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Critical Appraisal: Prospective Cohort Studies

Definition: Subjects classified into cohorts depending on exposure to risk factor. Followed over a time period after which cohorts compared.

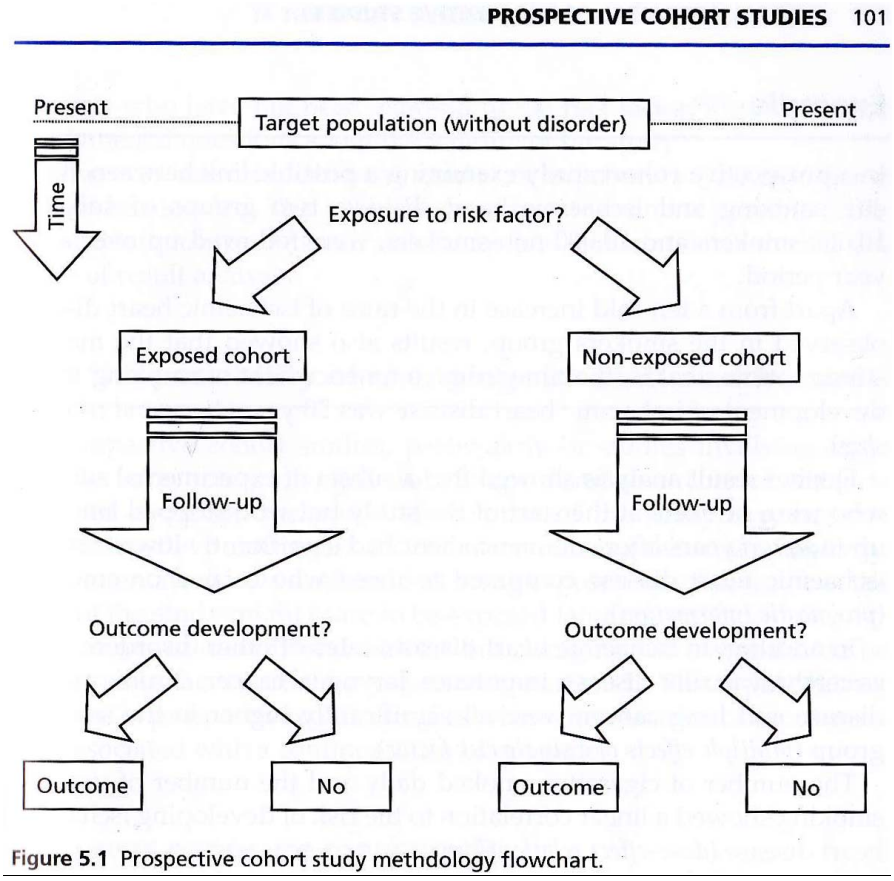

Figure 5.1 Prospective cohort study methdology flowchart.

Applications:

1. Identifies strength of relationship between risk factor and outcome
2. Multiple effects of a single risk factor
3. Dose-effect relationship between risk factor and outcome
4. Data on "temporal relationships"
5. Prognostic information on other factors affecting outcome
6. Accurate disease incidence data, especially with large studies

Advantages:

1. Less recall bias as events noted as they occur
2. Less confusion regarding causality as exposure status known at outset prior to onset of disease in either cohort.

Disadvantages:

1. Expesnsive
2. Time-consuming
3. Require follow-up over prolonged periods

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4. High attrition rate

Appraisal of PRO:

D - Is survey Design methodologically sound?

R - What do Results show?

E - How do the results Effect patient care?

D = Design:

1. Are the exposure criteria described?
   $ Clearly defined and set prior to selection process
   $ Gradation of exposure --> allows dose-effect analysis

2. Was the possibility of changing risk status addressed?
   $ Cessation / Commencement of exposure recorded

3. How was exposure measured?
   $ Clear description of methods + instruments

4. How were experimental subjects selected?
   $ Representative of concerned target population

5. How were control subjects selected?
   $ Sampling frame justified - control should be of a similar demographic to experimental cohort, minus exposure

6. How were outcomes measured?
   $ Clear description of methods + instruments

7. Are the chosen outcome measures justified?
   $ Validated + reflective of clinical outcome
   $ Principal outcome should be stated
   * Multiple outcomes = more Type 1 error (false rejection of null hypothesis)

8. Were relevant prognostic data collected?
   $ Data on other factors with effects on outcome obtained and compared between cohorts

9. Were the compared groups similar?
   $ Similar demographics to balance CFs

10. Was follow-up duration adequate?
    $ Determined based on clinical grounds
    * Too long = wastes resources + high attrition rate
    * Too short = introduces bias

11. Do the numbers add up?

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$ Measures to counteract attrition
$ Drop out rates + description of subjects stated

12. How was sample size determined?
$ Calculations based on prevalence and magnitude of risk
* Rare diseases need larger samples

13. Were the appropriate statistical tests used?
$ Consultation with a statistician

R = Results... **Risk:** Probability of outcome (risk) = Outcome / Total
Value between 0 and 1

Harmful relationships: If RiskE = 0.6 and RiskU = 0.2

Relative Risk (RR): Ratio comparing risk in the exposed (E) to risk in the unexposed (U).
RR = RiskE / RiskU = 0.6 / 0.2 = 3 --> increased risk > 1

RR < 1 = Decreased risk
RR = 1 = No difference in risk
RR > 1 = Increase risk

Absolute Risk Increase (ARI): Difference in risk between E and U groups.
ARI = RiskE - RiskU = 0.6 - 0.2 = 0.4

Relative Risk Increase (RRI): Ratio of risk difference to baseline in unexposed
RRI = ARI / RiskU = 0.4 / 0.2 = 2
Hence exposure increases risk of outcome by 200%

Beneficial relationships: If RiskE = 0.1 and RiskU = 0.5,
RR = RiskE / RiskU = 0.1 / 0.5 = 0.5 --> decreased risk < 1

Absolute Risk Reduction (ARR): Difference in risk between U and E groups.
ARR = RiskU - RiskE = 0.5 - 0.1 = 0.4

Relative Risk Reduction (RRR): RRR = ARR / RiskU = 0.4 / 0.5 = 0.8
Hence exposure reduces risk of outcome by 80%

E = Effect

1. Implications for practice if area examined directly relevant
2. Ensure that the subjects are not essentially different from targets
3. Implications for health education of targets with exposure to risk
4. Limitations of resources