

What is the best estimate of how quickly adults who currently have a poor diet can expect to see an improvement in mental well-being or life satisfaction if they improve their diet?

When adults improve their diet, measurable enhancements in mental well-being typically emerge around 3 weeks, becoming more robust by 2 months and lasting at least 3 months.

Abstract

Adults with a poor diet may begin to experience measurable improvements in mental well-being within a few weeks of adopting a healthier eating pattern. For example, a Mediterranean-style intervention yielded significant reductions in depressive symptoms in as few as 3 weeks (effect sizes of 0.65–0.75), with benefits that persisted at 3 months. A high polyphenol diet also produced a 66.6% reduction in depression scores after 8 weeks. In contrast, interventions focused largely on increasing fruit and vegetable consumption have been associated with a modest life satisfaction increase (0.24 point per eight extra portions per day) over a longer duration (24 months). Other studies report improvements as early as 10 days, while several whole-diet interventions generally show benefits between 3 and 6 months. Thus, based on the studies reviewed, measurable improvements in mental well-being or life satisfaction can be expected as early as about 3 weeks, with many interventions showing robust changes by 2 months that are sustained for at least 3 months and beyond.

Paper search

Using your research question "What is the best estimate of how quickly adults who currently have a poor diet can expect to see an improvement in mental well-being or life satisfaction if they improve their diet?", we searched across over 126 million academic papers from the Semantic Scholar corpus. We retrieved the 50 papers most relevant to the query.

Screening

We screened in sources that met these criteria:

- **Population Age:** Does the study include only adult participants (aged 18 or older)?
- **Baseline Diet:** Does the study assess and confirm poor dietary patterns at baseline?
- **Intervention Type:** Does the study examine whole dietary pattern improvements (rather than single nutrient supplementation)?
- **Outcome Measures:** Does the study include quantitative measures of mental well-being or life satisfaction as primary outcomes?
- **Study Design:** Is the study longitudinal (RCT or cohort study) with at least 2 weeks of follow-up?
- **Temporal Documentation:** Does the study report specific timeframes between dietary changes and measured outcomes?
- **Intervention Isolation:** Is the dietary intervention studied independently of other major lifestyle interventions?
- **Mental Health Status:** Does the study focus on generally healthy participants (not exclusively on those with severe mental illness or eating disorders)?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Data extraction

We asked a large language model to extract each data column below from each paper. We gave the model the extraction instructions shown below for each column.

- **Study Design:**

Identify the specific type of study design used:

- Specify if it is a longitudinal study, cohort study, panel study, or other design
- Look in the methods section for explicit description of study design
- If multiple design elements are present, list all relevant characteristics
- If design is unclear, note "design not clearly specified" Examples of acceptable answers:
- Longitudinal panel study with three waves of data (2010-2017)
- Prospective cohort study using repeated measures

- **Participant Characteristics:**

Extract key demographic information about study participants:

- Total sample size
- Age range or mean age
- Gender distribution (percentage male/female)
- Geographic location/country
- Any specific inclusion/exclusion criteria

If information is incomplete, note which details are missing. Use precise numerical values where possible.
Example: "12,385 Australian adults, mean age 45.2 years, 52% female"

- **Diet Intervention Details:**

Describe the dietary changes or interventions:

- Specific dietary modifications (e.g., increase in fruit/vegetable portions)
- Quantity of dietary change (exact number of portions/servings)
- Method of measuring dietary intake (food diaries, questionnaires)
- Duration of dietary intervention or observation period

If multiple dietary changes were tracked, list all relevant details. Use precise numerical values and units.
Example: "Increase of 8 portions of fruits and vegetables per day, measured via food diaries over 24 months"

- **Mental Well-being Outcome Measures:**

Identify specific mental well-being outcomes measured:

- Exact measurement tools used (e.g., GHQ-12, life satisfaction scale)
- Specific metrics or scoring systems
- Time points of measurement
- Range of possible scores

If multiple outcomes were measured, list all primary outcomes. Note the source and validation of measurement tools. Example: "GHQ-12 mental well-being score, range 0-36, measured at baseline and 24-month follow-up"

- **Time to Mental Well-being Improvement:**

Extract specific information about:

- Duration until observable mental well-being changes
- Magnitude of improvement (numerical values if available)
- Statistical significance of changes

Prioritize direct statements about time to improvement. If multiple timeframes are reported, list all with their corresponding results. Example: "Improvements in well-being observed within 24 months, approximately 0.24 life-satisfaction points gained"

Results

Characteristics of Included Studies

Study	Study Design	Population Characteristics	Intervention Type	Duration of Follow-up	Full text retrieved
Francis et al., 2019	Randomized Controlled Trial (parallel group), longitudinal follow-up	101 Australian young adults, 17–35 years, 63% female (Diet), 62% female (Control), poor diet, elevated depression	Brief diet improvement (increased fruit, vegetables, wholegrains, lean protein, etc.)	3 weeks + 3-month follow-up	Yes
Mujcic and Oswald, 2016	Longitudinal panel study (3 waves: 2007, 2009, 2013)	12,385 Australian adults; age, gender not specified	Increased fruit and vegetable consumption (up to 8 portions/day)	24 months (well-being measured at 3 time points)	No
Ocean et al., 2019	Longitudinal panel study (3 waves: 2010–2017)	United Kingdom adults; sample size, age, gender not specified	Increased fruit and vegetable consumption	7 years (3 waves)	No

Study	Study Design	Population Characteristics	Intervention Type	Duration of Follow-up	Full text retrieved
Molendijk et al., 2018	Meta-analysis of 24 prospective cohorts	1,959,217 person-years; demographics not specified	High-quality diet (Mediterranean, prudent, pro-vegetarian, Tuscan)	No mention found (pooled cohort durations)	Yes
Kontogianni et al., 2020	Randomized Controlled Trial (parallel group), single-blind	99 Northern Irish adults, 40–65 years, mean age 54.9, 53.5% male, mild hypertension	High polyphenol diet (6 portions fruit/vegetables/day, berries, dark chocolate) vs. low polyphenol diet	8 weeks (after 4-week washout)	Yes
Firth et al., 2019	Systematic review and meta-analysis of 16 Randomized Controlled Trials	45,826 participants, majority nonclinical depression; demographics not specified	Various dietary interventions	No mention found	No
Opie et al., 2015	Systematic review of 17 Randomized Controlled Trials	4015 adults, 18 years, gender not fully specified, multiple countries	Whole-of-diet interventions (increase fruit/vegetables/fibre, fish, reduce red meat)	10 days–36 months (most common: 3–6 months)	Yes
Parletta et al., 2017	Randomized Controlled Trial, longitudinal panel	152 adults with self-reported depression, 18–65 years; gender, country not specified	Mediterranean diet plus fish oil, food hampers, cooking workshops	3 months (diet), 6 months (fish oil), follow-up at 3 and 6 months	No

Study Design:

- Three Randomized Controlled Trials, two longitudinal panel studies, and three meta-analyses or systematic reviews were included.

Intervention Type:

- Increased fruit and vegetable consumption was the intervention in two studies.
- Brief diet improvement, high-quality diet (including Mediterranean, prudent, pro-vegetarian, Tuscan), high polyphenol diet, various dietary interventions, whole-of-diet interventions, and Mediterranean diet

plus fish oil were each found in one study.

- We did not find mention of any studies using only supplementation or single-nutrient interventions among the included studies.

Duration of Follow-up:

- Two studies had follow-up durations of less than one month.
 - Four studies had follow-up durations of one to three months.
 - Four studies had follow-up durations longer than three months.
 - For two studies, we did not find mention of the duration of follow-up.
 - Some studies were counted in more than one duration category due to multiple follow-up periods.
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Effects of Dietary Improvement

Short-term Effects (3 months)

Study	Intervention Duration	Mental Health Measure	Reported Change	Time to Effect
Francis et al., 2019	3 weeks	Center for Epidemiologic Studies Depression Scale-Revised (CESD-R), Depression Anxiety Stress Scales-21 (DASS-21)	Significant reduction in depression (effect size, Cohen's d = 0.65–0.75, p = 0.007/0.002)	3 weeks
Mujcic and Oswald, 2016	No mention found (24 months)	Life satisfaction	No mention found	No mention found
Ocean et al., 2019	No mention found	General Health Questionnaire-12 (GHQ-12), life satisfaction	Dose-response improvement, timing not specified	No mention found
Molendijk et al., 2018	No mention found	Depression incidence	No mention found	No mention found
Kontogianni et al., 2020	8 weeks	Beck Depression Inventory-II (BDI-II), Depression Anxiety Stress Scales-21 (DASS-21), Short Form-36 (SF-36)	66.6% reduction in BDI-II, significant improvement in SF-36 (p = 0.01/0.04)	8 weeks

Study	Intervention Duration	Mental Health Measure	Reported Change	Time to Effect
Firth et al., 2019	No mention found	Depression/anxiety symptoms	Significant reduction in depression (Hedges' $g = 0.275$, $p = .002$)	No mention found
Opie et al., 2015	10 days–36 months (most 3–6 months)	Various depression/anxiety scales	47% of Randomized Controlled Trials significant, effect sizes 0.19–2.02	As early as 10 days, most at 3–6 months
Parletta et al., 2017	3 months (diet)	Depression, Quality of Life (QoL)	Significant reduction in depression, improved Quality of Life ($p < 0.01/0.04$)	3 months

Summary of Short-term Effects:

- Intervention duration:Four studies used short-term interventions (3 months). One study used a long-term intervention (>3 months). One study included both short- and long-term durations. We did not find mention of the intervention duration for three studies.
- Mental health measures:Six studies used depression-specific measures. Four studies used anxiety-specific measures. Four studies used life satisfaction or quality of life measures. One study used a general mental health measure. Five studies used multiple or various mental health measures.
- Reported change:Five studies reported significant improvement in mental health outcomes, as described in the included studies. One study reported a dose-response improvement. One study did not specify the reported change. One study reported that the outcome was not applicable. One study reported that 47% of Randomized Controlled Trials showed significant improvement.
- Time to effect:Three studies reported effects within eight weeks. Two studies reported effects after more than eight weeks. We did not find mention of the time to effect for three studies. One study reported that time to effect was not applicable. One study reported multiple time points (as early as 10 days, most at 3–6 months).

Sustained Effects (>3 months)

Study	Intervention Duration	Mental Health Measure	Reported Change	Time to Effect
Francis et al., 2019	3 months (follow-up)	Depression Anxiety Stress Scales-21 (DASS-21)	Improvement maintained ($p = .009$)	3 months

Study	Intervention Duration	Mental Health Measure	Reported Change	Time to Effect
Mujcic and Oswald, 2016	24 months	Life satisfaction	Up to 0.24 point increase for 8 extra portions/day	24 months
Ocean et al., 2019	7 years	General Health Questionnaire-12 (GHQ-12), life satisfaction	Dose-response improvement, timing not specified	No mention found
Molendijk et al., 2018	No mention found	Depression incidence	High-quality diet associated with lower depression risk (Odds Ratio 0.64–0.78)	No mention found
Kontogianni et al., 2020	No mention found	No mention found	No mention found	No mention found
Firth et al., 2019	No mention found	Depression/anxiety symptoms	Sustained reduction in depression symptoms	No mention found
Opie et al., 2015	Up to 36 months	Various depression/anxiety scales	Some studies show sustained effects at 6–36 months	6–36 months
Parletta et al., 2017	6 months	Depression, Quality of Life (QoL)	Improvements sustained at 6 months	6 months

Summary of Sustained Effects:

- Intervention duration: Interventions lasting 6 months were found in three studies, >6 months to 24 months in two studies, and >24 months in two studies (with one study spanning multiple categories due to a range). We did not find mention of the intervention duration for two studies, and one study was not applicable.
- Mental health measures: Depression/anxiety scales were used in four studies. Life satisfaction was measured in two studies. General Health Questionnaire-12 was used in one study. Quality of Life was measured in one study. Depression incidence was assessed in one study. We did not find mention of a mental health measure for one study (not applicable).
- Reported change: Improvement or sustained improvement in mental health outcomes was found in five studies. Dose-response improvement was reported in one study. An association with lower depression risk was reported in one study. We did not find mention of a reported change for one study (not applicable).
- Time to effect: Effects at 6 months were found in three studies, at >6 months to 24 months in two studies, and at >24 months in one study (with one study spanning multiple categories due to a range). We did not find mention of the time to effect for three studies. One study was not applicable.

Key Insights on Response Time:

- Population characteristics: Younger adults and those with clinical depression may experience more rapid improvements.
 - Dietary intervention type: Interventions with structured support (such as meal plans or workshops) and specific dietary targets (such as Mediterranean or high polyphenol diets) may yield faster or larger effects.
 - Measurement tools: Studies using validated depression scales (such as the Center for Epidemiologic Studies Depression Scale-Revised, Beck Depression Inventory-II, and Depression Anxiety Stress Scales-21) report clearer and more quantifiable changes.
 - Baseline diet and mental health status: Those with poorer baseline diet or higher depression symptoms may see greater or faster improvements.
 - Duration and intensity of intervention: Short, intensive interventions (3–8 weeks) can produce measurable effects, but sustained changes may require ongoing support.
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Specific Dietary Components and Their Effects

Mediterranean Diet Patterns

- Francis et al., 2019: A Mediterranean-style diet (increased fruit, vegetables, wholegrains, lean protein, olive oil, etc.) led to significant depression reduction in three weeks, maintained at three months.
- Parletta et al., 2017: Mediterranean diet plus fish oil improved depression and Quality of Life at three months, sustained at six months.
- Molendijk et al., 2018: High adherence to Mediterranean or prudent diets was associated with lower depression risk (Odds Ratio 0.64–0.78), but timing was not specified.
- Opie et al., 2015: Mediterranean and similar diets were among effective interventions, with effects seen as early as three months.

Fruit and Vegetable Consumption

- Mujcic and Oswald, 2016: Up to a 0.24 life-satisfaction point increase for eight extra portions per day, effect within 24 months.
- Ocean et al., 2019: Dose-response between fruit and vegetable intake and well-being, timing not specified.
- Kontogianni et al., 2020: High polyphenol diet (six portions fruit/vegetables per day, berries, dark chocolate) led to a 66.6% reduction in Beck Depression Inventory-II depression scores in eight weeks.
- Opie et al., 2015: Increased fruit and vegetable intake was common to effective interventions.

Study	Dietary Component	Time to Effect	Magnitude of Change	Population Group
Francis et al., 2019	Mediterranean-style (fruit, vegetables, wholegrains, lean protein, olive oil)	3 weeks	Effect size, Cohen's $d = 0.65\text{--}0.75$, maintained at 3 months	Young adults, poor diet, elevated depression

Study	Dietary Component	Time to Effect	Magnitude of Change	Population Group
Mujcic and Oswald, 2016	Fruit/vegetables (up to 8 portions/day)	24 months	+0.24 life-satisfaction points	General Australian adults
Ocean et al., 2019	Fruit/vegetables (quantity/frequency)	No mention found	Dose-response improvement	United Kingdom adults
Molendijk et al., 2018	High-quality diet (Mediterranean/prudent)	No mention found	Odds Ratio 0.64–0.78 for depression risk	Multiple cohorts
Kontogianni et al., 2020	High polyphenol (6 portions fruit/vegetables, berries, dark chocolate)	8 weeks	66.6% Beck Depression Inventory-II reduction	Hypertensive adults
Firth et al., 2019	Various dietary improvements	No mention found	Hedges' $g = 0.275$ for depression	Mixed populations
Opie et al., 2015	Increased fruit/vegetables/fiber, fish, reduced red meat	10 days–36 months	Effect sizes 0.19–2.02	Adults, various countries
Parletta et al., 2017	Mediterranean diet plus fish oil	3–6 months	Significant depression/Quality of Life improvement	Adults with depression

Summary of Dietary Components and Effects:

- **Dietary components:** Three studies evaluated Mediterranean-style, prudent, or high-quality diets. Two studies focused on fruit and/or vegetable intake. One study evaluated a high polyphenol diet (including berries and dark chocolate). Two studies examined various dietary improvements (including increased fruit/vegetables/fiber, fish, and reduced red meat).
- **Time to effect:** Two studies reported effects within one month. Two studies reported effects within one to three months. Three studies reported effects at more than three months. For three studies, we did not find mention of a specified time to effect. One study (Opie et al., 2015) reported a range spanning 10 days to 36 months; one study (Parletta et al., 2017) reported a range spanning three to six months.
- **Magnitude of change:** Three studies reported standardized effect sizes (Cohen's d or Hedges' g , or effect size), with values ranging from 0.19 to 2.02. One study reported an odds ratio for depression risk (Odds Ratio 0.64–0.78). One study reported a 66.6% reduction in Beck Depression Inventory-II depression scores. One study reported a +0.24 point change in life satisfaction. One study reported a dose-response improvement. One study reported a significant improvement in depression and Quality of Life without a quantitative effect size.
- **Reporting approaches:** There was no consistent approach to reporting effect magnitude across studies; effect sizes, odds ratios, percent reductions, point changes, and qualitative improvements were all used.

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