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Critical Appraisal: Retrospective Case-Control Studies

Definition: Subjects with a disease (cases) are compared with healthy (control) subjects with regards to a past exposure to a risk factor (variable).

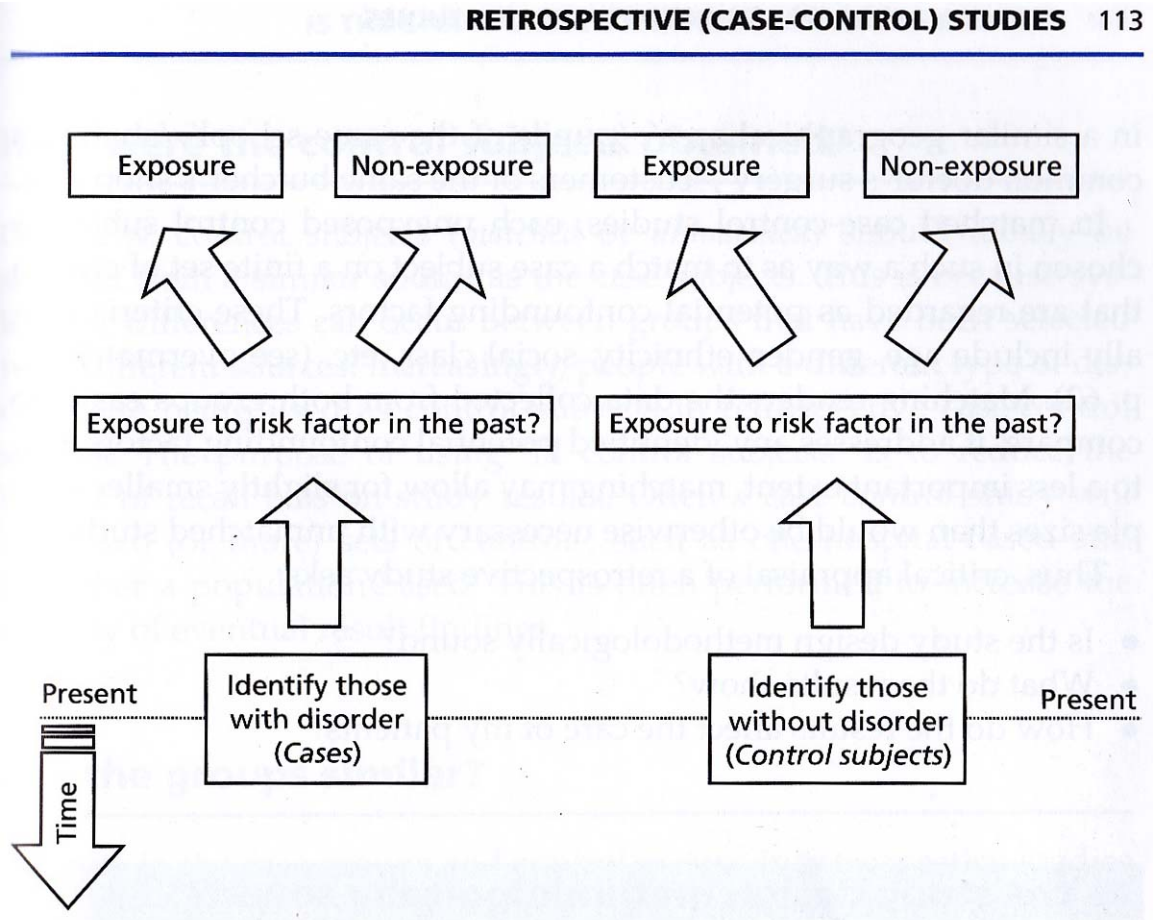

Figure 6.1 Case-control study methodology flowchart.

Advantages:

1. Quick + cheap
2. Good for prolonged diseases
3. Good for latent diseases (long asymptomatic periods)
4. Good for rare diseases
5. Good for multiple hypotheses

Disadvantages:

1. Recall bias ---> major drawback
2. Difficulty ascertaining causality; which came first - exposure to risk or development of outcome?

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Case-Control Studies:

Matched = Each unexposed control subject chosen to match a case subject on finite criteria regarding as CFs.
$ Easier analysis
$ Addresses potential CFs
$ Allows for smaller sample size

Unmatched = No matching procedure; control population selected based on other criteria, i.e. geography

Appraisal of RET:

D - Is survey Design methodologically sound?

R - What do Results show?

E - How do the results Effect patient care?

D = Design:

1. How were the cases selected?
   * Specialized populations = prevalence bias
   $ General pop'n or primary care = more representative

2. How were the control subjects obtained?
   $ Similar source to case subjects
   $ "Ill control subjects" reduce recall bias
   $ 2+ sets of controls (i.e. hospital based/community based) to improve validity

3. Are the groups similar?
   $ Similar sample size + demographics

4. Are there sufficient numbers?
   * Too few = more Type 2 error prone (false acceptance of null hypothesis)
   $ Large enough sample improves validity + robustness of results

5. How was the disorder confirmed in the cases?
   $ Validated methods to confirm disease
   $ Confirmations prior to recruitment
   $ Diagnostic criteria for "caseness" stated

6. Were there equal opportunities?
   $ Control subjects should have had similar opportunities to exposure to proposed risk factor as case subjects

7. Was exposure status in both groups measured similarly?
   $ Assessors should be blind to disease state of subjects to reduce observer bias

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$ Use of objective instruments in measuring past exposure in order to reduce recall bias

Odds: The probability of an event occurring compared with the probability of that event not occurring.

Odds (o) = Prob / (Total - Prob)

hence if of 1000 subjects in case group, 60 had exposure: oE = 60 / 940 = 0.064
and if of 1000 subjects in control group, 2 had exposure: oC = 2 / 998 = 0.002

Odds Ratio: Ratio of the odds of an event occurring in the experimental group (oE) compared with the odds of the same even in the control group (oC).

OR = oE / oC
= 0.064 / 0.002 = 32

Hence: The odds of exposure are 32 times greater in those subjects with the disease.
or... Subjects with the disease are 32 times more likely to have been exposed than subjects without the disease.

OR < 1 suggests exposure reduces outcome
OR = 1 suggests exposure has no effect
OR > 1 suggests exposure increases outcome

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

<u>Retrospective Cohort Studies:</u>

Methodology: Cohorts are followed up from a time point in the past.
Sample of subjects chosen irrespective of disease status.
History of risk factor in the past determined.
Both groups followed up; relevant events recorded.
* Recall bias = major drawback

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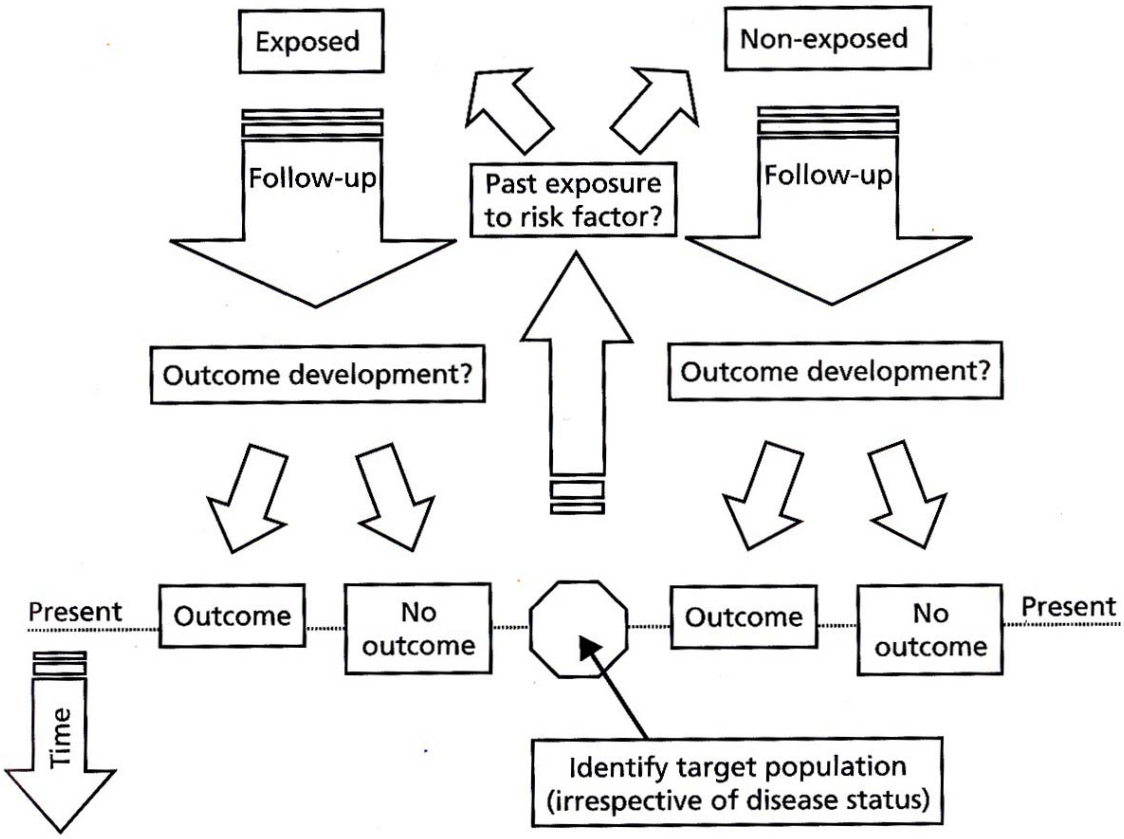

Figure 6.2 Restrospective cohort study methodology flow chart.