ASSESSING THE QUALITY OF REPORT IN NETWORK META-ANALYSIS

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BACKGROUND AND OBJECTIVE

Network meta-analysis (NMA) became an important evidence-gathering technique, but further investigation on its methodological quality is needed to allow its standard use in healthcare decisions. (1-2) We aimed to determine the quality of report of NMAs using PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and PRISMA-NMA checklists.

SETTING AND METHOD

A systematic review of NMAs comparing any pharmacological intervention was performed (updated April 2017; searches in Medline and Scopus). PRISMA and PRISMA-NMA checklists were applied to all NMAs. Both checklists were converted into quantitative scores with maximum values of 27 and 32 points, respectively. To normalize the values between the two checklists, a third score (PRISMA-SCORE) was created (values 0-1). The association of these score with the NMA's publication year, journal impact factor, and most productive countries were calculated.

RESULTS

We identified 477 NMAs (Figure 1). Almost half of them were published after PRISMA-NMA publication (June 2015). Only 36% of studies followed PRISMA statements. The median of PRISMA and PRISMA-NMA scores were 21 (IQR 19 - 23) and 23 (IQR 19 - 26), respectively (Figure 2). The normalized PRISMA-SCORE median was 0.73. Several methodological problems in NMA were noted (Table 1). NMAs from the most productive countries (United States of America and China) have similar quality. Correlation analyses showed a positive but weak correlation for PRISMA-SCORE and journal impact factor (Spearman's ρ=0.193; $p<0.001$). However, NMAs poor quality remain steady over the years (see Figures 3 to 5).

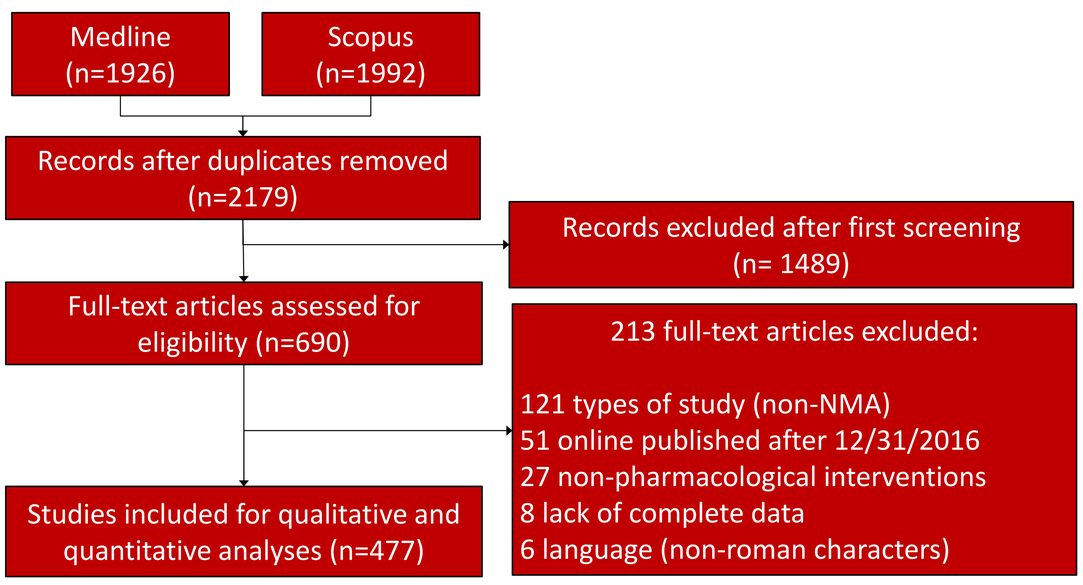

Figure 1. Flowchart of the included NMAs

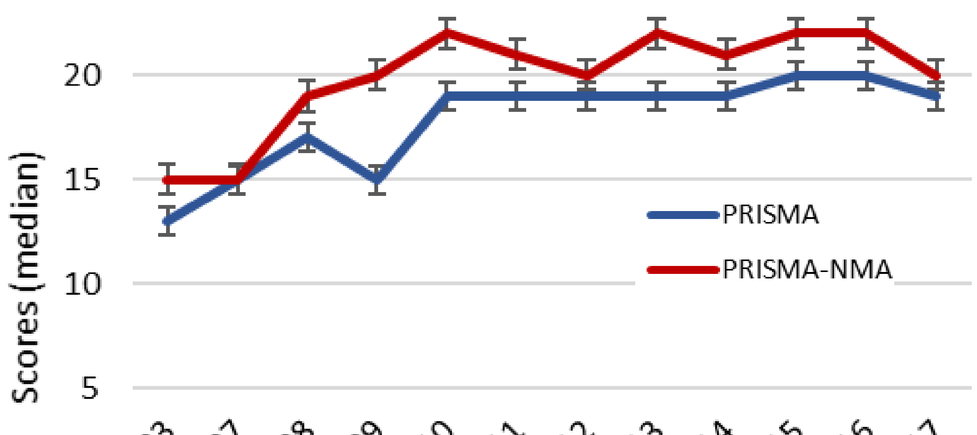

Figure 2. Scores obtained for PRISMA and PRISMA-NMA checklists

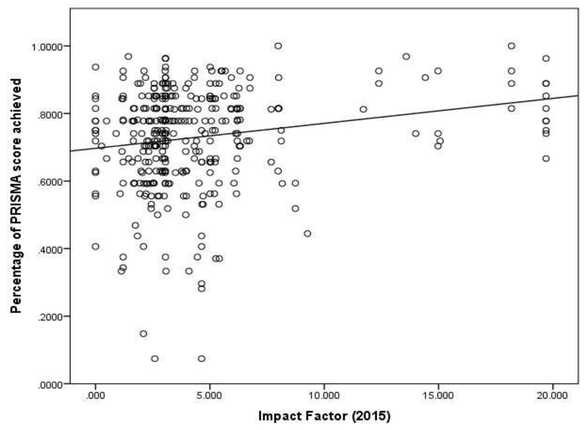

Figure 3. Correlation of the normalized PRISMA-SCORE and journal's impact factor (2015)

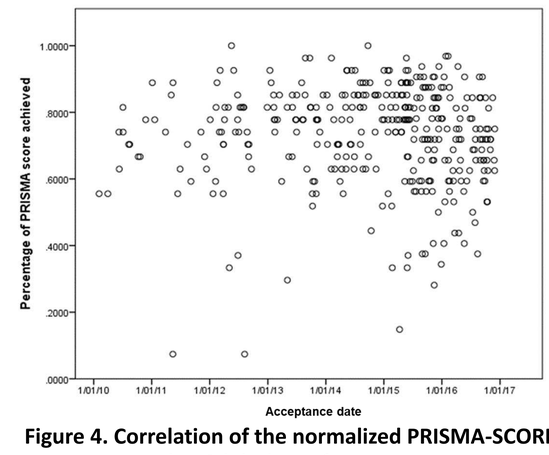

Figure 4. Correlation of the normalized PRISMA-SCORE and article's date of acceptance

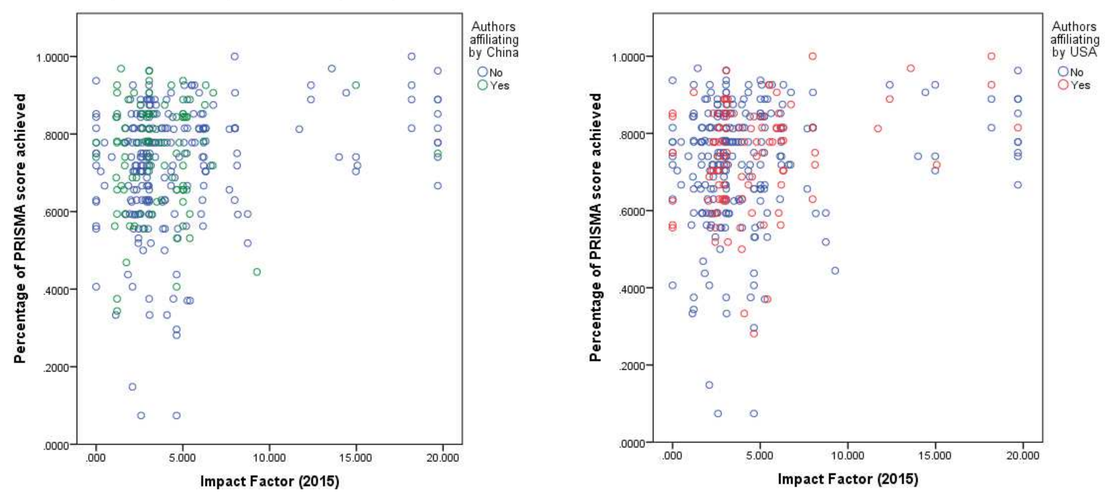

Figure 5. Correlation of the normalized PRISMA-SCORE with journal impact factor by the most productive countries (i) China (green) and (ii) USA – United States of America (red)

Table 1. Methodological characteristics of NMA according to PRISMA and PRISMA-NMA

Item	PRISMA N (%)	P.NMA N (%)	Items	PRISMA N (%)	P.NMA N (%)	Items	PRISMA N (%)	P.NMA N (%)
Identify as systematic review and *network meta-analysis*	438 (91.8)	434 (91.0)	**Methods: risk of bias across studies**	**116 (24.3)**	**116 (24.3)**	***Results of additional analyses***	**227 (47.6)**	**216 (45.3)**
Structured abstract *mentioning NMA was done*	442 (92.5)	394 (86.2)	*Methods: eligible treatments included in NMA*	444 (93.1)	422 (88.5)	Results: network graph	-	231 (83.7)
Provide explicit statement of questions (e.g. PICOS)	364 (76.3)	364 (76.3)	Method: main measures and *additional measures*	459 (96.2)	446 (93.5)	**Results: characteristics of the network**	**-**	**157 (56.8)**
Rationale *mentioning why NMA was performed*	451 (94.5)	379 (79.5)	Methods: handling data, *alternative methods to NMA*	429 (89.9)	408 (85.6)	**Results: inconsistency**	**-**	**58 (21.0)**
Review protocol and registration number	**85 (17.8)**	**85 (17.8)**	**Methods to explore the geometry of the network**	**-**	**29 (10.5)**	Result: risk of bias within studies	286 (60.0)	286 (60.0)
Information sources and date of last searches	449 (94.1)	449 (94.1)	**Methods for additional analyses**	**240 (50.3)**	**227 (47.6)**	**Result: risk of bias across studies**	**99 (20.8)**	**99 (20.8)**
Full electronic search strategy	**164 (34.4)**	**164 (34.4)**	**Methods: statistics to evaluate inconsistency**	**-**	**156 (56.5)**	Summarize findings, strengths	465 (97.5)	465 (97.5)
Process of selecting studies e eligibility	433 (90.8)	433 (90.8)	Results: studies screened, assessed, included	440 (92.2)	440 (92.2)	Limitations (*assumptions of network)*	423 (88.7)	423 (88.7)
Methods for data extraction and complete process	432 (90.6)	432 (90.6)	Results: characteristics for individual studies	452 (94.8)	452 (94.8)	Interpretation of the results, implications	456 (95.6)	456 (95.6)
List and definition of variables (extraction data)	444 (93.1)	444 (93.1)	**Results: summary data, *including for NMA***	**312 (65.4)**	**258 (54.1)**	Describe sources of funding	407 (85.3)	407 (85.3)
Methods: risk of bias within studies	316 (66.2)	316 (66.2)	*Results of meta-analysis, credible intervals*	463 (97.1)	443 (92.9)			

Italic items: modified from the original PRISMA (published in July 2009) to the PRISMA-NMA (June 2015)
Highlighted items: poorly reported
N=477 studies. For the five new items of PRISMA-NMA, N=276 were evaluated (published after June 2015)

CONCLUSIONS

The increase of NMAs publication was not associated with better reporting quality, even after PRISMA-NMA publication. Editors, peer-reviewers, funding agencies should ensure that these problems are solved before publication.

REFERENCES

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