UNIVERSITI SAINS MALAYSIA

PEPERIKSAAN TAMBAHAN
PROGRAM SARJANA FARMASI
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FCP 556: BIOSTATISTICS, STUDY DESIGN AND CLINICAL PHARMACOKINETICS

(2 HOURS)

This examination consists of **two sections**

Section A consists of 50 multiple choice questions

Section B consists of **two (2)** long questions

Answer **ALL** questions

Answers to Section A must be entered into the scripts provided

...2/-

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4. Which of the following is common to both experimental and non-experimental research strategy?

..... (a) Experimental hypothesis.

..... (b) Selection of cases to be studied.

..... (c) Field research.

..... (d) Assignment.

5. As sample size increases.....

..... (a) the sample becomes more biased.

..... (b) the ecological validity of the investigation increases.

..... (c) the population becomes more accesible.

..... (d) the sampling error decreases.

6. A representative sample .....

..... (a) consists of at least 500 cases.

..... (b) must be a random sample.

..... (c) is defined as the inverse of the square root of the sample size.

..... (d) reflects precisely the crucial dimensions of a population.

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9. The dependent variable in this study is.....

..... (a) the PT

..... (b) drug XYZ

..... (c) the method of assignment

..... (d) the type of treatment.

10. The independent variable in this study is.....

..... (a) the PT

..... (b) drug XYZ

..... (c) the method of assignment

..... (d) the type of treatment.

11. The main threat to internal validity in this research is.....

..... (a) mortality.

..... (b) history.

..... (c) maturation.

..... (d) regression to the mean.

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16. Which of the following factors can decrease theophylline clearance ?

..... (a) Marijuana

..... (b) Children of aged 1 - 9 years.

..... (c) Phenytoin therapy

..... (d) Cor pulmonale

17. Which of the following conditions is not an indication for theophylline serum level monitoring ?

..... (a) Asthmatic with cardiac decompensation, liver cirrhosis, and respiratory insufficiency.

..... (b) Patients developed tachycardia on IV aminophylline infusion.

..... (c) Chronic asthmatic with variable response despite daily theophylline dose of 25 mg/kg.

..... (d) Chronic bronchitic on beta-agonist, anticholinergics and theophylline developed fine tremors.

18. Which of the following drugs may significantly increase theophylline serum concentrations ?

..... (a) Isoniazid

..... (b) Phenobarbital

..... (c) Oral contraceptive

..... (d) Rifampicin

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22. Which of following may not be contributed to the failure of theophylline therapy ?

..... (a) Possibility of irreversible component of the airways disease.

..... (b) Possibility of theophylline overdoses.

..... (c) Possibility of unresolved concurrent pulmonary infection.

..... (d) Possibility of ethylenediamine hypersensitivity.

23. Which of the following is/are measure(s) of disease occurrence?

..... (a) Incident rate

..... (b) Cummulative incidence

..... (c) Prevalence

..... (d) All of the above

24. Which of the following can be classified under observational study design ?

..... (a) Case reports

..... (b) Case series

..... (c) Incidence studies

..... (d) All of the above

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28. A study that observes a population for a sufficient number of person-years to generate reliable incidence or mortality rates in the population subsets is known as a ...

..... (a) cohort study

..... (b) case-control

..... (c) randomised trial

..... (d) cross-sectional study

29. Which of the following are advantages of a case-control study ?

(i) It is well suited to the study of rare diseases

(ii) It is relatively inexpensive

(iii) It requires relatively few subjects

(iv) It allows study of multiple potential causes of a disease

..... (a) (i) and (iii) only

..... (b) (ii) and (iv) only

..... (c) (i), (ii) and (iii) only

..... (d) (i), (ii), (iii) & (iv)

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..... (a) (i) and (iii) only

..... (b) (ii) and (iv) only

..... (c) (i), (ii) and (iii) only

..... (d) (i), (ii), (iii) & (iv)

32. Which of the following are limitations of a cohort study design ?

(i) It requires large numbers of subjects to study rare diseases

(ii) Relatively expensive to conduct

(iii) Maintaining follow-up is difficult

(iv) Validation of information is difficult or impossible

..... (a) (i) and (iii) only

..... (b) (ii) and (iv) only

..... (c) (i), (ii) and (iii) only

..... (d) (i), (ii), (iii) & (iv)

33. All of the following are observational study design used in epidemiological research except....

..... (a) cohort study

..... (b) case-control

..... (c) randomised trial

..... (d) cross-sectional study

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37. Prevalence of a disease in a population can be estimated from ...

..... (a) a case-control study

..... (b) a cohort study

..... (c) a cross-sectional study

..... (d) a randomised clinical trial

38. Which of the following observational study design is not analytical in their approach ?

..... (a) a cohort study

..... (b) a case-control study

..... (c) a cross-sectional study

..... (d) a population-based mortality studies

39. Which of the following observational study design is descriptive in their approach ?

..... (a) A case report

..... (b) A case series

..... (c) An incidence studies

..... (d) All of the above

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44. A reliable study means that...

..... (a) the results are consistent

..... (b) the results are reproducible

..... (c) both (a) and (b) applies

..... (d) none of the above applies

45. Which anticonvulsant drug requires therapeutic monitoring of phenobarbital serum levels as well as its own ?

..... (a) Phenytoin

..... (b) Primidone

..... (c) Carbamazepine

..... (d) Ethosuximide

46. Auto-induction is a unique characteristic of .....

..... (a) phenytoin

..... (b) primidone

..... (c) carbamazepine

..... (d) ethosuximide

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49. Which of the following is/are true regarding drug metabolism ?

(i) Administration of phenobarbitone to a pregnant mother may result in increased drug metabolism in neonates.

(ii) Antipyrine is not useful as a model to estimate hydroxylation kinetics of drugs.

(iii) Rifampicin is a metabolic inducer.

(iv) Non-linearity is seen with phenytoin kinetics at therapeutic doses.

..... (a) (i) only

..... (b) (i) and (ii) only

..... (c) (i), (ii) and (iii) only

..... (d) (i), (ii), (iii) and (iv).

50. Which of the following is/are considered for the selection of an appropriate statistical test?

(i) The scale of measurement.

(ii) Measurements from independent subjects or repeated in the same subject.

(iii) The number of groups studied.

(iv) Sample size.

..... (a) (i) and (iii) only.

..... (b) (ii) and (iv) only.

..... (c) (i), (ii) dan (iii) only.

..... (d) (iv) only.

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Section B

1. Mr. D.E., is a 76 year old man who has been on aminophylline constant IV infusion at a rate of 25mg/hr for 15 hours. A theophylline concentration determined at this time (15 hours after the start of the infusion) is 16.2 mcg/ml.

Baseline data:

Weight: 45 kg
Medical history: Congestive heart failure for 10 years
Peptic ulcer x 5 years
Social history: Smokes 2 packs per day
Concurrent medications:
Digoxin 0.125mg OD
Cimetidine 800mg q hs
Salbutamol inhaler ii puffs QID
Becotide inhaler ii puffs QID

A. Is the measured theophylline concentration at steady-state ?

Give your reasons and state any assumption(s) you make.

(10 marks)

B. Decide if the administration rate should be changed. Give reasons for your decision.

(15 marks)

...21/-

Appendix

Normal Laboratory Values

1.	Ammonia	80-110 mcg/dl or	47-65 umol/L
2.	Amilase	4-25 IU/ml	
3.	Billirubin		
	- Direct	0-0.2 mg/gl	0-3 umol/L
	- Indirect	0.2-0.8 mg/dl	30-14 umol/L
	- Total	0.2-1 mg/dl	30-17 umol/L
4.	CO_2	20-30 mEq/L	24-30 mMol/L
5.	pCO_2	35-45 mmHg	
6.	CI	100-106 mEq/L	100-106 mMol/L
7.	Cpk	50-170 U/L	
8.	Creatinine (SCr)	0.6-1.5 mg/dl	60-130 umol/L
9.	Random blood sugar	70-110 mg/dl	3-10 umol/L
10.	Iron	50-150 mcg/dl	9.0-26.9 umol/L
11.	Lactic dehydrogenase	70-210 IU/L	
12.	Magnessium	1.5-2.0 mEq/L	0.8-1.3 mMol/L
13.	pO_2	75-100 mmHg	
14.	pH	7.35-7.45	
15.	Acid phosphatase		
	Male	0.13-0.63 IU/ml	36-176 nmol s^{-1}/L
	Female	0.101-0.65 IU/ml	2.8-156 nmol s^{-1}/L
16.	Alkaline phosphatase	39-117 IU/L	
17.	Phosphorous	3.0-4.5 mg/dl	1.0-1.5 mMol/L
18.	Potassium (K+)	3.5-5.0 mEq/L	3.5-5.0 mMol/L
19.	Calcium (Ca^{2+})	8.5-10.5 mg/dl	2.1-2.6 mMol/L
20.	Sodium (Na+)	135-145 mEq/L	135-145 mMol/L
21.	Bicarbonate (HCO_3-)	24-38 mEq/L	24-28 mMol/L

NORMAL HEMODYNAMIC VALUES AND DERIVED INDICES

		Normal Value	Units
BP S/D/M	Blood Pressure Systolic/Diastolic/Mean	120/80/93	mm Hg
CO	Cardiac Output	4-6	Liters/min.
RAP	Right Atrial Pressure (Mean)	2-6	mm Hg
PAP S/D/M	Pulmonary Artery Pressure Systolic/Diastolic/Mean	25/12/16	mm Hg
PCWP	Pulmonary Capillary Wedge Pressure (mean)	5-12	mm Hg
CI	Cardiac Index $CI = \frac{CO}{\text{Body Surface Area}}$	2.5-3.5	Liters/min/m^2
SV	Stroke Volume $SV = \frac{CO}{\text{Heat Rate}}$	60 - 80	ml/beat
SVI	Stroke Volume Index $SVI = \frac{SVI}{\text{Body Surface Area}}$	30 - 50	ml/beat/m^2
PVR	Pulmonary Vascular Resistance $PVR = \frac{MPAP - PCWP}{CO} \times 80$	< 200	dynes.sec.cm^{-5}
TPVR	Total Peripheral Vascular Resistance $TPVR = \frac{MBP - RAP}{CO} \times 80$	900-1400	dynes.sec.cm^{-5}
LVSWI	Left Ventricular Stroke Work Index $LVSWI = (MBP-PCWP)(SVI)(.0136)$	35-80	gm-m/m^2/beat