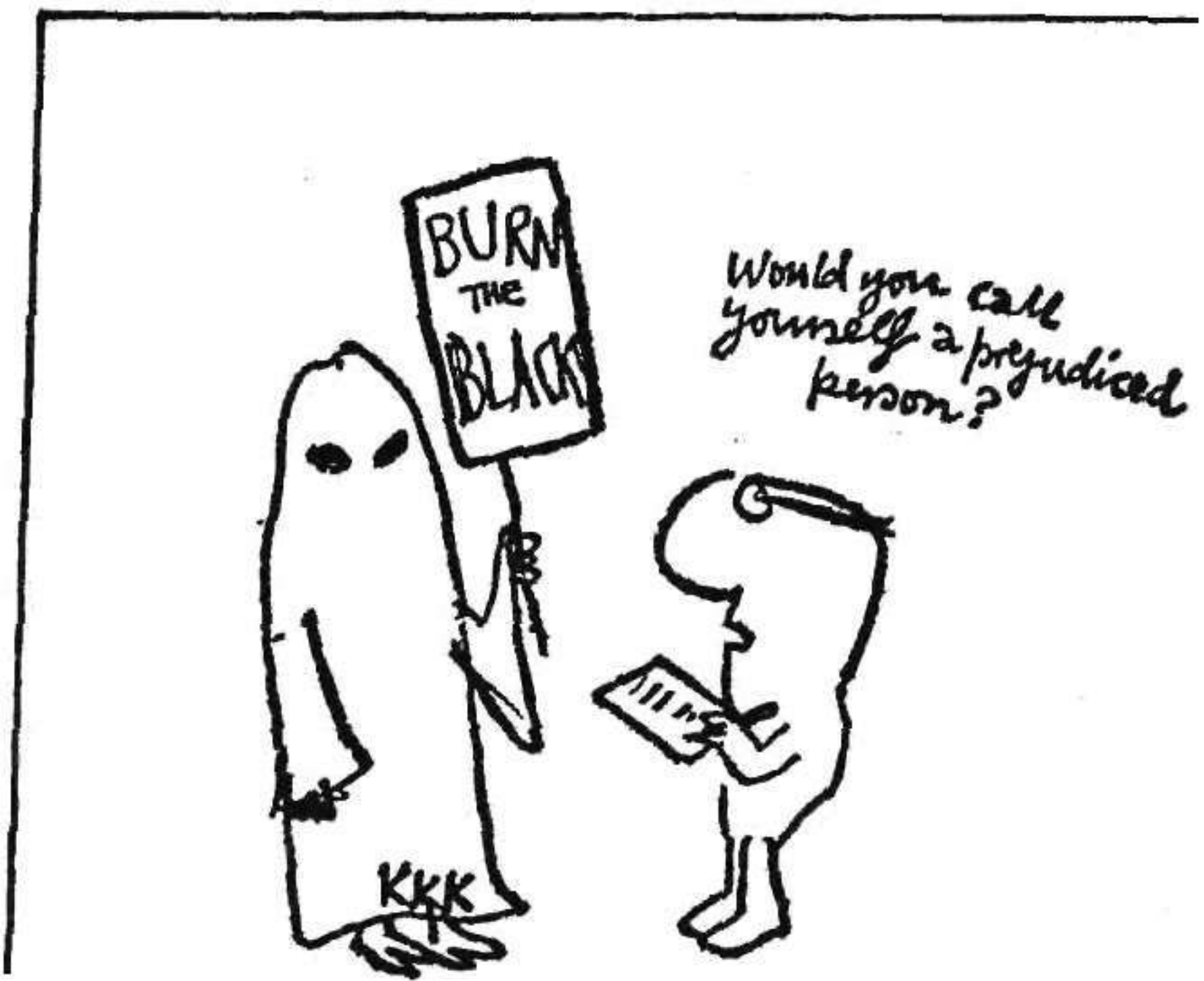


EPIDEMIOLOGY:

HOW TO DO A STUDY

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INTRODUCTION.

In the first article in CRITICAL HEALTH, Number 2, on the use of epidemiology in South Africa, which appeared the following was discussed :-

- (i) The scope of epidemiology;
- (ii) Some issues relating to the decision to do a particular study;
- (iii) Examples of ways in which epidemiology can be used (using mainly South African studies).

This article is intended as an introduction for people who may want to do a study but feel uncertain of how to go about doing it. The techniques described may be used for studies of many things that are not necessarily medical but may be health-related. Examples are studies of housing conditions or of level of literacy in a community.

The first section outlines the stages common to all types of studies. The second section deals with some of the methodological issues to be considered when doing a descriptive study.

Stages of a Study:

Table 1 shows the stages of a study as listed by Abramson. Each stage is dependant on the preceding one.

1. Preliminary Steps:

The first steps in converting an interest in doing a study into a concrete proposal are taken by answering the following questions ?

- (i) What is the purpose of the study ?
- (ii) What aspect of a health problem am I going to investigate ?

Hypertension (high blood pressure) may be a common problem in the area in which one is working.

A number of different kinds of study may usefully be done e.g.

- (i) Studies of the prevalence of hypertension in the area.
- (ii) Studies looking at factors associated with hypertension.
- (iii) Studies looking at interventions aimed at reducing

TABLE 1:

STAGES OF A STUDY.

1. Preliminary Steps.
2. Planning.
3. Preparing for data collection.
4. Collecting the data.
5. Processing and analysing the data.
6. Writing a Report.

hypertension. This type of study may also be useful to decide on what sorts of health care services are needed to deal with the problem.

In addition one may have different reasons for doing any particular kind of study. A prevalence study may be done to help estimate the size of the problem so that appropriate interventions may be planned. Alternatively, the purpose may be to monitor the effect of rapid urbanization on blood pressure. The purpose of the study has implications for the planning of the study such as the choice of population to be studied and the sample size required. Having decided what one is going to investigate, and why, planning of the study can begin.

2. Planning the Study:

The value of a study depends on careful planning. This stage may take longer than any of the other stages or all the other stages combined. Some of the issues to be considered in planning a descriptive study will be discussed in the second part of this article. By the end of this stage one should have a written protocol (outline) which describes what information is needed and how it is to be collected and analysed.

3. Preparing for data collection:

Having finalised a plan for a study one needs to test the methods used and to make various practical arrangements.

Pretesting of methods is always necessary. Sometimes all that is required is to look at a few clinic cards to see whether certain information is routinely collected. At other times a pilot study or "dress rehearsal" needs to be done. The pilot study should be done in exactly the same way as you are planning to do the main study. In this way you can pick up problems with your study (e.g. questions that are not phrased clearly) before you actually start the study itself. At times one is testing to see whether any unforeseen difficulties crop up. Time after time major flaws are detected in apparently well constructed questionnaires. At other times one is looking for particular information. Many studies are inconclusive because samples are too small. A pilot study can help one decide on the size of the sample needed to answer the question one is asking.

Practical arrangements for the main study may need to be made at this stage, including :-

- (i) Finding and training fieldworkers.
- (ii) Arranging venues.
- (iii) Obtaining equipment and printing questionnaires.
- (iv) Obtaining informed consent and co-operation from participants.

4. Collecting the Data:

After the stimulation of planning the study comes the often rather dull period of collecting the data in a systematic manner. At this stage one needs to monitor two aspects of the study.

- (i) A record should be kept of participants and non-participants (i.e. those who do not answer the questionnaire). For example people who do not participate (reply) in a questionnaire on level of literacy may in fact be illiterate. In this way one can act either to obtain improved participation in the study or one can collect information to enable one to assess the sample bias caused by the non-participation.
- (ii) The quality of the data being collected should be checked.

5. Processing and Interpreting the Data:

Processing the data involves firstly, looking at the data for possible errors of recording and indexing. Following this the data are arranged in the format one needs to interpret it. During the planning stage it is useful to construct dummy tables of the data to be collected. At analysis stage one then fills in the data obtained from the survey in these tables. Interpreting the data involves making sense of them and deciding what the practical implications are.

6. Writing a Report:

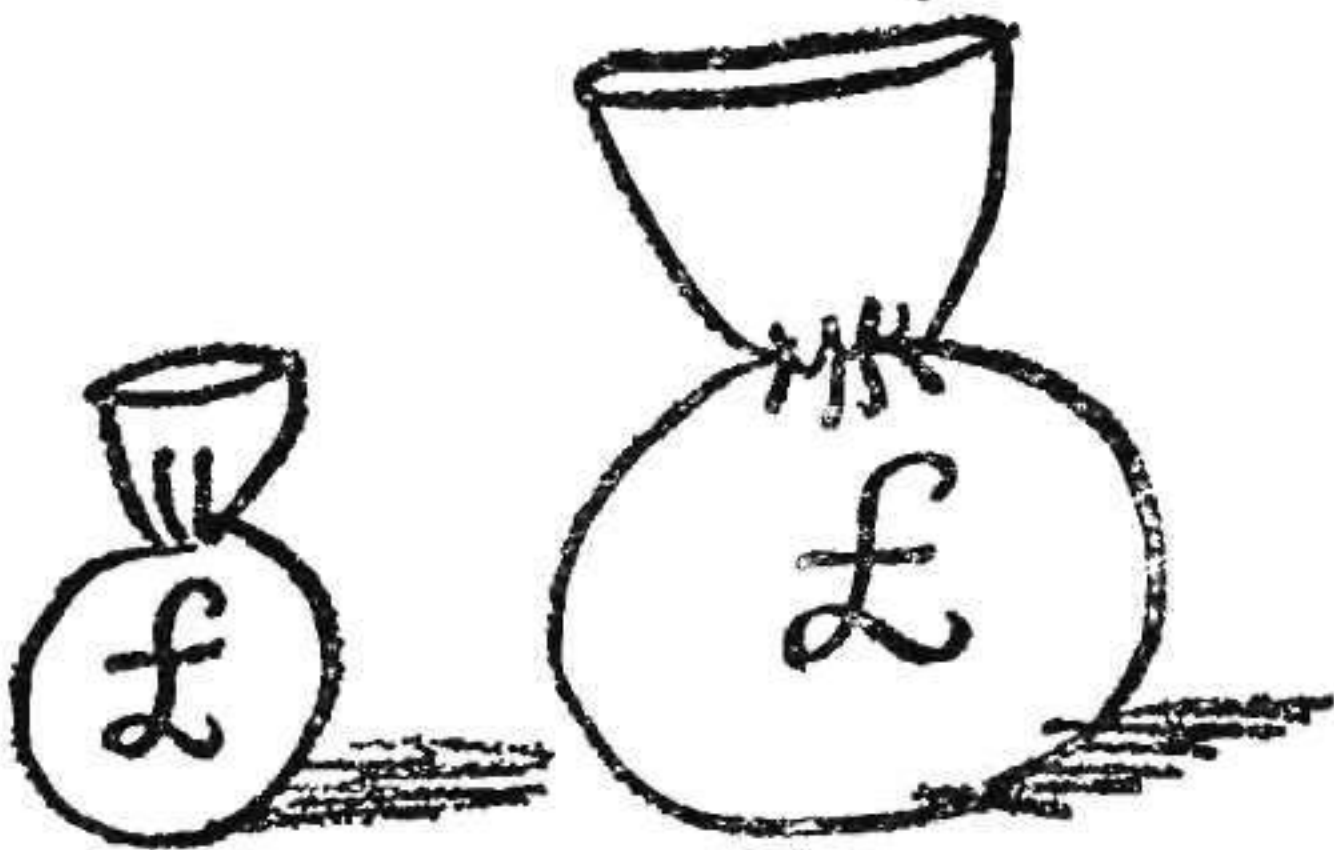
Even if the results are only of interest to the investigator, no study is complete until a report has been written.

PART TWO.

Planning a Descriptive Study:

A descriptive study is designed to find out the size of a health problem. The design of descriptive studies is rela-

it's NOT cheating -
it's dramatizing



tively simple. Nevertheless, studies reported in the medical literature are often seriously flawed.

The first step is to define exactly what one wants the study to yield, i.e. the objective of the study. This can usefully be set out in the form of a question with the following characteristics.

1. It can be answered by a number.
2. Each term in the question is clearly defined.

e.g. What is the prevalence of hypertension in population Y at time X ?

The main issues involved in the design of a study to answer such a question are shown in figure 1.

1. The Study Population:

The choice of study population is often implicit in the purpose of the study. How generalizable one wants the study to be is important in defining a study population. It is inappropriate to use clinic attenders to measure the prevalence of hypertension in the surrounding area. However, this population would be appropriate if one was interested in the hypertension prevalence of clinic attenders. If one wanted to measure the prevalence of hypertension in a particular community, one would have to randomly study members of the community and not only those attending the clinic.

2. Sample Selection:

To measure the blood pressure of every person in a large city is a difficult task. The effort and expense involved in measuring the prevalence of hypertension can be reduced by sampling. However, the disadvantage of sampling is that one can only estimate the size of the health problem. By using certain sampling methods one can make a statement about the prevalence of hypertension in the whole population with measurable confidence and precision. If one measured the blood pressures on the whole population one could say that the prevalence of hypertension in the population was e.g. 20%. However, if a random sample of people from this population had blood pressures taken one would only be able to say e.g. that one is 95% confident that the prevalence of hypertension is between 17% and 23%.

It is important to seek statistical advice about the sample size required for a particular study. At this stage one

FIGURE 1.DESCRIPTIVE STUDY DESIGN.

<u>DESIGN:</u>	<u>ISSUES:</u>
Study Population	Defined ? Generalizable Size
Sample	Random ? Size ?
Measurements	Valid ? Repeatable ? Response Rate ?

may decide to abandon the study because of the large sample needed to obtain an estimate of the required precision. To estimate the prevalence of tuberculosis in a part of Soweto, a study involving 2500 persons was planned. The purpose of this study was to estimate the number of tuberculosis sufferers in the community not known to the T.B. service. However, if positive sputum tests were found at a rate of 7/1000 in the sample one could be 95% confident that the population prevalence rate was between 4/1000 and 11/1000. This estimate was too imprecise to be of help and therefore other methods were developed to find out how adequately the T.B. service was finding tuberculosis sufferers.

3. Measurements:

To be useful, measurements should be valid and repeatable. Validity is the extent to which the measurements reflect what one is trying to measure. With regard to blood pressure the question is :- does an indirect blood pressure reading (sphygmomanometer reading) reflect the intra-arterial pressure ?

Reliability is the extent to which similar information is obtained by repeated measurements. Blood pressure readings on one person may vary either because of variations in the blood pressure, the instrument or the observers. Reliability can be enhanced in this instance by adapting a standard procedure for taking the blood pressure, regular checking of the sphygmomanometers (blood pressure meters) used and training the observers respectively.

4. Response Rate:

As non respondents are often different from respondents it is important that a high response rate is obtained. As a rule a 80% response rate is acceptable. If the response rate is lower than this one should investigate whether the non-respondents are likely to be different to the respondents for the variable being studied.

CONCLUSION:

The intention of this article was to serve as an introduction for people who were uncertain how to go about doing a study. The books by Abramson and Barker are highly recommended for those who would like to learn more about this.

In particular Abramson deals thoroughly with all aspects of study design and illustrates points made with numerous examples and references.

REFERENCES:

1. Abramson, G.H. (1979)
Survey Methods in Community Medicine.
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2. Barker, P.G.P. (1976).
Practical Epidemiology.
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NOTE:

People interested in doing a study on issues of concern to communities and who require further advice on how to do it are welcome to send their queries to Critical Health and the editors will put them into contact with resource people that will be able to assist them.

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