

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway

Summer Examination 2001

Diploma in Health Services Research

Paper 1

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Answer 1 question from *each* Section
45 minutes for each question

Use one answer book for *each* question

Time Allowed: 3 hours

Section A: Biostatistics

Q1. Samples of female employees in two different environments were tested for stress levels on a scale from 0-150, where 0 means no stress at all. The first group comprised factory shop floor operatives ($n = 50$) the mean stress level was 120 and the sum of squares was 5.51. In the second group, all the women were clerical staff, ($n = 36$), the mean stress level was 124 and the sum of square was 5.18.

- (a) Test the hypothesis that the groups differed significantly in relation to stress.
- (b) Offer an explanation for these findings.
- (c) If you were to repeat the study, what improvements would you suggest?

(S. NicGabhainn/S. Friel)

Q2. Write short notes on four of the following:

- (a) When would you use a median rather than a mean?
- (b) What is the usefulness of Z scores?
- (c) Describe the difference between parametric and non-parametric data analyses.
- (d) What influences the correlation co-efficient r ?
- (e) What are the assumptions underlying Chi square and what can be done if they are violated?

(S. NicGabhainn/S. Friel)

Section B: Advanced Biostatistics

Q3. Discuss any FOUR of the following

- (a) The importance of data cleaning prior to analysis
- (b) The major assumptions of multivariate data analysis
- (c) When you would use multiple regression
- (d) Why you would use factor analysis
- (e) The difference between exploratory and confirmatory data analysis
- (f) The importance of level of measurement for choosing analytic techniques
- (g) How regression differs from correlation

(S. NicGabhainn)

Q4. (a) What do you understand by the term “regression analysis”?

- (b) What is a scattergram? Draw an example of a scattergram representing a:
- Positive (direct) relationship
 - Negative (indirect) relationship

(Q4 is continued on the next page):

(Q4 continued):

(c) Simple regression calculates (among other things) a series of coefficients. Briefly explain the following terms:

- the regression coefficient, b ,
- the correlation coefficient, r ,
- the coefficient of determination, r^2 ,

You are carrying out research into maternal mortality and the availability of trained healthcare staff to attend the birth. You have decided to examine the situation in a number of countries, and your results are shown below.

| Nation | Percentage attended | Maternal Mortality Rate per 100,000 live births |
|---------------|---------------------|---|
| Bangladesh | 5 | 600 |
| Belgium | 100 | 9 |
| Chile | 98 | 47 |
| Ecuador | 27 | 190 |
| Hong Kong | 92 | 5 |
| Hungary | 99 | 26 |
| Iran | 82 | 120 |
| Kenya | 28 | 170 |
| Morocco | 29 | 300 |
| Nepal | 6 | 830 |
| Nigeria | 40 | 800 |
| Norway | 100 | 2 |
| Pakistan | 24 | 500 |
| Philippines | 57 | 93 |
| Portugal | 87 | 12 |
| South Korea | 70 | 26 |
| Spain | 96 | 11 |
| Switzerland | 99 | 5 |
| United States | 99 | 8 |
| Venezuela | 82 | 59 |

Comparison of maternal mortality and percentage attendance at childbirth of qualified healthcare personnel

(d) What are your null and alternative hypotheses?

The SPSS results are summarised below.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------|----------|-------------------|----------------------------|
| 1 | -.815 | .664 | .646 | 161.41610 |

a Predictors: (Constant), PERCENT

(Q4 is continued on the next page):

(Q4 continued):

Coefficients

| | | Unstandardize d Coefficients | | Standardized Coefficients | t | Sig. |
|-------|-------------|---------------------------------|---------------|------------------------------|--------|------|
| Model | | | Std. Error | Beta | | |
| 1 | (Constant) | 607.075 | 78.542 | | 7.729 | .000 |
| | PERCEN T | -6.309 | 1.057 | -.815 | -5.970 | .000 |

a Dependent Variable: MORTALIT

(e) Summarise the SPSS readout *in your own words*. How would you describe the relationship between maternal mortality and the presence at childbirth of a qualified healthcare worker?

(f) How would you interpret both the *r*-value of -0.815 and the r^2 value of 0.664?

(D. McKeown)

Section C: Health Services Organisation and Management

Q5. Discuss the relevance of *THREE* of the following to the management of health service delivery:

- (a) Current knowledge of health status
- (b) Changing relationships between voluntary and statutory sectors
- (c) Nursing education
- (d) Freedom of Information Act
- (e) Historical legacy

Q6. “Challenging the culture of acceptance, deference and inertia is the most challenging aspect of the health strategy” (Dixon and Baker, 1996).

Discuss this statement with reference to the concepts of organisational culture and organisational change in the context of the Irish health services.

(M. Hodgins)

Section D: Computing

Q7. Statistical analysis of data can be a complex process. Discuss appropriate software tools, commenting on the different types of analysis possible and how you would perform them using the computer.

Q8. Describe in detail the differences between Operating Systems and Computer Packages. Give an example of each and discuss how they work and what they do.

(S. Friel)