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The combination of regular physical activity, healthy diet, and sleep hygiene as main lifestyle approaches in the management of depression- A scoping review

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VÄSTRA GÖTALANDSREGIONEN

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Summary

Background

Depression is a leading global health concern, affecting many adults and contributing significantly to disability, suicide, and reduced quality of life. While standard treatments such as psychotherapy and antidepressant medications remain important, there is increasing recognition of the potential for lifestyle-based approaches to play a meaningful role in managing depression. Emerging evidence suggests that interventions focusing on physical activity, healthy diet, and sleep hygiene may offer effective, accessible, and empowering strategies for improving mental health.

Objective

The main objective of this review is to map the existing literature on the combination of regular physical activity, a healthy diet, and sleep hygiene as main lifestyle approaches in the management of depression

Method

This study was designed as a scoping review following the framework of Arksey and O'Malley, with the literature search conducted in PubMed and Cochrane Library databases.

Results

The systematic search identified four randomised controlled trials that met the inclusion criteria for final analysis. All included studies investigated the combined effect of physical activity, diet, and sleep hygiene on depressive symptoms, though the studies varied in sample size, duration, delivery format, and outcome measures. Three of the four studies reported statistically significant reductions in depressive symptoms following structured and interactive lifestyle changes. All three studies included some form of a continuous support of the patients, whether it was an interactive online programme, individual coaching, or group-based sessions. In contrast, one study found no significant change when participants received written lifestyle advice without additional support.

Conlusion

The reviewed studies showed that lifestyle changes, specifically improvements in physical activity diet and sleep can reduce depressive symptoms. However, the success of these interventions largely depends on how they are delivered, and the level of support patients receive in adopting and maintaining these changes. Structured lifestyle changes that actively engage participants, through online coaching, guided content, or group support, showed

reduction of depressive symptoms. In one study, however, it was shown that passive interventions such as delivering written information had no significant improvement. These findings support the integration of interactive scalable lifestyle programmes into primary care as a cost effective and empowering treatment option.

Background

Depression is a major public health concern. According to the World Health Organization (WHO), about 5% of adults suffer from depression worldwide. Depression can have detrimental effects on various aspects of life, including physical health, social functioning, productivity, and quality of life in general. Depression can also lead to suicide with more than 720 000 people dying due to suicide every year globally. This is especially alarming in young people as suicide is the third leading cause of death among people aged between 15-29 years old. Depression is also considered one of the main reasons of disability worldwide, as it is estimated that around 12 billion workdays are lost due to employees suffering from depression and anxiety and losing their work ability (1).

Patients with clinical depression (which is also referred to as Major Depressive Disorder) experience persistent feeling of sadness, decreased interest or pleasure in otherwise joyful experiences, and a wide range of cognitive and physical symptoms that can be debilitating. Depression differs from the human temporary mode changes in the time frame these feelings are experienced and their frequency. Patients with depression experience those feelings every day, for the most part of day, for a minimum of two weeks (2).

The severity of depression can vary from one patient to another, but it is usually graded into mild, moderate, and severe. Depression is usually treated with psychotherapy as a stand-alone treatment or as an adjuvant therapy to pharmacological treatment (3). In this study, these usual methods of treatment will be referred to as treatment as usual (TAU).

When choosing the best possible treatment of depression, it is important to assess the severity of symptoms as it affects the choice of the most suitable treatment. Psychotherapy is considered the first-line of treatment for patients with mild-to-moderate depression (4). Even though pharmacological treatment has long been a cornerstone in the treatment of depression, the benefit-risk ratio for milder forms of depression has been the subject of ongoing debate. In severe cases, however, the first line of treatment is antidepressants, as they present a favorable benefit-risk profile (4).

As important as it is to recognize severe cases of depression and starting antidepressants when needed, according to data from the organisation for Economic Cooperation and development OECD the use of antidepressants in 18 European countries nearly doubled between 2000 and 2020 (5). Additionally, a respective longitudinal study conducted in English primary care revealed an increase in the prescription of higher-strength formulations for certain antidepressants indicating a trend toward higher dose prescribing (6).

After interviewing 21 general practitioners, a qualitative study reports that treatment decisions for depression during the first primary care visit were influenced by the doctor and the patient characteristics as well as treatment options. Antidepressants were often prescribed due to severe symptoms and time constraints while non-pharmacological approaches were linked to strong

doctor-patient relationships. Limited training and poor access to counselling reduced the use of psychotherapy and behavioural modification treatments despite their simplicity and effectiveness (7). Initiating antidepressants when treating depression can have negative long-term effects. Most importantly, difficulties in discontinuation of these medications and experiencing emotional blunting. Studies have shown that up to 60% of patients on antidepressants experience emotional blunting which results in a decrease of the emotional span, empathy, and a lack of creative energy. This may play a detrimental role in patients' motivation to engage in developing self-care skills (8, 9).

There is growing evidence that lifestyle changes can play a significant role in the treatment of depression as daily habits can play a substantial role in mental health. Ensuring that we are providing our bodies with the basic needs to function properly such as nutrition, sleep and physical activity is detrimental for maintaining our mental health (10).

A systematic review of 21 randomized controlled trials suggests that exercise can be equally effective when compared to antidepressants medications in enhancing patients' depressive symptoms (11).

Furthermore, researchers have also been able to demonstrate a direct correlation between sleep quality and symptoms such as irritability and stress, and that lack of sleep can be a reliable predictor for developing depression and eventually suicidal thoughts (12, 13).

Dietary habits can also affect our mood because 95% of Serotonin, which is the main neurotransmitter that helps regulate mood, sleep, and energy levels, is produced in the gastrointestinal tract (14). A previous study has shown that healthy diets which are rich in vegetables, fruits, and unprocessed foods can reduce the risk of depression up to 35% in comparison to diets that include more processed and refined foods and sugars (15).

There is currently a lack of comprehensive reviews that specifically examine the combined impact of these three main lifestyle changes on depression. This scoping review will summarize the current knowledge studying the combination of regular physical activity, healthy diet, and sleep hygiene, and their possible combined role in treating depression as one of the most common mental disorders.

Objective

The main objective of this review is to map the existing literature on the combination of physical activity, healthy diet, and sleep hygiene as main lifestyle approaches among adults in the management of depression.

Method

Research Question and Framework:

The research question guiding this scoping review was: What is the role of lifestyle changes — specifically physical activity, healthy diet, and sleep hygiene — among adults in the treatment of depression in adults.

This question was formulated using the PCC framework:

- Population (P): Adults with depression or depressive symptoms.
- Concept (C): Combined lifestyle changes including physical activity healthy diet and sleep hygiene.
- Context (C): Clinical and community-based settings, with a focus on interventions aimed at treatment rather than prevention.

This framework informed the inclusion criteria, search strategy, and data extraction process throughout this review. This study is designed as a scoping review following the methodological framework by Arksey and O'Malley for scoping studies (16).

Inclusion criteria:

- The intervention explicitly incorporated all three lifestyle components: physical activity, healthy diet, and sleep hygiene.
- The study design was a Randomized Controlled Trials (RCT)
- The publication was available in English.
- Participants should be aged 18 or above.

Exclusion Criteria:

- Participants were undergoing concurrent pharmacological treatment.
- The primary aim of the study was to assess factors such as adherence, associations, or prevention rather than treatment and reduction of depressive symptoms.
- The full text of the study was not available for review.

The decision to include only randomized controlled trials was based on the fact that RCTs represent a strong quantitative design which offers a higher level of evidence. Given that the aim of this review is to explore the role of lifestyle changes in the treatment of depression, it was important to include studies with quantitative findings that could provide clearer conclusions regarding the potential impact of these lifestyle changes on depressive symptoms. While it is acknowledged that restricting the inclusion to RCTs may exclude valuable insights

from other study designs and therefore may limit the broader understanding of these interventions, this criterion was intended to enhance comparability across studies and minimize the risk of systematic bias that is more common in other study designs.

Search strategy:

A systematic literature search was conducted on March 4th, 2025, in the databases PubMed and Cochrane Library, with assistance from librarians at the Biomedical Library at the University of Gothenburg. The search strategy used the following search terms:

- PubMed: ("depressive disorder"[MeSH Terms] OR "depression"[MeSH Terms] OR "depression") AND ("Lifestyle recommendation" OR "Lifestyle modification" OR "Lifestyle interventions" OR "Lifestyle medicine" OR "Lifestyle Therapy" OR "Lifestyle Change")
- Cochrane Library: (depressive disorder OR depression) AND ("lifestyle recommendation" OR "lifestyle modification" OR "lifestyle interventions" OR "lifestyle medicine" OR "lifestyle therapy" OR "lifestyle change")

Selection process:

A comprehensive literature search was conducted in PubMed and Cochrane Library. These two databases were chosen for their strong coverage of high-quality studies, particularly randomized clinical trials relevant to healthcare and evidence-based practice. With support from librarians at the Biomedical Library, the search strategy was developed to include terms related to depression and various formulations of lifestyle change. Search links were refined iteratively in collaboration with the librarians to optimize precision and sensitivity. Adjustments were made to keyword combinations, MeSH terms, and Boolean operators based on the preliminary results to ensure the retrieval of studies most relevant to the research question. The search results were exported to the citation manager EndNote, where duplicates were identified and removed. The remaining articles were screened by title and abstract, followed by full-text review based on the predefined inclusion and exclusion criteria.

Ethical Considerations:

As this study is a scoping review based on previously published research, it was not necessary to obtain ethical approval. However, an ethical evaluation of the included articles was conducted. All included RCTs demonstrated adherence to fundamental ethical standards, including ethics committee and informed consent. Participants with high medical or psychological risk were appropriately excluded, and most interventions posed minimal risk. However, some studies lacked participant blinding or real-time monitoring, and a few control groups received no intervention, which could raise questions about equity. Overall, the studies maintained sound ethical practices.

Results

The systematic search yielded a total of 1,843 articles: 725 from PubMed and 1,118 from Cochrane Library. After removing 346 duplicate articles, 1497 articles were first screened by title and abstract. Following the first screening, 1,367 articles were excluded based on irrelevance, not meeting the inclusion/exclusion criteria, leaving 130 articles for full-text assessment. After evaluating the 130 articles, 126 of them were excluded for the following reasons:

- 73 articles did not include all three lifestyle components (physical activity, diet, and sleep hygiene), with the majority (n=55) lacking a sleep component.
- 15 articles focused on outcomes other than the treatment or reduction of depressive symptoms (e.g., prevention, adherence, or association).
- 14 articles were excluded because the full text was not available for review.
- 12 articles were not RCTs.
- 11 articles included participant undergoing concurrent pharmacological treatment.
- 1 article was not published in English.

Ultimately, four RCTs met all the inclusion and exclusion criteria and were included in the final analysis. See Figure 1 for a detailed flowchart of the selection process.

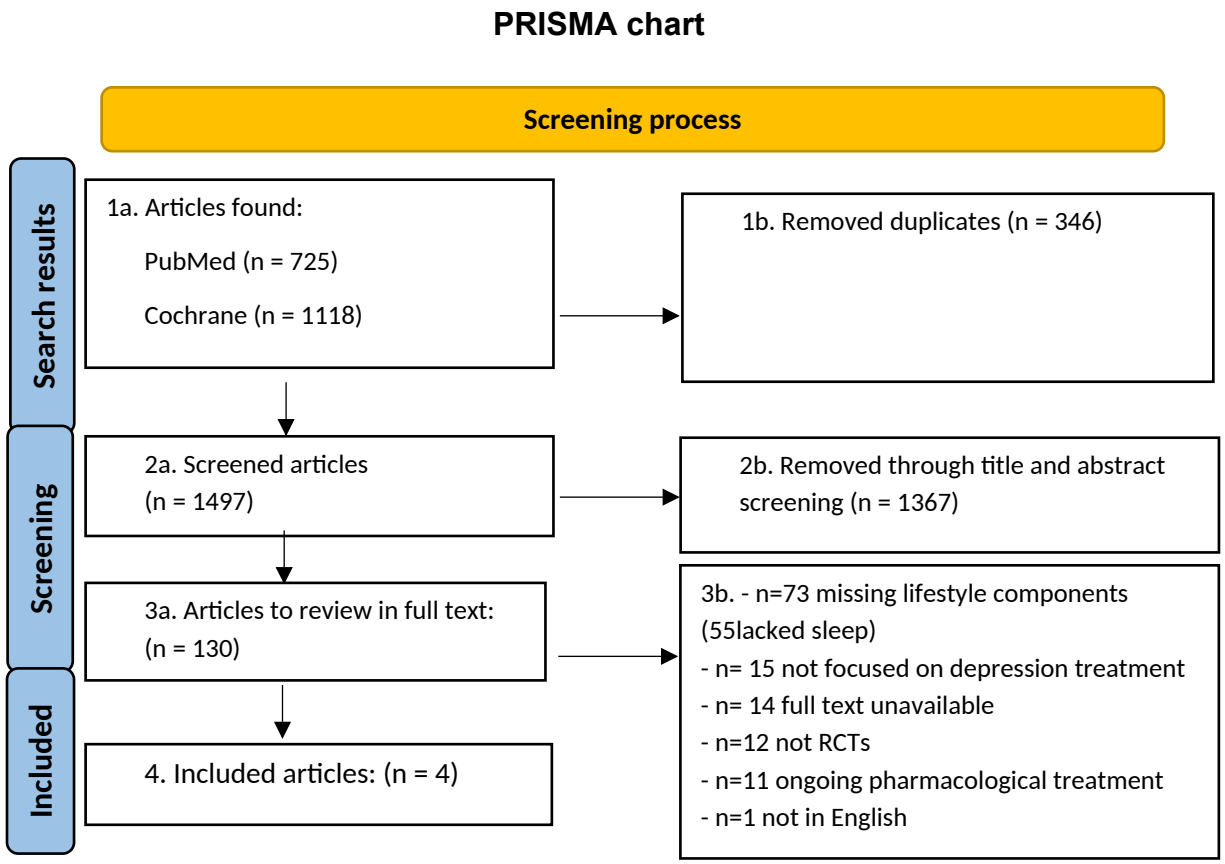

Figure 1. Flowchart of the selection process.

All four studies were RCTs investigating the combined effect of physical activity, diet, and sleep hygiene on depression in adults (17, 18, 19, and 20). The studies varied in intervention delivery methods, duration, sample size, and outcome measures.

The studies were conducted in four different countries with participant numbers ranging from 31 to 425. The largest study, conducted by Przybylko et al. (2021) in Australia, included 425 participants, while Ip et al.'s study (2021) had the smallest sample size of 31 participants in Hong Kong. The other two studies, Shiri et al. (2022) in Finland and Serrano Ripoll et al. (2015) in Spain, involved 319 and 273 participants, respectively.

The interventions were delivered in various formats. Przybylko et al. (2021) used a 10-week fully online programme with interactive multimedia modules, and the control group was assigned to a waitlist and received no support during the intervention period. Shiri et al. (2022) delivered 8 weeks of remote coaching, either individually or in groups and compared the results to a passive control group where participants had access to usual occupational health services. Ip et al. (2021) offered six weekly in-person group sessions, and the control group received a care-as-usual (CAU) model in which participants could seek external support independently, though no structured care was provided by the research team. However, Serrano Ripoll et al. (2015) provided written recommendations to both intervention and control group without any form of coaching or behavioural therapy. The intervention group received a structured, study-specific document integrating recommendations on physical activity, diet, and sleep tailored to depression management. In contrast, the control group was given standard generic health leaflets routinely used in Spanish primary care.

To measure outcomes, Przybylko et al. (2021) used the Depression, Anxiety, and Stress Scale–21 items (DASS-21); Shiri et al. (2022) assessed depression using two items of the Patient Health Questionnaire (PHQ-9) and the Whooley questions. Ip et al. (2021) used both the complete version PHQ-9 and the DASS-21 to assess depression in participants, and Serrano Ripoll et al. (2015) used the Beck Depression Inventory (BDI).

Three of the four studies (17, 18, 19) reported statistically significant improvements in depressive symptoms following the intervention. Przybylko et al. (2021) observed a 41% reduction in depressive symptoms in the intervention group compared to the waitlist control at post-intervention, with effects sustained at 2-week follow-up ($p < 0.001$). Shri et al. (2022) found that individualized coaching led to a 53% lower likelihood of reporting frequent

depressive symptoms compared to the control group after the intervention (p=0.01), although group coaching yielded no significant benefit. Ip et al. (2021) reported significant improvements in depressive symptoms for participants in the in-person group sessions compared to CAU group, both immediately post-intervention and at 12-week follow-up (p=0.02 and p=0.01, respectively).

In contrast, Serrano Ripoll et al. (2015) reported no statistically significant difference between intervention and control groups at 12-months follow-up (p=0.594), despite the intervention group receiving more targeted written materials. Table 1 summarizes results analysis of the included studies.

Table 1. Summary of included studies

Author, Year, Title, Country	Purpose	Population, Size, Gender, Age	Method of Delivery	Control Group	Outcome Measures	Main Results	P value
Przybylko et al., 2021 "The effectiveness of an online interdisciplinary intervention for mental health promotion" (Australia)	To evaluate an online interdisciplinary lifestyle medicine and positive psychology program for improving mental health	425 participants, aged 18 years or older, mean age ~47, around 72% females	Online weekly modules over 10 weeks with practical exercises and videos	Waitlist: No access to the intervention materials or guidance. Access to the program after the study was concluded.	DASS-21, Assessments before and after the intervention, and a 12-week post-treatment follow-up.	Significant improvements in depressive symptoms in the intervention group vs waitlist post-intervention. Effects maintained at 12-week follow-up in the intervention group.	P < 0.001 Intervention group vs control group immediately post intervention. No P value mentioned for 12-week post-treatment follow-up for comparison between groups.
Shiri et al., 2022 "The Effect of Healthy Lifestyle Changes on Work Ability and Mental Health Symptoms" (Finland)	To assess whether remote individual or group coaching on lifestyle factors reduces depression symptoms	319 employees, mixed gender, age 18-65	Remote coaching sessions via phone or video, 1:1 or group-based, over 8 weeks	No coaching or materials were provided. Only routine occupational health services which did not include any specific lifestyle intervention or mental health support.	Whooley questions and PHQ-2, After-intervention assessment (Presumably immediately after-intervention, but not mentioned specifically). No follow-up assessment.	Post-intervention assessment showed 53% lower risk of frequent depressive symptoms in the individual group vs control. Group coaching showed no significant results compared to control group.	P = 0.01 for individual vs. control group.
Ip et al., 2021 "Effects of a group-based lifestyle medicine for depression" (Hong Kong)	To evaluate the feasibility and effectiveness of a group-based integrative lifestyle medicine program	31 participants, adults aged 18 or above with depressive symptoms, mean age ~41	In-person group sessions once per week for 6 weeks.	CAU: Free to seek general health or psychological support. No intervention-related content was provided.	PHQ-9, DASS-21. Assessments before and after the intervention, and a 12-week posttreatment follow-up.	Significant reductions in depressive symptoms in the intervention group compared to control group immediately post-intervention and at 12-weeks follow-up.	P=0.02 Immediately post-intervention P=0.01 At 12-week follow-up.
Serrano Ripoll et al., 2015 " Lifestyle change recommendations in major depression: Do they work?" (Spain)	To study the effects of written lifestyle recommendations on depression symptoms in a primary care population	273 primary care patients, aged 18 or above, mean age 51, 76% female	Written materials handed to participants; no coaching	Standard written health promotion leaflets covering general recommendations for physical activity, diet, and sleep.	Beck Depression Inventory (BDI). Assessments before the intervention, and 6 and 12 months after trial start.	No statistically significant difference in depression between groups after 6 or 12 months	P= 0.594 at 12 months follow-up. No P value was mentioned regarding the 6-months follow-up.

Discussion:

The findings presented here are based on a small number of studies, which limits the breadth of conclusions that can be drawn. As this is a scoping review, the aim has been to map and describe existing evidence rather than to establish effectiveness. Only four studies met the inclusion criteria, and the variability among them in terms of design, sample size, delivery method, and outcome measures further restrict the generalizability of the results. The review therefore provides an overview of current research and points to potential patterns.

This scoping review highlights that structured and interactive lifestyle changes targeting physical activity, diet, and sleep hygiene may contribute to reductions in depressive symptoms, and that the effectiveness of these interventions may be linked to the method of delivery. All four studies addressed similar lifestyle domains, yet only three showed statistically significant reductions in depressive symptoms. The key differentiator across successful interventions was the presence of active engagement mechanisms such as weekly coaching (Shiri et al., 2022), guided online content (Przybylko et al., 2021), or structured group sessions (Ip et al., 2021). These formats may have supported adherence, accountability, and motivation, which are important factors for individuals with depression who often struggle with low energy, reduced executive function, and impaired self-initiative (21). This contrast is most striking when comparing Shiri et al.'s (2022) two formats: Individual coaching significant effect versus group coaching non-significant results. This suggests that even within structured interventions, personalization and direct feedback may play a role in enhancing the efficacy (18). Przybylko et al.'s (2021) study shows that digital interventions also have the potential to reduce depressive symptoms (17).

In contrast, the study by Serrano Ripoll et al. (2015) illustrates the possible limitation of passive strategies despite including the same lifestyle domains. The absence of support or structured contact might have contributed to the null findings. This finding may stem from behavioural change theories that emphasize the role of external cues, reinforcement, and structured support in facilitating lasting behavioural modifications (22).

From a public health perspective, these findings suggest that scalable and interactive models, including digital formats, may have a potential role in the management of depression n primary

care. Digital delivery models as used by Przybylko et al. (2021), could offer low-cost, high-accessibility options for addressing mild to moderate depression in community populations (23). However, passive dissemination of information may be a less effective method to introduce lifestyle changes for patients with depression.

There are some limitations with the included studies in this scoping review. The studies reviewed varied in outcome measures (DASS-21, PHQ-9, BDI, Whooley questions), sample sizes, and populations, which may limit direct comparability. The small sample size in Ip et al. (2021) introduces questions about generalizability, while the 12-months follow-up in Serrano Ripoll et al. (2015) raises issues about intervention maintenance. The three studies that demonstrated a positive effect on depressive symptoms had relatively short follow-up periods. Both Przybylko et al., (2021), and Ip et al., (2021) included a 12-weeks post-intervention follow-up, while Shiri et al., (2022) included only an assessment immediately after the intervention with no specific timeline provided. While these initial results are encouraging, the limited follow up duration presents a key limitation to the conclusions that can be drawn. This means that short-term improvements don't necessarily indicate sustained long-term benefits, especially when ongoing support or reinforcement is lacking as noticed in Serrano Ripoll et al. (2015). This highlights the importance of future research incorporating longer follow-up periods to better assess the durability of lifestyle changes in managing depression.

The scoping review itself has methodological limitations. This review included only randomized controlled trials. While this strengthens internal validity and reduces the risk of bias, it can also exclude potentially valuable insights from observational and qualitative studies such as patient experiences and contextual barriers. These studies may be particularly relevant when studying complex lifestyle interventions. In addition, the literature search was limited to PubMed and Cochrane Library, which may have excluded relevant studies in other databases and thereby reduced the comprehensiveness of the evidence base.

The generalizability of the findings is restricted by several factors. First, the populations studied were context-specific (e.g., healthcare workers, students), which may not represent the wider primary care population. Second, the studies were conducted in four different countries with distinct healthcare systems which limits transferability across settings. Third, although three studies reported short term benefits only one included 12 month follow up which did not show

significant effects. This raises question about the long-term sustainability of improvements and suggests that ongoing support may be necessary to maintain benefits.

This review highlights a potential role for scalable interactive formats such as digital platforms and structured coaching in supporting patients with mild to moderate depression however the small number of studies and their heterogeneity prevent firm conclusions future research should prioritize larger and more diverse samples standardized outcome measures and longer follow-up periods to better assess sustainability of lifestyle interventions it would also be valuable to investigate mechanisms of adherence and patient perspectives as well as implementation strategies in different healthcare contexts such research could help clarify how best to integrate lifestyle interventions into routine depression management in primary care.

Conclusion

Structured lifestyle interventions may offer short-term benefits for adults with depressive symptoms. While passive approaches appear less effective, active management strategies, such as coaching or group support, have the potential to play an important role, but evidence is still limited. Future research should use standardized outcomes, include long-term follow-up, and test hybrid formats that combine digital delivery with human support. Lifestyle approaches may have potential as a cost-effective complement in early management of mild to moderate depression, though sustained effects remain uncertain.

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