Caries-Risk Assessment (CRA) is vital in patient-centered caries management.

Design of CRA systems based on cross-sectional or prospective studies.

Main conceptual limitations:
- Study designs inadequate for correctly identifying individuals at risk
- Caries status determined by past exposure to risk factors that cannot be assessed at one point in time
- Few prospective studies of good quality

Aims

To find characteristics of high/low risk individuals
To estimate effects of individual risks while controlling for other risks
To estimate variation in caries combining effects of multiple risks

Analysis

Common Analytical Methods: (Regression/Discriminant Analysis)

Existing CRA systems/guidelines
- AAPD CAT
- CAMBRA CRA
- ADA CRA
- Cariogram

Are current CRA systems/guidelines predictive of future caries?
What are the outcomes of management based upon the use of these systems?

Inclusion Criteria:
- Primary outcome: caries incidence/increment
- Human subjects and natural carious lesions

Exclusion Criteria:
- Incomplete description of sample selection, outcomes or small N
- Designs # than RCT's, prospective and retrospective cohorts

Validity: Se, Sp, NPV/PPV, and AUROC

Data extracted by one author and checked independently by a second author

Quality of the studies: ADA Clinical Recommendations (good, fair or poor)
**Evidence of Existing Caries Risk Assessment Systems**

**Tellez M, Gomez J, Preety I, Ellwood R, Ismail AI**

**Results**

Total Scientific Publications (N=539)

- Selected for full review (N=137)
  - Prediction Models (26%)
  - Carigram (12%)
  - CAMBRA (6%)
  - Summaries/Comments (56%)

No published prospective studies using ADA or AAPD CRA tools

**Are CRA systems predictive of future caries increments?**

- **Children**
  - Almost all new caries lesions appeared in groups assessed with HR of developing disease.
  - Pre-school: Se + Sp 139% ; School children: Se + Sp 110-133%, AUROC: .72- .75
  - Comparability of groups
    - Number of factors considered for both children and adults (range 10-24)
    - Categorization of Risk (H,M,L,E)
    - Plaque
    - Fluoride exposure
    - Diet
    - Saliva flow
    - Overall general health

- **Adults**
  - Able to sort elderly individuals into risk groups that reflected actual caries outcome (5 times > new carious surfaces in HR vs. LR)

**What are the outcomes of management based upon the use of these systems?**

**CARIOTOMY (RCT – 5 y follow up) vs 2- 4 year olds**

- No significant difference in caries development between risk categories.
- Salivary SMI: strongest predictor among control subjects.

**NOT USING CURRENT CRA (RCT- 2 y follow up 18-54 year olds)**

- Risk status: Salivary M, L, D and P levels
- Altering the pathological/preventive factor balance lowers caries risk and reduces caries increments.

**Challenges**

- Methodology:
  - Use of Se and Sp values.
  - Effect of BL prevalence on predictive values.
  - Use of past caries experience (effect and not cause of disease).

- Lack of consistency in clinical and non-clinical factors considered good predictors (vary by population, age groups and dentition).
Conclusions

- Prediction validity of current systems is limited for both adults and children and cost savings of their use in different settings is unknown.
  - Cariogram (7-10 items): Acceptable performance, better for elderly, school children and pre-school.
  - CAMBRA (24 items): Acceptable performance in adult population seeking care.
  - ADA (14-19 items)/AAPD (14 items): No published evidence.

- Unknown if identification of HR individuals w/existing CRA systems can lead to more effective long term patient management.

- Need to standardize comparable predictors, cut-off points, statistical analyses & outcome measures.

Thank you!
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