Readers' attention of shorter versus longer abstracts of systematic reviews: A randomized controlled trial

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Background:

The number of systematic reviews (SRs) indexed in PubMed continues to grow[1], highlighting the importance of well-written abstracts. Researchers often do not have the time or interest to read all of the available research and instead base their decision to read the full article on the information presented in the title and abstract[2–4]. Abstracts should therefore reflect all the essential content of the main manuscript in an informative, accurate, attractive, and concise form that attracts researchers' attention[2].

Several articles have been published on how to write good abstracts, emphasizing that the abstract is one of the most important parts of the manuscript[2,5,6]. Abstracts serve to 'sell' the work to editors, reviewers, and potential readers and help to improve the findability of the article[2]. Due to the importance of the abstract, the preferred reporting items for systematic reviews and meta-analysis for abstracts (PRISMA-A) was developed in 2013[7] and updated in 2020[8]. It provides guidance on which items should be reported in an abstract alongside with examples.

In our previous studies on the reporting of abstracts according to the PRISMA-A guidelines, we found that there are differences in structure, length, and reporting quality between Cochrane Reviews (CRs) and non-Cochrane Reviews (non-CRs)[9,10]. In particular, CRs are better reported and always structured. While non-Cochrane reviews consistently remain at a median length of 250 words, CR abstract's length has increased steadily from 353 words in 2000 to 838 words in 2022[10]. It is questionable whether such long abstracts meet the goal of being informative, accurate, attractive, and concise. However, there are no guidelines regarding the optimal length of well-written SR abstracts, nor are there any studies indicating whether longer abstracts are more likely to attract readers' attention.

Objective:

Primary:

The primary aim of the study will be to investigate readers' attention of shorter versus longer abstracts, based on trial participation after reading the abstract.

Secondary:

The secondary objective will be to assess the perception of an abstract based on the four indicators of a well-written abstract, outlined by Bahadoran et al[2]. These indicators state that abstracts should be: a) informative, b) accurate, c) attractive, and d) concise.

Study design:

This will be a two-arm, single-blinded, superiority, parallel-group randomized controlled trial (RCT) with 1:1 allocation of intervention and control groups.

Reporting:

This protocol was reported in line with the SPIRIT checklist[11].

Study setting:

The study will involve researchers from all over the world who recently published a SR, regardless of their research field.

Participants:

Eligibility criteria

The corresponding authors of SRs that were indexed in PubMed between January 1, 2024, and March 26, 2024, and for which an English abstract is available will be included. These include authors of all

types of SR as defined by Munn et al.[12], with the majority likely representing SRs on effectiveness[13]. Authors of other types of evidence syntheses (e.g. scoping reviews, methodological papers), editorials, protocols, corrections, retractions, erratums, or summaries of SRs will be excluded. For identifying the SRs from which the corresponding authors will be contacted we will use the following eligibility criteria.

Table 1 Eligibility criteria

Inclusion	Exclusion
Systematic reviews of all types (Munn et al.[12])	No English abstract
	Other types of evidence syntheses (e.g. scoping reviews, methodological papers)
	Protocols
	Editorials
	Others: e.g. Corrections, retractions, erratums, or summaries of SRs
	No email address available

Identification of participants:

To identify eligible authors, MEDLINE (via PubMed) was searched with the following search strategy (date of search: 23.05.2024). To ensure the extracted contact data was up-to-date, we included SRs from January 2024 onwards until the minimum sample size of 6200 was reached. This was the case on March 26, 2024.

"systematic review"[Filter] AND ("2024/01/01"[Date - Entry]: "2024/03/26"[Date - Entry]) NOT ("1000"[Date - Publication]: "2023/12/31"[Date - Publication] OR "2024/03/27"[Date - Publication]: "3000"[Date - Publication])

All references will be screened by two reviewers independently. Articles that identify themselves as a study type other than SR, corrections or summaries in the title or abstract (e.g. explicitly labeled as a protocol or scoping review) will be excluded from this study. For all included SRs, the name, country, and email address of the corresponding author will be extracted manually from PubMed, the journal's page or the full text by the same independent reviewers. The extraction process will proceed according to the following procedure:

- If only one email address is provided in PubMed, this author is defined as the corresponding author.
- If multiple email addresses are provided, the first and then the last author will be given priority. If no e-mail address is provided for either of them, the first author to appear with an email address will be listed as the corresponding author.
- If there´s no email address listed in PubMed, we will first search the journal page and then the full text to determine the identity of the corresponding author.
- If more than one email address is provided for a single author, the first email address and affiliation will be utilized.
- If no email address can be identified in PubMed the journal page or the full text, the article will be excluded.

All data is extracted from a single source, with PubMed being the primary source of information. If no information can be found in PubMed the journal page or the full text being consulted. The source of the information will be extracted. Disagreements between reviewers will be resolved by discussion or, if necessary, by a third reviewer.

Before randomization, duplicate e-mail addresses will be excluded using SAS for Windows version 9.4 (SAS Institute Inc, Cary, North Carolina) to prevent the cover letter from being sent to the same email address on more than one occasion.

Intervention:

In this study, we will attempt to emulate the reading process observed in PubMed. When searching PubMed, researchers are initially presented with an overview of the references identified. After clicking on the title, the corresponding abstract appears. For full-text access, researchers must actively follow a separate link to the journal page.

In this RCT, participants are randomly assigned to two groups (those receiving a long abstract vs. those receiving a short abstract). Both groups receive the same cover letter by e-mail explaining the purpose of the study, the use of the data, measures to ensure anonymity of participation and a link for participation. When participants click on the link, they automatically confirm their participation in the study.

The link will direct participants to SoSci Survey, an online survey tool. Those in the group receiving the long abstract will see an abstract with a length of 771 words (PMID: 37955353). Those in the group receiving the short abstract will see an abstract with a length of 277 words (PMID: 37942649). Both abstracts are structured and pertain to the same review by Soderberg et al. entitled "Percutaneous nephrolithotomy vs. retrograde intrarenal surgery for renal stones". This review was published once in the Cochrane Database of Systematic Reviews and once in the journal BJU International.

The design of the abstract presented is similar to that of PubMed, but no title or authors will be indicated. After reading the abstract, participants must actively click the "Continue" button to proceed.

Outcomes:

Primary outcome:

The primary outcome of this RCT will be the trial participation, which is defined as the proportion of participants who read the abstract and then clicked on the "Continue" button. This will be quantified by dividing the number of participants who read the abstract and proceeded to complete the survey by the total number of individuals who clicked on the link in the email. Information will be electronically captured in SoSci survey.

Secondary outcomes:

The secondary outcomes will be the four criteria outlined by Bahadoran et al.[2] as indicators of a well-written abstract:

a) Informativeness
b) Accuracy
c) Attractiveness
d) Conciseness.

The extent to which participants perceive these criteria to be fulfilled will be quantified on a 4-point Likert scale, e.g. very little informative, little informative, informative, very informative. For data analysis, the data will be dichotomized. For instance, the statements "very little informative" and "little informative" will be summarized in the category "non-informative," while the statements "informative" and "very informative" will be summarized in the category "informative."

Additionally, the time needed to read the abstract will be quantified. The time interval is defined as the period between the participant clicking on the link in the email and clicking on the „Continue" button to proceed to the survey. This time will be automatically recorded by SoSci Survey.

Additional outcomes:

In addition, data on some formal and structural characteristics of an Abstract (structure, length, funding, and registration) as well as participant characteristics (age, gender, country, and experience in writing SRs) will be collected.

Sample size:

Assuming an 80% trial participation in the control group, a two-sided significance level of 5% (α =0.05), and a power of 90% (β=10%), 558 participants (279 per group) are needed to detect a relative difference in trial participation of 15% (80% vs. 68%). The sample size calculation was carried out using the PROC POWER function in SAS. Given an expected response of 9.6%[14], the sample size was estimated to be 5813. Additionally, expecting an approximately 5% exclusion due to study types other than SR[13] or duplicate email addresses, the sample size was increased to 6103. To achieve this, a total of at least 6200 SRs will be selected from PubMed and assessed for eligibility.

Recruitment and incentives

The corresponding authors of the identified SRs will be contacted by email with a link to the survey and invited to participate. To achieve the highest possible response, recruitment will follow the recommendations for increasing the response of electronic questionnaires from Edwards et al.[15].

Accordingly, we will:

- use a short and personalized cover letter that includes a picture
- use a simple but meaningful header, not including the term “survey”
- use a brief e-questionnaire that is designed in an attractive way
- give participants enough time, but also set and communicate a firm deadline.
- send the email by a female investigator.

The initial email invitation to participate in the study will be sent in August 2024. After two weeks, a first reminder will be sent out. A second reminder will be sent after four weeks. Data collection will conclude eight weeks after the initial e-mail has been sent.

No financial incentives are planned.

Participant timeline

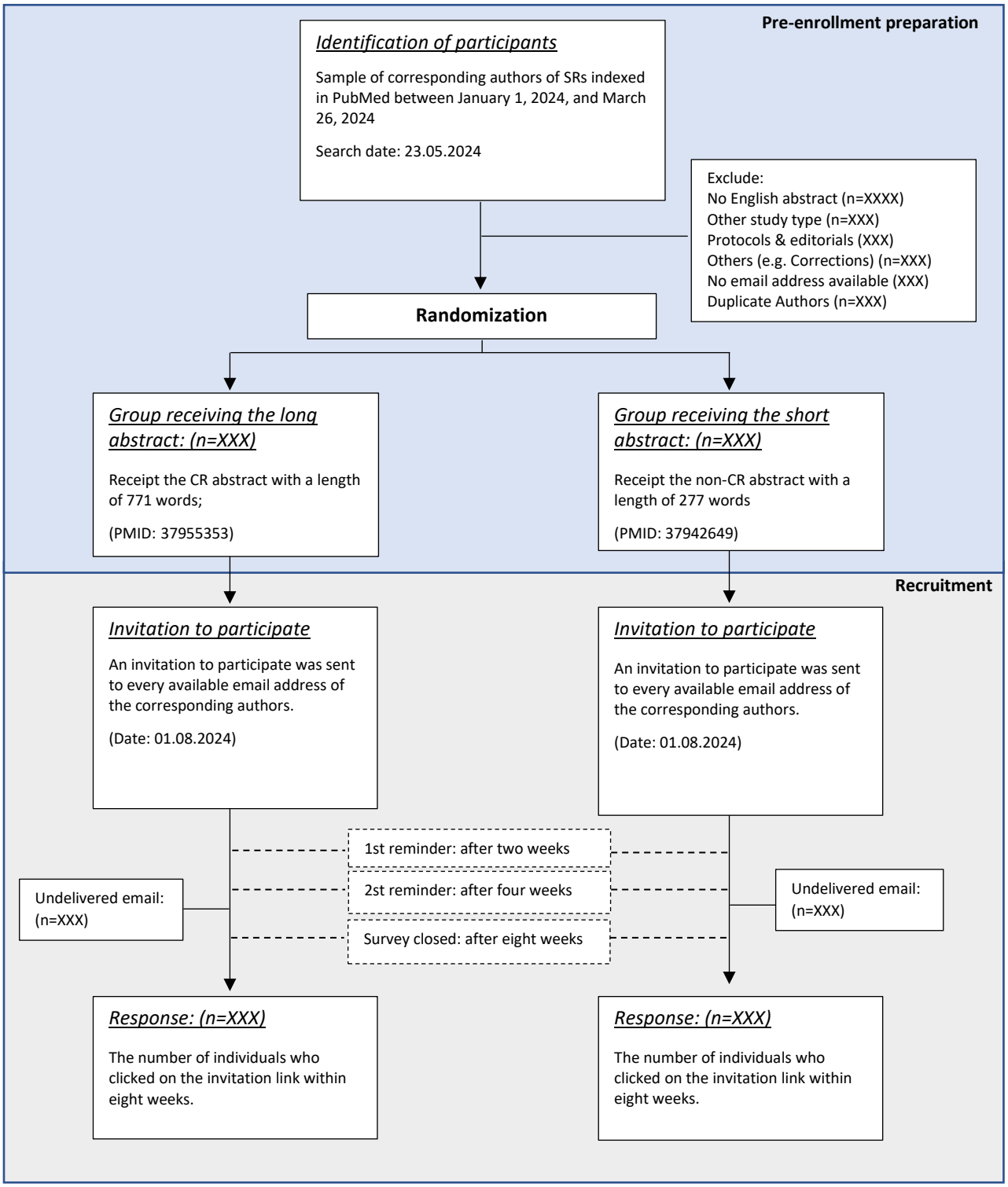

Figure 1. Flowchart: Preparation for enrollment and recruitment

Allocation:

Sequence generation and implementation:

In a 1:1 ratio, the corresponding authors will be randomly assigned to either the group receiving the long abstract or the group receiving the short abstract using the PROC PLAN procedure in SAS.

Allocation concealment:

A third party (FH) not directly involved in the data extraction will generate the randomization plan (PROC PLAN procedure) in SAS.

Blinding:

The participants will be blinded to the intervention. In the cover letter, participants will be informed that the study aims to examine the characteristics of an abstract. However, they will not be informed that the primary focus of this study is the influence of the abstract´s length. Furthermore, the participants will be not aware of the number of different abstracts that were randomly allocated.

Data collection and management:

All data will be collected and managed using the online survey tool SoSci Survey.

Statistical methods:

Data will be analysed descriptively, using frequencies and proportions for categorical and means with standard deviations (SDs) as well as medians with interquartile ranges (IQRs) for continuous variables. All p-values less than 0.05 will be considered statistically significant. All statistical analyses will be conducted with SAS.

Table 1. Variable, Measures, and Methods of Analysis

Variable/Outcome		**Outcome measure**	**Methods of analysis**
Primary:	Trial participation	Proportion (percentage) of participants who continued to participate after reading the abstract	Chi-square test
Secondary:	Informativeness	Likert scale 1 to 4, dichotomized as informative and non-informative	Chi-square test
Secondary:	Accuracy	Likert scale 1 to 4, dichotomized as accurate and non-accurate	Chi-square test
Secondary:	Attractiveness	Likert scale 1 to 4, dichotomized as attractive and non-attractive	Chi-square test
Secondary:	Conciseness	Likert scale 1 to 4, dichotomized as concise and non-concise	Chi-square test
Secondary:	Time needed to read the abstract	Time spent on the first page that presents the abstract	Mann-Whitney U-Test

Data monitoring:

Not applicable.

Harms:

We do not anticipate any harm to the participants.

Ethical approval:

Participation in this study is entirely voluntary, and the data will be collected anonymously. The study has been presented to the Medical Ethics Committee of the [Carl von Ossietzky University of Oldenburg] for review and has received a waiver (2024-113).

Consent:

The cover letter will inform participants of the objectives of the study, as well as ethical, legal, and anonymity information. Participants will be informed that their click on the link will be their consent for participation in the study.

Confidentiality:

No personal or medical data will be collected.

Access to data:

We do not plan to publish our raw data.

Ancillary and post-trial care:

Not applicable.

Dissemination policy:
We plan to communicate study results in a peer-reviewed journal.

Auditing:

Not applicable.

Author contribution to the protocol

JH and FH conceived the study idea. JH, KW, DP, and FH further developed the study design. JH and KW developed the contact letter for the study participants and the survey via SoSci-Survey. The authors' contact information was extracted manually by JH, KH, SS, SS, PL, LB, ES, and LL. All authors contributed to the refinement of the study protocol and approved the final version of the protocol.

Roles and responsibilities in the conduct of the study

Principal investigator: JH
Conduct of the trial: JH, KW, DP, FH
Data Analysis: JH, KW
Writing the manuscript: JH
Approval of the manuscript: JH, KW, DP, FH

Conflict of interest:

The authors declare that there are no conflicts of interest.

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References

1. Hoffmann F, Allers K, Rombey T, et al. Nearly 80 systematic reviews were published each day: Observational study on trends in epidemiology and reporting over the years 2000-2019. *J Clin Epidemiol* 2021; 138: 1–11.
2. Bahadoran Z, Mirmiran P, Kashfi K, et al. The Principles of Biomedical Scientific Writing: Abstract and Keywords. *Int J Endocrinol Metab* 2020; 18: e100159.
3. Squires BP. Structured abstracts of original research and review articles. *C Can Med Assoc J = J l'Association medicale Can* 1990; 143: 619–622.
4. Shiely F, Gallagher K, Millar SR. How, and why, science and health researchers read scientific (IMRAD) papers. *PLoS One* 2024; 19: e0297034.
5. Tullu MS. Writing the title and abstract for a research paper: Being concise, precise, and meticulous is the key. *Saudi J Anaesth* 2019; 13: S12–S17.
6. Cals JWL, Kotz D. Effective writing and publishing scientific papers, part II: title and abstract. *J Clin Epidemiol* 2013; 66: 585.
7. Beller EM, Glasziou PP, Altman DG, et al. PRISMA for Abstracts: Reporting Systematic Reviews in Journal and Conference Abstracts. *PLoS Med* 2013; 10: e1001419.
8. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *PLoS Med* 2021; 18: 1–15.
9. Helbach J, Hoffmann F, Pieper D, et al. Reporting according to the preferred reporting items for systematic reviews and meta-analyses for abstracts (PRISMA-A) depends on abstract length. *J Clin Epidemiol* 2022; 154: 167–177.
10. Helbach J, Wandscher K, Pieper D, et al. Cochrane review abstracts are getting longer, but this has no large impact on the reporting quality. *J Evid Based Med* 2023; 16: 294–302.
11. Chan A-W, Tetzlaff JM, Altman DG, et al. SPIRIT 2013 statement: defining standard protocol items for clinical trials. *Ann Intern Med* 2013; 158: 200–207.
12. Munn Z, Stern C, Aromataris E, et al. What kind of systematic review should i conduct? A proposed typology and guidance for systematic reviewers in the medical and health sciences. *BMC Med Res Methodol* 2018; 18: 1–9.
13. Hoffmann F, Allers K, Rombey T, et al. Nearly 80 systematic reviews were published each day: Observational study on trends in epidemiology and reporting over the years 2000-2019. *J Clin Epidemiol* 2021; 138: 1–11.
14. Barcot O, Ivanda M, Buljan I, et al. Enhanced access to recommendations from the Cochrane Handbook for improving authors' judgments about risk of bias: A randomized controlled trial. *Res Synth Methods* 2021; 12: 618–629.
15. Edwards PJ, Roberts I, Clarke MJ, et al. Methods to increase response to postal and electronic questionnaires. *Cochrane database Syst Rev* 2023; 11: MR000008.