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DATA COLLECTION

by

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1. Preliminary work

In research one does not hurry into the field.

It is necessary to be familiar with the current state of knowledge in the science and in the field to be studied. So far as professional health workers are concerned they should, as part of their normal professional expertise, be cognisant of the current state of knowledge in their own speciality and a minority of them will be skilled in the research methods of a relevant science. It is still as well to check up and a search of the literature and discussion with others known to be working in the field should be regarded as an essential preliminary to any study. It is followed by:

- a) the identification of the specific problem for investigation, question to be answered or hypothesis to be tested;
- b) the selection of the scientific discipline or disciplines which have a contribution to make in the investigation.

It goes without saying that one does not undertake research in a scientific discipline with which one is not familiar. There are many sciences with a contribution to make to the study of nursing problems: biological, sociological, psychological, managerial, mathematical to name but a few. Research teams can be uni-disciplinary, inter-disciplinary or multi-disciplinary. The research programmes can be joint or concurrent or consecutive.

Studies may be descriptive, experimental or field trials. Every science has to describe and classify the phenomena with which it deals. The science of nursing is in an embryonic state. At present most nursing studies are descriptive in nature and properly so. Accurate descriptions and classifications are useful not only as the essential foundation for a science but also to provide more reliable information on which professional judgements can be made. A description cannot provide a prescription. A

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description of what staff are doing does not tell us what they ought to be doing. A description of patients' opinions about their care does not tell us how to increase their satisfaction. A measure of patient anxiety does not tell us the level which is therapeutic. Descriptive studies quantify and help to classify phenomena. Once nursing activities are quantified and classified it may be possible to make a professional judgement identifying a, b and c as nursing duties and x, y and z as non-nursing duties. The study has not shown this but it has facilitated a professional judgement. The description may identify factors which appear to be influencing a situation, e.g. a choice of food at meal times has been shown to be associated with greater satisfaction with hospital feeding than more money spent on food. This may not be a directly causal relationship but the association is worth following up. The data collecting and processing instruments developed for a descriptive study may subsequently be converted for use to provide information regularly for management purposes.

Descriptive studies may lead to experimental work to test hypotheses derived from the descriptive study. An experiment which aims to see what changes occur if an innovation is introduced has problems related to the establishment of causal relationships, control of other variables and introduction of control groups, which themselves may produce ethical problems. There are procedures for dealing with these problems. If, however, one wants to say that one situation is in some sense 'better' than another then the criteria for 'better' must be made explicit. The second situation may be cheaper, quicker, preferred by patients or staff or meet a specification based on professional judgement. Measures which show more effective nursing care in terms of improved patient recovery rates or welfare are still not

available in any form which can be readily used. Thus assessment of the current nursing situation or evaluation of the care given or introduction of change designed to improve a situation present difficult measurement problems. This lack of criteria for assessment of nursing care is one of the major blocks in determining nursing policy in administration, education or practice.

It may be necessary to give innovations field trials as well as to test them in experimental situations. Field trials encounter much the same difficulties as the more limited experiments because of the lack of criteria for assessment.

Direct relationships between nursing care and patient recovery have not so far been demonstrated statistically. Patient satisfaction and staff satisfaction studies have produced insufficiently sensitive or consistent measures for evaluation of quality of care. They could be worth further exploration. Studies which attempt to measure the difference between intention and achievement give some information on specific activities. For example, the difference between what a doctor or sister ordered and what the patients received can be used as a measure of success. The same technique can be used citing any other source of authority. Attempts can be made to achieve a consensus of opinion instead of using the authority of the individual. It is not yet possible to answer questions as to whether a particular form of nurse education or administrative organisation or of nursing practice increases the patient's chance of recovery or speeds it. At present measures such as those mentioned above can be used. Nurses are beginning to examine the effects of nursing practice in relation to specific activities or types of patient.

They will gradually build up fundamental knowledge. Aydelott summarises the characteristics appropriate for criteria for evolution of nursing care as follows: They should be stated in terms of results to be achieved with the patient, not in terms of actions of the nurse. They describe the desirable conditions to be observed if care is as it should be. They provide the best information available to assess the present status of the patient as well as the potential for future welfare. They are the criteria that can be demonstrated to be the most crucial to the welfare of the particular group of patients. They are realistic, but they are rigorous enough to encourage continued study of the nursing process for improved methods.¹

The literature search should have led to a specific and very precise statement of the problem to be studied, to a decision about the scientific approach and the type of project appropriate to advance the current state of knowledge. It now remains to set up the study.

2. Methods of data collection

a) Population and sample

A population may be defined as an entire group of people (or things) belonging to the category to be studied. e.g. all student nurses in hospital y, the inhabitants of a town, readers of 'Nursing Research'; associations in membership with I.C.N., minutes of the meetings of a local health authority.

For small scale studies it may be possible to include everyone in a population. It can however be both expensive and time-consuming to do so with large populations particularly if observation or interview data collecting methods are used. It is then customary to employ sampling techniques.

A sample is a group taken from the total population.

Random sampling ensures that each member or item in the population has a known chance of being chosen.

Simple random samples can be obtained by drawing names from a hat or by allocating a number to each person or item and using a table of random numbers. Each person or item has an equal chance of being drawn.

Systematic random samples. Names can be drawn from a sampling frame, e.g. a list of members of an organisation, a list of hospitals in a country. The necessary sample is then obtained by taking every n th name on the list starting from a random number not greater than the sampling interval. Care must be taken that there is not a relationship between the properties of the population, the ordering system and the sampling system as a systematic error or bias could be introduced into the sample.

Stratified random samples can be used where the distribution of characteristics it is desired to study is uneven. The population is divided into subgroups not necessarily using the same sampling interval in each subgroup, e.g. in hospital there are students, staff nurses, sisters etc. In the stratified sample all Chief Nursing Officers may be taken but only 1:7 of staff nurses.

Two stage or multi-stage random samples. It will be appreciated that to interview or observe a random sample spread over a wide geographical area, e.g. all the women in a country, could be prohibitively expensive in time and money. It is possible to draw a random sample of geographical areas and then to sample the relevant population in the areas drawn in the first sample.

It is best to avoid using samples selected by the researcher or anyone else on a basis other than random sampling, e.g. judgement sampling or quota sampling. It is not safe to generalise from these samples to the

population from which they were drawn and significance tests for the reliability of results cannot be applied whereas with random sampling the conclusion drawn from study of the sample can be applied to the population from which it was drawn and the likelihood the results were due to chance can be statistically calculated.

Sample size. Sample size depends on the degree of accuracy required in the findings, the variations expected in the population to be studied and the size of the total population.

b) Methods of collecting data.

Fundamentally there are four methods of collecting data from observation, interviewing, written material and documents.

Observation. "Observation can fairly be called the classic method of scientific enquiry. The accumulated knowledge of biologists, physicists, astronomers and other natural scientists is built upon centuries of systematic observation, much of it of the phenomena in their natural surroundings rather than in the laboratory." ² In the social sciences observation presents difficulties in the greater risks of influencing subjects and in problems of physically being present to observe phenomena occurring particularly at infrequent intervals. Observation is invaluable in studying small communities, institutions or groups of subjects.

Observation can be participant where the observer joins the group he wishes to study, living and/or working amongst them. He may or may not declare himself. If he does certain things may be concealed from him; if he does not, resentment may be expressed when he reports his findings. Observation may be strictly non-participant with the observer recording his observations without involvement in the group. There are various intermediate possibilities.

If the activities to be observed do not take place in a geographical space which can readily be observed, observations may be made on an activity or time sampling basis or the subject to be studied may be shadowed.

Observation may cause people to alter what they do. Most observers do not use information collected during at least the first 24 hours to give people time to settle down and forget they are being watched.

Probably the greatest hazard against which the observer has to guard is unconscious interpretation of what he sees. Observers can be trained to record exactly what they see, tears running down a child's cheeks not the child crying; a nurse talking with a patient, not a nurse reassuring a patient. Alternatively they may need to interpret. For example it is possible to record no teaching of student nurses because activities undertaken jointly by trained staff and students have been recorded only as service to the patient. It is important that all observers within each project use the same definitions and rules and know whether or not they are to interpret.

Observers are liable to other errors. Familiarity with the subject under observation may lead to failure to note the obvious whilst deviations from normal are recorded thus providing a false picture of the whole. An observer may be influenced by his preconceptions.

Observation may be assisted by video tapes, photographs, microscopes, stethoscopes, monitoring equipment or any of a multitude of aids to the senses.

Interviewing. Research interviewing differs from therapeutic interviewing, selection interviewing, counselling etc. The interviewer in research is seeking information, making no judgements and making every effort to avoid influencing the responses of his subject.

Interviews may be structured with the interviewer adhering completely to the interview schedule, recording answers to precoded questions by ringing the appropriate code on the form. Some questions may be open-ended allowing the respondent to elaborate his reply or express his views. In free interviewing respondents express their views, or describe their activities untrammelled by questions, though it is usual for the researcher to predetermine certain aspects of the matter on which the respondent can be asked to comment. Free interviews are most useful when exploring a completely new field and may be used as a preliminary to drawing up a more structured schedule for subsequent use. A variety of intermediate types of interview between the completely free and the completely structured are used.

Interviewers need to be trained in their approach to people, in the use of their schedules, in the use of 'prompts' and 'probes'. Prompts aid recall and ensure comprehensiveness of an answer. Probes such as "anything else?", "why was that?" are neutrally worded aids to securing complete answers. Some factual information may need to be checked; "so that makes five of you in the house, yourself, your husband, the two children and your lodger?". With factual matters the interviewer may be allowed to repeat or explain or ask for clarification. It is probably safer to allow no deviation from the printed word with opinion questions. With knowledge questions there is always a danger of 'educating' the respondent.

Cards can be shown to the respondent and he can be asked to ring the appropriate answer from the list on the card. Tape recorders may be used to facilitate recording of free or semi-structured interviews.

"The choice between formal and informal methods depends on the character of the survey problem and the use to be made of the results. The formal approach

achieves greater uniformity and this is a weighty factor when comparability between interviews is important and when the interest is in the characteristics of the aggregate more than in those of the individual.....Its use becomes questionable when complex phenomena are under study." ³ Informal techniques require more skill and greater awareness of the dangers of introducing personal bias.

Written responses. Written responses may be elicited in a wide range of forms. First there is the questionnaire which can be completed by subjects on the spot or mailed to them. As in interviews the questions may be structured and precoded or open-ended. Alternatively respondents may be asked to write essays or keep diaries. They may be asked to complete the equivalent of an observation schedule but recording their own activities at stated intervals. The returns asked for may be in numerical form, e.g. household budgets or clinic attendances. A whole range of tests used by psychologists come into this category: intelligence tests, attitude surveys, thematic apperception tests for example.

Great care is required in drawing up any questionnaire or self-recording document to ensure that it is readily comprehensible, unambiguous and easy to complete. The response rate from mailed documents is normally lower than from interview or observation based studies. This despite pre-paid and addressed envelopes for reply, reminders and careful explanations. Interviewer bias is eliminated. It remains an open question whether people are more likely to act as they say they will or as they record in writing. Where information may not be readily recalled, the opportunity to check before answering is an advantage and the same applies when considered views are wanted. Postal surveys are unsuitable where spontaneous responses are needed. Some people may answer embarrassing or

personal questions more readily when they are not seeing the enquirer face to face.

Whether observation, or interview or written responses are chosen for a study a pilot run is essential to test the data collecting instrument, to note response rate and check timing. In all three forms of study respondents' right to decline to take part must be respected. Respondents are entitled to know what organisation is responsible for the survey and to have a written note of the purpose of the study. At no time does the researcher promise benefit to the respondent but a feedback of findings can be promised and should be ensured.

Documentary Research. This may be a research method in its own right or its use may be supplementary to other methods. Material such as census material, central or regional reports of medical officers of health, previously published studies form a useful background to data collected for a specific project. They provide checks on the generality of findings and help to judge the significance of survey results.

More important much information can be gathered from existing documents which, appropriately handled, can provide insight into trends and even causes of events. Typically historical research is of this nature. Primary data is obtained from contemporary documents, letters, articles in journals, evidence to commissions of enquiry, minutes of meetings, account books, treatment records. These show the situation as it appeared contemporaneously. Secondary data is not so valuable being obtained from writings and recordings of a date subsequent to the events.

3. Preparing data for use.

For completeness a reminder of the steps necessary to make raw data yield information is appended.

Raw data before it can be used has to be organised.

Editing for completeness, accuracy and uniformity, (e.g. of interviewer's interpretation of questions) should be in progress whilst the data is being collected.

When data collection is completed any information which was not precoded must be coded. Unstructured information presents problems. It is customary to draw a 10% random sample of the completed responses, classify the answers and develop codes and instruction sheets for coders. In preparing codes either for precoding or coding subsequent to data collection it is wise to use standard codes if they exist, e.g. the W.H.O. classification of diseases.

Coding completed, processing the data can start. For small-scale surveys hand counting is practicable. Pin or Cope-Chat cards are a useful aid. The information is punched on numbered spaces round the edges of the card; a knitting needle inserted into the stock of cards will allow the punched cards to fall out for counting. Usually, however, the coded information is punched onto cards on tape for machine or computer counting.

The data is made to yield information by producing frequency distributions, by calculating measures of central tendency and of spread. Cross tabulations and the calculation of correlation co-efficients indicate relationships between variables. Tests of significance indicate the likelihood that correlations are due to chance.

Reports on research projects are presented in narrative form illustrated by tables, charts, graphs, photographs, illustrative quotations. The findings arising directly out of the data collected are subjected to scrutiny in the light of the theories of the science used and in the light of the results of previous studies in the same field. The researcher will try by these means to understand and interpret his findings and build them into the general body of knowledge. It is at this stage that the health service practitioners will be in a position to assess the applicability of the results to the health service.

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