selection of participants	I
f.	Selection participants before outcomes (bone mineral status and fracture) assessed	V
g.	Nonbiased selection of participants and with exclusion criteria applied equally to all	V
h.	Sufficient description of characteristics of participants at baseline	I
i.	Response rate of participants ≥ 80% or ≥ 60% and known characteristics of responders and non-responders comparable	I
Assessment of dietary patterns (exposures)		
j.	Method used to measure dietary intake is valid	V
k.	Dietary intake was measured identically in entire studied population	V
l.	An appropriate empirical approach to identify dietary patterns is described	V
m.	Description of an appropriate method for calculation of dietary pattern scores	I
Assessment of bone density (outcome)		
n.	An appropriate method of bone density measurement was used and performed according to a standardised protocol	V
o.	Bone density measured at clinically relevant sites	I
Assessment of fracture (outcome)		
p.	Protocol described valid method of fracture assessment	V
q.	Clinically relevant fracture sites measured	I
r.	Method of fracture measurement is identical for entire study population	V
Analysis and data presentation		
s.	Data presented for bone density and/or fracture outcomes	I
t.	Appropriate statistical tests used	V
u.	Adjusted for key confounders	V
v.	Description of an appropriate method for dealing with missing data	I

I, criterion on informativeness; V, criterion on validity/precision; RCT, randomised controlled trial

Specific criteria list for the quality assessment of methodology (see criteria – Part A above)

Criteria – Part B
Study design
a. Adequate if prospective cohort or RCTs was used. Also positive in case of a historical (retrospective) cohort when the determinants were measured before the outcome was determined. Unclear if a historical cohort was used, considering determinants at baseline which were not related to the primary research question for which the cohort was created or in case of ambispective design. Also unclear if insufficient information about trial design and randomisation.
b. Adequate if the total withdrawal rate ≤20%. Not applicable if study design was not prospective cohort or RCTs.
c. Adequate if at least two out of five following information were described for completers and withdrawals: • Age • Sex • BMI • Dietary patterns • Bone mineral status or fracture Not applicable if study design was not prospective cohort or RCTs.
d. Adequate if the study date of start and completion was described.
Study population
e. Adequate if relevant inclusion and exclusion criteria were formulated.
f. Adequate if the study population was selected before bone mineral density and fracture status were measured. Also adequate if (sub-) groups were selected at a uniform point in the study.
g. Adequate if participants were selected from the same population (primary study base) and exclusion criteria were equally applied to all participants.
h. Adequate if bone mineral status or fracture and at least 7 out of 13 items below were presented: • Age (mean, SD) • Sex • BMI (mean, SD) or height and weight • Smoking status • Physical activity • Energy intake • Medical history • Medication intake • Fall history • Fracture history • Place of recruitment • Sampling frame of source population (identified community, hospital or general population) • Sample size
i. Adequate if response rate ≥ 80% or ≥ 60% and known characteristics of responders and non-responders sufficiently comparable to suggest minimal selection bias
Assessment of dietary patterns (exposures)
j. Adequate if dietary intake using a validated method such as 24-hour recall, diet record or validated food frequency questionnaire.
k. Adequate if dietary intake was measured in an identical way for the whole studied population.

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Criteria – Part B (cont'd)
l. Adequate if dietary patterns were identified from a validated empirical approach such as factor analysis, principal component analysis, cluster analysis, reduced rank regression or partial least-squares regression.
m. Adequate if dietary pattern scores were calculated using a valid method such as sum score by factor, weighted sum score, regression score or Bartlett score.
Assessment of bone density (outcome)
n. Adequate if an appropriate method of bone density measurement such as dual energy X-ray absorptiometry (DXA), quantitative computed tomography (QCT) or ultrasound was performed identically for each participant following a standardised protocol.
o. Adequate if bone mineral density was measured at one or more following sites: lumbar spine, total hip, femoral neck, distal radius or forearm and if total body bone mineral content was measured.
Assessment of fracture (outcome)
p. Adequate if fracture assessment using a valid method was described. (For radiological vertebral fracture measurement must use CT, X-ray, DXA-based vertebral morphometry or MRI, other fractures must have been confirmed from radiology)
q. Adequate if fracture was measured at one or more following sites total, hip, distal forearm or radius and clinical (symptomatic) or radiological vertebral fracture.
r. Adequate if the fracture was measured in an identical way for all studied individuals.
Analysis and data presentation
s. Adequate if the results of test of associations between exposures and outcomes are reported, including measures of variance, precision or a *P* value.
t. Adequate if suitable statistical tests were used to measure the association between exposures and outcomes.
u. Adequate if studies were adjusted at least four out of the following confounders such as age, sex, BMI or height or weight, physical activity, energy intake, smoking, menopausal status (in women) and medication affecting bone metabolism.
v. Adequate if an appropriate method to treat missing data was described. For example, baseline characteristics of those who lost to follow-up and withdrawals was compared; inverse probability or multiple imputation was used. Not applicable if study design was not prospective cohort or RCTs.

BMI, body mass index; CT, computed tomography; MRI, magnetic resonance imaging; RCT, randomised controlled trial; SD, standard deviation