

Writing a medical paper

Mihai Ionac

Surgical Clinic 2

Victor Babes University of Medicine and Pharmacy, Timisoara

What is R

In every area our knowledge is incomplete and
problems are waiting to be solved

What is R

We can address the holes in our knowledge and unresolved problems by asking relevant questions and then seeking answers through systematic research

*Nothing in science has
any value to society if it is
not communicated*

Ann Roe

Planning

1. Select a topic

- my interest and passion for the research topic
- is my research question important and interesting?
- do I have resources to answer?

Planning

2. Conduct a literature search: *finding*

- I have to know the work that has already been published
- how do I find it? → ***INTERNET***
- PubMed or Medline (16 million abstracts from 4000 biomedical journals since 1957) → search terms → full text article

Classification of the reading of the literature according to seniority

<i>Medical student</i>	Reads entire article but does not understand what any of it means
<i>Resident</i>	Would like to read entire article, but eats dinner instead
<i>Chief resident</i>	Skips articles entirely and reads classifieds
<i>Senior attending</i>	Reads abstracts and quotes the literature liberally
<i>Chief of service</i>	Reads references to see if he was cited anywhere
<i>Emeritus attending</i>	Reads entire article, but does not understand what any of it means

Planning

3. Conceptualize the problem

- organize your thoughts
- formulate a good approach to solve the problem
- draw general conclusions from specific instances

Planning

4. Methodology

- state the problem
- formulate the hypothesis
- design the study
- collect data
- interpret the data
- draw conclusions

Planning

4. Methodology

- state the problem
 - the idea: observation, conferences, research, discussions with colleagues
 - “What is the main purpose of the study?”

Planning

4. Methodology

- formulate the hypothesis
 - “a tentative explanation that accounts for a set of facts and can be tested by further investigation”

American Heritage Dictionary 1996

Planning

4. Methodology

- formulate the hypothesis
 - null hypothesis: history of cigarette smoking is not associated with lung cancer
 - alternative hypothesis: opposite to null hypothesis, there may be many

Planning

4. Methodology

- design the study
 - strong, complete you should not find yourself in front of problems you cannot answer after the data have been collected
 - take care at the:
 - ~ sample of subjects
 - ~ intervention
 - ~ measurement

Planning

4. Methodology

- study design terminology
 - incidence: no. of new cases of a disease in a defined population over a specific period

ex.: in 1998, the no. of new cases of tuberculosis in residents of Timisoara was X per 100.000

- prevalence: total number of cases of a disease existing in a given population at a specific time

ex.: The no. of cases of tuberculosis on January 1, 1999, was Y per 100.000 residents of Timisoara

Planning

4. Methodology

- study design: classification
 - descriptive

reports the frequency of conditions and the characteristics of the study population

- analytic

examine the relation between variables to detect risk factors and make interferences

Planning

4. Methodology

- study design: classification

- observational

- experience is observed, not manipulated: comparison of newborns in two groups – mothers used/ did not used cocaine during pregnancy*

- quasi-experimental

- a factor/ treatment is changed, but not randomly allocated: comparison of newborns in two cities: city law to test pregnant women with cocaine use – submitted to treatment*

- experimental

- intervention – measurement of the effect on an outcome: comparison of newborn rats from two groups – mothers received/ not received cocaine during pregnancy*

Planning

4. Methodology

- study design: types

- **case-control** (retrospective)

- outcome is determined in the present and subjects are asked to recall if they were exposed in the past (food poisoning at a wedding)*

- **cohort** (prospective/randomized controlled)

- exposure is measured in the present and outcome is recorded in the future (sudden death)*

- **historical prospective**

- exposure is determined from the past records and outcome is determined in the present (predictors of complications by charts analysis)*

- **cross-sectional** (synchronic)

- snapshot of the problem at a specific point in time (body temperature and pressure ulcers in 100 pt at a nursing home)*

Planning

4. Methodology

- can you answer?

- were the events under study (exposure or treatment) changed as part of the study?

experimental / observational

- were the measurements in the study made more than one occasion?

if not – cross-sectional

Planning

5. Minimizing bias

- systematic error introduced into sampling or testing by selecting or encouraging one answer over others

Merriam-Webster's Collegiate Dictionary, 1993

parents of children with cancer may remember more information and describe with greater detail about exposure to potentially carcinogenic factors than parents of children without cancer, even if both groups have identical exposure levels

Planning

6. Data collection form

FIȘA ANGIOLOGICĂ

NUME	DATA NAȘTERE		DATA
ANAMNEZA GENERALĂ			
ANAMNEZA ANGIOLOGICĂ			
Sediu claudicație:	Terapie urmată		
stabilă			
progresivă			
Investigații vasculare	ergometrie pe covor rulant	km/h	%creștere
	distanța parcursă pe jos	m	
	distanța max. parcursă	m	
FACTORI RISC	Hiperlipoproteinemie tip ()	STADIU	
	HDL - colesterol scăzut ()	LOCALIZARE	
	Hiperglicemie ()	Bazin ()	
	Hiperturcemie ()	Coapsă ()	
	Hipertensiune ()	Periferic ()	
	Obezitate ()	Poletajat ()	
	Nicotină ()		
	Alte ()		
CAROTIDE	anamneza ()	PIELE:	
	auscultatie ()	edeme ()	
	Echo-Doppler ()	gangrenă ()	
		eczemă ()	

PREZENȚA PULSULUI

Sfaturi pentru pacienții cu boli arteriale ale membrelor inferioare

NU VĂ FACETI RĂU SINGURI!

- Evitați să fumați: fumatul favorizează apariția de noi zone de obstrucție vasculară!
- Evitați creșterea în greutate!

SUSTINETI RECUPERAREA MEDICALĂ!

- Faceți schimbări de minim o jumătate de oră pe zi, după posibilități!
- Respectați regimul (dieta) prescris pentru dumneavoastră!
- Luati medicamentele care v-au fost prescrise de medicul de familie!
- Efectuați exercițiile fizice prescrise pentru dumneavoastră!

PROTEJAȚI PICIOARELE BOLNAVE DE LEZIUNI!

- Nu umblați desculți!
- Atenție la pedichiură!
- Nu vă tratați singuri bălăturile sau bejecile și informați pedichirul despre boala dumneavoastră!
- Evitați să faceți băi fierbinți și nu adăugați în apă substanțe iritante!
- Merțineți întotdeauna zonele dintre degete curate și uscate: acestea pot fi sediul unor procese infecțioase și fungice!
- Pielea uscată și crăpată a piciorului se va unge cu multă grijă și atenție!
- Evitați să purtați pantofi prea strâmți sau care vă jerează!
- Merțineți picioarele calde, fără a vă ajuta de obiecte precum încălzitorii.
- Orice lucru care irită pielea picioarelor, e periculos!

FOARTE IMPORTANT!

- În cazul apariției unor leziuni sau răni, sau în cazul agravării simptomelor, dureri, crampe sau colorări ale picioarelor, apelați de urgență la medicul de familie.

TERAPIA DE MISCARE ÎN TULBURĂRI DE IRIGAȚIE ARTERIALĂ PERIFERICĂ

Se exclud bolnavii cu infecții, zone deschise și colorații ale picioarelor, precum și cei cu senzații de parestezii nocturne și dureri ale labeli piciorului.

Apa cum ați aflat deja de la medicul dumneavoastră, suferiți de o boală arterială lumen arterial e obstruit, iar piciorul e irigat pe căi colaterale. În repaus irigația e în general suficientă. În caz de efort, de ex. după mers prelungit, irigația devine insuficientă. Feși exteriorizate prin dureri musculare puternice. Aceste dureri repetate care apar la mers, sunt cunoscute sub denumirea de claudicație intermitentă.

Prin exerciții fizice repetate (mers) și antrenament al musculaturii insuficient irigate, pot fi mobilizate rezervele și poate fi crescută performanța de mers, concomitent cu ameliorarea stării generale.

Exemplele de exerciții care urmează, sunt menite să vă stimuleze irigația

Important este ca la nici un exercițiu să nu apară dureri. În caz contrar, pot apare efecte secundare dăunătoare!

Efectul exercițiilor poate fi întârziat prin repetare succesivă. Între exerciții trebuie luată o pauză de 3-5 minute.

CONTROLUL EVOLUȚIEI

	DATA:	DATA:	DATA:	DATA:
ECHO-DOPPLER	dreapta stânga	dreapta stânga	dreapta stânga	dreapta stânga
A. tibialis posterior	mmHg	mmHg	mmHg	mmHg
A. dorsalis pedis	mmHg	mmHg	mmHg	mmHg
A. poplitea	mmHg	mmHg	mmHg	mmHg
Tensiunea de referință				
A. radialis	mmHg	mmHg	mmHg	mmHg
DISTANȚA PARCURSĂ				
LABORATOR				
MEDICAȚIE				

1. Exercițiu: Mers rapid

Un exercițiu simplu e reprezentat de mersul rapid. La apariția primelor semne de oboseală musculară sau a crampei se recomandă a se face o pauză.

Schemă:
mers rapid până la apariția oboseală;
3-5 minute pauză
mers rapid până la apariția oboseală;
3-5 minute pauză
mers rapid până la apariția oboseală;
3-5 minute pauză

Această schemă se execută în mod regulat, de 2-4 ori pe zi.

2. Exercițiu: Ridicări repetate pe vârfuri

Acest exercițiu se recomandă dacă crampele apar cu precădere la nivelul gambelor. Nici la acest exercițiu nu e voie să apară oboseală sau crampe. La primele semne de oboseală se face pauză.

Schemă:
ridicări repetate pe vârfuri: 10-20";
3-5 minute pauză
ridicări repetate pe vârfuri: 10-20";
3-5 minute pauză
ridicări repetate pe vârfuri: 10-20";
3-5 minute pauză

La executarea exercițiului, trunchiul trebuie să fie în premanță drept, nu înclinat. Acest exercițiu se execută regulat, o dată sau de două ori pe zi.
1. poziția de start: ambele picioare sunt paralele și apropiate
2. se ridică călcâiele de pe sol, iar apoi se lasă înapoi pe sol
3. falpa se ridică cât mai mult de pe sol - vezi pozele -

3. Exercițiu: Genoflexiuni repetate

Dacă la mers apar suferințe în mușchii coapsei sau ai feselor se recomandă executarea de genoflexiuni repetate. La primele semne de oboseală sau durere se face pauză.

Schemă:
genoflexiuni: 8-15;
apoi 3-5 minute pauză
genoflexiuni: 8-15;
apoi 3-5 minute pauză
genoflexiuni: 8-15;
apoi 3-5 minute pauză

Genunchii nu se îndoaie prea tare, iar trunchiul se menține în poziție verticală. Se va efectua o dată sau de două ori pe zi.
1. poziția de start: ortostatică cu picioarele paralele și apropiate
2. se ridică călcâiele de pe sol
3. cu călcâiele ridicate se reflectează ușor genunchii - vezi pozele -

4. Exercițiu: tip Ratschow

Acest exercițiu trebuie repetat de mai multe ori, unul după altul
1. poziție de start: culcat pe spate
2. ambele picioare se ridică întinse și se fac rotații cu piciorul până când colorația subunghială devine palidă



3. se trece apoi rapid în poziția țezăndă și se lasă picioarele să atârne în jos până când se înroșește complet - vezi pozele -



Planning

7. Randomization and blinding

- random allocation – reduces the effect of other factors
- double (triple)-blinding – clinicians and pt. (and statistician) are unaware of which group is subject to which intervention

8. Confidentiality

- use “case numbers” instead of names
- protecting patient, hospital and physicians
confidentiality is ethical and required for publication

Prepare to write a publishable paper

1. Organize your material

Cover letter

Copyright transfer page

Title page

Abstract and key words

Text - Introduction

Materials and methods

Results

Discussion, with conclusions

Acknowledgement

References

Tables

Figure legends

Copy of each figure

Writing

1. Title

Give a snappy title:

- interesting, easy to understand, simple, concise
- short
- indicate study design
- begin with a key word

Provide the species of animals used in the study

Writing

2. Abstract

Take time to polish the abstract

- make a good impression with a well written abstract
- most people read only your abstract!
- structure it: background; methods; results; conclusions
- clearly describe the problem in the first sentence, begin with a key word
- indicate study design
- avoid using the same sentences in abstract/body of the paper

Keep it short

Provide the species of animals used in the study

Writing

3. Introduction

Begin with thunder

- write an introductory reader grabber: a provocative question, a new perspective, a good quotation
- explain why your study is necessary

Provide adequate background information

- start with a general, yet concise description of the problem
- reference previous work that supports your ideas
- define all potentially questionable terms

Writing

3. Introduction

Articulate the purpose of your study

- the aim and hypothesis should be easy to find and understand
- provide a map showing the direction of your study

Remember! A good paper has one main problem to solve, not 2 or 3

Writing

4. Methods

Replicability of results is the heart of science

- present clear, but detailed description of research design

Organize the methods

- study design - describe it carefully
- eligibility
- randomisation, blinding
- intervention and compliance
- statistical analysis

Describe your data collection method

- who, what, when, where, how, why

Writing

4. Methods

Eligibility

- describe the
 - source of the study subjects
 - inclusion/exclusion criteria
- provide the beginning / ending dates of the study
- describe the informed consent process

Writing

4. Methods

Intervention and compliance

- describe medical devices, dosage, route of administration,
- include the trade, name, and the manufacturer's name, location in parentheses
- provide evaluation of the tests
 - *diagnostic tests* - determine the presence of disease
 - *screening tests* - detect individuals that need more testing
 - *prognostic tests* - predict the outcome of disease

Writing

4. Methods

Sample size

- description of the sample size calculations is CRUCIAL

Statistical analysis

- describe the statistical analysis carefully
- provide reproducible details of your statistical methods
- explain why did you choose specific tests

Writing

5. Results

Organize the results

- present your results enthusiastically
- remember Archimedes' reaction
- summarize the similar types of numbers in tables, refer the reader to them and shorten the text the Results

Present the results in a natural order

Start your Results section with the major positive findings, report negative associations at the end

Writing

5. Results: Use statistical terms skillfully

- **Significant** = “probably caused by something other than mere chance”
- “*statistically significant*” - probability of the finding to occur by chance is less than 5% ($P < 0.05$).
- **Random** = each element in a set has an equal probability of occurrence (not unplanned, incidental)
- A **sample** = a finite part of a statistical population whose properties are studied to gain information about the whole
- A **random sample** = a chance selection in which all members of the base population presumably have the same chance of being selected

Writing

5. Results: Describe people sensitively and diplomatically

Subject, individual, case

Man, woman, patient (pt), participant

45 males

45 male patients, 45 men

67 females

67 female patients, 67 women

Had surgery

Underwent surgery

Patients with complications

Pt who experience complications

Epileptics

People with epilepsy

Mental disorder

Impaired cognitive function

In 43 pt used as controls

For 43 pt who served as controls

Man and wife

Husband and wife, man and woman

Orientals

Asian people

Writing

5. Results: Tables

Checklist for creating a high quality table

- ✓ Simple and self-explanatory
- ✓ Not a repetition of the text
- ✓ Double spaced
- ✓ Units provided for each variable
- ✓ \pm values are either SD or SE of the mean
- ✓ Exact *P* values included
- ✓ No vertical lines

Writing

5. Results: Figures

1. Use graphs to illustrate only the major points, particularly those that cannot be easily expressed in the text or tables
2. Obtain written permission for any figures or tables that you borrow from published work

Writing

5. Results: Figures

Checklist for creating a high quality figure

- ✓ Thick lines
- ✓ Large text
- ✓ Exact P values included
- ✓ Clear, detailed legend
- ✓ Information that is not included in the text
- ✓ Self explanatory

Writing

5. Discussion

Start the discussion with your most important point

- ✓ You should start with one sentence that clearly shows that your paper contains new information: “We found that ...”
- ✓ Then describe your findings and explain their importance

The Discussion is the place to discuss the implications of your findings - not simply repeat them

- ✓ Do not discuss any data that you did not present in the Results (that your study did not generate)

Writing

5. Discussion

Describe the **NEW INFORMATION** your paper provides

Compare your study with previous studies

- ✓ Discuss how your results compare with landmark papers
- ✓ When your conclusions differ - explain why
- ✓ *Say what you mean, mean what you say, but don't say it mean.*

Writing

5. Discussion

Be skeptical of published work

- ✓ Do not fail to consider the “null” hypothesis
- ✓ Most people - especially younger doctors and students - assume that any published report is true and unconsciously add their name to the author list
- ✓ It is safer to assume that the author was wrong and see if he or she can overcome your skepticism
- ✓ Ex: are conclusions based on recent data?, a large sample size?, are data drawn from a population appropriate for your needs?

Writing

5. Conclusions

Conclude with a “Bolt of lightning”

- ✓ What do you recommend?

Provide conclusions that are fully supported by your data

- ✓ Are the conclusions correctly derived from the data presented?
- ✓ Are the recommendations too general?

Writing

5. Conclusions

Answer the question: “Who cares?”

- ✓ What are the clinical applications of your findings?

Describe precisely what further research is needed

- ✓ If you recommend additional research explain why
- ✓ Ex: a larger sample is needed to permit more statistically significant conclusions - explain why your paper makes a contribution despite this problem

Writing

5. References

- ✓ Use full length articles from peer reviewed journals
- ✓ Abstracts are not allowed
- ✓ Paper submitted but not accepted are not allowed
- ✓ Limit references to key citations (20-40)
- ✓ Place reference citations properly
 - Previous reports have shown an incidence of 50%^{12,24,29}

Writing

5. Referencing systems

1. Citation-Order, Citation-by-Reference, or Vancouver System
2. Author-Date, Name-and-Year, or Harvard System
3. Alphabet Number System

Format references correctly (see abbreviations)

*Worship the spirit of
criticism*

Pasteur

Why God never received a PhD

1. He had only one major publication; 2. It was in Hebrew and Greek; 3. It had no references; 4. It wasn't published in a refereed journal; 5. Some even doubt he wrote it by himself; 6. It may be true that he created the world, but what has he done since then? 7. His co-operative efforts have been quite limited; 8. The scientific community has never been able to reproduce his results; 9. He never applied to the ethics board for permission to use human subjects; 10. When one experiment went awry he tried to cover it by drowning his subjects; 11. When subjects didn't behave as predicted, he deleted them from the sample; 12. He rarely came to class, just told students to read the book.

Thank you!