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Research in human reproduction: Strengthening of resources in developing countries

Report of a WHO Study Group

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IN DEVELOPING COUNTRIES FOR RESEARCH
IN HUMAN REPRODUCTION

Geneva, 24-28 July 1978

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RESEARCH IN HUMAN REPRODUCTION: STRENGTHENING OF RESOURCES IN DEVELOPING COUNTRIES

Report of a WHO Study Group

A WHO Study Group on the Strengthening of Resources in Developing Countries for Research in Human Reproduction met in Geneva from 24 to 28 July 1978. The meeting was opened by Dr A. Kessler, Director, Special Programme of Research, Development and Research Training in Human Reproduction, on behalf of the Director-General.

1. INTRODUCTION

In the context of general development in the less industrialized countries, the benefits of research on health problems are gaining increasing recognition. This has led to growing emphasis on self-reliance so that these countries may carry out such research, adapt technology, interpret advances made elsewhere, and enable their scientists to make a full contribution to the solution, not only of local, but also of global problems.

In the field of human reproduction and family planning, the large number of problems requiring research, their urgency and their complexity have stimulated the development of resources for research and have generated many professions of faith on the need to do more. However, little concrete guidance is available, in this field as in others, on how to strengthen research resources in developing countries.

For this reason, the present Study Group was convened to analyse actual experience in a variety of developing country settings and to determine whether it is possible to derive general principles, or more limited ones that might apply only in certain settings. For a number of years, the WHO Special Programme of Research, Development and Research Training in Human Repro-

duction has collaborated with governments and institutions in strengthening the resources of developing countries for research.

The members of the Study Group were directors of institutions or departments engaged in research in human reproduction from the following countries: Argentina, Egypt, India, Mexico, Pakistan, Republic of Korea, Singapore, Thailand, and United Republic of Cameroon. The Study Group adopted a case-history approach. The members presented in turn a detailed historical analysis of the development of their institutions, bringing out the approaches that had been most successful and the obstacles encountered. Each case history was discussed step by step by the Study Group to determine why certain decisions had been taken and what general principles, if any, could be derived from the experience gained. The discussion was candid, critical and informal; only the general principles that emerged are summarized in this report.

The institutions discussed differ greatly in their origins, objectives, stage of development, size and settings. For example, they include departments of obstetrics and gynaecology, multidepartmental groups in large universities, a department of reproductive biology in a national research institute, an institute of reproductive physiology in a private university, a research department in a social security hospital, and the research institute of a national family planning programme. Their degree of involvement in teaching and clinical care varies considerably. The scope of their research programmes is in some cases broad, including many aspects of laboratory, clinical, epidemiological, sociological and operational research; in other cases, the emphasis is mainly on one of these approaches. The oldest research group was started 17 years ago, most others about 10 years ago, and one has only just begun work.

Nearly all the members of the Study Group had been involved in the development of their institution from its very beginning. Over half of the institutions had been active in strengthening the resources for research in reproduction in other institutions in their own countries or other developing countries; this gave another dimension to the discussions.

It became clear early in the meeting that there can be no single blueprint for setting up a successful research group. Different solutions have to be found to meet extremely varied situations. It is hoped that the points summarized below will be of some help to

other scientists trying to build up their own facilities, to those responsible for research administration and support at the national level, and to other organizations and agencies that promote and support research.

2. RESEARCH GROUPS: ORIGINS AND SETTING

Successful research groups have sprung from very different soils: some from clinical and teaching departments, others from research institutes, yet others from family planning administrations. A strong constitutional directive to promote research, which is a feature of certain national universities, would certainly seem to facilitate the early stages. Linking research to clinical care and to undergraduate and graduate teaching is often quoted as benefiting all three types of activities; this has resulted in a high frequency of research groups in university departments of obstetrics and gynaecology. However, the conflicting claims of providing care and teaching may seriously hinder the initiation and progress of research. This can be overcome by adequate staffing or by appointing at least some full-time research staff.

If the aim is to develop a research capability that will ultimately be able to deal with laboratory, clinical, social and operational research in human reproduction and family planning, implanting it in a university setting where it will have access to basic science departments, clinical departments and the skills of community medicine and public health is clearly desirable.

However, in some developing countries the universities are not yet sufficiently stable institutionally. This has led to the establishment of research groups in other settings such as research institutes or hospitals. National administrations may be reluctant to commit themselves to supporting research groups in universities, considering them to be too academic in outlook, or insufficiently interested in family planning, or too slow to respond to the rapidly changing problems that may confront programmes and that require research.

There is no doubt that the government's attitude to family planning will have a great influence on the initiation and growth of the research programme. Most successful research groups are located in countries where family planning is a national priority.

However, this is not an essential prerequisite; in some cases, in fact, the findings of a research group may have influenced the formulation of more positive family planning policies. In some countries, the research may have grown out of an interest in problems of sterility or in the more academic aspects of reproduction.

Lack of funds for research is a perennial problem in developing countries. All the institutions with active research programmes reviewed by the Study Group had received substantial financial support from international or other agencies. The same need still appears to prevail. Indeed, stable "core" support for a number of years is considered to be a prerequisite for the launching of research groups and will probably have to continue to come largely from other than national sources. This recourse to external funding, which will be returned to in Section 8 below, makes it essential for the scientists concerned to discuss the objectives of the programme with their national authorities and to establish procedures for keeping them informed of results, if the authorities have not themselves been the prime movers in soliciting the needed funds.

Another obstacle encountered initially by some research groups, particularly those located in clinical departments, is the suspicion with which research has sometimes been regarded. Any suggestion that the research worker is superior to the clinician should be avoided and due recognition given, in publications and in other ways, to the service personnel contributing to the management of patients in clinical studies. Research equipment, for instance for radioimmunoassays of reproductive hormones, can be used to assist in patient care and thus help to make the research team acceptable.

3. PROGRAMME CONTENT AND REVIEW

There has been much debate by scientists and administrators in developing countries as to the appropriate balance between basic and applied research. The Study Group was unanimous in advocating a mixture of both types of research. Indeed, its historical analysis showed that the groups that had started with non-applied, purely biological research in reproduction had extended and still

were broadening their programmes at least into clinical work, and those that had begun with community-oriented research had found it necessary to develop clinical and laboratory competence.

Clinical research in developing countries appears to pose particular problems, owing to a lack of tradition and shortcomings in scientific stringency. This is an area to which particular attention should be given: interaction with the basic sciences, which have a longer tradition of scientific methodology, appears to be one way of improving the standard of clinical research.

One of the greatest obstacles to research development in the least industrialized countries has, in fact, been lack of understanding of research methodology in many potential research workers. If, as has so often happened, training is initially given in one specific aspect of reproduction research, they fail to acquire the principles of research methodology or the broader background of the reproductive sciences. This issue is taken up in Section 5 below.

The generation of ideas for research, the drawing up of study protocols and the interpretation of results are fundamental to the content of any research programme and to the productivity of a research group. How to reinforce these aspects is probably the most difficult part of institution-strengthening. Several factors have been found to be significant, either singly or together. The presence of an active scientific leader with knowledge and vision, either local or brought in from abroad for several years, was shown in the case histories to have been the significant factor in a number of groups. Joining in collaborative research with other institutions often provided, besides the stimulation of ideas, assistance with study protocols, laboratory determinations, procedures for quality control, and data processing—all vital ingredients in the conduct and quality of a programme.

The case histories showed the growing awareness of the value of stringent technical and ethical review of projects. The setting up of appropriate mechanisms is as important a part of institution-strengthening as elaboration of the content of the programme. A number of research groups had found it valuable and stimulating to arrange periodic reviews of current and planned work by groups of scientists from other institutions.

Difficulties had been encountered by several of the groups in establishing structures for ethical review. In some instances, a group external to the institution carried out ethical review to avoid

the deadlocks caused by interdepartmental jealousies. Much greater emphasis on the ethical implications of research involving human subjects, at the undergraduate level as well as in any research training programme, would, it is hoped, foster a far better understanding of the question.

4. STAFFING

The importance of the quality of the leadership has already been mentioned. Its stability, through a tenured position, is equally vital, but provision for ensuring succession is also essential.

The quality of other members of the research group is of similar importance and may pose an acute problem in developing countries where there is a shortage of trained manpower. This is exacerbated in clinical research in reproduction, where salaries cannot match the income from private practice. Other incentives have been found: for example, making university promotion more dependent on research achievement; providing sabbatical leave; and facilitating attendance at international meetings. Some supplementation of salaries for research workers has been found to be acceptable to scientists and administrators in certain countries.

It is usually not possible to establish tenured positions when work is financed with short-term ("soft") funds. Since much research in reproduction in developing countries is dependent on such funds, this creates problems in obtaining staff. Long-term commitment of programme-related rather than short-term project funding is a way of overcoming this difficulty until the positions gradually become established. However, there is a benefit in this short-term recruitment on "soft" money: it provides a probationary period during which the research worker's performance can be assessed before a final undertaking is given for more permanent recruitment.

The lack of a career structure for technicians within research groups in developing countries is another major impediment to the strengthening of resources for research. Better prospects are offered to technicians in industry, to which they move when their training is completed. This wasteful brain-drain could be avoided by offering them opportunities to achieve professional status within a research group.

An analogous problem of "caste" is that arising between non-clinicians and clinicians. The multidisciplinary nature of reproduction research requires their close interaction, yet there are several sources of conflict. One is the salary differential that exists in most institutions between the clinician and non-clinician of identical hierarchical status, which has arisen through compensating clinicians for loss of private practice. Another is the frequent initial non-acceptance of the basic or social scientist working in a clinical department. This appears to be overcome with time and strong support from the group's leader.

In the Study Group's view, it is not possible to specify staffing patterns or staffing ratios. It is important, however, to avoid the dependence of a line of research on one individual, whose departure will then cause that part of the programme to collapse. A team approach is advocated which not only ensures intellectual interaction but also allows staff to be sent out for training when needed. This has the corollary of limiting the number of lines of research that can validly be conducted.

In a few groups in developing countries, an attempt is being made to build up fairly large multidisciplinary groups for research and research training in human reproduction. The purpose is to achieve a "critical mass" in which interaction between the scientists and access to large facilities may lead to a greater output than could be achieved were each of these scientists to work in isolation.

5. TRAINING

Training is clearly a keystone in the strengthening of resources for research in developing countries. Its timing and integration into a plan for research development are crucial. Training has frequently been wasted when trainees have returned to their home institutions to find that no facilities or possibilities for research await them, or that their training is irrelevant to their institution's research priorities. It is evident that the phasing of training, selection of trainees, choice of training institution and subject area are vital considerations.

The case-studies showed that, of the groups starting 10 or 15 years ago, many were led by basic or clinical scientists who had

spent four or five years in research training abroad. It is well known, however, that such training abroad has often resulted in considerable brain-drain. This can be avoided in several ways. One is to bring consultants, for long or short periods, to the institution in the developing country. Training is then provided in the setting in which the researcher will be working, in terms of both priority subjects and the everyday problems encountered in research work. This has the added merit of providing training for several people at the same time, both scientists and technicians.

Another solution that has been tried is the establishment of Ph.D. programmes that allow candidates to obtain their training in both developed and developing country settings. Establishing links between institutions in developed and developing countries to exchange staff for research, consultant assistance and training is also often advocated. Such coupling may allow the institution in the developed country, from better knowledge of its sister institution, to provide more appropriate training. There is, however, little experience with such arrangements for research training in human reproduction. This approach seems well worth trying if institutions can be identified in developed countries that are willing, and have the resources, to make the considerable commitment required.

Yet another solution to the brain-drain problem can be provided by the increasing availability of local and regional facilities. Their use for training, and other forms of institution-strengthening, has a number of advantages. The training will take place in a research programme which is likely to be concerned with problems similar to those studied in the trainee's institution. The working conditions and access to equipment will more closely approximate those he encounters in his own institution. Lastly, the geographical proximity of the training institution should facilitate continued contact after training. These are similar arguments to those brought forward, in other areas of development, for technical cooperation between developing countries.

In fact, however, scientists from developing countries are often reluctant to make use of regional training facilities. They would rather go to the more prestigious institutions in developed countries. In some parts of the world, language problems are more easily overcome by going to a developed country than to a neighbouring country using a different language. The Study Group recognized that, with a few exceptions, regional facilities in deve-

veloping countries cannot hope, for many years, to meet the demand for research training if it were to be entirely directed to them. Support is required to enable them further to develop their training capabilities.

The Study Group felt that it could offer no "profile" of the ideal candidate for research training, apart from a commitment to research. One of the institutions it studied was providing some support for research to medical students and then selecting those who appeared to offer most promise as research workers. Another institution, which focused on the training of research leaders, demanded of its trainees at least three years' post-doctoral experience in clinical or research work.

The Study Group was similarly unable to give general guidelines on the length of research training. Different members assessed differently the value of short- or long-term training at varying stages of the development of their institution's programme. Most felt that for initial training a period of about two years is required. This allows the trainees to be exposed to research methodology, a general background of reproductive biology, and the basics of conduct of research, including instrumentation and data analysis.

The selection of the institution to which trainees are sent was considered a most important matter. In many developing countries, this is a neglected aspect. Information on training institutions is not easily available and there is insufficient communication between the training institution and that of the trainee as to the exact objectives of the training. An inventory of research training institutions and programmes would be helpful.

6. CONSULTANTS

The possible contribution of consultants to the strengthening of research resources has already been referred to. On the whole, it appears that the lessons learnt about consultants are similar in reproduction research to those in other fields: for example, consultants are of more value when they are prepared to return at intervals; moreover, they must combine wisdom and sensitivity with technical competence and skills.

Countries which have suffered a considerable brain-drain in the past have, in some instances, been able to turn this to some profit by using their former nationals, established scientists in developed countries, as consultants. Their knowledge of local conditions is an obvious asset.

Reproduction research may differ from many other fields in that the global manpower pool is still very small. As the number of groups asking for the assistance of consultants increases, it is becoming more difficult to meet requests. In some disciplines, such as health services research, epidemiology, and pharmacology, suitable consultants are extremely scarce.

7. FACILITIES

Some problems may not be specific to developing countries but should be mentioned as they are encountered there. A number of research groups have had difficulty in convincing administrators to allot adequate space for laboratories, offices, stores, conference rooms, etc. Very few external agencies can help with this problem as most are prevented from doing so by their own terms of reference. The concept of the "research bed" in clinical institutions—required, for instance, for metabolic studies of fertility-regulating agents—still has to gain acceptance in many developing countries.

A set of problems more specific to developing countries arises with respect to equipment and its maintenance, and to supplies. The equipment and supplies required are usually only manufactured in a small number of developed countries. This adds the problem of shortage of hard currency to the more general one of lack of funds. The availability of external funds to buy equipment and supplies has been of vital importance in equipping and keeping going research groups in most developing countries. The practice, however, of certain national agencies of restricting the purchase of laboratory or data-processing equipment, vehicles and supplies to firms in their own countries has sometimes limited the value of this assistance.

Equipping a research group is not a one-time affair. Not only are spare parts needed, but major pieces of equipment become obsolete after 5–10 years of use and must be replaced. Budgetary provision must be made for this.

A chronic problem in most developing countries is maintenance of equipment. A survey of biomedical research equipment in one country showed that 60% of the equipment was dysfunctional, frequently owing to very minor faults. Possible approaches to providing adequate maintenance include the following: ascertaining, before purchasing major equipment, that the manufacturer will guarantee maintenance; taking out special maintenance contracts; insisting on a three-year rather than the usual one-year guarantee; purchasing equipment for many departments from the same manufacturer; ensuring that maintenance manuals, circuit diagrams and spare parts are obtained with the instruments; and establishing maintenance facilities at a departmental, institutional, multi-institutional or even regional level.

Considerable difficulty is experienced everywhere with customs clearance. Authorities in developing countries, by giving more support in overcoming bureaucracy, could have a major impact on research by reducing the time required and the frustration of their own scientists.

The Study Group discussed the value of centralized laboratory, animal experimentation and data-processing facilities. Centralization has obvious economic advantages. However, it can lead to delays in urgent work and to favouritism. It also removes the scientist from part of his own work. To work well, centralization requires highly professional organization and supervision, impartiality and, where centralized facilities are used directly by all concerned, self-discipline on the part of scientists.

Adequate access to literature is another problem of developing countries. Space, skilled personnel, access to past and current literature, and airmail subscriptions to at least a core group of journals are essential.

A wealth of valuable material is being lost through the practice of destroying clinical records after a short interval. Provision for adequate storage, data processing and retrieval might, in some instances, help to identify problems requiring research and, in others, provide answers and obviate the need for *de novo* studies.

8. FUNDING

The Study Group was unanimous in identifying insecurity regarding continuity of funding as a major problem, since each

institution represented had to rely heavily on external sources of finance. Most agencies find it difficult, or have been unwilling, to make long-term commitments for support. One of the institutions is partly funded from the interest from an endowment fund jointly established by the government and a private foundation. Such funding clearly has the merit of stability, as long as there is no major inflation. The value of programme or "core" funding, at least during the first several years of a research group, as distinct from funding on a project-to-project basis, has already been mentioned.

The Study Group estimated that a full decade is required by most institutions before they can demonstrate their productivity and scientific independence. The governments of most developing countries, given the paucity of local funds for biomedical research, may be reluctant to make major commitments to support a research group before it has demonstrated its viability. This should not deter such groups from making every effort to involve the authorities at as early a stage as possible in providing some support. Another possible source of funds in some countries may be the pharmaceutical industry, which should be encouraged to expand its support beyond clinical trials to more basic studies.

From the case histories studied, it was, moreover, quite evident that substantial external support will continue to be needed after the 10-year period. This may require a radical change in the thinking of agencies promoting and supporting the strengthening of developing countries' resources for research in human reproduction.