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Review

Executive summary

Preschool vision screening

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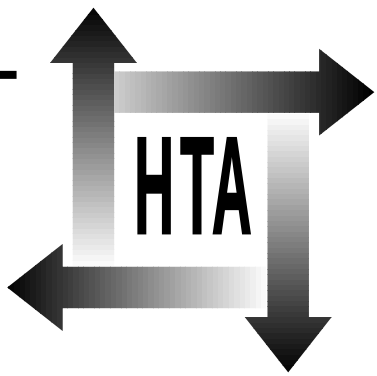

Executive summary

Objectives

- To undertake a systematic review of the effectiveness of preschool vision screening.
- To provide evidence on which decisions about the future provision of this service can be made.
- To indicate areas for further research.

How the research was conducted

Study selection

The Centre for Reviews and Dissemination guidelines for systematic reviews were used. The research questions were formulated using the Wilson and Jungner criteria for evaluating screening programmes. They concerned prevalence, natural history, disability, treatment and screening in relation to three target conditions: amblyopia, refractive errors and squints which are not cosmetically obvious.

Studies were considered for inclusion according to pre-determined criteria for the age group studied, the outcomes measured and the study design. The following types of study design were considered: cross-sectional studies of prevalence, cohort studies of natural history, any type of study (e.g. cross-sectional surveys, case-series, qualitative studies) of disability attributable to a target condition, controlled trials, observational studies and audits of screening programmes, and prospective controlled trials of treatment.

Data sources

The following electronic databases were searched: Biological Abstracts, CINAHL, Embase, ERIC, IAC Health Periodicals, IAPV, Medline, Psychlit, Science Citation Index, System for Information on Grey Literature in Europe, DHSS-Data, Faculty of Public Health Medicine Database of Dissertations, Index of Scientific and Technical Proceedings, Dissertation Abstracts, Index of Theses, NHS Research Register, Public Health Information Sharing Database. A limited amount of handsearching was undertaken. Reference lists were scanned to identify other relevant studies, and requests for unpublished data were made to people working in the field.

Data extraction

Data was extracted by the first author and then checked by the second.

Data synthesis

Quantitative analysis was undertaken where possible. Qualitative analysis was performed where studies were too heterogeneous for the data to be combined, or for research questions that were not suitable for quantitative synthesis.

Research findings

The electronic search yielded over 5000 references, and over 500 abstracts were downloaded from the databases for further scrutiny. A total of 85 studies were included in the main analysis.

Prevalence

No studies were found with the primary aim of establishing the prevalence of visual defects in preschool children. Data from studies of screening programmes report a range of yields for all the target conditions combined of 2.4–6.1%.

Natural history

No studies designed with the intention of documenting the natural history of the target conditions in children aged 3 or 4 years were found. Other studies that provide some natural history data suggest that mild degrees of amblyopia may resolve spontaneously. In the absence of information about natural history it is impossible to estimate the effect of treatment from studies without a control group that was not treated.

Disability

A total of 21 studies exploring disability in relation to the target conditions were included. The literature provides a reasonable basis for generating plausible hypotheses about the ways in which the target conditions might disable people, but is insufficient to draw any firm conclusions about their impact on quality of life. The research to date is not sufficient to determine appropriate outcomes for controlled trials of treatment.

Treatment

Five randomised controlled trials of treatment and six prospective controlled trials without randomisation were found. No studies compared treatment with no treatment. Most of the studies were methodologically flawed.

Screening programmes

One prospective controlled trial and 16 retrospective studies (observational studies and audits) of different screening programmes were found. They showed that orthoptic screening programmes perform better than health visitor or general practitioner (GP) screening in terms of programme yield and positive predictive value. The mean uptake rate was 64.8%. The mean referral rate was 6.7% for primary orthoptic screening programmes and 3.9% for screening by health visitor or GP. The positive predictive value ranged from 47.5% to 95.9% for orthoptic screening and from 14.4% to 61.5% for screening by health visitor or GP. Only two studies were found which reported numbers of false-negative cases. The findings of the one prospective study do not support the belief that identifying children with amblyopia in the preschool period reduces the prevalence of this condition in children aged 7 years.

Conclusions

There is a lack of good quality research into the natural history of the target conditions, the disabilities associated with them, and the efficacy of available treatments. This evidence is essential to support a screening programme for a non-fatal condition for which there have been no rigorously controlled trials. An invitation to preschool vision screening carries with it the implicit assumption that screening is going to benefit the child. In the absence of sound evidence that the target conditions sought in these programmes are disabling and that the interventions available to correct them do more good than harm, the ethical basis for such interventions is very weak.

Recommendations

Clinical practice

Purchasers and providers are advised not to implement new preschool vision screening programmes unless they have been rigorously evaluated.

The National Screening Committee should consider whether to recommend that existing vision screening programmes be discontinued, unless they are part of a controlled trial of treatment.

Research recommendations

There is a need to research the following areas.

- The extent of disability attributable to the target conditions.
- The prevalence of blindness or partial sight attributable to amblyopia in the UK.
- The prognosis for vision in the amblyopic eye following loss of vision in the better eye.
- The impact of orthoptic treatment on family life and the psychological well-being of the child.
- The effectiveness of orthoptic treatment for amblyopia on vision and quality of life. This should be a randomised controlled trial in which the control group is not treated, using health outcome measures defined in studies of disability. This would also provide data on the natural history of amblyopia. Trials undertaken in groups of children aged 3–4 years and 5–7 years would determine whether treatment in the preschool years confers any benefit over treatment at school entry.
- The effectiveness of treatment of non-cosmetically obvious squints and refractive errors in this age group.

Publication

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NHS R&D HTA Programme

The overall aim of the NHS R&D Health Technology Assessment (HTA) programme is to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and work in the NHS. Research is undertaken in those areas where the evidence will lead to the greatest benefits to patients, either through improved patient outcomes or the most efficient use of NHS resources.

The Standing Group on Health Technology advises on national priorities for health technology assessment. Six advisory panels assist the Standing Group in identifying and prioritising projects. These priorities are then considered by the HTA Commissioning Board supported by the National Coordinating Centre for HTA (NCCHTA).

This report is one of a series covering acute care, diagnostics and imaging, methodology, pharmaceuticals, population screening, and primary and community care.

The views expressed in this publication are those of the authors and not necessarily those of the Standing Group, the Commissioning Board, the Panel members or the Department of Health.

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