

What designs and statistical methods are used in Primary Care research?

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Summary of talk

- Review of use of statistics in Primary care and General Practice
- Describe a survey of 3 UK Primary Care Journals
- Discussion

Use of statistics in Primary Care

- Traditionally statisticians in Medical School located in Public Health Departments
- Statistics is distinct from Epidemiology
- Many GPs engaged in research may not have access to professional medical statisticians

Different uses of statistics

Statistics is more than data analysis

Design of studies

Sample size estimation

Quantitative thinking

Data display

Risk communication

Survey of Statistical methods in Primary Care Research

3 statisticians

Each reviewed all papers in one journal for the year 2000

Exclude : editorials, Reviews and Views, correspondence and discussion papers

Used checklists to decide on

design

methods used in analysis

Methods

10 papers were reviewed jointly to discuss scoring and disputes resolved by discussion

Queries were brought to a meeting for joint resolution

Checklist based on earlier surveys

Journals

British Medical Journal (General Practice Section) (n=79)

General medical journal

Family Practice (n=81)

Less academic - aimed at GPs

British Journal of General Practice (n=145)

Journal for Royal College of General Practitioners

Results of Survey: design of studies

<i>Design</i>	<i>BMJ</i> <i>79 papers</i> <i>n (%)</i>	<i>Family Practice</i> <i>81 papers</i> <i>n (%)</i>	<i>BJGP</i> <i>145 papers</i> <i>n (%)</i>	<i>Total</i>
Cross-sectional study	18(22.7)	29(35.8)	57 (39.3)	104
Qualitative	2(2.5)	17(21.0)	16 (11.0)	35
Cohort	7(8.8)	4(4.9)	21(14.5)	32
RCT	12 (15.2)	8(9.9)	7(4.8)	27
Reviews	4 (5.1)	0(0)	8(5.5)	12
Reliability/ diagnosis	3 (3.8)	0 (0)	8(5.5)	11
Cluster RCT	5(6.3)	2(2.5)	1 (0.7)	8
Case control	4(5.1)	3(3.7)	1(0.7)	8
Other	24(30.3)	18(22.2)	26(17.9)	68

Results of Survey:

Statistical Methods: top 6

<i>Methods</i>	<i>BMJ</i> 79 <i>papers</i> <i>n (%)</i>	<i>Family</i> <i>Practice</i> 81 <i>papers</i> <i>n (%)</i>	<i>BJGP</i> 145 <i>papers</i> <i>n (%)</i>	<i>Total</i> <i>n=305</i>
No Statistics or simple summaries	24 (30.4)	33 (40.7)	47 (32.4)	104
Chi-squared tests	13 (16.5)	19 (23.5)	40 (27.6)	72
Logistic regression	14 (17.7)	11(7.5)	19(13.1)	44
Odds ratios/relative risks	8(10.1)	14(17.2)	13 (9.0)	35
t-tests	5 (6.3)	14 (17.2)	22 (15.2)	31
Non-parametric methods	11 (13.9)	4 (4.9)	24(16.6)	29
Regression (simple/multiple)	8 (10.1)	11(13.6)	10(6.9)	29

Results of survey:

Statistical methods:remainder

<i>Methods</i>	<i>BMJ 79 papers n (%)</i>	<i>Family Practice 81 papers n (%)</i>	<i>BJGP 145 papers n (%)</i>	<i>Total n=305</i>
Summaries with confidence intervals	14 (17.7)	6 (7.4)	3 (2.1)	23
Kappa	2 (2.6)	4 (4.9)	9 (6.2)	15
Sensitivity/specificity	4 (5.1)	0 (0)	10 (6.9)	14
Pearson correlation	2 (2.4)	6 (7.4)	6 (4.1)	14
Multiple comparisons	2 (2.6)	4 (4.9)	4 (2.8)	10
ANOVA	5 (6.3)	0 (0)	4 (2.8)	9
Random effects models	4(5.1)	0 (0)	4 (2.8)	8
Likelihood ratio	3(3.8)	0 (0)	3 (2.1)	6
Survival analysis (Kaplan Meier/Cox regression)	6(7.2)	0 (0)	0 (0)	6
Other	6(7.6)	12(14.8)	14(9.7)	32

Other surveys

Methods	NEJM ¹	Chinese Med J ²	Primary Care
	1978/79	1995	2000
No stats	27	40	34
t-tests	44	38	10
X ² tests	27	23	26
Non-parametric	11	2	10
Regression	13	4	10
Logistic	4	0	15
Odds ratios	9	2	12

1 Emerson JD Colditz GA Use of statistical analysis in the New England Journal of Medicine. NEJM, 1983, 709-713.

2 Wang Q, Zhang B. Research Design and Statistical methods in Chinese Medical Journals. JAMA 1998, 283-285.

Conclusions: Design

Most common sort of study in Primary Care journals is a cross-sectional study

(e.g. prevalence study, questionnaire survey)

Cohort design popular

Subjects followed up over time

Substantial number of RCTs, including cluster RCTs

Conclusions: Analysis

Fewer t-tests, than other surveys

Perhaps Primary Care more interested in binary data

More logistic regression than other surveys

- Availability of software?

Wide range of other methods

Conclusions for teaching: Design

Cross-sectional studies

- Emphasise getting a representative sample

- Ensure response rates reported

Cohort studies

- Subjects followed up over time

RCTs

- Primary care = pragmatic trials?

- Cluster randomised trial design more common
in Primary Care

Conclusions for Teaching: Analysis

Concentrate on binary data

Odds ratios/relative risks instead of t-tests

Cover logistic regression as well as multiple regression

Binary data analysis not well covered by many current elementary text books

Conclusion

Knowledge of elementary statistics is required to read and understand the majority of research papers published in Primary Care

Understanding chi-squared tests, odds ratios/relative risks increases coverage of understandable papers by 25%