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

Matty de Wit, Marion Koopmans, Yvonne van Duynhoven

rivm
National Institute for Public Health and the Environment

Research for man and environment
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. Food handling hygiene (continuous scale)
   1↑ 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 household.
   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 foodhandling 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. Food handling hygiene (continuous scale)
   \[1 \uparrow \quad OR = 1.5 \ (1.1 - 2.1) \quad PARF \ 46\%\]

2. Contact symptomatic person outside household.
   - No \quad OR = 1.0
   - Yes \quad OR = 12.9 \ (1.2 - 133.6) \quad 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 foodhandling 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)