The effects of interventions on health-related quality of life among persons with diabetes: a systematic review

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CRD summary
This review assessed the effect of interventions on the health-related quality of life (HRQL) of adults with diabetes, as measured by the Short Form-36 questionnaire. The authors concluded that interventions improve HRQL, with the different types of interventions varying in levels of effectiveness. The authors accounted for certain limitations and their conclusions are likely to be reliable as they were not dependent on the pooled estimates.

Authors' objectives
To assess the effect of interventions on the health-related quality of life (HRQL) of adults with diabetes.

Searching
MEDLINE, EMBASE, CINAHL, PsycINFO, Sociological Abstracts, Web of Science, and the NCCDPHP's Health Promotion and Education Database were searched between 1992 (first publication of SF-36) and September 2006; the search terms were reported. In addition, reference lists were checked for further citations, and authors were contacted if the data were unclear or missing.

Study selection

Specific interventions included in the review
Studies using interventions among adults with diabetes were eligible for inclusion. The included studies reported on interventions using education and behavioural modification for diabetes, pharmacotherapy to optimise glycaemic control or treat co-morbidities and complications, or surgery for co-morbidities and complications.

Participants included in the review
Studies of adults (aged 18 years or older) with diabetes were eligible for inclusion. Studies included patients with type 1 or type 2 diabetes, with or without complications or co-morbidities. Other patient characteristics were varied, but often not reported.

Outcomes assessed in the review
Studies reporting pre- and post-intervention Short Form (SF)-36 scores were eligible for inclusion. The primary outcome measure was the difference between pre- and post-intervention SF-36 profile scores.

How were decisions on the relevance of primary studies made?
One reviewer screened studies for relevance, with any uncertainties discussed with a second reviewer to reach agreement.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Two reviewers extracted the data from the included studies and a third reviewer checked the extraction. The data were extracted by intervention type and study focus, and differences in pre- and post-intervention SF-36 profile scores (delta
I) were calculated for each intervention. Standardised mean differences (SMDs) were calculated using Cohen's d technique.

**Methods of synthesis**

**How were the studies combined?**

Due to clinical and methodological heterogeneity, not all of the studies could be pooled. However, educational and behavioural interventions were considered sufficiently similar to justify pooling, and these data sets were then tested for statistical heterogeneity. Sufficient homogeneity of 10 educational interventions (5 RCTs and 5 pre- versus post-intervention studies) enabled pooling of SMDs using the DerSimonian and Laird random-effects model. Funnel plot analysis was used to test publication bias.

**How were differences between studies investigated?**

The results were reported by intervention and further stratified by clinical application. Where pooled effect estimates were generated, statistical heterogeneity was assessed using Cochran's Q (chi-squared) test, and a funnel plot was used to test small sample bias.

**Results of the review**

Thirty-three studies (n=6,463) were included in the review: 15 randomised controlled trials (RCTs, n=3,664), 4 non-randomised trials (n=396), 3 cohort with comparison studies (n=396) and 11 pre-test post-test design (n=2,007).

The authors reported that HRQL generally improved with the interventions. The greatest effects were reported with surgical interventions, with all 8 profile scores improving post-intervention; ranges of mean changes in scores were 15.0 to 42.0 for surgery to treat diabetes co-morbidities, and -13.0 to 37.9 for surgery to treat diabetes complications. Improvements were also found for the other interventions; pooled results from the 5 educational and behavioural modification RCTs showed significant improvements in physical function (SMD 3.4, 95% confidence interval, CI: 0.1, 6.6) and mental health (SMD 4.2, 95% CI: 1.8, 6.6), and a decrease in bodily pain (SMD 3.6, 95% CI: 0.6, 6.7). Pooled effects for the 5 pre- versus post- educational and behavioural intervention studies showed significant improvements for social function (SMD 5.8, 95% CI: 2.0, 9.6), vitality (SMD 3.0, 95% CI: 1.6, 4.4) and mental health (SMD 2.5, 95% CI: 0.6, 4.4), and a decrease in role limitations due to physical problems (SMD 4.3, 95% CI: 0.1, 8.4).

Delta I scores and SMDs for each profile score in each study were reported. Given its limited usefulness owing to the small number of studies pooled, the funnel plot analysis assessing publication bias was not reported.

**Authors’ conclusions**

The interventions improved HRQL in adults with diabetes, as measured by the 8 profile scores of the SF-36, with effectiveness varying for the different types of interventions.

**CRD commentary**

The review questions were clear and appropriate inclusion criteria were used for the study design, participants and outcomes. Relevant literature searches were undertaken using electronic databases and other appropriate sources with no restrictions on language, thus reducing the potential for language bias. The absence of a validity assessment makes it difficult to judge the reliability of the included studies and the conclusions drawn from the data synthesis.

Adequate study details were presented. However, a number of studies, particularly the educational and behavioural modification interventions, had missing data which resulted in limited patient characteristic analysis; this makes their generalisability difficult to assess. Sufficient statistical homogeneity for educational and behavioural modification studies enabled the pooling of results, but this was only possible for a limited number of studies, and the CIs provided were wide. However, as the authors investigated and accounted for heterogeneity, their conclusions are likely to be reliable.
Implications of the review for practice and research

Practice: The authors stated that it remains unclear how clinicians can best tailor specific interventions to patients in order to gain the greatest improvements in HRQL.

Research: The authors stated that the high cost interventions were most effective in improving HRQL, but further investigations into cost-effectiveness should be undertaken. Future studies should also explore a wider variety of interventions and measurement tools. The relationship between diabetes progression and HRQL also needs further investigation, focusing in particular on the social and economic status of individuals to assess the effectiveness of specific interventions.

Bibliographic details

PubMedID
17712252

DOI
10.1097/MLR.0b013e3180618b55

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Databases, Bibliographic; Diabetes Mellitus, Type 1 /physiopathology /psychology /therapy; Diabetes Mellitus, Type 2 /physiopathology /psychology /therapy; Evidence-Based Medicine; Health Education /organization & administration; Humans; Outcome Assessment (Health Care); Quality of Life; Sickness Impact Profile

AccessionNumber
12007008303

Date bibliographic record published
31/03/2008

Date abstract record published
31/03/2008

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.