

Quality assessment in meta-analyses of diagnostic studies: what difference does email contact with authors make?

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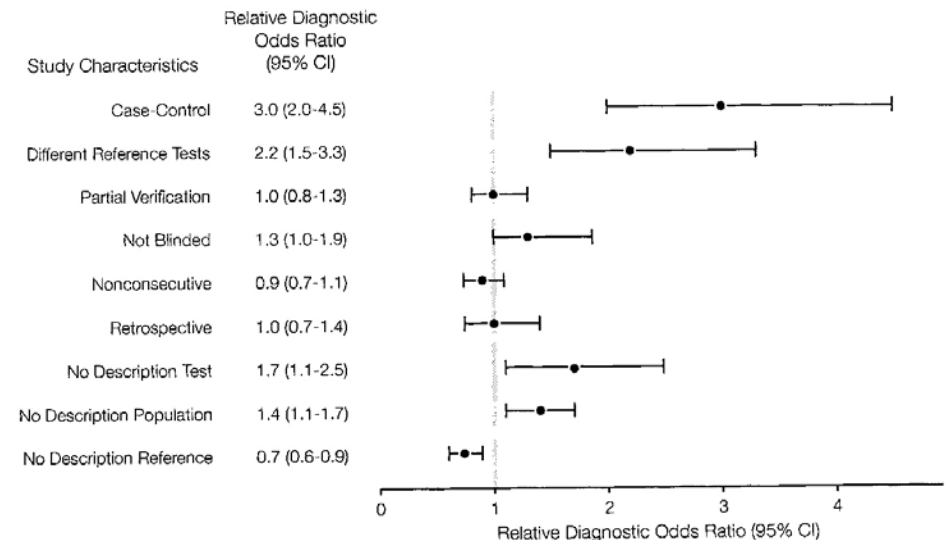
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Quality assessment in diagnostic meta-analyses

- Quality assessment is a vital part of diagnostic reviews
- Empiric research* suggests that some design features might be associated with diagnostic accuracy:
 - Case-control study design
 - Verification bias
 - Lack of blinding
 - Inadequate description of index test and study population

Figure. Relative Diagnostic Odds Ratios and 95% Confidence Intervals (CIs) of the 9 Study Characteristics Examined With a Multivariate Regression Analysis



*Lijmer JG, et al. Empirical evidence of design-related bias in studies of diagnostic tests. JAMA 1999;282:1061-6



Quality assessment: problem of missing data

- Poor reporting of quality and study design features in primary diagnostic studies makes the process of quality assessment difficult and frustrating
- Contacting authors is the ideal method of overcoming the problem of poor reporting and missing data
- We describe the impact of contact with authors on assessment of study quality in two diagnostic meta-analyses



Methods

- We conducted two meta-analyses on the accuracy of nucleic acid amplification tests (e.g. PCR) for the diagnosis of:
 - Tuberculous meningitis* [49 studies]
 - Tuberculous pleuritis (pleurisy)** [40 studies]

*Pai M, et al. Diagnostic accuracy of nucleic acid amplification tests for tuberculous meningitis: a systematic review and meta-analysis. *Lancet Infect Dis* 2003;3:633-43.

**Pai M, et al. Nucleic acid amplification tests in the diagnosis of tuberculous pleuritis: a systematic review and meta-analysis. Under review: *Int J Tubercul & Lung Dis*.



Methods

- In both meta-analyses, we used the following quality criteria (adapted from Lijmer et al. 1999) for assessment of validity:
 - Study design (spectrum)
 - Case-control vs. cross-sectional
 - Verification bias
 - Complete, partial, differential verification
 - Blinding
 - Single or double blinded interpretation of test and reference standard
 - Patient sampling
 - Consecutive or random vs non-consecutive/non-random
 - Data collection strategy
 - Prospective vs retrospective
 - Study size
- Two reviewers independently performed quality assessment (blinded, in one review)



Methods

- Since quality of reporting was poor in both reviews, we contacted the authors for additional information:
 - Contact was only via email, no letters were sent
 - Emails were sent with an attached, structured questionnaire with only the most relevant questions
 - Authors were asked to check the correct responses and return the questionnaire via email
- In the TB meningitis review, 24/41 (59%) authors responded after 1 or 2 email contacts
- In the pleural TB review, additional data was obtained for 25/40 (63%) included studies



Case study 1: TB meningitis meta-analysis: impact of contacting authors

Characteristic	Before contact % [N = 49]	After contact % [N = 49]
Study design		
Cross-sectional	63	61
Case-control	37	39
Verification		
Complete	94	94
Partial	6	6
Industry funding		
Yes	8	16
No	92	84



Case study 1: TB meningitis meta-analysis: impact of contacting authors

Characteristic	Before contact % [N = 49]	After contact % [N = 49]
Blinding		
Double or single blind	26	59
Not blinded	0	10
Not reported	74	31
Sampling		
Consecutive/random	18	49
Not consecutive/random	6	20
Not reported	76	31
Data collection		
Prospective	51	61
Retrospective	0	4
Both	2	10
Not reported	47	25



Case study 2: TB pleuritis meta-analysis: impact of contacting authors

- Quality criteria:

1. Independent comparison of NAA test against reference standard
2. Cross-sectional design
3. Single or double blinded interpretation of test and reference standard results
4. Consecutive or random sampling of patients
5. Prospective data collection
6. At least 10 specimens/patients with tuberculous pleuritis

- Quality criteria:

- High quality:
 - Meets at least 5/6 criteria
- Medium quality:
 - Meets 3 or 4 of the 6 criteria
- Low quality:
 - Meets < 3 of the 6 criteria



Case study 2: TB pleuritis meta-analysis: impact of contacting authors

Characteristic	Before contact % [N = 40]	After contact % [N = 40]
Blinding		
Double/Single blind	20	55
Unblinded	0	15
Not reported	80	30
Sampling		
Consecutive/random	30	53
Not consecutive/random	2	20
Not reported	68	27
Data collection		
Prospective	42	53
Retrospective	0	7
Both	0	13
Not reported	58	27



Case study 2: TB pleuritis meta-analysis: impact of contacting authors

Quality	Before contact % [N = 40]	After contact % [N = 40]
Commercial tests		
High	21	36
Medium	50	50
Low	29	14
In-house tests		
High	19	39
Medium	50	42
Low	31	19



Conclusions

- Missing information due to poor quality of reporting is a major concern in diagnostic meta-analyses
- Contact with authors can significantly improve quality assessment in diagnostic meta-analyses
- The impact of author contact is large on some (but not all) quality criteria
- Response rates $>50\%$ can be achieved with just repeated email contact