How to write a scientific paper

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EAMA
European Academy for Medicine of Ageing

EUGMS
European Union Geriatric Medicine Society
Fostering geriatric medicine across Europe

University of Glasgow

CONFLICT OF INTEREST DISCLOSURE

Potential conflict of interest

- Editor-in-Chief of Age and Ageing 2014-present

Additional credentials

- Author of >200 peer review publications
  - Clinical geriatrics and gerontology
  - RCTs, observational studies, cohort studies, mendelian randomisation studies, diagnostic test accuracy studies, prognostic studies, qualitative research
- Practising consultant geriatrician in urban teaching hospital

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Information resources – research methods

http://www.equator-network.org/
Enhancing the QUAlity and Transparency Of health Research

Reporting guidelines for main study types

- Randomised trials - CONSORT + Extensions
- Observational studies - STROBE + Extensions
- Systematic reviews - PRISMA + Extensions
- Diagnostic / prognostic studies - STARD + TRIPOD
- Quality improvement studies - SQUIRE

375 reporting guidelines!

equator network

Key steps in writing a paper – firstly decide your target journal!

- Study protocol
- Trial registration
- A priori statistical analysis plan
  - Power calculations, pre-specified primary outcome
- Statistical analysis
  - Intention to treat
- Preparation of data for publication
  - Tables, figures, text
- Abstract
- Introduction, methods, discussion
- Referencing
- Declaration of COI, funding
- Authorship
  - Lead / corresponding author
  - Senior author
  - Co-authors (specified contribution)
  - Order of authors
- Acknowledgments

Some general points

- Use spelling and grammar checker
- Read what you have written!
- Avoid acronyms
- Strive for internal consistency
  - Order of argument, use of language, data presented
- Be honest about limitations
- Avoid over-interpretation of data / giving conclusions that are not justified by the findings
- Follow journal instructions to authors

Common ethical issues

- Segmented (‘salami’) publication
  - Single study split into several segments just large enough to gain reasonable results and conclusions
- Duplicate publication
  - Paper that overlaps substantially with one or more already published
  - Particular problem if no clear, visible reference to the previous publication(s)
- Journal process
- Routine plagiarism checks e.g. iThenticate for all papers that are potentially suitable for publication

Introduction

- Background
  - Scientific background and explanation of rationale
- Objectives
  - Specific objectives or hypotheses

http://www.consort-statement.org/checklists/view/32--consort-2010/69-background

Methods

- Trial Design
  - eg parallel group / factorial / cluster RCT – include allocation ratio
  - Changes after trial commencement
- Participants
  - Eligibility criteria
- Study settings
- Interventions
  - Sufficient detail to allow replication
- Outcomes
  - Prespecified primary and secondary outcomes including how and when they were assessed
  - Changes to outcomes
- Sample size
- Interim analyses / stopping guidelines
- Randomisation
  - Type (restriction? – eg block, stratified, minimisation), allocation concealment, implementation
- Blinding
  - Participants, care providers, outcome assessors
- Statistical methods

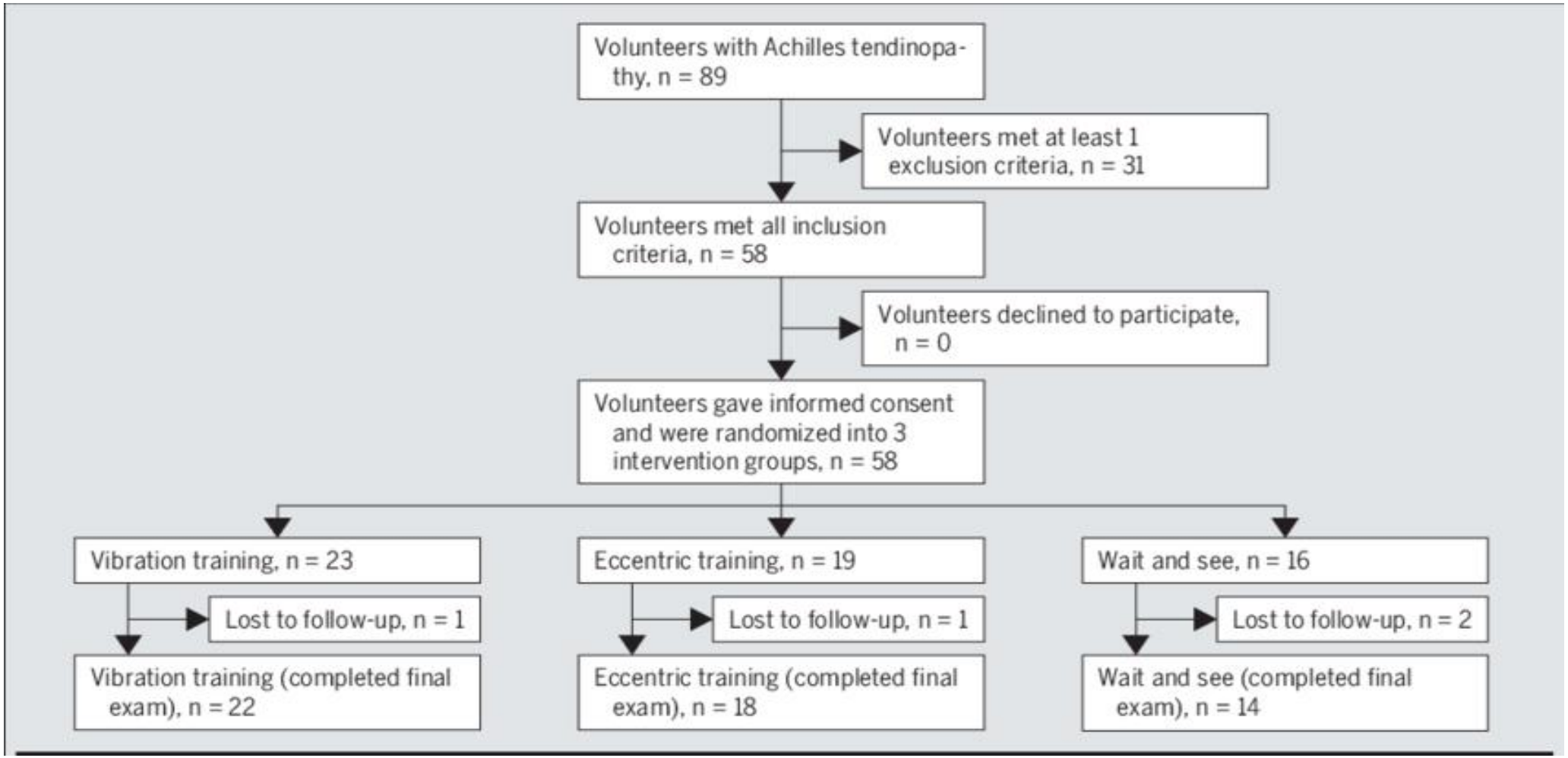
http://www.consort-statement.org/checklists/view/32--consort-2010/69-background

Results

- Participant flow
  - Numbers randomised, who received intended treatment, and analysed for primary outcome
- Losses and exclusions
  - Reasons
- Recruitment
  - Dates
- Reason for stopped trial
- Baseline data table
- Numbers analysed
- Outcomes and estimation
  - For each primary and secondary outcome results for each group, and the estimated effect size and precision (eg 95% CI)
  - For binary variables give both absolute and relative effect sizes
  - Ancillary analyses – subgroups, adjusted analyses – state if pre-specified or exploratory
- Harms

http://www.consort-statement.org/checklists/view/32--consort-2010/69-background

Study data - Simplified patient flow chart (CONSORT)



Horstmann et al, J Orthop Sports Phys Ther, Epub 9 September 2013. doi:10.2519/jospt.2013.4762.

RCT – table 1
Baseline characteristics – can you spot 5 weaknesses?

	All (n=737)	**Placebo (n=369)**	**Levothyroxine (n=368)**	**P-value**
Age (years) [Mean, SD and range]	74.48 (6.32) [65.1-93.4]	74.82 (6.83) [65.1-93.4]	74.0 (5.8) [65.2-93.0]	0.86
Female sex	396 (53.7%)	198 (53.7%)	198 (53.8%)	0.75
Current smokers	62 (8.42%)	33 (8.91%)	29 (7.90%)	0.68
Number of concomitant medicines [median, IQR]	4.0 (2.0, 6.0)	4.0 (2.0, 6.0)	4.0 (2.0, 6.0)	0.89
EuroQol-5D	0.847 (0.179)	0.847 (0.171)	0.846 (0.187)	0.76
Weight <50Kg	10 (1.4%)	5 (1.4%)	5 (1.4%)	0.90
TSH (mU/L) [Mean, SD and range]	6.40 (2.01) [4.6-17.6]	6.38 (2.01) [4.6-17.6]	6.41 (2.01) [4.6-17.6]	0.83

RCT – table 1
Baseline characteristics – spot the weaknesses!

- Spurious accuracy
  - Mean age 78.63 years
- Inconsistency in data presentation
  - Mean age different groups 78.42, 78.0 years
- p-values in baseline table of RCT
- Use of acronyms
  - SD, EuroQol-5D, TSH
- Explanation of range of scores, what high and low score mean

Structured discussion

- Statement of principal findings
- Strengths and weaknesses of the study
  - CONSORT – sources of potential bias, imprecision, and if relevant multiplicity of analyses; external validity, applicability
- Strengths and weaknesses in relation to other studies, discussing particularly any differences in results
- Meaning of the study: possible mechanisms and implications for clinicians or policymakers
  - CONSORT – interpretation consistent with the results, balancing benefits and harms, and considering other relevant evidence
- Unanswered questions and future research

Docherty and Smith BMJ 1999;318:1224

Journal response

- Rejection – is it worth appealing?
  - If response suggests misunderstanding by the reviewer / editor or rationale for rejection appears illogical
- Interested – but a raft of amendments suggested
  - Open door for resubmission!
  - Detailed point-by-point response
  - Accede to request for amendment where this seems reasonable
  - Explain if suggested amendments not possible or inappropriate
  - Be respectful in your reply
  - Track changes manuscript
  - Ask for extra time if you need it
  - Keep your co-authors on-board
- Accept without amendment (highly unlikely!)

Good luck!

Acupressure for frail older people in community dwellings—a randomised controlled trial
Chan et al; Age and Ageing 2017; doi: 10.1093/ageing/afx050

Table 2. Principal outcome analysis at 12 weeks based on intention-to-treat principle ($N = 101$).

Variable	Treatment group ($n = 50$) Mean ± SD[a]	Within-group effect size (Cohen's d)[b]	Control group ($n = 51$) mean ± SD[a]	Within-group effect size (Cohen's d)[b]	Between-group difference in change of score or percentage (95% CI)	P-value[c]
WHOQOL-BREF (HK)						
Self-reported overall QOL[d] (Scores 1–5)						
Baseline	3.49 ± 0.78		3.54 ± 0.79			
12 weeks	3.70 ± 0.64	0.294	3.45 ± 0.71	−0.120	0.30 (−0.06 to 0.67)	0.105
Self-reported General Health[e] (Scores 1–5)						
Baseline	3.05 ± 0.92		3.30 ± 0.93			
12 weeks	3.23 ± 1.06	0.181	3.10 ± 1.14	−0.192	0.37 (−0.12 to 0.87)	0.140
Physical domain (Scores 0–100)						
Baseline	55.03 ± 14.42		59.79 ± 14.35			
12 weeks	63.49 ± 15.69	0.561	56.52 ± 16.71	−0.210	11.74 (5.01 to 18.47)	0.001*
Psychological domain (Scores 0–100)						
Baseline	63.97 ± 12.02		66.90 ± 12.00			
12 weeks	67.91 ± 12.94	0.315	64.89 ± 13.78	−0.156	5.95 (0.20 to 11.70)	0.043*
Social domain (Scores 0–100)						
Baseline	59.89 ± 11.31		65.69 ± 11.28			
12 weeks	64.45 ± 10.47	0.418	63.70 ± 11.21	−0.177	6.54 (1.40 to 11.69)	0.013*
Environment domain (Scores 0–100)						
Baseline	67.31 ± 10.89		70.78 ± 10.85			
12 weeks	71.61 ± 11.81	0.379	68.13 ± 12.57	−0.226	6.95 (2.02 to 11.87)	0.006*
Suffered from daily pain						
Baseline	42%		37%			
12 weeks	30%	−0.243	52%	0.366	−25% (−46% to −12%)	0.022*
Pain Intensity (Scores 0–10)						
Baseline	4.60 ± 2.76		4.23 ± 2.79			
12 weeks	3.24 ± 3.04	−0.468	4.67 ± 3.29	0.144	−1.79 (−3.01 to −0.52)	0.006*

Research methods series

- Descriptive statistics; Ruth Pickering
- Systematic reviews; Susie Shenkin
- Randomised controlled trials; Miles Witham and David Stott
- Quality assessment tools; Jenni Harrison

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Age and Ageing - summary

- >1000 new submissions / annum
  (+200 resubmissions)
  - Research papers, short reports, systematic reviews, reviews, commentaries, case reports, clinical reminders
- Commissioned articles
  - Editorials, Commentaries, New Horizons
- eletters
- Editor's view
- Output
  - Printed journal (bi-monthly), on-line, web collections

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