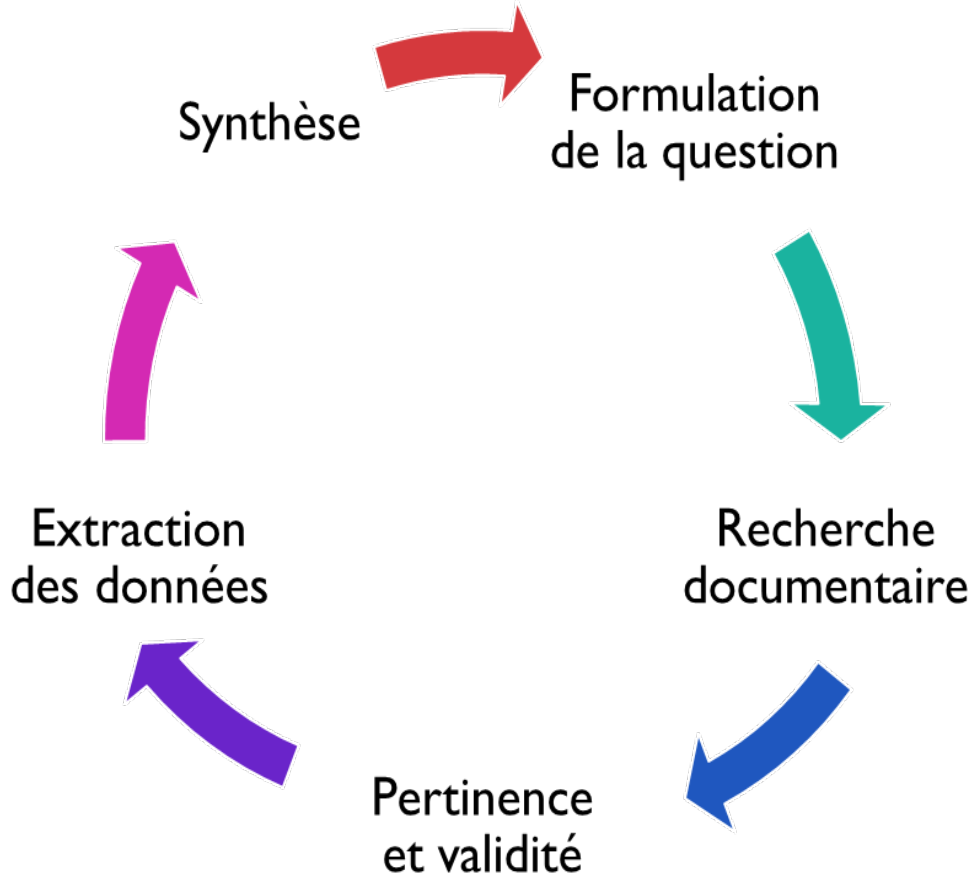
Introduction aux revues systématiques dans le domaine de la santé

Patrice Ngangue, MD, PhD

Les étapes d'une synthèse de connaissances



Contenu du jour

- Retour sur les travaux de groupe et consignes pour la suite
- Consignes pour la suite des travaux individuels
- Exemple de grille d'extraction
- Synthèse des résultats d'une revue systématique

Synthèse/analyse des données

- Vise à assembler les résultats collectés d'une manière qui représente et explique le ou les phénomène(s) étudié(s)

- Une synthèse de données bien planifiée aide à garantir que les résultats de l'analyse restent ancrés dans les données originales et qu'ils reflètent les expériences originales des participants

Publishing SR

- Differences between publishing SR in the Cochrane Library and in a journal:
  - Cochrane has some specific rules (e.g. titles structure: a title cannot start with 'A' or 'The'; should not not include 'a systematic review of')

- Publishing in a journal: PRISMA Statement
  - Preferred Reporting Items for Systematic Reviews and Meta-Analyses (2009)
  - 27-item checklist, flow diagram

  - PRISMA authors are also heavily involved in the Cochrane work, high compatibility of both guides

http://www.prisma-statement.org/

Reporting of systematic reviews

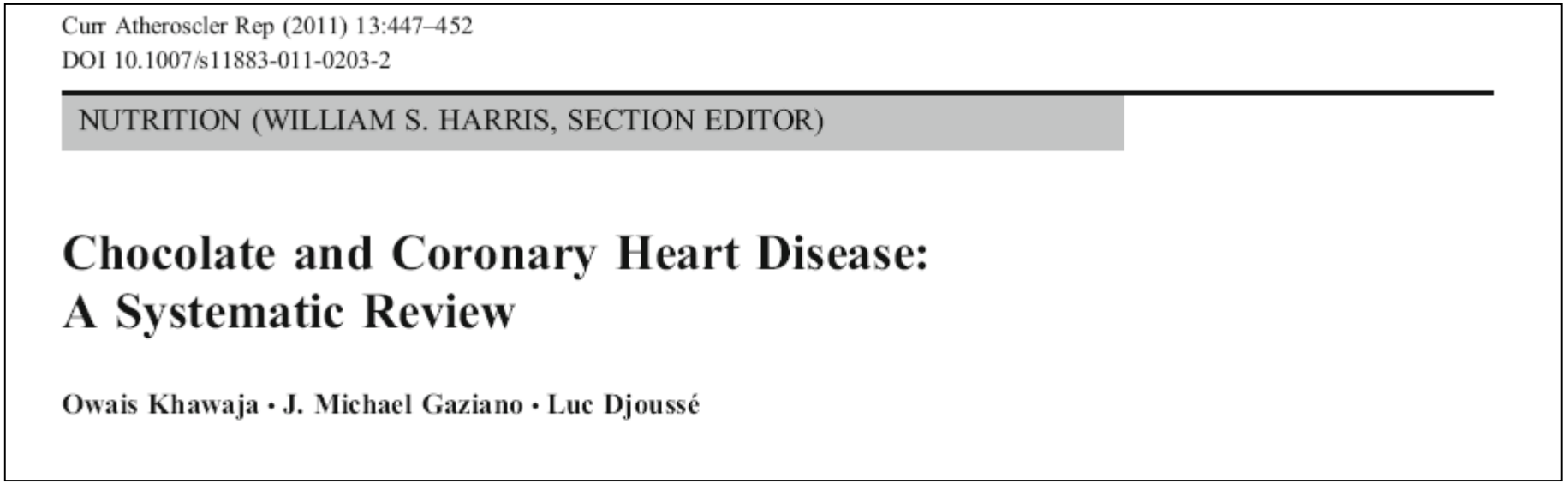
- Good reporting of primary studies is crucial for SR development

BUT

- Reviews are not immune to the problems of poor reporting
  - Moher et al. assessed epidemiological and reporting characteristics and bias-related aspects of 300 systematic reviews (of which 125 were Cochrane reviews). The overall quality of reporting of key aspects of methodology was very inconsistent with particularly discouraging findings for non-Cochrane reviews.

[Moher; PLoS Medicine 2007]

Example of bad reporting



Curr Atheroscler Rep (2011) 13:447–452
DOI 10.1007/s11883-011-0203-2

NUTRITION (WILLIAM S. HARRIS, SECTION EDITOR)

Chocolate and Coronary Heart Disease: A Systematic Review

Owais Khawaja · J. Michael Gaziano · Luc Djoussé

- Nowhere in the paper any mention of the review methodology!

Example of good reporting

Ried *et al. BMC Medicine* 2010, **8**:39
http://www.biomedcentral.com/1741-7015/8/39

BMC Medicine

RESEARCH ARTICLE Open Access

Does chocolate reduce blood pressure? A meta-analysis

Karin Ried[1*], Thomas Sullivan[2], Peter Fakler[1], Oliver R Frank[1], Nigel P Stocks[1]

Abstract

Background: Dark chocolate and flavanol-rich cocoa products have attracted interest as an alternative treatment option for hypertension, a known risk factor for cardiovascular disease. Previous meta-analyses concluded that cocoa-rich foods may reduce blood pressure. Recently, several additional trials have been conducted with conflicting results. Our study summarises current evidence on the effect of flavanol-rich cocoa products on blood pressure in hypertensive and normotensive individuals.

Methods: We searched Medline, Cochrane and international trial registries between 1955 and 2009 for randomised controlled trials investigating the effect of cocoa as food or drink compared with placebo on systolic and diastolic blood pressure (SBP/DBP) for a minimum duration of 2 weeks. We conducted random effects meta-analysis of all studies fitting the inclusion criteria, as well as subgroup analysis by baseline blood pressure (hypertensive/normotensive). Meta-regression analysis explored the association between type of treatment, dosage, duration or baseline blood pressure and blood pressure outcome. Statistical significance was set at $P < 0.05$.

Results: Fifteen trial arms of 13 assessed studies met the inclusion criteria. Pooled meta-analysis of all trials revealed a significant blood pressure-reducing effect of cocoa-chocolate compared with control (mean BP change ± SE: SBP: -3.2 ± 1.9 mmHg, $P = 0.001$; DBP: -2.0 ± 1.3 mmHg, $P = 0.003$). However, subgroup meta-analysis was significant only for the hypertensive or prehypertensive subgroups (SBP: -5.0 ± 3.0 mmHg; $P = 0.0009$; DBP: -2.7 ± 2.2 mm Hg, $P = 0.01$), while BP was not significantly reduced in the normotensive subgroups (SBP: -1.6 ± 2.3 mmHg, $P = 0.17$; DBP: -1.3 ± 1.6 mmHg, $P = 0.12$). Nine trials used chocolate containing 50% to 70% cocoa compared with white chocolate or other cocoa-free controls, while six trials compared high- with low-flavanol cocoa products. Daily flavanol dosages ranged from 30 mg to 1000 mg in the active treatment groups, and interventions ran for 2 to 18 weeks. Meta-regression analysis found study design and type of control to be borderline significant but possibly indirect predictors for blood pressure outcome.

Conclusion: Our meta-analysis suggests that dark chocolate is superior to placebo in reducing systolic hypertension or diastolic prehypertension. Flavanol-rich chocolate did not significantly reduce mean blood pressure below 140 mmHg systolic or 80 mmHg diastolic.

line blood pressure, dosage, duration, type of control, study design, age, body mass index and trial quality on blood pressure outcome.

Methods

Search strategy

We searched the Medline and Cochrane databases for randomised controlled trials of chocolate or cocoa on blood pressure published between 1955 and 2009 using the following search terms: chocolate OR cocoa AND blood pressure. We also searched reference lists of published studies and checked international trial registries http://www.clinicaltrials.gov; http://www.trialregister.nl; http://www.anzctr.org.au; http://www.controlled-trials.com for unpublished but completed studies investigating chocolate/cocoa for blood pressure.

Selection of trials

Trials were included in the meta-analysis if the control group received a placebo or a low dose of flavanol-containing cocoa product (drink, bar or tablet), the trial duration was ≥ 14 days, and the clinical mean or median systolic or diastolic blood pressure (SBP/DBP) and standard deviation (SD) were available. We contacted authors of studies which did not report numerical mean SBP/DBP or SD and received datasets from two studies [18,22], which we included in the meta-analysis. Three eligible completed but unpublished studies were excluded because data were not available at the time of this study [25-27].

Data extraction and quality assessment

Data were abstracted and quality was assessed independently by two investigators (KR, PF) using guidelines published by the Cochrane Collaboration [28] (Tables 1,2,3). Any disagreement was resolved by discussion between the authors (KR, PF) in consultation with the statistician (TS). Characteristics of trials included in the meta-regression analysis are shown in Table 1. We assessed quality on the basis of randomisation, blinding, whether blood pressure was a primary outcome measure, loss to follow-up, funding source and whether compliance and dietary chocolate intake had been assessed, as these could have influenced findings (Table 3). No trial was excluded in the meta-analysis on grounds of quality; however, higher-quality trials (score ≥ 3.5 of 5 points) were compared with lower-quality trials by meta-regression analysis.

Analysis

Meta-analysis was conducted using the Cochrane Program Review Manager version 5 [29]. Owing to high

line mean blood pressure, similar to our recent meta-analysis of the effect of garlic on blood pressure [30]. For systolic blood pressure, trials were divided into a hypertensive subgroup (SBP ≥ 140 mmHg) and a normotensive subgroup (SBP < 140 mmHg) at the start of treatment. For diastolic blood pressure, a division into a higher BP subgroup (DBP ≥ 80 mmHg) and lower BP subgroup (DBP < 80 mmHg) at the start of treatment allowed an even distribution of trials between subgroups and reduction in heterogeneity.

Meta-regression analyses were conducted using Stata version 10 [31] to explore reasons for high heterogeneity in the pooled meta-analysis of all studies. The following variables were tested, as their associations with blood pressure outcomes are physiologically plausible: Dosage of polyphenols in the active treatment group (continuous variable), type of control (categorical variable: low-flavanol control as drink, tablet or bar/flavanol-free control as white chocolate, milk, or placebo capsules), duration (continuous and categorical > 2 weeks yes/no), study design (parallel versus crossover), starting SBP (continuous and categorical > 140 mmHg yes/no), starting DBP (continuous and categorical >80 mmHg yes/no), quality score (≥ 3.5 yes/no), average body mass index (BMI) (continuous and categorical > 25 or > 30 yes/no) and average age (continuous).

If meta-regression results indicated a variable to contribute significantly to heterogeneity between studies, subgroup analysis by this variable was conducted, testing whether there was an effect of treatment on blood pressure outcomes within each subgroup. If heterogeneity was reduced, the subgroup analysis provided a more reliable estimate of pooled effect size between the treatment groups. Additionally, sensitivity analysis excluding selected trials explored the robustness of results. Publication bias or small study effect was assessed by Begg's funnel plots and Egger's regression tests [32,33].

Results

Summary of included studies

A total of 18 publications including 21 trial arms were assessed in detail for inclusion [10-13,15-24,34-38] (Figure 1). Fifteen trial arms reported in 13 publications met the inclusion criteria [10-13,15-18,20-24] (Figure 1, Table 1). Six trial arms were excluded because 1) the same population and protocol were used in [19] compared with [13]; 2) the comparison group received other vasoactive substances rather than placebos as a) chocolate ± plant sterols [34,35], b) tomato extract in phase 2 of trial [23], or c) half dose of chocolate [38]; 3) mean SBP/DBP and SD were not reported and could not be obtained from the authors [36]; and 4) the trial was of

PRISMA 2009 Checklist

Section / topic	#	Checklist item
TITLE		
Title	1	Identify the report as a systematic review, meta-analysis, or both.
ABSTRACT		
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.
INTRODUCTION		
Rationale	3	Describe the rationale for the review in the context of what is already known.
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).

PRISMA 2009 Checklist (2)

METHODS		
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.

PRISMA 2009 Checklist (3)

Methods - continued

Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.

PRISMA 2009 Checklist (4)

RESULTS		
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).
Results of individual studies	20	For all outcomes considered (benefits or harms) present, for each study: (a) simple summary data for each intervention group, (b) effect estimates and confidence intervals, ideally with a forest plot.
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see item 15).
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).

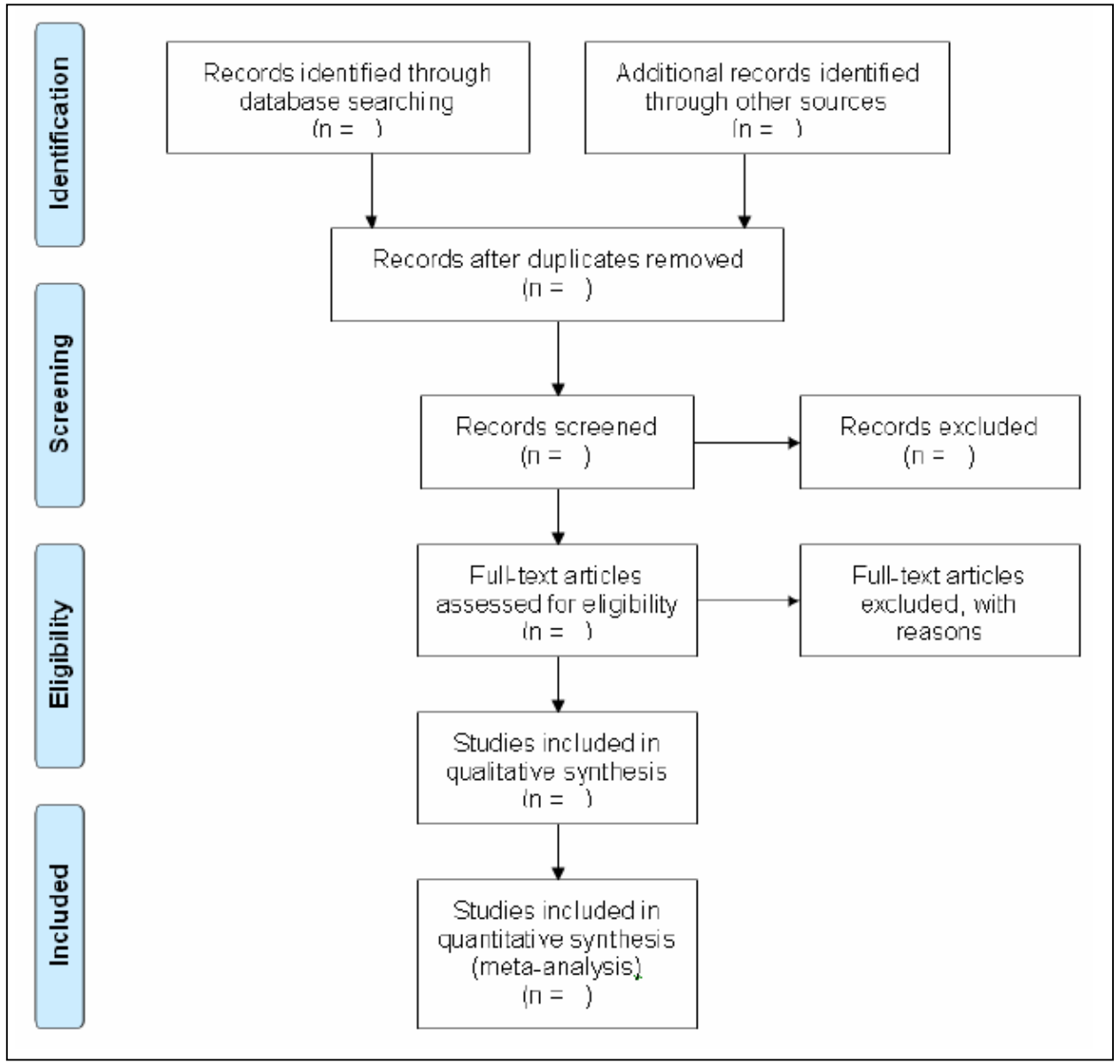
Mistake in the published PRISMA papers: Item 21 should read →

Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency

PRISMA 2009 Checklist (5)

DISCUSSION		
Summary of evidence	24	Summarise the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).
Limitations	25	Discuss limitations at study and outcome-level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.
FUNDING		
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.

PRISMA 2009 Flow diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

www.prisma-statement.org

PRISMA explanation & elaboration paper

- Explanation and rationale for reporting of suggested information (items)
- Examples of good reporting
- Relevant data about how this information is reported presently

Long but recommend to read to avoid basic mistakes in SR reports!

Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche P, Ioannidis JPA, Clarke M, Devereaux PJ, Kleijnen J, Moher D, the PRISMA Group. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration.

- PLoS Med 2009 6(7): e1000100
- Annals of Internal Medicine 2009;151:w65-w94
- BMJ 2009; 339:b2700.
- Journal of Clinical Epidemiology 2009; PMID: 19631507

www.prisma-statement.org

www.equator-network.org

Narrative reviews (NR)

- Provide an overview of a particular topic
- Often cover a wide range of issues within a given topic
- Can be useful for understanding new concepts
- But there are problems associated with NR:
  - they are rarely comprehensive
  - they do not reveal many details about their methodology
  - they are highly susceptible to reviewers' bias
  - they seldom take into account differences in the quality of studies
  - they can often come to the wrong conclusion – careful interpretation needed

Example of NR

TRIALS IMPACT FACTOR 2.08

Search this journal for Go

Advanced Search

Home | Articles | Authors | Reviewers | About this journal | My Trials

Top
Abstract
Background
Rationale, ai...
Findings
Discussion
Conclusions
Competing interests
Authors' contributions
Acknowledgements
References

Review

Highly accessed | Open access

Reporting bias in medical research – a narrative review

Natalie McGauran*, **Beate Wieseler**, **Julia Kreis**, **Yvonne-Beatrice Schüler**, **Heike Kölsch** and **Thomas Kaiser**

* Corresponding author: Natalie McGauran n.mcgauran@iqwig.de

Author Affiliations

Institute for Quality and Efficiency in Health Care, Dillenburger Str 27, 51105 Cologne, Germany

For all author emails, please log on.

Trials 2010, **11**:37 doi:10.1186/1745-6215-11-37

The electronic version of this article is the complete one and can be found online at: http://www.trialsjournal.com/content/11/1/37

Received: 7 November 2009
Accepted: 13 April 2010
Published: 13 April 2010

Abstract

Reporting bias represents a major problem in the assessment of health care interventions. Several prominent cases have been described in the literature, for example, in the reporting of trials of antidepressants, Class I anti-arrhythmic drugs, and selective COX-2 inhibitors. The aim of this narrative review is to gain an overview of reporting bias in the medical literature, focussing on publication bias and selective outcome reporting. We explore whether these types of bias have been shown in areas beyond the well-known cases noted above, in order to gain an impression of how widespread the problem is. For this purpose, we screened relevant articles on reporting bias that had previously been obtained by the German Institute for Quality and Efficiency in Health Care in the context of its health technology assessment reports and other research work, together with the reference lists of these articles.

Trials
Volume 11

Viewing options
Abstract
Full text
PDF (1.5MB)
Additional files

Associated material
PubMed record
About this article
Readers' comments
Pre-publication history

Related literature
Articles citing this article
Other articles by authors
▸ on Google Scholar
▸ on PubMed
Related articles/pages
on Google
on Google Scholar
on PubMed

Tools
Download references
Download XML
Email to a friend
Order reprints
Post a comment

Share this article

Synthèse quantitative (la méta-analyse)

- Combine les résultats d'études **semblables** selon une méthode quantitative

- Produit un sommaire statistique représentant l'effet de l'intervention (sommation des effets de plusieurs études)

- Le sommaire statistique est plus précis que l'ampleur de l'effet noté dans les études individuelles

Synthèse quantitative (la méta-analyse)

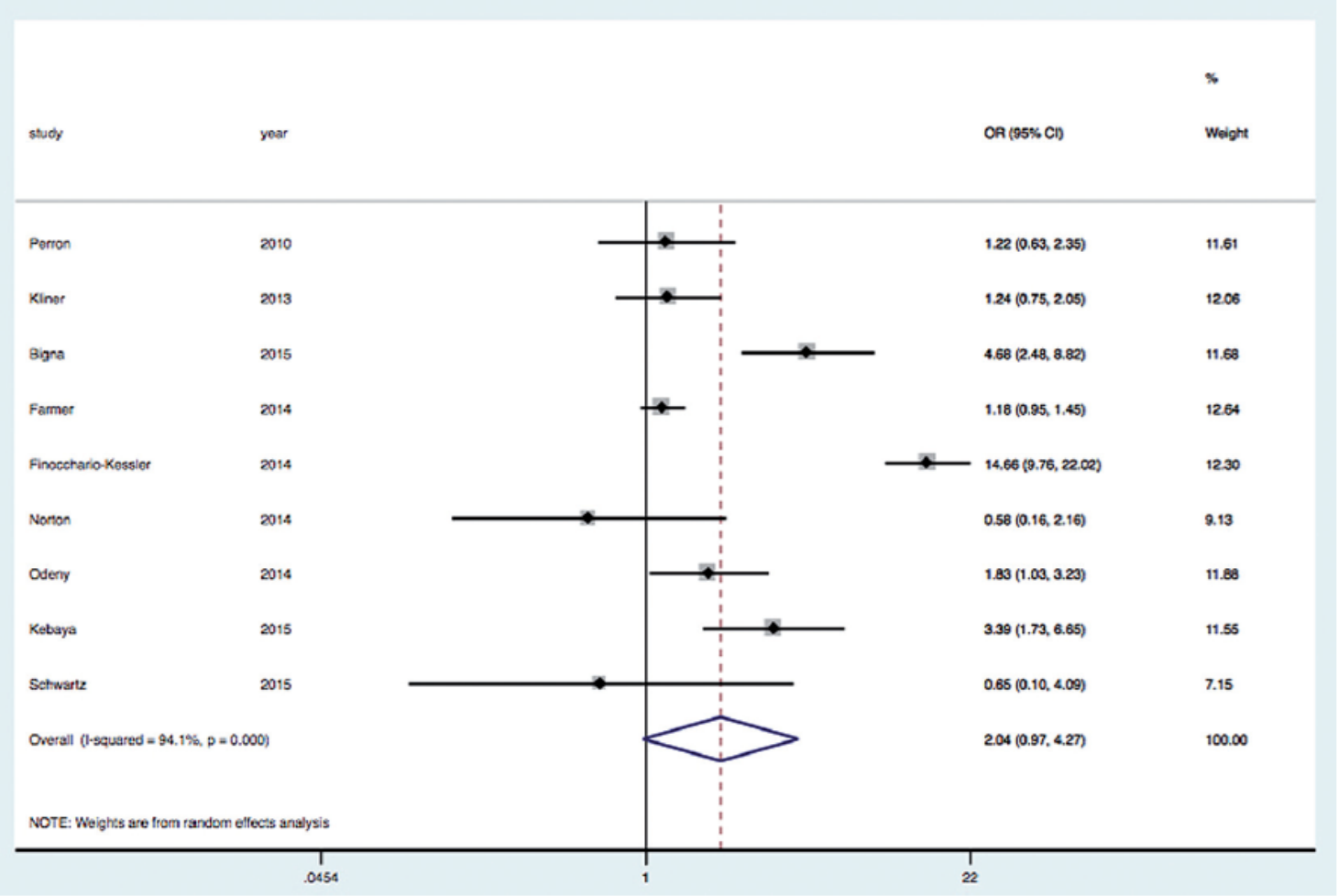
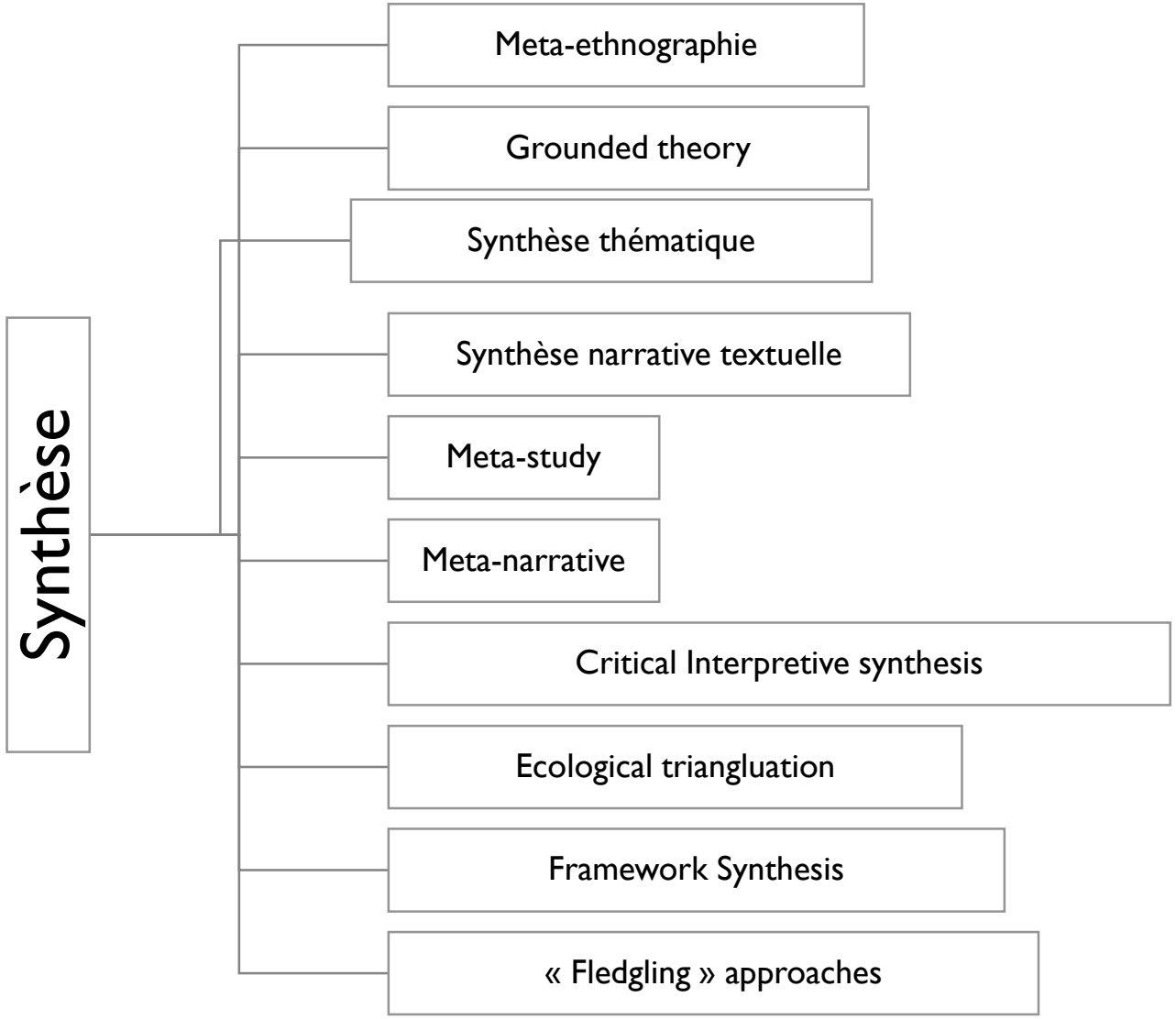


Figure 2: Forest plot for 9 studies of Mobile Phone Reminders.

Synthèse qualitative des données



Méthodes	Caractéristiques
Meta-ethnographie (Noblit & Hare, 1988)	▪ Analyse translationnelle réciproque (translation des concepts des études individuelles les uns dans les autres, ce qui permet une évolution des concepts) ▪ Synthèse par réfutation (explication des contradictions entre les études) ▪ Synthèse par lignes d'argumentation (construction d'une image d'ensemble sur la base d'études individuelles = forme de théorisation enracinée)
Grounded theory (Kearney, 2001, Eaves, 2001, Finfgeld, 1999, Glaser & Strauss, 1967, Strauss & Corbin, 1990, 1998)	Approche inductive permettant à la théorie d'émerger des données, comparaison constante Codes libres organisés en thèmes « descriptifs » qui sont ensuite interprétés pour générer des thèmes « analytiques »
Synthèse thématique (Thomas & Harden, 2008)	Combinaison et adaptation de la méta-ethnographie et de la théorisation enracinée
Synthèse narrative (textuelle) (Lucas et al, 2007)	Approche qui organise les études en groupes plus homogènes; développement de résumés structurés par élaboration et mise en contexte des données extraites
Meta-study (Paterson et al, 2001)	Méta-analyse de données (analyse des résultats), méta-méthode (analyse de méthodes), méta-théorie (analyse de théorie)

Méthodes	Caractéristiques
Meta-narrative (Greenhalgh et al, 2005)	Met en lumière les similitudes et les différences entre les résultats d'études de traditions (paradigmes) différentes
Critical Interpretive synthesis (Dixon-Woods et al, 2006)	Implique une approche itérative pour affiner la question de recherche, faire la recherche, sélectionner la littérature, définir et appliquer des codes et des catégories
Ecological triangluation ou « ecological sentence synthesis »	Libère les relations mutuellement dépendantes entre les comportements, les personnes et les environnements (formulation pendant l'extraction et la synthèse des données)
Framework Synthesis (Brunton et al, 2006)	Offre une approche très structurée pour organiser et analyser les données (indexation par codes numériques, réorganisation des données dans des graphiques)
« Fledgling » approaches regroupent (1) analyse de contenu, (2) méta-interprétation, (3) méta-résumé qualitatif	(1) Texte condensé en quelques catégories en lien avec le contenu, (2) focus sur le contexte, interprétation de données brutes (quotes) pour la synthèse, (3) résultats des études accumulés/sommés et résumés plutôt que transformés (validité basée sur la fréquence du résultat)