Risk factors for gastroenteritis due to Norwalk-like virus, Sapporo-like virus and rotavirus group A

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Data collection: Sensor study 1999

- Community-based cohort (4860 participants)
- Nested case-control study (772 cases, 765 controls)
  - Stool samples and risk factor questionnaire

Risk in 7 days before onset of illness:
contact with symptomatic persons (within/outside household), contact with animals/manure, swimming, travel, food consumption (at home/out)

Long-term risk: demographics, size of household, child in day care center, child in diapers, chronic GI complaints, indicators kitchen/food hygiene (11 items used to score for less hygienic practices)
Statistical analyses risk factors viral GE

- NLV: 152 case-control pairs
- SLV: 48 case-control pairs
- Rotavirus: 54 case-control pairs

- Univariate analyses (McNemar, Bowker’s symmetry test, paired t-test, Wilcoxon signed rank): OR, 95% BI
- Multivariate analyses (conditional logistic regression): adjusted OR, 95% BI
- Population attributable risk fraction (PARF)
- Subanalysis estimate part foodborne proportion
Incidence NLV, SLV and rotavirus (per 1000 person years)

Gastroenteritis overall: 283 (46% pathogen)
NLV: 31 (11%)  SLV: 6 (2%)  rotavirus:11 (4%)
## Risk factors for NLV (multivariate)

1. **Foodhandling hygiene (continuous scale)**
   - \(1 \uparrow\) OR = 1.3 (1.0 - 1.7)  PARF 47%

2. **Number symptomatic household members**
   - 0  OR = 1.0  PARF 17%
   - 1  OR = 1.2 (0.3 - 4.2)
   - 2  OR = 10.9 (2.0 - 60.5)

3. **Contact symptomatic cases outside househ.**
   - No  OR = 1.0  PARF 56%
   - Yes OR = 12.7 (3.6 - 51.8)

**Risk 1,2,3 combined: PARF 80% (1+2=56%)**
Estimate part of foodborne proportion of NLV-gastroenteritis

• What proportion is caused by contaminated food entering the household (so excl. food contaminated within household)?

• 34 pairs in analysis, only cases without contact with symptomatic individuals

• Then OR for food handling hygiene = 1.4

PARF 12-16% (of all NLV gastroenteritis)
Risk factors for SLV (multivariate)

1. Contact with symptomatic person outside household
   No   OR=1.0
   Yes  OR=4.4 (1.3-14.9)   PARF  60%
Risk factors for rotavirus (multivariate)

1. Foodhandling hygiene (continuous scale)
   1↑ OR= 1.5 (1.1-2.1)      PARF  46%

2. Contact symptomatic person outside househ.
   No  OR=1.0
   Yes OR=12.9 (1.2-133.6)    PARF  86%

Risk 1 and 2 combined: PARF 92%
Estimate part of foodborne proportion of rotavirus-gastroenteritis

• What proportion caused by contaminated food entering the household (so excl. food contaminated within household)?

• 10 pairs in analysis, only cases without contact with symptomatic individuals

• OR for food handling hygiene = 1.8

PARF 4% (of all RV gastroenteritis)
Conclusions

- **Person to person** most important, followed by foodborne (NLV/RV): explains 60-90% of cases

- **For NLV**
  - Part of infections probably person-food-person, mainly children >5, adults (contamination food in household)
  - About 12-16% of NLV-GE caused by contaminated food entering household
  - Suggested that infections are often introduced through children attending day-care centers / primary school
  - Professionals in food industry / catering might be made aware of their risk of being infectious if they have contact with a symptomatic person (to take extra precautions at work)