

Practical examination

Research Methodology in Musculoskeletal Physiotherapy

Part 1

Friday, October 28, 2016
12:00-14:45, G402/G410

Instructions

- Write down your answers in a Word document.
- Put your name and student number on top of the Word document.
- Besides Word, you are allowed to use SPSS, <https://www.statstodo.com/index.php>, <http://vassarstats.net/> or Excel, and once you have completed your exam or when the available time has expired an email program to send your completed exam to the examiner(s). During the exam you are not allowed to use email, Blackboard or websites other than vassarstats.net or statstodo.com. You may use internet when you have finished the exam and have to email the document.
- You are not allowed to use your own or other notes.
- Save your document as: lastname_studnr.doc (don't forget to regularly save preliminary drafts during the exam!!!)
- Once you have completed the exam or when the time has expired, email the document to: m.j.m.hoozemans@vu.nl

REMEMBER TO SAVE YOUR WORK AS YOU GO.

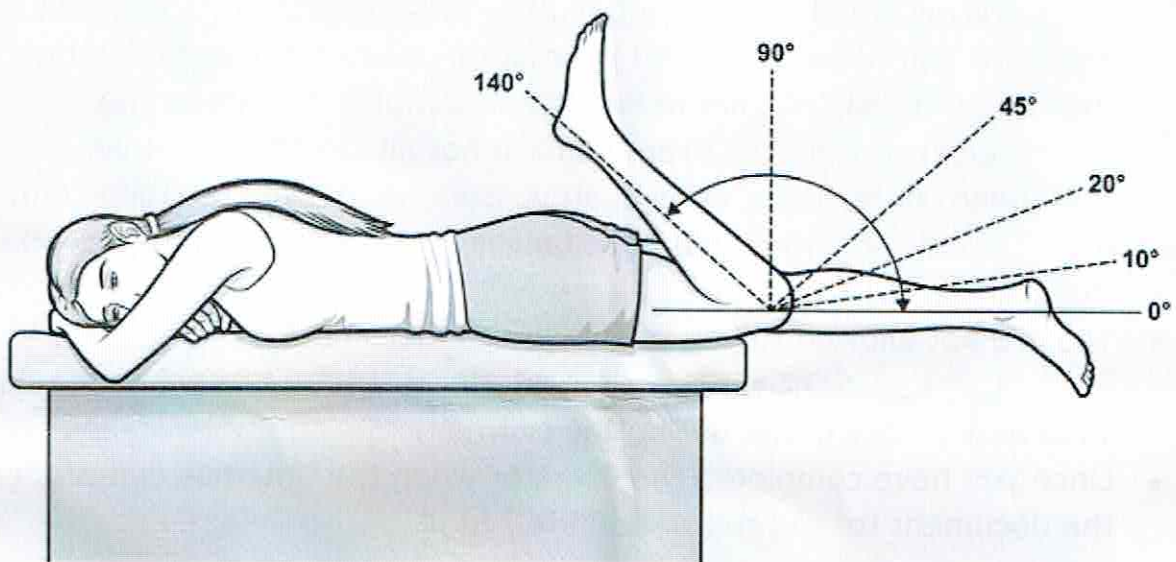
Good Luck!

1.

The ESCAPE study is a multicenter randomized controlled trial (RCT) designed to compare surgical to conservative (physiotherapy) treatment of meniscal injuries in the knees of older patients. The meniscal injuries in the knee might limit the range of knee motion (ROM). Below you can find the data of the ROM of the first fifteen patients that are included in the study:

109, 91, 107, 78, 93, 106, 92, 99, 88, 85, 94, 95, 91, 82, 84

Do you consider these data to be normally distributed? Provide the necessary evidence to substantiate your answer. (5 marks)



2.

The physiotherapist of the ESCAPE study is interested in whether the treatment – surgery or physiotherapy – affects the recovery, which is defined as the ability to perform a 6 minute walking test without experiencing pain in the knees. Below you can find the data.

	Treatment	Recovery	Agegroup	Time
1	Physiotherapy	Recovered	55-65 years	18
2	Physiotherapy	Recovered	>65 years	14
3	Physiotherapy	Recovered	>65 years	20
4	Physiotherapy	Not recovered	55-65 years	40
5	Physiotherapy	Recovered	>65 years	16
6	Physiotherapy	Recovered	>65 years	16
7	Physiotherapy	Recovered	55-65 years	15
8	Physiotherapy	Recovered	>65 years	14
9	Physiotherapy	Recovered	>65 years	17
10	Physiotherapy	Recovered	>65 years	30
11	Physiotherapy	Not recovered	55-65 years	38
12	Physiotherapy	Not recovered	55-65 years	45
13	Physiotherapy	Not recovered	55-65 years	30
14	Physiotherapy	Recovered	55-65 years	40
15	Physiotherapy	Not recovered	55-65 years	48
16	Physiotherapy	Recovered	>65 years	23
17	Physiotherapy	Recovered	>65 years	21
18	Physiotherapy	Not recovered	55-65 years	25
19	Physiotherapy	Not recovered	>65 years	34
20	Physiotherapy	Recovered	>65 years	43
21	Surgery	Recovered	55-65 years	13
22	Surgery	Recovered	55-65 years	25
23	Surgery	Recovered	55-65 years	37
24	Surgery	Recovered	>65 years	14
25	Surgery	Not recovered	>65 years	30
26	Surgery	Not recovered	55-65 years	19
27	Surgery	Not recovered	>65 years	40
28	Surgery	Not recovered	55-65 years	14
29	Surgery	Not recovered	55-65 years	21
30	Surgery	Not recovered	55-65 years	24
31	Surgery	Not recovered	55-65 years	26
32	Surgery	Not recovered	55-65 years	40
33	Surgery	Not recovered	55-65 years	13
34	Surgery	Not recovered	>65 years	29
35	Surgery	Not recovered	>65 years	33
36	Surgery	Not recovered	>65 years	28
37	Surgery	Not recovered	55-65 years	16
38	Surgery	Not recovered	55-65 years	23
39	Surgery	Not recovered	>65 years	50
40	Surgery	Not recovered	55-65 years	33

The physiotherapist registers whether the patients belong to the group that received either knee surgery or physiotherapy (Treatment), whether the patients recovered or not during the study (Recovery), the age group to which the patients belonged, which was either 55-65 years or >65 years (Agegroup), and the time (in weeks) until recovery (Time).

- a) After entering these data in SPSS, first determine and report the incidences of recovery among the two treatment groups. (2 marks)
- b) Determine, using SPSS, and report both the relative risk (RR) and odds ratio (OR), their 95% confidence intervals and whether they are significant, for recovering and describe in words what they mean. (4 marks)
- c) You suspect that age may be a potential confounder. Firstly, determine whether age (Age group) is associated with treatment and with recovery. What would be your conclusion at this stage as to whether age is a confounder? Present the data that substantiates your answer. (5 marks)
- d) Secondly, you eliminate 'confounding by age' using a logistic regression analysis. Report the unadjusted/crude OR of treatment (physiotherapy/surgery) for recovery and its 95% confidence interval after logistic regression and report the OR of treatment (physiotherapy/surgery) for recovery adjusted for age. What would be your conclusion at this stage, i.e., after the logistic regression, as to whether age is a confounder? (6 marks)
- e) Thirdly, does age modify the association between therapy and recovery? Explain your answer using the SPSS output. (3 marks)
- f) The physiotherapist also registered the time to recovery in weeks. Create and show a graph with Kaplan-Meier curves for both treatment modalities. Also include the log-rank test. What is the result of the log-rank test and how do you have to interpret the result? (5 marks)
- g) Analyse the data using Cox regression analysis. Follow the same steps as you just did for the logistic regression: 1) run the analysis without age as a confounder, 2) explore confounding by age and determine whether age is actually a confounder, 3) explore whether there is effect modification by age. Show the relevant output from SPSS and describe the results and conclusion in words. (5 marks)

3.

The physiotherapist wants to know whether recovery was reliably assessed in the study. She and her colleague both independently determined whether 20 patients recovered or not using a standardised protocol. She collects the following data:

Subject	Physiotherapist 1	Physiotherapist 2
1	recovery	recovery
2	recovery	recovery
3	no recovery	no recovery
4	no recovery	no recovery
5	no recovery	recovery
6	recovery	recovery
7	recovery	recovery
8	no recovery	no recovery
9	recovery	no recovery
10	recovery	no recovery
11	no recovery	no recovery
12	recovery	recovery
13	no recovery	recovery
14	no recovery	no recovery
15	recovery	recovery
16	no recovery	no recovery
17	no recovery	no recovery
18	recovery	recovery
19	recovery	recovery
20	no recovery	no recovery

Determine the reliability of the standardised protocol to assess recovery by calculating the parameter for reliability. What would be your conclusion as to the reliability of the protocol, is the reliability sufficiently high and explain why? (6 marks)