Assessment of the quality of reporting for treatment components in Cochrane reviews of acupuncture

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Assessment of the quality of reporting for treatment components in Cochrane reviews of acupuncture

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Running Title: STRICTA for Cochrane reviews of acupuncture

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Abstract

Objectives: High quality reporting of treatment details can aid replication of study results in real-world clinical practice. The Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) is a reporting guideline for key elements of acupuncture interventions in clinical trials. This study used STRICTA to investigate whether Cochrane reviews of acupuncture adequately report important treatment details.

Design: Systematic review

Methods: Cochrane reviews of acupuncture were identified from *The Cochrane Library* (Issue 7, 2012). Randomized controlled trials (RCTs) included in the reviews and published after 2005 were obtained. Using STRICTA, we extracted acupuncture-related information from both the Cochrane reviews and the RCTs. The Characteristics of included studies table was the major source of intervention information from Cochrane reviews. Reporting quality of acupuncture interventions in Cochrane reviews was assessed and compared to the respective RCTs.

Results: 25 Cochrane reviews of acupuncture and 92 RCTs met the selection criteria. Cochrane reviews were 16% less likely to report the acupuncture-related items of STRICTA than RCTs (risk ratio 0.84, 95% confidence interval 0.79 to 0.88, I^2=8%). Information was significantly better reported for 10 of the 15 treatment-group items of STRICTA in RCTs than in Cochrane reviews ($p<0.05$), while four items did so without statistical significance. One item related to practitioner background was significantly better reported in Cochrane reviews.

Conclusion: Reporting quality of treatment details in Cochrane reviews of acupuncture was insufficient with regard to STRICTA, even though such information was readily reported in RCTs. The overall quality of reporting of the RCTs, while better than the reviews, was also often suboptimal. Use of STRICTA guideline during the review process is recommended to adequately report the key treatment components in Cochrane reviews of acupuncture. The

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potential impact of STRICTA to the replicability and utilization of reviews in future research and practice needs to be investigated.

Strengths and limitations of this study

- This study is the first investigation that revealed the avoidable incompleteness of reporting quality with regard to important treatment components of acupuncture in the Cochrane reviews, even though information was readily reported in relevant primary RCTs.
- Our findings suggest there is a loss of treatment-related information during data abstraction for Cochrane reviews which may influence the replicability of trial interventions.
- Whether loss of treatment-related information actually leads to the altered replicability of reported interventions in Cochrane reviews was not investigated.

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Background

Cochrane systematic reviews have summaries of study characteristics, which aim to include details of study interventions to be replicated in practice.[1] Developing methods to improve the descriptions of complex interventions are considered as essential task to complement existing systematic review methodology.[2] Therefore, adherence to international standards for reporting interventions might be helpful for detailed description of study interventions in Characteristics summaries in Cochrane systematic reviews. The Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) is an internationally recommended standard for reporting details of acupuncture interventions in clinical trials of acupuncture. It can be used to provide sufficient information for researchers or clinicians to understand acupuncture interventions used in the study and replicate them in other researches or practices.[3] Consolidated Standards of Reporting Trials (CONSORT) for non-pharmacological treatments has also suggested to provide detailed information for study interventions thus to improve the uptake of study results in studies of complex interventions, including surgery, psychological interventions and acupuncture.[4] However, many current trials and reviews have been found to often omit crucial details of non-pharmacological treatments.[5] In case of Cochrane reviews, clear description on the intervention of interests has been emphasized to improve applicability of review into real clinical practice.[6] To the best of our knowledge, however, there is no study assessing whether Cochrane reviews provide satisfactory description on any particular intervention by adopting standards for reporting interventions. Although previous researches focused on managing the reporting quality of Cochrane review in terms of methodological process,[7] the reporting quality for interventions in Cochrane review had been largely ignored. Hence, this study aimed to assess the reporting quality of acupuncture treatment-related information in the Cochrane reviews of acupuncture, as well as to investigate whether utilization of the reporting guideline for treatment

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Methods

Search strategy and selection criteria for Cochrane reviews of acupuncture

Cochrane Database of Systematic Reviews (CDSR) of Issue 7, March 2012 were searched to identify Cochrane reviews of acupuncture using the term "acupuncture". Cochrane reviews that investigated acupuncture as a primary treatment intervention or as one of various treatment or control interventions with at least one primary component study that assessed the effects of acupuncture were included. Reviews without any included study (i.e., empty reviews) or reviews that did not include acupuncture-related studies were excluded.

Search strategy and selection criteria for component studies in eligible Cochrane reviews of acupuncture

Component study was defined as a study included in the Cochrane review regardless of the contribution to the qualitative or quantitative analyses. These were searched using the reference citation information provided in the relevant Cochrane reviews. Among studies in eligible Cochrane systematic reviews, only trials published since 2005 were considered to be analyzed in this study. This is because of the possible necessary time-span for uptake of STRICTA guideline. This approach is similar to the work of Prady et al. (2008) which analyzed acupuncture studies published after 3 to 4 years following the publication of STRICTA.[8]Component studies which involved the assessment of acupuncture as a treatment or control intervention were eligible in our study. The term "acupuncture" was defined as interventions involving penetration of certain points on the skin by needling regardless of manual or electrical stimulation, since the needling is believed to be the most representative feature of acupuncture and STRICTA items were originally developed for the reporting of needle acupuncture in clinical studies.[3] Thus, component studies using other types of non-penetrating stimulation on acupuncture points, such as laser acupuncture, acupressure,

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device-involved acupuncture point stimulation (i.e., wrist band application) and injections on acupuncture points were excluded. Studies employing stimulation on non-classical acupuncture points, such as trigger points, were eligible only if they clearly mentioned the intervention was "acupuncture" in the review.

Data extraction in Cochrane reviews of acupuncture

Intervention details for acupuncture treatments in tables for characteristics of included component studies were extracted in each Cochrane review. Characteristics of included component studies were chosen for the main data source of our analysis because they intend to provide sufficient information on various study components including details of interventions to enable readers to understand the study better or replicate interventions in their own contexts.[1] Methods and results of the included Cochrane reviews were also examined to identify further acupuncture-related information which was not reported in the tables. Two independent authors underwent these processes.

General characteristics of each component study, including publication languages (English or non-English), type of control groups in primary component studies, publication or last-updated years and number of included studies in the Cochrane reviews were extracted. Whether clinical heterogeneity related to the acupuncture treatments were planned to be investigated by subgroup, sensitivity or other analysis regardless of the availability of those analyses were also identified. One review author conducted these processes.

Data extraction in component studies

For included studies to be analyzed, full-texts were obtained to check whether there is any difference of reported information for acupuncture treatments in terms of STRICTA items between the primary component studies and the Cochrane review. This was done to identify

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any selective omission of treatment-related information by the Cochrane review author. Published protocols or supplements of included studies for more detail information were further sought when the primary component studies had relevant information for tracking such data (i.e., citation information in the reference or web-appendix provided by the component study).

Selection of STRICTA items for data extraction

Acupuncture-related items of STRICTA were used to assess the quality of reporting for acupuncture treatment-related information in Cochrane reviews of acupuncture. Items with regard to the description of the comparison interventions were not used, because the main interest of this review was to assess the completeness of description of the acupuncture treatment itself. The revised STRICTA checklist published in 2010 served as a primary source of extraction form of acupuncture-related information.[3]

Rating methods of items in STRICTA

Each item of STRICTA was rated with a dichotomous scale (i.e., “reported” or “not reported”). The rating of “reported” was given when relevant information is at least partially reported in the Cochrane review or primary component studies. The rating of “not reported” was given when relevant information is completely lacked in the Cochrane reviews or primary component studies. When there is written evidence in the Cochrane review that the review authors attempted to report and sought the relevant information but could not find it in the component study, the item was rated as successfully reported one in the Cochrane review. Our approach is in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statements that stressed the importance of reporting all variables for which data were sought, regardless of its availability in the component

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studies.[7]STRICTArecommends reporting of actually performed acupuncture intervention, rather than reporting of treatment protocols without any evidence of implementation. However, we assumed the reporting of Cochrane reviews or of component studies as performed, because distinctions were not clear in most cases.

Inquiries to the review authors and review groups

One author (KKH) visited websites of relevant Cochrane review groups (CRGs) to see whether any reporting guidelines for acupuncture-related intervention were provided for review authors. (accessed at 12th July 2012) E-mail queries were also sent to the contact point of CRGs as well as to the correspondence of the included Cochrane reviews. Two questions were used for the survey, as follows: "Do your CRG have a policy or specific recommendations about the reporting details of acupuncture interventions for review authors? If any, please specify" and "Have you ever recommended any specific guideline for reporting details of acupuncture interventions for the review to review authors? If any, please specify", respectively. This was done to check if CRGs or review authors had been aware the existence of reporting guidelines of acupuncture (i.e., STRICTA), had or had been recommended to use reporting guidelines for detailed description of interventions regarding acupuncture.

Training of trial assessors

Two reviewers (KHK and JWK), both experienced acupuncture researchers and systematic reviewers, received training on STRICTA assessment checklists. The training course aimed to minimize inconsistency in data extraction and scoring. Ten trials in the Cochrane reviews that were published before 2005 thus excluded in our analyses were randomly selected for initial scoring by both reviewers. Two reviewers independently assessed and scored the quality of reporting in terms of acupuncture treatment-related information of ten component trials in the

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Cochrane reviews. Following this, we attempted to develop and re-assure the standardized scoring instruction for the main analysis.

Statistical analysis

The number of items rated as "reported" in the Cochrane review was compared with those in the relevant primary component studies. Results were presented as risk ratios (RR) with 95% confidence intervals (CI). Random effects model was used, and heterogeneity was analysed using a Chi^2 test on N-1 degrees of freedom, with an alpha of 0.05 used for statistical significance and with the I^2 statistic. The number and proportion of component studies in the Cochrane reviews and the original RCTs that reported information for each STRICTA item was compared using the McNemar test as percentage reported with binomial 95% confidence intervals. STATA version 10.0 (Stata-Corp, College Station, Texas) and RevMan 5.2 (The Nordic Cochrane Centre, Copenhagen) was used for statistical analyses and the forest plot, respectively.

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Results

Totally 74 Cochrane reviews were identified following the search of CDSR, of which 26 reviews with 96 component studies were deemed to be eligible. Among them, one review and three component studies were excluded from the analysis, because of the wrong citation (n=3) and no accessibility (n=1) of component studies that resulted in the analysis of 25 reviews and 92 component studies.(Figure 1) General characteristics of included reviews and those of component studies are provided in Table 1.

Study characteristics

Of the 25 included Cochrane reviews of acupuncture, 17 reviews (68%) evaluated acupuncture as a primary intervention of interest. The median value of publication year or year that last update were performed was 2010. 12 reviews (48%) attempted to investigate the clinical heterogeneity related to acupuncture treatment by the means of subgroup, sensitivity or other type of analysis (i.e., acupuncture adequacy test).

Of the 92 component studies, 58 studies (63%) were published in English. The median value of publication year of component studies published after 2005 was 2007. Type of comparison to acupuncture was non-acupuncture interventions (n=68, 74%), sham acupuncture (n=34, 37%) and active acupuncture treatments (n=14, 15%). Details of characteristics for Cochrane acupuncture reviews and component studies are provided in Table 2.

Review policy or recommendations for the reporting acupuncture intervention

No CRG policy or recommendations given to the review author for reporting of acupuncture treatment were identified by an e-mail survey to the CRG correspondence or review authors. Five of 16 CRGs replied that the Cochrane Handbook should serve as a general standard guideline for reporting in the review, although no detailed instructions or any

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recommendations for reporting the details or at least core components of complex interventions such as acupuncture were provided to authors. One CRG of the Cochrane review that did not evaluate acupuncture as primary intervention reported that they sought the feedback from an acupuncture specialist during editorial process. Less than half of reviewers (44%) reported that they were aware of STRICTA and only 16% of reviewers had utilized STRICTA during the review process. Reviewers did not receive either recommendation or restriction in terms of reporting acupuncture treatment during their review process (Table 2).

STRICTA reporting in the Cochrane reviews and in the component studies

Risk ratio of the reporting rate of STRICTA items was 0.84 (95% confidence interval 0.79 to 0.88, I^2=8%), indicating that Cochrane reviews were 16% less likely to report the acupuncture-related items of STRICTA than component RCTs (Figure 2). Information was significantly better reported for 10 of the 15 acupuncture treatment-related items of STRICTA in RCTs than in Cochrane reviews ($p<0.05$), while four items did so without statistical significance (Table 3). The most significant difference of reporting rate was found for the item A2 (reasoning of treatment) and B9 (needle type) with better reporting in 39.1 % and 45.7 % of RCTs, respectively. One item (E1) related to practitioner background was significantly better reported in Cochrane reviews. Four items including A2 (reasoning of treatment), B4 (depth of insertion), D1 (details of other treatments) and D2 (setting and context) were reported in less than half of component studies in the Cochrane reviews and of RCTs.

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Discussion

This study is the first systematic investigation of selective reporting in terms of details of interventions in the Cochrane reviews of acupuncture. We found some items which have been regarded as core components of acupuncture treatments were not reported in the Cochrane review, even though those information was already reported in the component RCTs. Details of interventions were significantly better reported in the RCTs in most items of STRICTA. This was achieved without further contact of authors of RCTs, which might imply the improvement of the reporting quality in terms of intervention details could be achieved directly by adopting STRICTA as a guideline for data abstraction by reviewers, editorials and peer-reviewers. However, no specific recommendation or guidelines for review authors were provided by CRG, and only minor portion of review authors or members of CRGs were identified to be aware of the existing CONSORT extension version of acupuncture. Overall, there is an insufficient reporting of acupuncture details which could have been improved if the existing reporting guidelines were well utilized in the review process.

In our review, less reporting of treatment-related information in the Cochrane reviews was observed in most of selected STRICTA items. To some extent, missing details of complex intervention might be inevitable during abstraction of information due to the complexity in practice.[5] However, some items showed almost compatible or even better reporting quality in the Cochrane reviews than in the RCTs. For example, information regarding the practitioner qualification was relatively well-reported (over 60% of component studies). Some of mechanical aspects of acupuncture treatments were also relatively well-reported both in Cochrane reviews and primary component studies, although some showed modest reporting quality both in Cochrane reviews and RCTs. Item B9 (Needle type) showed the most difference (45.7% difference) of reporting rates between Cochrane reviews and primary

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component studies. This is in line with the previous research that common missing element of non-pharmacological interventions in randomized controlled trials were materials necessary to provide the intervention (51%) and details about intervention-related procedures (46%) published in six major general medical journals.[10] On the contrary, poor reporting of contextual factors (D1; details of other treatments, D2; setting and context, D3; Patient-practitioner interaction) was obvious both in Cochrane reviews and primary component studies. Although treatment context can have a significant influence on treatment effects,[11] reporting information related to study contexts and patient-practitioner interactions seems to have been largely ignored by researchers of complex intervention.[12] Since acupuncture is a practitioner-dependent, non-pharmacological complex intervention,[13] sufficient details of intervention delivered and study contexts might be of particular importance to enable readers to consider the application and reproduction of review results in different treatment settings.[12] Items that explain theoretical background of acupuncture intervention were also largely underreported in Cochrane reviews of acupuncture, although theoretically-derived therapeutic actions or strategies in complex interventions such as acupuncture may also have an important role in constituting overall therapeutic effects.[13] It is still unclear for acupuncture which component exerts therapeutic effects which combination of potential therapeutic components works best, or whether combination of several components during the acupuncture treatment is additive or synergistic.[14] Therefore, it would be a reasonable suggestion for reviewers to report component factors of acupuncture that seems potentially contributable to the effectiveness which are well-represented in STRICTA, until future researches elucidate the therapeutic role of each component or group of components in the acupuncture treatment.

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One possible explanation of inconsistent and suboptimal reporting of acupuncture treatment-related information would be that the Cochrane reviewers might not perceive some items of STRICTA as relevant to their review and selectively depicted some items of STRICTA. In a small survey of Prady et al., some trialists and Cochrane review authors did not perceive some items of the previous version of STRICTA as relevant to acupuncture treatments.[15] Another reason might be a lack of standard reporting guideline for interventions in the Cochrane review. Either Cochrane review authors or CRG correspondence reported that they did not know the existence of reporting guidelines for acupuncture. To date, however, there is no study investigating reasons for the selective reporting intervention-related information (including acupuncture) in Cochrane reviews. Since information related to the treatment intervention is essential to enhance the external validity, applicability and implementation of results of systematic review,[5] barriers to the optimal quality of reporting for treatment intervention should be explored and tackled in future studies.

Removal of STRICTA-specific information in the reporting due to the journal's space constraints or suggestions of editors as well as peer-reviewers was addressed by some trial authors.[15] This may be the case for the systematic review published in non-Cochrane medical journals which have limited word counts.[15] In our research, the possibility of potential influence of space constraints on suboptimal reporting seems unlikely because Cochrane review allows review authors to describe the main characteristics of each included study without any space constraints. However, lack of comparison of the reporting quality of acupuncture intervention in Cochrane reviews with those in non-Cochrane reviews published in journals with space-constraints do not provide evidence to support this argument. Future research incorporating both Cochrane and non-Cochrane reviews may reveal whether there is any systematic differences of reporting quality in terms of the details of treatment

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intervention between Cochrane and non-Cochrane reviews, thus space-constraints could be an influencing factor to the reporting quality of intervention-related information or not.

Evaluation of internal validity has been put on great emphasis in the Cochrane systematic reviews.[9,16] However, evaluating applicability of review results may also be of similar importance, since uptake and reproduction of review results may be able to change the routine clinical practice toward evidence-based practice.[5] Lack of consideration of external validity is a major criticism of systematic reviews and RCTs, and is a potential threat of poor uptake of evidence into routine clinical practice.[17-20] Intervention details and treatment contexts which STRICTA aims to address are suggested as the determinants of external validity in trial, systematic review and guideline publications,[12, 23] although little is known whether detailed description of acupuncture interventions in systematic reviews can affect uptake of evidence in practice. Whether selective reporting of acupuncture interventions observed in our study would influence the uptake of evidence may deserve further research.

Strengths and weakness

Our study is the first investigation of the completeness of reporting quality in terms of treatment process and components, by comparing reports in primary component studies with those in Cochrane reviews. In particular, STRICTA is the best representative recommendation agreed by international acupuncture experts, constituting core components of acupuncture treatment that may be inter-related.[3] However, STRICTA had not been developed to measure the quality of reporting acupuncture interventions, although we summed the scores of each items to score the overall quality of reporting acupuncture interventions. Since this method is not based on the original purpose of STRICTA and there is no weighting criteria for each items, interpretations of our results should be cautious.[8] The scores should not be understood

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10 Results of rating might be prone to subjective assessment, although extensive training of
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12 authors using CONSORT elaboration document [3] were preceded. Two assessors were
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14 unblinded to the study characteristics, such as publication dates or allocation of acupuncture
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16 as a primary or control intervention. Since both assessors are acupuncture researchers as well
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18 as practitioners thus may be familiar with included acupuncture studies, we did not attempt to
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20 blind the assessors. Prady et al. found that unblinded assessor gave higher scores to some of
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22 acupuncture studies in terms of items of STRICTA, although this tendency was not consistent
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24 in the rest of studies to be assessed.[8]Nevertheless, unblinded assessors with prior knowledge
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26 of study characteristics in our review may have introduced bias.
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32 The first STRCITA was published in 2001, and as a revised version in 2010. We adopted the
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34 revised version of STRICTA for studies which had been published both before and after it.
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36 Thus, component studies published before the publication of revised STRICTA may not
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38 address the some revised items assessed in this review. This may have yielded a systematic
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40 bias when assessing the component studies by disadvantaging articles following a previous
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42 version of the guideline.[8] Nevertheless, the utilization of the latest version of STRICTA was
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44 justified in our study with three reasons: First, the CONSORT initiatives recommended the
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46 use of most recently released version of reporting standards when reporting and analyzing
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48 RCTs.[21] Second, the ultimate aim of using STRCITA in this study was not to score
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50 component studies per each item, but to reflect whether and how Cochrane reviews report or
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52 omit essential component of acupuncture treatments which were deemed the best
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54 representation of consensus across international acupuncture experts. Third, we identified that
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selected components for this review in the original STRICTA and in the revised one is almost consistent enough to justify the use of the latest version of STRICTA. In this sense, the latest version of STRICTA was preferred.

We did not contact authors of the primary component studies to gain additional information with regard to the under-reported items of STRICTA. This was because our primary interest is to identify selective reporting / omissions of acupuncture-related information during the review process in the Cochrane reviews. Given the authors of primary component studies are often contacted to gain additional information when conducting systematic review, however, our study might not reflect common information-seeking procedure during review process. Author contact would have brought to what extent Cochrane reviews could have comprehensively described the treatment-related information of acupuncture based on the standard author query process recommended in the Cochrane handbook.[22] Future follow-up study may address such limitation.

Implication for future research

Factors associated with how and why review authors selectively summarize the treatment intervention during the review process should be investigated to identify the potential barrier of optimal quality of reporting in Cochrane reviews of acupuncture. Recent empirical evidence supports that the utilization of reporting guideline (i.e., CONSORT, STROBE, TREND and STARD) with regard to general methodological issues during peer review processes improves the quality of publication in biomedical journals.[23]Whether and how reporting guidelines for the description of treatment intervention such as STRICTA can be efficiently utilized during editorial and peer-review process and provided as author-support resources in CRG websites should be explored to improve the reporting quality of treatment

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3 intervention. Whether and how reporting items of STRICTA explaining theoretical
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5 background, mechanical aspects and contextual factors of acupuncture could contribute to the
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7 investigation of clinical heterogeneity of acupuncture treatments and their potential impacts
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9 on effect estimates should also be explored. Whether loss of treatment-related information
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11 actually leads to an altered replicability of reported interventions in Cochrane reviews was
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13 not investigated in this study, and should also be investigated in future research.
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18 **Conclusions**
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20 The reporting quality of treatment details in Cochrane reviews of acupuncture was
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22 insufficient with regard to STRICTA recommendation, even though information was readily
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24 reported in primary component studies. STRICTA was rarely utilized by CRGs and review
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26 authors. Use of STRICTA guideline for the reporting treatment details in Cochrane reviews
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28 and peer-review process should be considered to improve the replicability and utilization of
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30 review results in future research and clinical practice.
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Table 1. General characteristics of Cochrane reviews related to acupuncture

	Included Cochrane reviews N=25
Number of Cochrane reviews, N(%)	
Acupuncture as primary	17
Acupuncture as secondary	8
Number of component study	
Total	409
Mean	16.36 (11.77)
Median (Q1-Q3)	13 (3 – 47)
Number of component study published after 2005	
Total	92
Mean	3.7 (3.85)
Median (Q1-Q3)	2 (1 – 5)
Publication language of component studies after 2005, N (%)	
Total	92
English	58 (63%)
Languages other than English	34 (37%)
Number of component studies published in	
Acupuncture-related journal	47
Western medicine journal	43
Publication year	
Cochrane review (Q1-Q3)	2010 (2008-2011)
Component studies (Q1-Q3)	2007 (2006-2008)
Types of control*, N (%)	
Sham acupuncture	34 (37%)
Active acupuncture	14 (15%)
Non-acupuncture	68 (74%)
Clinical heterogeneity related to acupuncture	
Investigated	12 (48%)
in subgroup analysis	5 (20%)
in sensitivity analysis	6 (24%)
in other analysis	8 (32%)
Not investigated	13(52%)

* Sum of the number of each control group may exceed the total number of included trials, since there are trials that have more than two control groups.

Q1-Q3: interquartile range 1 to 3

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Table 2. Response of review authors for the reporting of acupuncture details in the Cochrane review

N=25	Q1	Q2	Q3	Q4
Yes	11 (44%)	4 (16%)	0 (0%)	0 (0%)
No	2 (8%)	5 (20%)	10 (40%)	8 (32%)
No answer	12 (48%)	16 (64%)	15(60%)	17 (68%)

Q1. Are you aware of any guideline or recommendation for reporting details of acupuncture treatment in journal publication?

Q2. Have you ever referred or used any reporting guidelines or recommendations when you reported the details of acupuncture treatments in your Cochrane review?

Q3. Have you ever received any guideline or recommendation for reporting details of acupuncture treatment from the Cochrane review group, when writing or updating your review?

Q4. Have you ever received any constraints or restrictions when reporting the details of acupuncture treatments in your Cochrane review?

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Table 3.The number of component studies in Cochrane reviews and of original RCTs with reporting of selected STRICTA items

Items	Component studies in Cochrane reviews		Original RCTs		*Difference (95% CI)
	n/N	(%)	n/N	%	
A. Acupuncture rationale					
1. Style of acupuncture treatment	59/92	(64.1)	66/92	(71.7)	7.6 [1.1, 14.1]
2.Reasoning of treatment	6/92	(6.5)	42/92	(45.6)	39.1[28.1,50.2]
3. Extent to which treatment was varied	76/92	(82.6)	87/92	(94.6)	12.0 [4.2, 19.5]
Total section A.					
B. Needling details					
1. Number of needles	76/92	(82.6)	84/92	(91.3)	8.7 [1.9, 15.5]
2. Names of points	74/92	(80.4)	84/92	(91.3)	10.9 [2.7, 19.0]
4. Depths of insertion	36/92	(39.1)	41/92	(44.6)	5.4 [-7.1, 17.9]
5. Response to needle	53/92	(57.6)	63/92	(68.5)	10.9 [0.0, 21.7]
6. Needle stimulation	42/92	(45.7)	64/92	(69.6)	23.9 [13.6, 34.2]
8. Retention time	69/92	(75.0)	81/92	(88.0)	13.0 [4.4, 21.6]
9. Needle type	18/92	(19.6)	60/92	(65.2)	45.7 [34.4, 56.9]
Total section B.					
C. Treatment regimen					
1. Number of sessions	85/92	(92.4)	90/92	(97.8)	5.4 [-0.3, 11.2]
2. Frequency/Duration	85/92	(92.4)	88/92	(95.7)	3.3 [-2.5, 9.1]
Total Section C.					
D. Treatment context					
1. Details of other treatments	15/92	(16.3)	31/92	(33.7)	17.4 [8.6, 26.2]
2. Setting and context	2/92	(2.2)	19/92	(20.7)	18.5 [9.5, 27.5]
Total Section D.					
E. Practitioner background					
1. Description of acupuncturists	56/92	(60.9)	51/92	(55.4)	-5.4 [-15.2, -4.4]

Abbreviation; RCTs, randomized controlled trials
*: Higher number means favorable results to RCTs.

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Figure 1. Flowchart of Cochrane reviews and component study selections
CDSR; Cochrane database of systematic reviews

Figure 2. The number of reported items of STRICTA in Cochrane reviews of acupuncture and related RCTs

RCT; Randomized controlled trial

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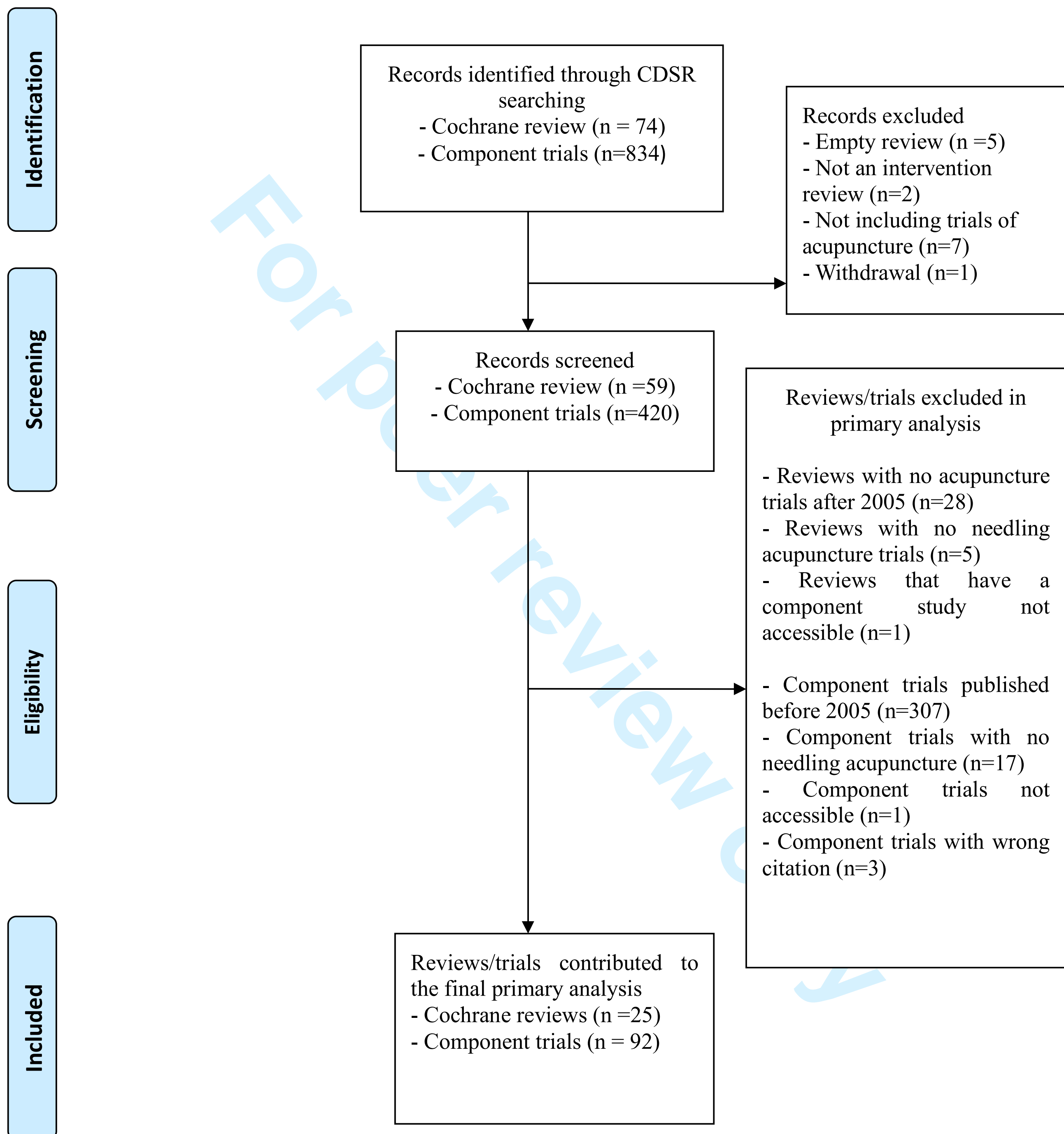

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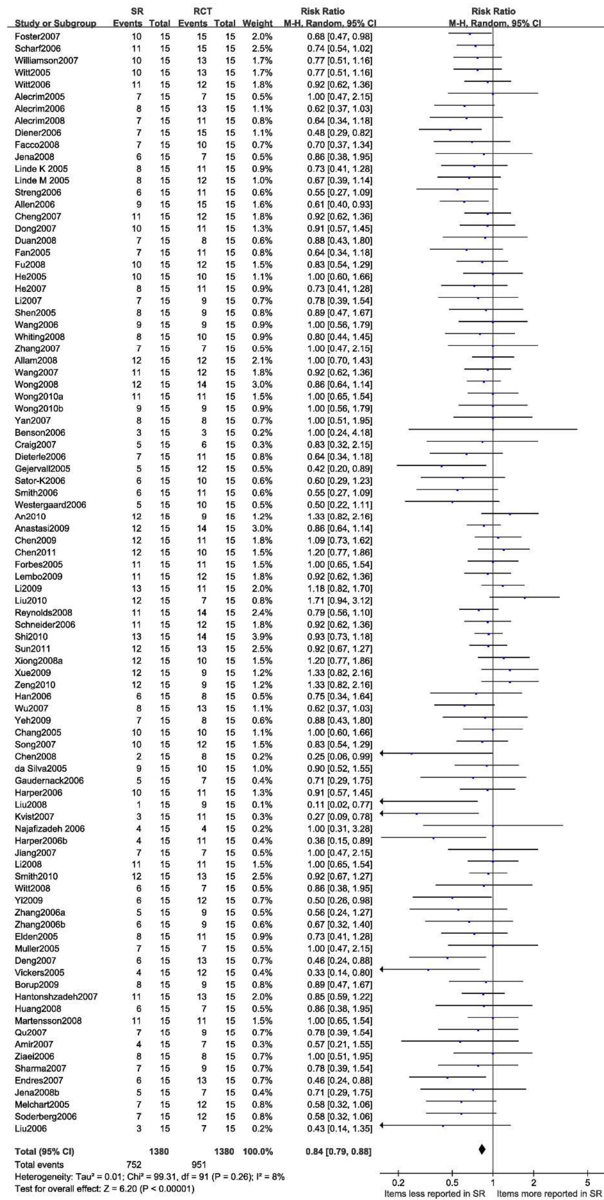

The number of reported items of STRICTA in Cochrane reviews of acupuncture and related RCTs
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Appendix 1. Cochrane reviews of acupuncture and relevant primary randomized controlled trials included in the analysis

Included Cochrane reviews of acupuncture

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2.White AR, Rampes H, Liu JP, Stead LF, Campbell J. Acupuncture and related interventions for smoking cessation. Cochrane Database Syst Rev. 2011; **1**: CD000009.

3.Wong V, Cheuk DK, Lee S, Chu V. Acupuncture for acute management and rehabilitation of traumatic brain injury. Cochrane Database Syst Rev. 2011; **5**: CD007700.

4.Cheuk DK, Wong V, Chen WX. Acupuncture for autism spectrum disorders (ASD). Cochrane Database Syst Rev. 2011; **9**: CD007849.

5.Paley CA, Johnson MI, Tashani OA, Bagnall AM. Acupuncture for cancer pain in adults. Cochrane Database Syst Rev. 2011; **1**: CD007753.

6.McCarney RW, Brinkhaus B, Lasserson TJ, Linde K. Acupuncture for chronic asthma. Cochrane Database Syst Rev. 2004; **1**: CD000008.

7.Smith CA, Hay PP, Macpherson H. Acupuncture for depression. Cochrane Database Syst Rev. 2010; **1**: CD004046.

8.Smith CA, Zhu X, He L, Song J. Acupuncture for dysmenorrhoea. Cochrane Database Syst Rev. 2011; **1**: CD007854.

9.Cheuk DK, Wong V. Acupuncture for epilepsy. Cochrane Database Syst Rev. 2008; **4**: CD005062.

10.Smith CA, Crowther CA. Acupuncture for induction of labour. Cochrane Database Syst Rev. 2004; **1**: CD002962.

11.Cheuk DK, Yeung WF, Chung KF, Wong V. Acupuncture for insomnia. Cochrane Database Syst Rev. 2007; **3**: CD005472.

12.Linde K, Allais G, Brinkhaus B, Manheimer E, Vickers A, White AR. Acupuncture for migraine prophylaxis. Cochrane Database Syst Rev. 2009; **1**: CD001218.

13.Manheimer E, Cheng K, Linde K, Lao L, Yoo J, Wieland S, et al. Acupuncture for peripheral joint osteoarthritis. Cochrane Database Syst Rev. 2010; **1**: CD001977.

14.Linde K, Allais G, Brinkhaus B, Manheimer E, Vickers A, White AR. Acupuncture for tension-type headache. Cochrane Database Syst Rev. 2009; **1**: CD007587.

15.Manheimer E, Cheng K, Wieland LS, Min LS, Shen X, Berman BM, et al. Acupuncture

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16.Smith CA, Collins CT, Crowther CA, Levett KM. Acupuncture or acupressure for pain management in labour. Cochrane Database Syst Rev. 2011; **7**: CD009232.

17. Waseem Z, Boulias C, Gordon A, Ismail F, Sheean G, Furlan AD. Botulinum toxin injections for low-back pain and sciatica. Cochrane Database Syst Rev. 2011; **1**: CD008257.

18.Dowswell T, Kelly AJ, Livio S, Norman JE, Alfirevic Z. Different methods for the induction of labour in outpatient settings. Cochrane Database Syst Rev. 2010; **8**: CD007701.

19.Pennick VE, Young G. Interventions for preventing and treating pelvic and back pain in pregnancy. Cochrane Database Syst Rev. 2007; **2**: CD001139.

20.Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, et al. Manipulation or Mobilisation for Neck Pain. Cochrane Database Syst Rev. 2010; **1**: CD004249.

21.Rada G, Capurro D, Pantoja T, Corbalán J, Moreno G, Letelier LM, et al. Non-hormonal interventions for hot flushes in women with a history of breast cancer. Cochrane Database Syst Rev. 2010; **9**: CD004923.

22.Bausewein C, Booth S, Gysels M, Higginson I. Non-pharmacological interventions for breathlessness in advanced stages of malignant and non-malignant diseases. Cochrane Database Syst Rev. 2008; **2**: CD005623.

23.Lee A, Fan LT. Stimulation of the wrist acupuncture point P6 for preventing postoperative nausea and vomiting. Cochrane Database Syst Rev. 2009; **2**: CD003281.

24. Thomas LH, Cross S, Barrett J, French B, Leathley M, Sutton CJ, et al. Treatment of urinary incontinence after stroke in adults. Cochrane Database Syst Rev. 2008; **1**: CD004462.

25.Mangesi L, Dowswell T. Treatments for breast engorgement during lactation. Cochrane Database Syst Rev. 2010; **9**: CD006946.

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Primary randomized controlled trials in included Cochrane reviews of acupuncture*

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5. Smith C, Coyle M, Norman RJ. Influence of acupuncture stimulation on pregnancy rates for women undergoing embryo transfer. Fertil Steril 2006;85(5):1352-58.

6. Westergaard LG, Mao Q, Krogslund M, Sandrini S, Lenz S, Grinsted J. Acupuncture on the day of embryo transfer significantly improves the reproductive outcome in infertile women: a prospective, randomized trial. Fertil Steril 2006;85(5):1341-46.

7. Dieterle S, Ying G, Hatzmann W, Neuer A. Effect of acupuncture on the outcome of in vitro fertilisation and intracytoplasmic sperm injection: a randomised, prospective, controlled clinical study. Fertil Steril 2006;85(5):1347-51.

8. Han Y. Combining of acupuncture and auricular points applying for treatment of 42 cases of tobacco withdrawal syndrome. Journal of Clinical Acupuncture and Moxibustion 2006;22(11):16.

9. Wu TP, Chen FP, Liu JY, Lin MH, Hwang SJ. A randomized controlled clinical trial of auricular acupuncture in smoking cessation. J Chin Med Assoc 2007;70(8):331-38.

10. Yeh ML, Chang CY, Chu NF, Chen HH. A six-week acupoint stimulation intervention for quitting smoking. Am J Chin Med 2009;37(5):829-36.

11. Chang ZJ, Liu P, Gan L. Rehabilitation and acupuncture treatment for patients with traumatic brain injury. Chinese Journal of Medical Device 2005;18(5):38-39.

12. Song YJ, Zhang L, Zhou YQ. Observations on the efficacy of electroacupuncture-assisted treatment for resuscitating coma patients with serious brain trauma. Shanghai Journal of

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* The number of primary studies exceeds 92 because some trials analyzed in Cochrane reviews had at least two references.

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Assessment of the quality of reporting for treatment components in Cochrane reviews of acupuncture

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Abstract

Objectives: High quality reporting of treatment details can aid replication of study results in real-world clinical practice. The Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) is a reporting guideline for key elements of acupuncture interventions in clinical trials. This study used STRICTA to investigate whether Cochrane reviews of acupuncture adequately report important treatment details.

Design: Systematic review

Methods: Cochrane reviews of acupuncture were identified from *The Cochrane Library* (Issue 7, 2012). Randomized controlled trials (RCTs) included in the reviews and published after 2005 were obtained. Using STRICTA, we extracted acupuncture-related information from both the Cochrane reviews and the RCTs. The Characteristics of included studies table was the major source of intervention information from Cochrane reviews. Reporting quality of acupuncture interventions in Cochrane reviews was assessed and compared to the respective RCTs.

Results: 25 Cochrane reviews of acupuncture and 92 RCTs met the selection criteria. Cochrane reviews were 16% less likely to report the acupuncture-related items of STRICTA than RCTs (risk ratio 0.84, 95% confidence interval 0.79 to 0.88, I^2=8%). Information was significantly better reported for 10 of the 15 treatment-group items of STRICTA in RCTs than in Cochrane reviews ($p<0.05$), while four items did so without statistical significance. One item related to practitioner background was significantly better reported in Cochrane reviews.

Conclusion: Reporting quality of treatment details in Cochrane reviews of acupuncture was insufficient with regard to STRICTA, even though such information was readily reported in RCTs. The overall quality of reporting of the RCTs, while better than the reviews, was also often suboptimal. Use of STRICTA guideline during the review process is recommended to adequately report the key treatment components in Cochrane reviews of acupuncture. The

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potential impact of STRICTA to the replicability and utilization of reviews in future research and practice needs to be investigated.

Strengths and limitations of this study

- This study is the first investigation that revealed the avoidable incompleteness of reporting quality with regard to important treatment components of acupuncture in the Cochrane reviews, even though information was readily reported in relevant primary RCTs.
- Our findings suggest there is a loss of treatment-related information during data abstraction for Cochrane reviews which may influence the replicability of trial interventions.
- Whether loss of treatment-related information actually leads to the altered replicability of reported interventions in Cochrane reviews was not investigated.

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Background

Cochrane systematic reviews have summaries of study characteristics, which aim to include details of study interventions to be replicated in practice.[1] Developing methods to improve the descriptions of complex interventions are considered as essential task to complement existing systematic review methodology.[2] Therefore, adherence to international standards for reporting interventions might be helpful for detailed description of study interventions in Characteristics summaries in Cochrane systematic reviews. The Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) is an internationally recommended standard for reporting details of acupuncture interventions in clinical trials of acupuncture. It can be used to provide sufficient information for researchers or clinicians to understand acupuncture interventions used in the study and replicate them in other researches or practices.[3] Consolidated Standards of Reporting Trials (CONSORT) for non-pharmacological treatments has also suggested to provide detailed information for study interventions thus to improve the uptake of study results in studies of complex interventions, including surgery, psychological interventions and acupuncture.[4] However, many current trials and reviews have been found to often omit crucial details of non-pharmacological treatments.[5] In case of Cochrane reviews, clear description on the intervention of interests has been emphasized to improve applicability of review into real clinical practice.[6] To the best of our knowledge, however, there is no study assessing whether Cochrane reviews provide satisfactory description on any particular intervention by adopting standards for reporting interventions. Although previous researches focused on managing the reporting quality of Cochrane review in terms of methodological process,[7] the reporting quality for interventions in Cochrane review had been largely ignored. Hence, this study aimed to assess the reporting quality of acupuncture treatment-related information in the Cochrane reviews of acupuncture, as well as to investigate whether utilization of the reporting guideline for treatment

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Methods

Search strategy and selection criteria for Cochrane reviews of acupuncture

Cochrane Database of Systematic Reviews (CDSR) of Issue 7, March 2012 were searched to identify Cochrane reviews of acupuncture using the term "acupuncture". Cochrane reviews that investigated acupuncture as a primary treatment intervention or as one of various treatment or control interventions with at least one primary component study that assessed the effects of acupuncture were included. Reviews without any included study (i.e., empty reviews) or reviews that did not include acupuncture-related studies were excluded.

Search strategy and selection criteria for component studies in eligible Cochrane reviews of acupuncture

Component study was defined as a study included in the Cochrane review regardless of the contribution to the qualitative or quantitative analyses. These were searched using the reference citation information provided in the relevant Cochrane reviews. Among studies in eligible Cochrane systematic reviews, only trials published since 2005 were considered to be analyzed in this study. This is because of the possible necessary time-span for uptake of STRICTA guideline. This approach is similar to the work of Prady et al. (2008) which analyzed acupuncture studies published after 3 to 4 years following the publication of STRICTA.[8] Component studies which involved the assessment of acupuncture as a treatment or control intervention were eligible in our study. The term "acupuncture" was defined as interventions involving penetration of certain points on the skin by needling regardless of manual or electrical stimulation, since the needling is believed to be the most representative feature of acupuncture and STRICTA items were originally developed for the reporting of needle acupuncture in clinical studies.[3] Thus, component studies using other types of non-penetrating stimulation on acupuncture points, such as laser acupuncture, acupressure,

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device-involved acupuncture point stimulation (i.e., wrist band application) and injections on acupuncture points were excluded. Studies employing stimulation on non-classical acupuncture points, such as trigger points, were eligible only if they clearly mentioned the intervention was "acupuncture" in the review.

Data extraction in Cochrane reviews of acupuncture

Intervention details for acupuncture treatments in tables for characteristics of included component studies were extracted in each Cochrane review. Characteristics of included component studies were chosen for the main data source of our analysis because they intend to provide sufficient information on various study components including details of interventions to enable readers to understand the study better or replicate interventions in their own contexts.[1] Methods and results of the included Cochrane reviews were also examined to identify further acupuncture-related information which was not reported in the tables. Two independent authors underwent these processes.

General characteristics of each component study, including publication languages (English or non-English), type of control groups in primary component studies, publication or last-updated years and number of included studies in the Cochrane reviews were extracted. Whether clinical heterogeneity related to the acupuncture treatments were planned to be investigated by subgroup, sensitivity or other analysis regardless of the availability of those analyses were also identified. One review author conducted these processes.

Data extraction in component studies

For included studies to be analyzed, full-texts were obtained to check whether there is any difference of reported information for acupuncture treatments in terms of STRICTA items between the primary component studies and the Cochrane review. This was done to identify

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any selective omission of treatment-related information by the Cochrane review author. Published protocols or supplements of included studies for more detail information were further sought when the primary component studies had relevant information for tracking such data (i.e., citation information in the reference or web-appendix provided by the component study).

Selection of STRICTA items for data extraction

Acupuncture-related items of STRICTA were used to assess the quality of reporting for acupuncture treatment-related information in Cochrane reviews of acupuncture. Items with regard to the description of the comparison interventions were not used, because the main interest of this review was to assess the completeness of description of the acupuncture treatment itself. The revised STRICTA checklist published in 2010 served as a primary source of extraction form of acupuncture-related information.[3]

Rating methods of items in STRICTA

Each item of STRICTA was rated with a dichotomous scale (i.e., "reported" or "not reported"). The rating of "reported" was given when relevant information is at least partially reported in the Cochrane review or primary component studies. The rating of "not reported" was given when relevant information is completely lacked in the Cochrane reviews or primary component studies. When there is written evidence in the Cochrane review that the review authors attempted to report and sought the relevant information but could not find it in the component study, the item was rated as successfully reported one in the Cochrane review. Our approach is in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statements that stressed the importance of reporting all variables for which data were sought, regardless of its availability in the component studies.[7] STRICTA

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3 recommends reporting of actually performed acupuncture intervention, rather than reporting of treatment protocols without any evidence of implementation. However, we assumed the reporting of Cochrane reviews or of component studies as performed, because distinctions were not clear in most cases.

Inquiries to the review authors and review groups

One author (KKH) visited websites of relevant Cochrane review groups (CRGs) to see whether any reporting guidelines for acupuncture-related intervention were provided for review authors. (accessed at 12th July 2012) E-mail queries were sent to the contact point of CRGs. Two questions were used for the survey, as follows: "Do your CRG have a policy or specific recommendations about the reporting details of acupuncture interventions for review authors? If any, please specify" and "Have you ever recommended any specific guideline for reporting details of acupuncture interventions for the review to review authors? If any, please specify", respectively. Similar e-mail queries with four questions were sent to the correspondence of the included Cochrane reviews (Table 2). This was done to check if CRGs or review authors had been aware the existence of reporting guidelines of acupuncture (i.e., STRICTA), had or had been recommended to use reporting guidelines for detailed description of interventions regarding acupuncture.

Training of trial assessors

Two reviewers (KHK and JWK), both experienced acupuncture researchers and systematic reviewers, received training on STRICTA assessment checklists. The training course aimed to minimize inconsistency in data extraction and scoring. Ten trials in the Cochrane reviews that were published before 2005 thus excluded in our analyses were randomly selected for initial scoring by both reviewers. Two reviewers independently assessed and scored the quality of

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reporting in terms of acupuncture treatment-related information of ten component trials in the Cochrane reviews. Following this, we attempted to develop and re-assure the standardized scoring instruction for the main analysis.

Statistical analysis

The number of items rated as "reported" in the Cochrane review was compared with those in the relevant primary component studies. Results were presented as risk ratios (RR) with 95% confidence intervals (CI). Random effects model was used, and heterogeneity was analysed using a Chi^2 test on N-1 degrees of freedom, with an alpha of 0.05 used for statistical significance and with the I^2 statistic. The number and proportion of component studies in the Cochrane reviews and the original RCTs that reported information for each STRICTA item was compared using the McNemar test as percentage reported with binomial 95% confidence intervals. STATA version 10.0 (Stata-Corp, College Station, Texas) and RevMan 5.2 (The Nordic Cochrane Centre, Copenhagen) was used for statistical analyses and the forest plot, respectively.

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Results

Totally 74 Cochrane reviews were identified following the search of CDSR, of which 26 reviews with 96 component studies were deemed to be eligible. Among them, one review and four component studies were excluded from the analysis, because of the wrong citation (n=3) and no accessibility (n=1) of component studies that resulted in the analysis of 25 reviews and 92 component studies. (Figure 1)

Study characteristics

Of the 25 included Cochrane reviews of acupuncture, 17 reviews (68%) evaluated acupuncture as a primary intervention of interest. The median value of publication year or year that last update were performed was 2010. 12 reviews (48%) attempted to investigate the clinical heterogeneity related to acupuncture treatment by the means of subgroup, sensitivity or other type of analysis (i.e., acupuncture adequacy test).

Of the 92 component studies, 58 studies (63%) were published in English. The median value of publication year of component studies published after 2005 was 2007. Type of comparison to acupuncture was non-acupuncture interventions (n=68, 74%), sham acupuncture (n=34, 37%) and active acupuncture treatments (n=14, 15%). Details of characteristics for Cochrane acupuncture reviews and component studies are provided in Table 1.

Review policy or recommendations for the reporting acupuncture intervention

No CRG policy or recommendations given to the review author for reporting of acupuncture treatment were identified by an e-mail survey to the CRG correspondence or review authors. Five of 16 CRGs replied that the Cochrane Handbook should serve as a general standard guideline for reporting in the review, although no detailed instructions or any recommendations for reporting the details or at least core components of complex

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interventions such as acupuncture were provided to authors. One CRG of the Cochrane review that did not evaluate acupuncture as primary intervention reported that they sought the feedback from an acupuncture specialist during editorial process. Less than half of reviewers (44%) reported that they were aware of STRICTA and only 16% of reviewers had utilized STRICTA during the review process. Reviewers did not receive either recommendation or restriction in terms of reporting acupuncture treatment during their review process (Table 2).

STRICTA reporting in the Cochrane reviews and in the component studies

Risk ratio of the reporting rate of STRICTA items was 0.84 (95% confidence interval 0.79 to 0.88, I^2=8%), indicating that Cochrane reviews were 16% less likely to report the acupuncture-related items of STRICTA than component RCTs (Figure 2). Information was significantly better reported for 10 of the 15 acupuncture treatment-related items of STRICTA in RCTs than in Cochrane reviews ($p<0.05$), while four items did so without statistical significance (Table 3). The most significant difference of reporting rate was found for the item A2 (reasoning of treatment) and B9 (needle type) with better reporting in 39.1 % and 45.7 % of RCTs, respectively. One item (E1) related to practitioner background was significantly better reported in Cochrane reviews. Four items including A2 (reasoning of treatment), B4 (depth of insertion), D1 (details of other treatments) and D2 (setting and context) were reported in less than half of component studies in the Cochrane reviews and of RCTs.

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Discussion

This study is the first systematic investigation of selective reporting in terms of details of interventions in the Cochrane reviews of acupuncture. We found some items which have been regarded as core components of acupuncture treatments were not reported in the Cochrane review, even though those information was already reported in the component RCTs. Details of interventions were significantly better reported in the RCTs in most items of STRICTA. This was achieved without further contact of authors of RCTs, which might imply the improvement of the reporting quality in terms of intervention details could be achieved directly by adopting STRICTA as a guideline for data abstraction by reviewers, editorials and peer-reviewers. However, no specific recommendation or guidelines for review authors were provided by CRG, and only minor portion of review authors or members of CRGs were identified to be aware of the existing CONSORT extension version of acupuncture. Overall, there is an insufficient reporting of acupuncture details which could have been improved if the existing reporting guidelines were well utilized in the review process.

In our review, less reporting of treatment-related information in the Cochrane reviews was observed in most of selected STRICTA items. To some extent, missing details of complex intervention might be inevitable during abstraction of information due to the complexity in practice.[5] However, some items showed almost compatible or even better reporting quality in the Cochrane reviews than in the RCTs. For example, information regarding the practitioner qualification was relatively well-reported (over 60% of component studies). Some of mechanical aspects of acupuncture treatments were also relatively well-reported both in Cochrane reviews and primary component studies, although some showed modest reporting quality both in Cochrane reviews and RCTs. Item B9 (Needle type) showed the most difference (45.7% difference) of reporting rates between Cochrane reviews and primary

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component studies. This is in line with the previous research that common missing element of non-pharmacological interventions in randomized controlled trials were materials necessary to provide the intervention (51%) and details about intervention-related procedures (46%) published in six major general medical journals.[10] On the contrary, poor reporting of contextual factors (D1; details of other treatments, D2; setting and context, D3; Patient-practitioner interaction) was obvious both in Cochrane reviews and primary component studies. Although treatment context can have a significant influence on treatment effects,[11] reporting information related to study contexts and patient-practitioner interactions seems to have been largely ignored by researchers of complex intervention.[12] Since acupuncture is a practitioner-dependent, non-pharmacological complex intervention,[13] sufficient details of intervention delivered and study contexts might be of particular importance to enable readers to consider the application and reproduction of review results in different treatment settings.[12] Items that explain theoretical background of acupuncture intervention were also largely underreported in Cochrane reviews of acupuncture, although theoretically-derived therapeutic actions or strategies in complex interventions such as acupuncture may also have an important role in constituting overall therapeutic effects.[13] It is still unclear for acupuncture which component exerts therapeutic effects which combination of potential therapeutic components works best, or whether combination of several components during the acupuncture treatment is additive or synergistic.[14] Therefore, it would be a reasonable suggestion for reviewers to report component factors of acupuncture that seems potentially contributable to the effectiveness which are well-represented in STRICTA, until future researches elucidate the therapeutic role of each component or group of components in the acupuncture treatment.

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One possible explanation of inconsistent and suboptimal reporting of acupuncture treatment-related information would be that the Cochrane reviewers might not perceive some items of STRICTA as relevant to their review and selectively depicted some items of STRICTA. In a small survey of Prady et al., some trialists and Cochrane review authors did not perceive some items of the previous version of STRICTA as relevant to acupuncture treatments.[15] Another reason might be a lack of standard reporting guideline for interventions in the Cochrane review. Either Cochrane review authors or CRG correspondence reported that they did not know the existence of reporting guidelines for acupuncture. To date, however, there is no study investigating reasons for the selective reporting intervention-related information (including acupuncture) in Cochrane reviews. Since information related to the treatment intervention is essential to enhance the external validity, applicability and implementation of results of systematic review,[5] barriers to the optimal quality of reporting for treatment intervention should be explored and tackled in future studies.

Removal of STRICTA-specific information in the reporting due to the journal's space constraints or suggestions of editors as well as peer-reviewers was addressed by some trial authors.[15] This may be the case for the systematic review published in non-Cochrane medical journals which have limited word counts.[15] In our research, the possibility of potential influence of space constraints on suboptimal reporting seems unlikely because Cochrane review allows review authors to describe the main characteristics of each included study without any space constraints. However, lack of comparison of the reporting quality of acupuncture intervention in Cochrane reviews with those in non-Cochrane reviews published in journals with space-constraints do not provide evidence to support this argument. Future research incorporating both Cochrane and non-Cochrane reviews may reveal whether there is any systematic differences of reporting quality in terms of the details of treatment

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intervention between Cochrane and non-Cochrane reviews, thus space-constraints could be an influencing factor to the reporting quality of intervention-related information or not.

Evaluation of internal validity has been put on great emphasis in the Cochrane systematic reviews.[9,16] However, evaluating applicability of review results may also be of similar importance, since uptake and reproduction of review results may be able to change the routine clinical practice toward evidence-based practice.[5] Lack of consideration of external validity is a major criticism of systematic reviews and RCTs, and is a potential threat of poor uptake of evidence into routine clinical practice.[17-20] Intervention details and treatment contexts which STRICTA aims to address are suggested as the determinants of external validity in trial, systematic review and guideline publications,[12, 23] although little is known whether detailed description of acupuncture interventions in systematic reviews can affect uptake of evidence in practice. Whether selective reporting of acupuncture interventions observed in our study would influence the uptake of evidence may deserve further research.

Strengths and weakness

STRICTA is the best representative recommendation agreed by international acupuncture experts, constituting core components of acupuncture treatment that may be inter-related.[3] However, STRICTA had not been developed to measure the quality of reporting acupuncture interventions, although we summed the scores of each items to score the overall quality of reporting acupuncture interventions. Since this method is not based on the original purpose of STRICTA and there is no weighting criteria for each items, interpretations of our results should be cautious.[8] The scores should not be understood as the exact quantitative estimates across the studies, but as possible indicators of incompleteness of reporting details of acupuncture.

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Results of rating might be prone to subjective assessment, although extensive training of authors using CONSORT elaboration document [3] were preceded. Two assessors were unblinded to the study characteristics, such as publication dates or allocation of acupuncture as a primary or control intervention. Since both assessors are acupuncture researchers as well as practitioners thus may be familiar with included acupuncture studies, we did not attempt to blind the assessors. Prady et al. found that unblinded assessor gave higher scores to some of acupuncture studies in terms of items of STRICTA, although this tendency was not consistent in the rest of studies to be assessed.[8] Nevertheless, unblinded assessors with prior knowledge of study characteristics in our review may have introduced bias.

The first STRCITA was published in 2001, and as a revised version in 2010. We adopted the revised version of STRICTA for studies which had been published both before and after it. Thus, component studies published before the publication of revised STRICTA may not address the some revised items assessed in this review. This may have yielded a systematic bias when assessing the component studies by disadvantaging articles following a previous version of the guideline.[8] Nevertheless, the utilization of the latest version of STRICTA was justified in our study with three reasons: First, the CONSORT initiatives recommended the use of most recently released version of reporting standards when reporting and analyzing RCTs.[21] Second, the ultimate aim of using STRCITA in this study was not to score component studies per each item, but to reflect whether and how Cochrane reviews report or omit essential component of acupuncture treatments which were deemed the best representation of consensus across international acupuncture experts. Third, we identified that selected components for this review in the original STRICTA and in the revised one is almost

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consistent enough to justify the use of the latest version of STRICTA. In this sense, the latest version of STRICTA was preferred.

Uptake of reporting guidelines by individual researchers and journal editors may take longer than expected. A survey of author instructions conducted in 2007 revealed that only 38% of 165 high-impact journals endorsed the CONSORT statement, which was initially published in 1996.[22] The median values of the publication years of the primary component studies and Cochrane reviews used in this study were 2007 and 2010, respectively. The first STRICTA statement was published in 2001, and insufficient time may have elapsed to justify our research. This should be recognized as a weakness of our study, and future follow-up studies may overcome this issue.

We did not contact authors of the primary component studies to gain additional information with regard to the under-reported items of STRICTA. This was because our primary interest is to identify selective reporting / omissions of acupuncture-related information during the review process in the Cochrane reviews. Given the authors of primary component studies are often contacted to gain additional information when conducting systematic review, however, our study might not reflect common information-seeking procedure during review process. Author contact would have brought to what extent Cochrane reviews could have comprehensively described the treatment-related information of acupuncture based on the standard author query process recommended in the Cochrane handbook.[23] Future follow-up study may address such limitation.

Implication for future research

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Factors associated with how and why review authors selectively summarize the treatment intervention during the review process should be investigated to identify the potential barrier of optimal quality of reporting in Cochrane reviews of acupuncture. Recent empirical evidence supports that the utilization of reporting guideline (i.e., CONSORT, STROBE, TREND and STARD) with regard to general methodological issues during peer review processes improves the quality of publication in biomedical journals.[24] Whether and how reporting guidelines for the description of treatment intervention such as STRICTA can be efficiently utilized during editorial and peer-review process and provided as author-support resources in CRG websites should be explored to improve the reporting quality of treatment intervention. Whether and how reporting items of STRICTA explaining theoretical background, mechanical aspects and contextual factors of acupuncture could contribute to the investigation of clinical heterogeneity of acupuncture treatments and their potential impacts on the direction and significance of effect estimates should also be explored. Whether loss of treatment-related information actually leads to an altered replicability of reported interventions in Cochrane reviews was not investigated in this study, and should also be investigated in future research.

Conclusions

The reporting quality of treatment details in Cochrane reviews of acupuncture was insufficient with regard to STRICTA recommendation, even though information was readily reported in primary component studies. STRICTA was rarely utilized by CRGs and review authors. Use of STRICTA guideline for the reporting treatment details in Cochrane reviews and peer-review process should be considered to improve the replicability and utilization of review results in future research and clinical practice.

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Contributorship Statement

Kim KH conceived and designed the study. Kim KH searched the literature from electrical databases. Kim KH and Kang JW analyzed the data. Lee MS and Lee JD provided critical comments and contributed to the interpretation of analyzed results. Kim KH wrote the first draft of this manuscript. All authors read and revised the draft

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Competing Interests

None

Data Sharing Statement

Authors adhere to the data sharing statement of BMJ Open. Please send an e-mail to the first author (Kim KH) to obtain additional unpublished data.

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Table 1. General characteristics of Cochrane reviews related to acupuncture

	Included Cochrane reviews N=25
Number of Cochrane reviews, N(%)	
Acupuncture as primary	17
Acupuncture as secondary	8
Number of component study	
Total	409
Mean	16.36 (11.77)
Median (Q1-Q3)	13 (3 – 47)
Number of component study published after 2005	
Total	92
Mean	3.7 (3.85)
Median (Q1-Q3)	2 (1 – 5)
Publication language of component studies after 2005, N (%)	
Total	92
English	58 (63%)
Languages other than English	34 (37%)
Number of component studies published in	
Acupuncture-related journal	47
Western medicine journal	43
Publication year	
Cochrane review (Q1-Q3)	2010 (2008-2011)
Component studies (Q1-Q3)	2007 (2006-2008)
Types of control*, N (%)	
Sham acupuncture	34 (37%)
Active acupuncture	14 (15%)
Non-acupuncture	68 (74%)
Clinical heterogeneity related to acupuncture	
Investigated	12 (48%)
in subgroup analysis	5 (20%)
in sensitivity analysis	6 (24%)
in other analysis	8 (32%)
Not investigated	13(52%)

* Sum of the number of each control group may exceed the total number of included trials, since there are trials that have more than two control groups.
Q1-Q3: interquartile range 1 to 3

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Table 2. Response of review authors for the reporting of acupuncture details in the Cochrane review

N=25	Q1	Q2	Q3	Q4
Yes	11 (44%)	4 (16%)	0 (0%)	0 (0%)
No	2 (8%)	5 (20%)	10 (40%)	8 (32%)
No answer	12 (48%)	16 (64%)	15(60%)	17 (68%)

Q1. Are you aware of any guideline or recommendation for reporting details of acupuncture treatment in journal publication?
Q2. Have you ever referred or used any reporting guidelines or recommendations when you reported the details of acupuncture treatments in your Cochrane review?
Q3. Have you ever received any guideline or recommendation for reporting details of acupuncture treatment from the Cochrane review group, when writing or updating your review?
Q4. Have you ever received any constraints or restrictions when reporting the details of acupuncture treatments in your Cochrane review?

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Table 3.The number of component studies in Cochrane reviews and of original RCTs with reporting of selected STRICTA items

Items	Component studies in Cochrane reviews		Original RCTs		*Difference (95% CI)
	n/N	(%)	n/N	%	
A. Acupuncture rationale					
1. Style of acupuncture treatment	59/92	(64.1)	66/92	(71.7)	7.6 [1.1, 14.1]
2.Reasoning of treatment	6/92	(6.5)	42/92	(45.6)	39.1[28.1,50.2]
3. Extent to which treatment was varied	76/92	(82.6)	87/92	(94.6)	12.0 [4.2, 19.5]
Total section A.					
B. Needling details					
1. Number of needles	76/92	(82.6)	84/92	(91.3)	8.7 [1.9, 15.5]
2. Names of points	74/92	(80.4)	84/92	(91.3)	10.9 [2.7, 19.0]
4. Depths of insertion	36/92	(39.1)	41/92	(44.6)	5.4 [-7.1, 17.9]
5. Response to needle	53/92	(57.6)	63/92	(68.5)	10.9 [0.0, 21.7]
6. Needle stimulation	42/92	(45.7)	64/92	(69.6)	23.9 [13.6, 34.2]
8. Retention time	69/92	(75.0)	81/92	(88.0)	13.0 [4.4, 21.6]
9. Needle type	18/92	(19.6)	60/92	(65.2)	45.7 [34.4, 56.9]
Total section B.					
C. Treatment regimen					
1. Number of sessions	85/92	(92.4)	90/92	(97.8)	5.4 [-0.3, 11.2]
2. Frequency/Duration	85/92	(92.4)	88/92	(95.7)	3.3 [-2.5, 9.1]
Total Section C.					
D. Treatment context					
1. Details of other treatments	15/92	(16.3)	31/92	(33.7)	17.4 [8.6, 26.2]
2. Setting and context	2/92	(2.2)	19/92	(20.7)	18.5 [9.5, 27.5]
Total Section D.					
E. Practitioner background					
1. Description of acupuncturists	56/92	(60.9)	51/92	(55.4)	-5.4 [-15.2, -4.4]

Abbreviation; RCTs, randomized controlled trials
*: Higher number means favorable results to RCTs.

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Figure 1. Flowchart of Cochrane reviews and component study selections
CDSR; Cochrane database of systematic reviews

Figure 2. The number of reported items of STRICTA in Cochrane reviews of acupuncture and related RCTs

RCT; Randomized controlled trial

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Assessment of the quality of reporting for treatment components in Cochrane reviews of acupuncture

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Running Title: STRICTA for Cochrane reviews of acupuncture

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Abstract

Objectives: High quality reporting of treatment details can aid replication of study results in real-world clinical practice. The Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) is a reporting guideline for key elements of acupuncture interventions in clinical trials. This study used STRICTA to investigate whether Cochrane reviews of acupuncture adequately report important treatment details.

Design: Systematic review

Methods: Cochrane reviews of acupuncture were identified from *The Cochrane Library* (Issue 7, 2012). Randomized controlled trials (RCTs) included in the reviews and published after 2005 were obtained. Using STRICTA, we extracted acupuncture-related information from both the Cochrane reviews and the RCTs. The Characteristics of included studies table was the major source of intervention information from Cochrane reviews. Reporting quality of acupuncture interventions in Cochrane reviews was assessed and compared to the respective RCTs.

Results: 25 Cochrane reviews of acupuncture and 92 RCTs met the selection criteria. Cochrane reviews were 16% less likely to report the acupuncture-related items of STRICTA than RCTs (risk ratio 0.84, 95% confidence interval 0.79 to 0.88, I^2=8%). Information was significantly better reported for 10 of the 15 treatment-group items of STRICTA in RCTs than in Cochrane reviews ($p<0.05$), while four items did so without statistical significance. One item related to practitioner background was significantly better reported in Cochrane reviews.

Conclusion: Reporting quality of treatment details in Cochrane reviews of acupuncture was insufficient with regard to STRICTA, even though such information was readily reported in RCTs. The overall quality of reporting of the RCTs, while better than the reviews, was also often suboptimal. Use of STRICTA guideline during the review process is recommended to adequately report the key treatment components in Cochrane reviews of acupuncture. The

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potential impact of STRICTA to the replicability and utilization of reviews in future research and practice needs to be investigated.

Strengths and limitations of this study

- This study is the first investigation that revealed the avoidable incompleteness of reporting quality with regard to important treatment components of acupuncture in the Cochrane reviews, even though information was readily reported in relevant primary RCTs.
- Our findings suggest there is a loss of treatment-related information during data abstraction for Cochrane reviews which may influence the replicability of trial interventions.
- Whether loss of treatment-related information actually leads to the altered replicability of reported interventions in Cochrane reviews was not investigated.

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Background

Cochrane systematic reviews have summaries of study characteristics, which aim to include details of study interventions to be replicated in practice.[1] Developing methods to improve the descriptions of complex interventions are considered as essential task to complement existing systematic review methodology.[2] Therefore, adherence to international standards for reporting interventions might be helpful for detailed description of study interventions in Characteristics summaries in Cochrane systematic reviews. The Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) is an internationally recommended standard for reporting details of acupuncture interventions in clinical trials of acupuncture. It can be used to provide sufficient information for researchers or clinicians to understand acupuncture interventions used in the study and replicate them in other researches or practices.[3] Consolidated Standards of Reporting Trials (CONSORT) for non-pharmacological treatments has also suggested to provide detailed information for study interventions thus to improve the uptake of study results in studies of complex interventions, including surgery, psychological interventions and acupuncture.[4] However, many current trials and reviews have been found to often omit crucial details of non-pharmacological treatments.[5] In case of Cochrane reviews, clear description on the intervention of interests has been emphasized to improve applicability of review into real clinical practice.[6] To the best of our knowledge, however, there is no study assessing whether Cochrane reviews provide satisfactory description on any particular intervention by adopting standards for reporting interventions. Although previous researches focused on managing the reporting quality of Cochrane review in terms of methodological process,[7] the reporting quality for interventions in Cochrane review had been largely ignored. Hence, this study aimed to assess the reporting quality of acupuncture treatment-related information in the Cochrane reviews of acupuncture, as well as to investigate whether utilization of the reporting guideline for treatment

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Methods

Search strategy and selection criteria for Cochrane reviews of acupuncture

Cochrane Database of Systematic Reviews (CDSR) of Issue 7, March 2012 were searched to identify Cochrane reviews of acupuncture using the term "acupuncture". Cochrane reviews that investigated acupuncture as a primary treatment intervention or as one of various treatment or control interventions with at least one primary component study that assessed the effects of acupuncture were included. Reviews without any included study (i.e., empty reviews) or reviews that did not include acupuncture-related studies were excluded.

Search strategy and selection criteria for component studies in eligible Cochrane reviews of acupuncture

Component study was defined as a study included in the Cochrane review regardless of the contribution to the qualitative or quantitative analyses. These were searched using the reference citation information provided in the relevant Cochrane reviews. Among studies in eligible Cochrane systematic reviews, only trials published since 2005 were considered to be analyzed in this study. This is because of the possible necessary time-span for uptake of STRICTA guideline. This approach is similar to the work of Prady et al. (2008) which analyzed acupuncture studies published after 3 to 4 years following the publication of STRICTA.[8] Component studies which involved the assessment of acupuncture as a treatment or control intervention were eligible in our study. The term "acupuncture" was defined as interventions involving penetration of certain points on the skin by needling regardless of manual or electrical stimulation, since the needling is believed to be the most representative feature of acupuncture and STRICTA items were originally developed for the reporting of needle acupuncture in clinical studies.[3] Thus, component studies using other types of non-penetrating stimulation on acupuncture points, such as laser acupuncture, acupressure,

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device-involved acupuncture point stimulation (i.e., wrist band application) and injections on acupuncture points were excluded. Studies employing stimulation on non-classical acupuncture points, such as trigger points, were eligible only if they clearly mentioned the intervention was "acupuncture" in the review.

Data extraction in Cochrane reviews of acupuncture

Intervention details for acupuncture treatments in tables for characteristics of included component studies were extracted in each Cochrane review. Characteristics of included component studies were chosen for the main data source of our analysis because they intend to provide sufficient information on various study components including details of interventions to enable readers to understand the study better or replicate interventions in their own contexts.[1] Methods and results of the included Cochrane reviews were also examined to identify further acupuncture-related information which was not reported in the tables. Two independent authors underwent these processes.

General characteristics of each component study, including publication languages (English or non-English), type of control groups in primary component studies, publication or last-updated years and number of included studies in the Cochrane reviews were extracted. Whether clinical heterogeneity related to the acupuncture treatments were planned to be investigated by subgroup, sensitivity or other analysis regardless of the availability of those analyses were also identified. One review author conducted these processes.

Data extraction in component studies

For included studies to be analyzed, full-texts were obtained to check whether there is any difference of reported information for acupuncture treatments in terms of STRICTA items between the primary component studies and the Cochrane review. This was done to identify

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any selective omission of treatment-related information by the Cochrane review author. Published protocols or supplements of included studies for more detail information were further sought when the primary component studies had relevant information for tracking such data (i.e., citation information in the reference or web-appendix provided by the component study).

Selection of STRICTA items for data extraction

Acupuncture-related items of STRICTA were used to assess the quality of reporting for acupuncture treatment-related information in Cochrane reviews of acupuncture. Items with regard to the description of the comparison interventions were not used, because the main interest of this review was to assess the completeness of description of the acupuncture treatment itself. The revised STRICTA checklist published in 2010 served as a primary source of extraction form of acupuncture-related information.[3]

Rating methods of items in STRICTA

Each item of STRICTA was rated with a dichotomous scale (i.e., "reported" or "not reported"). The rating of "reported" was given when relevant information is at least partially reported in the Cochrane review or primary component studies. The rating of "not reported" was given when relevant information is completely lacked in the Cochrane reviews or primary component studies. When there is written evidence in the Cochrane review that the review authors attempted to report and sought the relevant information but could not find it in the component study, the item was rated as successfully reported one in the Cochrane review. Our approach is in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statements that stressed the importance of reporting all variables for which data were sought, regardless of its availability in the component studies.[7] STRICTA

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recommends reporting of actually performed acupuncture intervention, rather than reporting of treatment protocols without any evidence of implementation. However, we assumed the reporting of Cochrane reviews or of component studies as performed, because distinctions were not clear in most cases.

Inquiries to the review authors and review groups

One author (KKH) visited websites of relevant Cochrane review groups (CRGs) to see whether any reporting guidelines for acupuncture-related intervention were provided for review authors. (accessed at 12th July 2012) E-mail queries were sent to the contact point of CRGs. Two questions were used for the survey, as follows: "Do your CRG have a policy or specific recommendations about the reporting details of acupuncture interventions for review authors? If any, please specify" and "Have you ever recommended any specific guideline for reporting details of acupuncture interventions for the review to review authors? If any, please specify", respectively. Similar e-mail queries with four questions were sent to the correspondence of the included Cochrane reviews (Table 2). This was done to check if CRGs or review authors had been aware the existence of reporting guidelines of acupuncture (i.e., STRICTA), had or had been recommended to use reporting guidelines for detailed description of interventions regarding acupuncture.

Training of trial assessors

Two reviewers (KHK and JWK), both experienced acupuncture researchers and systematic reviewers, received training on STRICTA assessment checklists. The training course aimed to minimize inconsistency in data extraction and scoring. Ten trials in the Cochrane reviews that were published before 2005 thus excluded in our analyses were randomly selected for initial scoring by both reviewers. Two reviewers independently assessed and scored the quality of

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reporting in terms of acupuncture treatment-related information of ten component trials in the Cochrane reviews. Following this, we attempted to develop and re-assure the standardized scoring instruction for the main analysis.

Statistical analysis

The number of items rated as "reported" in the Cochrane review was compared with those in the relevant primary component studies. Results were presented as risk ratios (RR) with 95% confidence intervals (CI). Random effects model was used, and heterogeneity was analysed using a Chi^2 test on N-1 degrees of freedom, with an alpha of 0.05 used for statistical significance and with the I^2 statistic. The number and proportion of component studies in the Cochrane reviews and the original RCTs that reported information for each STRICTA item was compared using the McNemar test as percentage reported with binomial 95% confidence intervals. STATA version 10.0 (Stata-Corp, College Station, Texas) and RevMan 5.2 (The Nordic Cochrane Centre, Copenhagen) was used for statistical analyses and the forest plot, respectively.

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Results

Totally 74 Cochrane reviews were identified following the search of CDSR, of which 26 reviews with 96 component studies were deemed to be eligible. Among them, one review and four component studies were excluded from the analysis, because of the wrong citation (n=3) and no accessibility (n=1) of component studies that resulted in the analysis of 25 reviews and 92 component studies. (Figure 1)

Study characteristics

Of the 25 included Cochrane reviews of acupuncture, 17 reviews (68%) evaluated acupuncture as a primary intervention of interest. The median value of publication year or year that last update were performed was 2010. 12 reviews (48%) attempted to investigate the clinical heterogeneity related to acupuncture treatment by the means of subgroup, sensitivity or other type of analysis (i.e., acupuncture adequacy test).

Of the 92 component studies, 58 studies (63%) were published in English. The median value of publication year of component studies published after 2005 was 2007. Type of comparison to acupuncture was non-acupuncture interventions (n=68, 74%), sham acupuncture (n=34, 37%) and active acupuncture treatments (n=14, 15%). Details of characteristics for Cochrane acupuncture reviews and component studies are provided in Table 1.

Review policy or recommendations for the reporting acupuncture intervention

No CRG policy or recommendations given to the review author for reporting of acupuncture treatment were identified by an e-mail survey to the CRG correspondence or review authors. Five of 16 CRGs replied that the Cochrane Handbook should serve as a general standard guideline for reporting in the review, although no detailed instructions or any recommendations for reporting the details or at least core components of complex

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3 interventions such as acupuncture were provided to authors. One CRG of the Cochrane
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5 review that did not evaluate acupuncture as primary intervention reported that they sought the
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7 feedback from an acupuncture specialist during editorial process. Less than half of reviewers
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9 (44%) reported that they were aware of STRICTA and only 16% of reviewers had utilized
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11 STRICTA during the review process. Reviewers did not receive either recommendation or
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13 restriction in terms of reporting acupuncture treatment during their review process (Table 2).

interventions such as acupuncture were provided to authors. One CRG of the Cochrane review that did not evaluate acupuncture as primary intervention reported that they sought the feedback from an acupuncture specialist during editorial process. Less than half of reviewers (44%) reported that they were aware of STRICTA and only 16% of reviewers had utilized STRICTA during the review process. Reviewers did not receive either recommendation or restriction in terms of reporting acupuncture treatment during their review process (Table 2).

STRICTA reporting in the Cochrane reviews and in the component studies

Risk ratio of the reporting rate of STRICTA items was 0.84 (95% confidence interval 0.79 to 0.88, I^2=8%), indicating that Cochrane reviews were 16% less likely to report the acupuncture-related items of STRICTA than component RCTs (Figure 2). Information was significantly better reported for 10 of the 15 acupuncture treatment-related items of STRICTA in RCTs than in Cochrane reviews ($p<0.05$), while four items did so without statistical significance (Table 3). The most significant difference of reporting rate was found for the item A2 (reasoning of treatment) and B9 (needle type) with better reporting in 39.1 % and 45.7 % of RCTs, respectively. One item (E1) related to practitioner background was significantly better reported in Cochrane reviews. Four items including A2 (reasoning of treatment), B4 (depth of insertion), D1 (details of other treatments) and D2 (setting and context) were reported in less than half of component studies in the Cochrane reviews and of RCTs.

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Discussion

This study is the first systematic investigation of selective reporting in terms of details of interventions in the Cochrane reviews of acupuncture. We found some items which have been regarded as core components of acupuncture treatments were not reported in the Cochrane review, even though those information was already reported in the component RCTs. Details of interventions were significantly better reported in the RCTs in most items of STRICTA. This was achieved without further contact of authors of RCTs, which might imply the improvement of the reporting quality in terms of intervention details could be achieved directly by adopting STRICTA as a guideline for data abstraction by reviewers, editorials and peer-reviewers. However, no specific recommendation or guidelines for review authors were provided by CRG, and only minor portion of review authors or members of CRGs were identified to be aware of the existing CONSORT extension version of acupuncture. Overall, there is an insufficient reporting of acupuncture details which could have been improved if the existing reporting guidelines were well utilized in the review process.

In our review, less reporting of treatment-related information in the Cochrane reviews was observed in most of selected STRICTA items. To some extent, missing details of complex intervention might be inevitable during abstraction of information due to the complexity in practice.[5] However, some items showed almost compatible or even better reporting quality in the Cochrane reviews than in the RCTs. For example, information regarding the practitioner qualification was relatively well-reported (over 60% of component studies). Some of mechanical aspects of acupuncture treatments were also relatively well-reported both in Cochrane reviews and primary component studies, although some showed modest reporting quality both in Cochrane reviews and RCTs. Item B9 (Needle type) showed the most difference (45.7% difference) of reporting rates between Cochrane reviews and primary

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component studies. This is in line with the previous research that common missing element of non-pharmacological interventions in randomized controlled trials were materials necessary to provide the intervention (51%) and details about intervention-related procedures (46%) published in six major general medical journals.[10] On the contrary, poor reporting of contextual factors (D1; details of other treatments, D2; setting and context, D3; Patient-practitioner interaction) was obvious both in Cochrane reviews and primary component studies. Although treatment context can have a significant influence on treatment effects,[11] reporting information related to study contexts and patient-practitioner interactions seems to have been largely ignored by researchers of complex intervention.[12] Since acupuncture is a practitioner-dependent, non-pharmacological complex intervention,[13] sufficient details of intervention delivered and study contexts might be of particular importance to enable readers to consider the application and reproduction of review results in different treatment settings.[12] Items that explain theoretical background of acupuncture intervention were also largely underreported in Cochrane reviews of acupuncture, although theoretically-derived therapeutic actions or strategies in complex interventions such as acupuncture may also have an important role in constituting overall therapeutic effects.[13] It is still unclear for acupuncture which component exerts therapeutic effects which combination of potential therapeutic components works best, or whether combination of several components during the acupuncture treatment is additive or synergistic.[14] Therefore, it would be a reasonable suggestion for reviewers to report component factors of acupuncture that seems potentially contributable to the effectiveness which are well-represented in STRICTA, until future researches elucidate the therapeutic role of each component or group of components in the acupuncture treatment.

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One possible explanation of inconsistent and suboptimal reporting of acupuncture treatment-related information would be that the Cochrane reviewers might not perceive some items of STRICTA as relevant to their review and selectively depicted some items of STRICTA. In a small survey of Prady et al., some trialists and Cochrane review authors did not perceive some items of the previous version of STRICTA as relevant to acupuncture treatments.[15] Another reason might be a lack of standard reporting guideline for interventions in the Cochrane review. Either Cochrane review authors or CRG correspondence reported that they did not know the existence of reporting guidelines for acupuncture. To date, however, there is no study investigating reasons for the selective reporting intervention-related information (including acupuncture) in Cochrane reviews. Since information related to the treatment intervention is essential to enhance the external validity, applicability and implementation of results of systematic review,[5] barriers to the optimal quality of reporting for treatment intervention should be explored and tackled in future studies.

Removal of STRICTA-specific information in the reporting due to the journal's space constraints or suggestions of editors as well as peer-reviewers was addressed by some trial authors.[15] This may be the case for the systematic review published in non-Cochrane medical journals which have limited word counts.[15] In our research, the possibility of potential influence of space constraints on suboptimal reporting seems unlikely because Cochrane review allows review authors to describe the main characteristics of each included study without any space constraints. However, lack of comparison of the reporting quality of acupuncture intervention in Cochrane reviews with those in non-Cochrane reviews published in journals with space-constraints do not provide evidence to support this argument. Future research incorporating both Cochrane and non-Cochrane reviews may reveal whether there is any systematic differences of reporting quality in terms of the details of treatment

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intervention between Cochrane and non-Cochrane reviews, thus space-constraints could be an influencing factor to the reporting quality of intervention-related information or not.

Evaluation of internal validity has been put on great emphasis in the Cochrane systematic reviews.[9,16] However, evaluating applicability of review results may also be of similar importance, since uptake and reproduction of review results may be able to change the routine clinical practice toward evidence-based practice.[5] Lack of consideration of external validity is a major criticism of systematic reviews and RCTs, and is a potential threat of poor uptake of evidence into routine clinical practice.[17-20] Intervention details and treatment contexts which STRICTA aims to address are suggested as the determinants of external validity in trial, systematic review and guideline publications,[12, 23] although little is known whether detailed description of acupuncture interventions in systematic reviews can affect uptake of evidence in practice. Whether selective reporting of acupuncture interventions observed in our study would influence the uptake of evidence may deserve further research.

Strengths and weakness

STRICTA is the best representative recommendation agreed by international acupuncture experts, constituting core components of acupuncture treatment that may be inter-related.[3] However, STRICTA had not been developed to measure the quality of reporting acupuncture interventions, although we summed the scores of each items to score the overall quality of reporting acupuncture interventions. Since this method is not based on the original purpose of STRICTA and there is no weighting criteria for each items, interpretations of our results should be cautious.[8] The scores should not be understood as the exact quantitative estimates across the studies, but as possible indicators of incompleteness of reporting details of acupuncture.

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Results of rating might be prone to subjective assessment, although extensive training of authors using CONSORT elaboration document [3] were preceded. Two assessors were unblinded to the study characteristics, such as publication dates or allocation of acupuncture as a primary or control intervention. Since both assessors are acupuncture researchers as well as practitioners thus may be familiar with included acupuncture studies, we did not attempt to blind the assessors. Prady et al. found that unblinded assessor gave higher scores to some of acupuncture studies in terms of items of STRICTA, although this tendency was not consistent in the rest of studies to be assessed.[8] Nevertheless, unblinded assessors with prior knowledge of study characteristics in our review may have introduced bias.

The first STRCITA was published in 2001, and as a revised version in 2010. We adopted the revised version of STRICTA for studies which had been published both before and after it. Thus, component studies published before the publication of revised STRICTA may not address the some revised items assessed in this review. This may have yielded a systematic bias when assessing the component studies by disadvantaging articles following a previous version of the guideline.[8] Nevertheless, the utilization of the latest version of STRICTA was justified in our study with three reasons: First, the CONSORT initiatives recommended the use of most recently released version of reporting standards when reporting and analyzing RCTs.[21] Second, the ultimate aim of using STRCITA in this study was not to score component studies per each item, but to reflect whether and how Cochrane reviews report or omit essential component of acupuncture treatments which were deemed the best representation of consensus across international acupuncture experts. Third, we identified that selected components for this review in the original STRICTA and in the revised one is almost

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consistent enough to justify the use of the latest version of STRICTA. In this sense, the latest version of STRICTA was preferred.

Uptake of reporting guidelines by individual researchers and journal editors may take longer than expected. A survey of author instructions conducted in 2007 revealed that only 38% of 165 high-impact journals endorsed the CONSORT statement, which was initially published in 1996.[22] The median values of the publication years of the primary component studies and Cochrane reviews used in this study were 2007 and 2010, respectively. The first STRICTA statement was published in 2001, and insufficient time may have elapsed to justify our research. This should be recognized as a weakness of our study, and future follow-up studies may overcome this issue.

We did not contact authors of the primary component studies to gain additional information with regard to the under-reported items of STRICTA. This was because our primary interest is to identify selective reporting / omissions of acupuncture-related information during the review process in the Cochrane reviews. Given the authors of primary component studies are often contacted to gain additional information when conducting systematic review, however, our study might not reflect common information-seeking procedure during review process. Author contact would have brought to what extent Cochrane reviews could have comprehensively described the treatment-related information of acupuncture based on the standard author query process recommended in the Cochrane handbook.[23] Future follow-up study may address such limitation.

Implication for future research

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Factors associated with how and why review authors selectively summarize the treatment intervention during the review process should be investigated to identify the potential barrier of optimal quality of reporting in Cochrane reviews of acupuncture. Recent empirical evidence supports that the utilization of reporting guideline (i.e., CONSORT, STROBE, TREND and STARD) with regard to general methodological issues during peer review processes improves the quality of publication in biomedical journals.[24] Whether and how reporting guidelines for the description of treatment intervention such as STRICTA can be efficiently utilized during editorial and peer-review process and provided as author-support resources in CRG websites should be explored to improve the reporting quality of treatment intervention. Whether and how reporting items of STRICTA explaining theoretical background, mechanical aspects and contextual factors of acupuncture could contribute to the investigation of clinical heterogeneity of acupuncture treatments and their potential impacts on the direction and significance of effect estimates should also be explored. Whether loss of treatment-related information actually leads to an altered replicability of reported interventions in Cochrane reviews was not investigated in this study, and should also be investigated in future research.

Conclusions

The reporting quality of treatment details in Cochrane reviews of acupuncture was insufficient with regard to STRICTA recommendation, even though information was readily reported in primary component studies. STRICTA was rarely utilized by CRGs and review authors. Use of STRICTA guideline for the reporting treatment details in Cochrane reviews and peer-review process should be considered to improve the replicability and utilization of review results in future research and clinical practice.

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Table 1. General characteristics of Cochrane reviews related to acupuncture

	Included Cochrane reviews N=25
Number of Cochrane reviews, N(%)	
Acupuncture as primary	17
Acupuncture as secondary	8
Number of component study	
Total	409
Mean	16.36 (11.77)
Median (Q1-Q3)	13 (3 – 47)
Number of component study published after 2005	
Total	92
Mean	3.7 (3.85)
Median (Q1-Q3)	2 (1 – 5)
Publication language of component studies after 2005, N (%)	
Total	92
English	58 (63%)
Languages other than English	34 (37%)
Number of component studies published in	
Acupuncture-related journal	47
Western medicine journal	43
Publication year	
Cochrane review (Q1-Q3)	2010 (2008-2011)
Component studies (Q1-Q3)	2007 (2006-2008)
Types of control*, N (%)	
Sham acupuncture	34 (37%)
Active acupuncture	14 (15%)
Non-acupuncture	68 (74%)
Clinical heterogeneity related to acupuncture	
Investigated	12 (48%)
in subgroup analysis	5 (20%)
in sensitivity analysis	6 (24%)
in other analysis	8 (32%)
Not investigated	13(52%)

* Sum of the number of each control group may exceed the total number of included trials, since there are trials that have more than two control groups.

Q1-Q3: interquartile range 1 to 3

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Table 2. Response of review authors for the reporting of acupuncture details in the Cochrane review

N=25	Q1	Q2	Q3	Q4
Yes	11 (44%)	4 (16%)	0 (0%)	0 (0%)
No	2 (8%)	5 (20%)	10 (40%)	8 (32%)
No answer	12 (48%)	16 (64%)	15(60%)	17 (68%)

Q1. Are you aware of any guideline or recommendation for reporting details of acupuncture treatment in journal publication?
Q2. Have you ever referred or used any reporting guidelines or recommendations when you reported the details of acupuncture treatments in your Cochrane review?
Q3. Have you ever received any guideline or recommendation for reporting details of acupuncture treatment from the Cochrane review group, when writing or updating your review?
Q4. Have you ever received any constraints or restrictions when reporting the details of acupuncture treatments in your Cochrane review?

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Table 3.The number of component studies in Cochrane reviews and of original RCTs with reporting of selected STRICTA items

Items	Component studies in Cochrane reviews		Original RCTs		*Difference (95% CI)
	n/N	(%)	n/N	%	
A. Acupuncture rationale					
1. Style of acupuncture treatment	59/92	(64.1)	66/92	(71.7)	7.6 [1.1, 14.1]
2.Reasoning of treatment	6/92	(6.5)	42/92	(45.6)	39.1[28.1,50.2]
3. Extent to which treatment was varied	76/92	(82.6)	87/92	(94.6)	12.0 [4.2, 19.5]
Total section A.					
B. Needling details					
1. Number of needles	76/92	(82.6)	84/92	(91.3)	8.7 [1.9, 15.5]
2. Names of points	74/92	(80.4)	84/92	(91.3)	10.9 [2.7, 19.0]
4. Depths of insertion	36/92	(39.1)	41/92	(44.6)	5.4 [-7.1, 17.9]
5. Response to needle	53/92	(57.6)	63/92	(68.5)	10.9 [0.0, 21.7]
6. Needle stimulation	42/92	(45.7)	64/92	(69.6)	23.9 [13.6, 34.2]
8. Retention time	69/92	(75.0)	81/92	(88.0)	13.0 [4.4, 21.6]
9. Needle type	18/92	(19.6)	60/92	(65.2)	45.7 [34.4, 56.9]
Total section B.					
C. Treatment regimen					
1. Number of sessions	85/92	(92.4)	90/92	(97.8)	5.4 [-0.3, 11.2]
2. Frequency/Duration	85/92	(92.4)	88/92	(95.7)	3.3 [-2.5, 9.1]
Total Section C.					
D. Treatment context					
1. Details of other treatments	15/92	(16.3)	31/92	(33.7)	17.4 [8.6, 26.2]
2. Setting and context	2/92	(2.2)	19/92	(20.7)	18.5 [9.5, 27.5]
Total Section D.					
E. Practitioner background					
1. Description of acupuncturists	56/92	(60.9)	51/92	(55.4)	-5.4 [-15.2, -4.4]

Abbreviation; RCTs, randomized controlled trials
*: Higher number means favorable results to RCTs.

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Figure 1. Flowchart of Cochrane reviews and component study selections
CDSR; Cochrane database of systematic reviews

Figure 2. The number of reported items of STRICTA in Cochrane reviews of acupuncture and related RCTs

RCT; Randomized controlled trial

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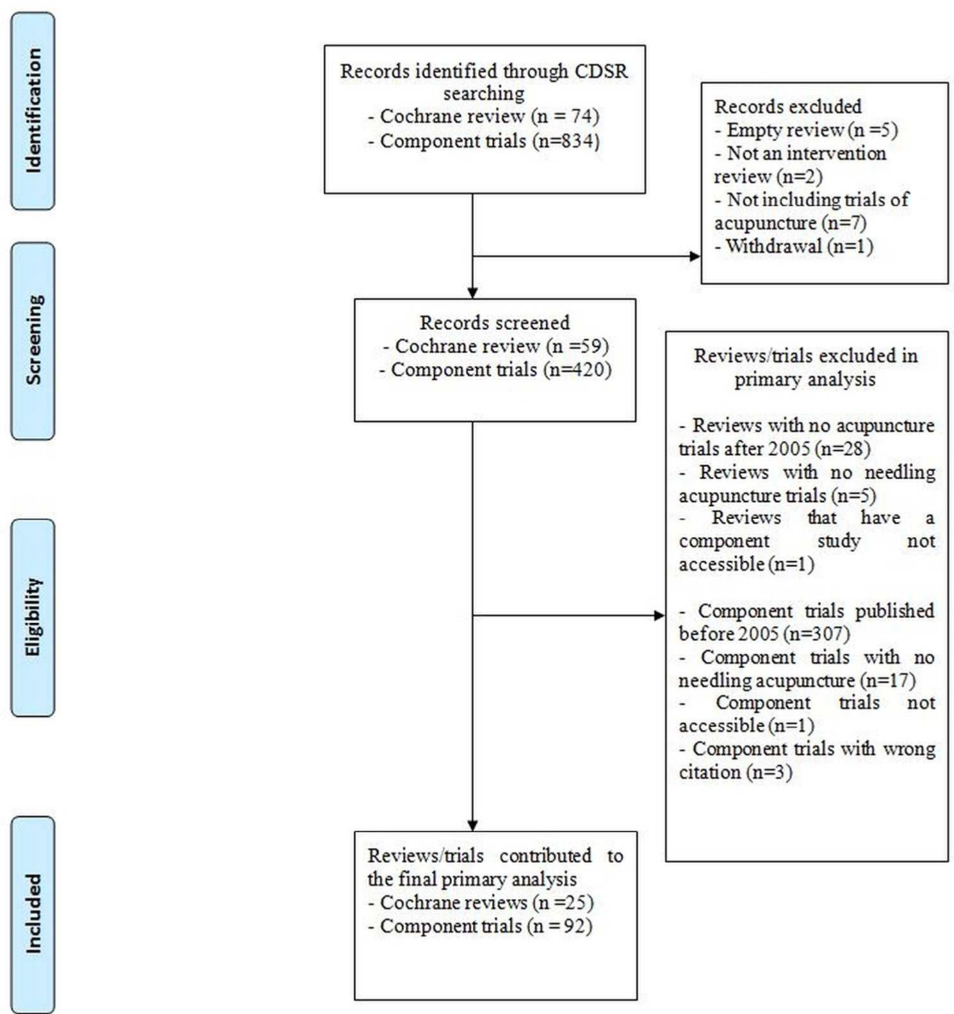

Flowchart of Cochrane reviews and component study selections
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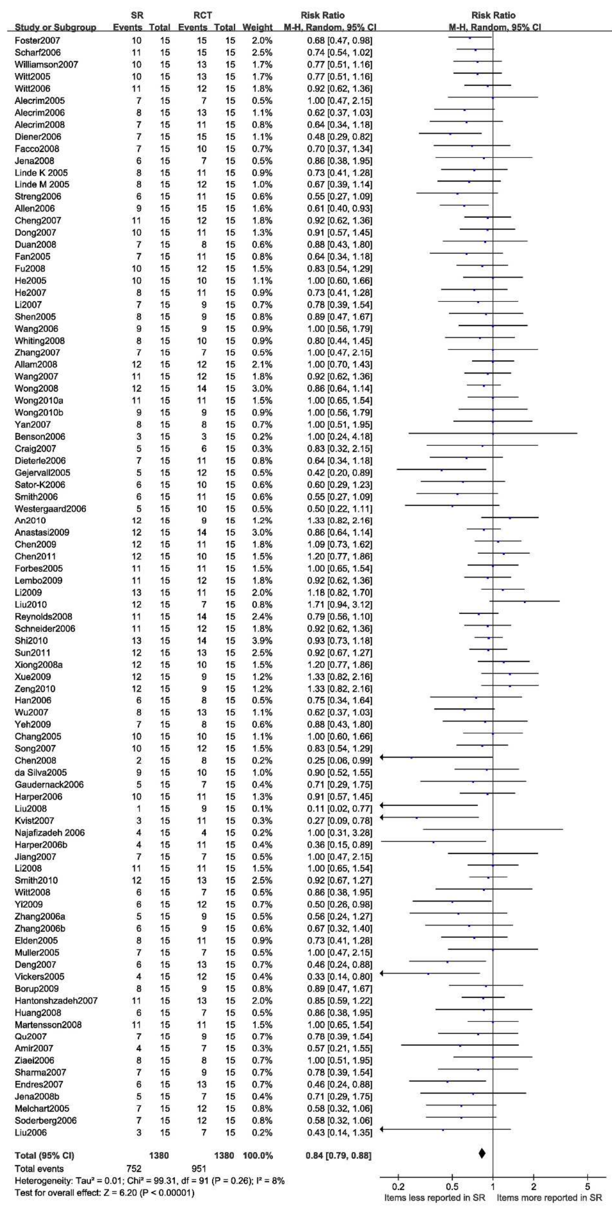

The number of reported items of STRICTA in Cochrane reviews of acupuncture and related RCTs
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Appendix 1. Cochrane reviews of acupuncture and relevant primary randomized controlled trials included in the analysis

Included Cochrane reviews of acupuncture

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2.White AR, Rampes H, Liu JP, Stead LF, Campbell J. Acupuncture and related interventions for smoking cessation. Cochrane Database Syst Rev. 2011; **1**: CD000009.

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4.Cheuk DK, Wong V, Chen WX. Acupuncture for autism spectrum disorders (ASD). Cochrane Database Syst Rev. 2011; **9**: CD007849.

5.Paley CA, Johnson MI, Tashani OA, Bagnall AM. Acupuncture for cancer pain in adults. Cochrane Database Syst Rev. 2011; **1**: CD007753.

6.McCarney RW, Brinkhaus B, Lasserson TJ, Linde K. Acupuncture for chronic asthma. Cochrane Database Syst Rev. 2004; **1**: CD000008.

7.Smith CA, Hay PP, Macpherson H. Acupuncture for depression. Cochrane Database Syst Rev. 2010; **1**: CD004046.

8.Smith CA, Zhu X, He L, Song J. Acupuncture for dysmenorrhoea. Cochrane Database Syst Rev. 2011; **1**: CD007854.

9.Cheuk DK, Wong V. Acupuncture for epilepsy. Cochrane Database Syst Rev. 2008; **4**: CD005062.

10.Smith CA, Crowther CA. Acupuncture for induction of labour. Cochrane Database Syst Rev. 2004; **1**: CD002962.

11.Cheuk DK, Yeung WF, Chung KF, Wong V. Acupuncture for insomnia. Cochrane Database Syst Rev. 2007; **3**: CD005472.

12.Linde K, Allais G, Brinkhaus B, Manheimer E, Vickers A, White AR. Acupuncture for migraine prophylaxis. Cochrane Database Syst Rev. 2009; **1**: CD001218.

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for treatment of irritable bowel syndrome. Cochrane Database Syst Rev. 2012; **5**: CD005111.

16.Smith CA, Collins CT, Crowther CA, Levett KM. Acupuncture or acupressure for pain management in labour. Cochrane Database Syst Rev. 2011; **7**: CD009232.

17. Waseem Z, Boulias C, Gordon A, Ismail F, Sheean G, Furlan AD. Botulinum toxin injections for low-back pain and sciatica. Cochrane Database Syst Rev. 2011; **1**: CD008257.

18.Dowswell T, Kelly AJ, Livio S, Norman JE, Alfirevic Z. Different methods for the induction of labour in outpatient settings. Cochrane Database Syst Rev. 2010; **8**: CD007701.

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20.Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, et al. Manipulation or Mobilisation for Neck Pain. Cochrane Database Syst Rev. 2010; **1**: CD004249.

21.Rada G, Capurro D, Pantoja T, Corbalán J, Moreno G, Letelier LM, et al. Non-hormonal interventions for hot flushes in women with a history of breast cancer. Cochrane Database Syst Rev. 2010; **9**: CD004923.

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25.Mangesi L, Dowswell T. Treatments for breast engorgement during lactation. Cochrane Database Syst Rev. 2010; **9**: CD006946.

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Acupuncture and Moxibustion 2007;26(4):11-12.

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* The number of primary studies exceeds 92 because some trials analyzed in Cochrane reviews had at least two references.

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