CRD summary
The review concluded that melatonin decreased sleep onset latency, increased total sleep time, and improved overall sleep quality compared with placebo in patients with primary sleep disorders. Given the limited search, inability to judge the quality of included trials, and results dominated by one large trial, the reliability of the authors’ conclusion is unclear.

Authors' objectives
To evaluate the effect of melatonin compared with placebo in improving sleep parameters in patients with primary sleep disorders.

Searching
PubMed was searched for relevant studies published in English. Two search terms were reported. Search dates were not reported. Bibliographies of relevant reviews, meta-analyses, and included articles were searched for additional studies.

Study selection
Eligible for inclusion were randomised placebo-controlled trials (with at least 10 participants for parallel designs or five participants for crossover designs) that evaluated the effect of melatonin on sleep onset latency (minutes), total sleep time (minutes), and sleep quality in patients with primary sleep disorders.

Most participants in included trials were adults. Trial duration ranged from seven days to 182 days. The melatonin dose ranged from 0.1mg to 5mg, where reported. Sleep outcomes were assessed by objective measures (polysomnography or actigraphy) and/or subjective measures (scales, questionnaires, sleep logs).

Two reviewers selected the studies for inclusion. Disagreements were resolved by a third reviewer.

Assessment of study quality
There was no reported quality assessment of included trial.

Data extraction
Data were extracted to enable the calculation of mean differences and 95% confidence intervals.

The authors did not state how many reviewers extracted the data.

Methods of synthesis
Fixed-effect meta-analyses were carried out to calculate mean differences for sleep latency and total sleep time, and to calculate the standardised mean difference for sleep quality, with 95% confidence intervals. Sensitivity analyses were conducted using a random-effects model. Statistical heterogeneity was assessed with Cochran’s Q and I².

Sub-group analyses and meta-regression were carried to explore differences between objective and subjective outcome measures, and to explore the effect of melatonin dose and trial duration.

Publication bias was assessed in a funnel plot, and by the Egger's test.

Results of the review
Nineteen trials (10 crossover and nine parallel design) including 1,683 participants (range 8 to 746) were included in the review.

Melatonin was more effective than placebo in decreasing sleep onset latency (MD 7.06 minutes, 95% CI 4.37 to 9.75; 15 trials; I²=56%), increasing total sleep time (MD 8.25 minutes, 95% CI 1.75 to 14.75; 13 trials; I²=44%), and improving sleep quality (SMD 0.22, 95% CI 0.13 to 0.32; 14 trials; I²=0%). Similar effects were reported in random-
effects analysis for total sleep time and sleep quality; sleep onset latency was further reduced (MD 10.18, 95% CI 6.1 to 14.27).

Measures of sleep onset latency and sleep quality were improved on both objective and subjective measures. Total sleep time was increased on subjective measures only; melatonin did not increase sleep time when using objective measures. Higher melatonin dose and longer trial duration were both associated with improved outcomes for sleep onset latency and total sleep time, but not sleep quality. There was no evidence of publication bias in any of the analyses.

**Authors' conclusions**
Melatonin decreased sleep onset latency, increased total sleep time, and improved overall sleep quality. The effects of melatonin were modest, but did not appear to dissipate with continued use.

**CRD commentary**
The review question was clear and inclusion criteria were specified adequately to enable replication. The search strategy was limited to one database and had no details of search dates. A limited search, together with language restrictions, may mean that relevant studies were missed. Steps were taken to minimise reviewer error and bias at the study selection stage; it was unclear whether this was applied to the data extraction phase.

All the included studies were randomised controlled trials, which tend to be more reliable than other study designs, but the absence of any formal quality assessment meant that reliability could not be confirmed. Although only limited trial details were provided, the methods of synthesis seemed appropriate and helpful sub-group analyses were presented. Most included trials were small; the authors drew attention to one large trial that contributed disproportionately to the findings.

Given the limited search, inability to judge the quality of the included trials, and results dominated by one large trial, the reliability of the authors' conclusion is unclear.

**Implications of the review for practice and research**
Practice: The authors stated that melatonin should be considered in clinical practice due to its benign side-effect profile, costs and limited evidence of habituation and tolerance.

Research: The authors stated that further research is needed to compare the effects of melatonin to common prescription medications. Research should also consider the long-term benefits of sleep medications.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract
contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on
the reliability of the review and the conclusions drawn.