A systematic review of adherence-enhancing interventions in adolescents taking long-term medicines

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CRD summary
The review concluded that to some extent adherence-enhancing interventions improved health outcomes and adherence to medicines in adolescents, but poor quality, underpowered studies limited the inferences drawn and further research was needed. The review had some limitations which reduce the reliability of results, but the authors’ conclusions were suitably cautious and seem appropriate.

Authors' objectives
To assess the effectiveness of adherence-enhancing interventions aimed at adolescents taking long-term medication.

Searching
MEDLINE, CINAHL, EMBASE, PsycINFO, Web of Knowledge, International Pharmaceutical Abstracts and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched from 1984 to 2009 for articles in English. Search terms were reported. The reference lists of retrieved articles and reviews were searched for additional studies.

Study selection
Controlled studies of adherence-enhancing interventions aimed at adolescents (aged 10 to 19 years) taking long-term medication were eligible for inclusion. Adherence to medications had to be reported. Studies were excluded if they were historically controlled or case studies.

Most interventions involved education with physical, social and psychosocial tasks. Some interventions also involved the adolescent's family. In most cases the control group was usual care. Over half of the studies were conducted in the USA; Europe and Canada were also represented. Type 1 diabetes was the most commonly studied medical condition. The mean/median age of participants was 13 or 14 years. Some studies excluded participants with comorbidities other than asthma or thyroid disease. Outcome measures were self-report, sometimes validated by pill counts, urine analysis, or chart reviews. Intervention periods ranged from a one-off 10-15 minute session up to 18 months (majority six months or more). Health outcomes included use of health services.

One reviewer performed study selection.

Assessment of study quality
Study validity was assessed using modified Jadad criteria, which appraised randomisation, blinding and withdrawals, to give a maximum score out of five. Studies that scored 0-2 were deemed poor quality, and studies that scored 3-5 were deemed good quality. The Evidence Based Medicine Criteria were also used. The authors did not state how many reviewers performed quality assessment.

Data extraction
One reviewer extracted data on adherence outcomes and health outcomes, which was checked for accuracy by a second reviewer. Effect sizes (Cohen's d) and odds ratios (ORs), with 95% confidence intervals, were extracted where reported.

Methods of synthesis
A narrative synthesis was presented. Subgroup analysis was conducted for modifiers such as age and peer and family involvement.

Results of the review
Seventeen studies (2,390 participants; range 20 to 794) were included in the review. Five studies were deemed good quality, and twelve studies were deemed poor quality according to Jadad criteria.
Eight studies showed an improvement in adherence with intervention compared with control, two of which also showed an improvement in health outcomes. Four studies showed no improvements in adherence, but improvements in health outcomes. Five studies showed no improvements.

Subgroup analysis indicated that targeting a narrow age range, inclusion of family members in the management of type 1 diabetes, and improving access to care appeared to be useful modifiers of adherence-enhancing interventions.

**Authors’ conclusions**

To some extent, adherence-enhancing interventions improved adherence to medicines and health outcomes in adolescents, but poor quality, underpowered studies and a lack of generalisability limited the inferences drawn from this review and further research was needed.

**CRD commentary**

Inclusion criteria for the review were clearly defined and several relevant data sources were searched. There was potential for language and publication bias. Some attempts were made to reduce reviewer error and bias during data extraction, but this was unclear for study selection and quality assessment. The studies were very different in terms of intervention, participants and setting, which the authors acknowledged.

Quality assessment indicated that most studies were poor quality, which the authors acknowledged. The studies had several limitations such as a lack of generalisability to other populations, use of self-reported outcome measures, a short intervention period and a short-follow up for some studies (those that did follow-up). Given these differences, a narrative synthesis was appropriate. However, the synthesis was somewhat limited. Some results such as improving access to care were hypothesis generating. It was unclear how the subgroup analyses were conducted. The review had some limitations which reduce the reliability of results, but the authors’ conclusions were suitably cautious and seem appropriate.

**Implications of the review for practice and research**

**Practice:** The authors stated that there was currently a paucity of evidence, and caution should be exercised to avoid the use of electronic technologies that may make interventions inaccessible to some populations.

**Research:** The authors stated that further basic research on adherence interventions needed to be undertaken, ideally of better quality and that involved more countries and other health conditions which required long-term medication. Researchers working with adolescents should consider the developmental stages of adolescence into intervention design and implementation. Researchers should aim to present adherence to medicines data as a discrete entity, so as to make interpretation of data easier. There may be a benefit in critically assessing the causes of intervention failure and deciding whether the intervention may be retested after methodological enhancement.

**Funding**

University of Nottingham.

**Bibliographic details**


**PubMedID**

22018559

**DOI**

10.1016/j.jadohealth.2011.02.010

**Original Paper URL**

http://www.sciencedirect.com/science/article/pii/S1054139X11000772

**Indexing Status**

Subject indexing assigned by NLM
MeSH
Adolescent; Adolescent Behavior /psychology; Attitude to Health; Child; Child Behavior /psychology; Chronic Disease /drug therapy; Diabetes Mellitus /drug therapy; Evidence-Based Medicine; Guideline Adherence; Humans; Hypoglycemic Agents /therapeutic use; Medication Adherence /statistics & numerical data; Patient Education as Topic /methods; Quality Assurance, Health Care /organization & administration; Reminder Systems /statistics & numerical data; Socioeconomic Factors

AccessionNumber
12011007067

Date bibliographic record published
30/03/2012

Date abstract record published
27/07/2012

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.