Protocol for determining the association between sample size and risk of bias in dermatological randomised controlled trials

Research question: Is there an association between small study sample size and increased risk of bias of Randomised Controlled Trials (RCTs) conducted in the field of clinical dermatology?

Background: Sample size has not been shown to be a predictor of study quality in previous meta-epidemiological studies in general medicine, but it is unclear if the same applies in the field of dermatology. Sample size is possibly a surrogate for other good design features. If there is a clear association between sample size and study quality, it would a useful finding as total sample size is easily available and understood by a wider audience than something like study quality or risk of bias.

Aim: To determine if there is an association between total randomised sample size and risk of bias in in RCTs published in Cochrane Skin Group (CSG) reviews in the last 5 years (2010 to 2014).

Study design: Meta-epidemiological study

Outcomes:

Primary

Cochrane's risk of bias (RoB) assessment (low, high, unclear) for three items: (i) Random sequence generation and allocation concealment; (ii) Blinding of participants and personnel and outcome assessment, and (iii) Incomplete outcome data. These items will be assessed separately.

Methods:

All RCTs published in CSG reviews between 2010 and 2014 will be identified. The risk of bias, sample size, study design (within-patient, cross-over, parallel or other), type of study (full/pilot/feasibility), primary outcomes and year of publication will be extracted for each study.

Analysis:

We will use the Kruskal-Wallis test to determine if there is a statistically significant association between sample size and risk of bias, for each item (assuming the data are non-normal). The median sample size for each risk of bias category (high, low, unclear) will be reported. Post-hoc analyses will be conducted using the Mann-Whitney U test for two individual comparisons, high vs. low and unclear vs. low unclear risk of bias.

Given within-patient and cross-over studies require fewer patients than parallel design, we will stratify the results by study design (parallel and non-parallel). Depending on numbers, we will also determine if there is a difference between full and pilot/feasibility studies.

Dissemination:

The target audience for this study will be anyone with an interest in dermatology research, especially those designing, reporting and using studies for guidelines and clinical practice. A report will be written and submitted to a peer reviewed journal, and findings will be presented at relevant academic conferences.

A lay summary of the study findings will be available on the Centre of Evidence Based Dermatology's website following publication.

The study protocol will be lodged on the Centre of Evidence Based Dermatology website (www.nottingham.ac.uk/dermatology) prior to data collection and analysis.