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TRAINING AND EDUCATION OF LABORATORY PERSONNEL

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Introduction

It is not the purpose of the paper to give detailed descriptions of the different types of training programmes which are needed in different countries. Several WHO publications¹ have dealt with these subjects, as well as UNESCO and other organizations. We want only to stress certain general points, particularly relevant to the training of laboratory staff which need clear improvement or further discussion as they are still controversial. They include the coordination of technical training programmes, training in laboratory management and economics, the use of polyvalent laboratory scientists and the undergraduate, postgraduate training and continuing education of laboratory personnel.

These are certain specific technical subjects that should be briefly mentioned, as they are today very important in the improvement of training programmes in health laboratory technology.

- The increased use of laboratory automation, including the use of small computers for the recording, reporting, storing and retrieval of results, has profoundly changed the organization and staffing of laboratories, but has had little influence on the training programmes which are in most cases similar to those of 10 or more years ago.
- The use of kits and other simplified laboratory techniques with their advantages and disadvantages, have not been well taught and many of the technicians follow the instructions of the manufacturers without knowing the principle of technology involved.
- The need for appropriate laboratory support to primary health care is not clearly understood by members of the health team. This support raises today the controversial question whether the simple laboratory tests need to be performed only by a laboratory worker or by any other health worker with a specific training in the tests.
- Laboratory staff should also be trained on the proper use and maintenance of laboratory equipment as most countries have only workshops at the central and regional levels.
- Evaluation and technical supervision are essential tools to improve training and should be carried out at all levels of the health services.

¹ WHO Technical Report Series, No. 345, 1966 and No. 491, 1972; Training of Medical Laboratory Technicians: A Handbook for Tutors by A. McMinn and G. J. Russell, 1975.

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Item 1. Coordination of technical training programmes for different types of laboratory personnel

It is generally agreed that the definition of a national training programme for laboratory staff should be the responsibility of the Ministry of Health, taking into consideration the health needs and priorities, as well as the actual facilities of the country concerned. Such programmes should be established in cooperation with the Ministry of Education in most countries, but the level of this cooperation depends primarily on the extension of the participation of the Ministry of Education in the actual training of both scientific and technical staff. The training of scientific staff, (medical postgraduate and non-medical graduates) is carried out in most countries in universities or high-level training institutions which depend on the Ministry of Education, with different levels of autonomy; only in a few countries, these institutions and medical faculties depend on the Ministry of Health. On the contrary, the training of technical staff is performed in most countries in technical institutions or laboratories depending on the Ministry of Health. In certain countries, diplomas issued by institutions of the Ministry of Health, are not fully recognized by the Ministry of Education and in others, only the Ministry of Education has the legal authority to issue diplomas for health laboratory staff, including the technical staff.

Other ministries or departments are also engaged in the training of laboratory staff, such as defence and agriculture and they should be consulted or participate in the coordination of these training activities. In many countries, coordination committees have been established with the participation of representatives of all authorities interested and their main role will be to advise on policy matters to the ministries concerned, particularly the Ministry of Health. They should also advise on the general planning, organization and implementation of training courses, establishment of training objectives and curricula, evaluation of the courses, definition of career structures and issue of diplomas.

Better coordination is also needed between the training of scientific and technical staff and even between different groups of scientific staff (medical and non-medical). In the first case, the training of both scientific and technical staff is carried out as two completely separate blocks and it is very difficult or even impossible for a laboratory technician to get access to the higher level of the scientific staff. This means that a well organized career structure is missing, leading to an increasing lack of interest and frustration of the personnel. In the scientific staff, it is still frequently the difficult relationships between the physicians and the non-medical graduates in laboratory science (biochemists, microbiologists, pharmacists, etc.); this was due to the lack of knowledge of general health matters which prevents these non-medical graduates to give any advice or discuss the interpretation of laboratory tests or take part in the collection of specimens; the situation has now very much improved, as the number of medical graduates with specialization in laboratory science is diminishing in most countries, their role will be taken by the non-medical graduates who need a better education and training in health subjects. The coordination of training of medical and non-medical graduates will improve very much the mutual understanding of their activities and the acceptance of non-medical graduates by the medical profession.

If a coordinating committee for training of laboratory staff exists, it is very useful for their members to visit frequently the different training institutions and discuss the problems, not only with the teaching staff, but also with the trainees themselves; special emphasis should be given to a clear definition and full description of the training objectives of the courses.

In many countries, different types of training exist at the same time, particularly for technical staff: full-time institutional, wholly laboratory-based and combined (sandwich) system of training; all have their advantages and disadvantages and only national authorities could select what best fits their needs and facilities; in any case, close coordination of their syllabus and of the diplomas issued are important.

Item 2. Training in laboratory management and economics

In most laboratories, both at central or regional levels, there is an acute problem of deficient management due to the fact that during their training, very little has been taught in this area. Only a few countries have organized specialized courses or seminars in management in recent years or included this subject in the curriculum of basic laboratory training. Management should not be considered in a strict sense of administrative and financial matters, but should deal with other subjects, such as: staff problems (satisfaction and motivation), purchase and supply of glassware, equipment and reagents, organization of training in the laboratory, long-term planning of activities, including their budgeting, etc.

The easiest way to improve the situation of poor management in laboratories is the inclusion of management in the syllabus for laboratory courses and the organization of practical seminars of one to two weeks' duration for the directors of large laboratories at first instance; later on, simpler courses might be organized for responsible staff for intermediate laboratories by the attendants of the first course. These courses should be followed by visits of senior managers to the laboratories. The improvement of management of peripheral laboratories could be obtained by the inclusion in the curriculum of the training courses for technicians of these subjects and by a better supervision from higher echelons.

Some courses on management techniques by correspondence have been recently organized and have shown very promising results; some of their advantages are the large number of participants, the reduced cost and the facility to do the work in a flexible way; the main problems are the lack of good direct supervision of the participants and the large work for the technical staff on the orientation and correction of the "homework".

Due to the increasing costs of laboratory tests today, the economical aspects of laboratory management could not be missed in training activities; the need to organize cost-benefit studies for the modification or introduction of any technology in their three main aspects: staff, reagents and equipment, should be carefully considered, keeping in mind the good quality of laboratory performance. This leads to a good education not only of the laboratory staff, but also of the physicians and other personnel and even of the patient himself.

Item 3. Polyvalent laboratory scientists for service outside central level

The tendency for specialization in the medical profession exists also in the field of laboratory science. All the professional staff, medical or non-medical, tend to specialize in one of the main areas of laboratory technology, such as biochemistry, microbiology or pathology and sometimes even a more specialized field such as enzymatic determinations, virology or cancer cytology; although on a smaller scale, this applies also to technical laboratory staff. Therefore, this specialized staff will remain in large laboratories at central or regional levels or in research institutions. There are several reasons for this tendency nowadays: difficulty to cope with the ever increasing number of laboratory tests in use, better pay and conditions of life for the specialist, pressure from the public or even health authorities, etc.

However, today with the expansion of laboratory services to the periphery, what is required in a small laboratory in a health centre or dispensary is a polyvalent technician or laboratory assistant; in a laboratory of larger dimensions, but still at peripheral or intermediate levels (district or provincial laboratory) is a polyvalent scientist (medical or not) to direct the laboratory; he has to supervise the work of technicians with a certain work specialization and should therefore have a global knowledge of laboratory subjects. Even at the central level, in a large hospital laboratory, his direction should really be a polyvalent professional with a reasonable experience in all laboratory areas; if not each department or section will become largely independent and will not easily accept technical supervision or management from the director.

The present need of a polyvalent scientist to direct a laboratory of large or medium size, has a direct impact on his training and education; as already stated, he should have learnt the concepts of managing a laboratory and have certain practical experience. In the career structure of the country, he should have similar privileges and positions as a specialist. These considerations apply also to the laboratory technicians or technologists.

Although the above considerations are directly related to hospitals, they apply in a similar way to public health laboratories when these two types of laboratories are not integrated as happens in most countries. In the case of private laboratories, the situation is very different from country to country, depending very much on the national regulations.

Item 4. Undergraduate, postgraduate training and continuing education of laboratory staff

A very frequent problem in many countries in the training of laboratory personnel, is the lack of a general training plan and most of the training activities are carried out independently. This is probably a consequence of the fact that no defined career structure exists or manpower studies have taken place. Each training course has been planned and organized for a specific need at a given moment or is the continuation of an activity planned several years ago and with little relevance to the actual health needs or policies of the country.

Some years after a training course and after gaining enough experience, a trainee who wants to progress in the career of health laboratories finds difficulties in being accepted to follow other training activities or to be promoted because the existing career structure consists of separate and independent technical grades and positions which prevents his upgrading. The most difficult promotion is between the technical and scientific grades and is mainly due to the very different educational background requested by such positions.

As already stated, at present most of the scientific staff are being trained in universities or in certain countries in technical institutions, belonging or not to a university; only a few follow courses or in-service training in health laboratories. On the contrary, most of the technicians or technologists are trained in health laboratories or technical institutions. In general terms, training in universities is of better quality for lectures and scientific background but the practical exercises are not so good as in health laboratories. In technical colleges and in a certain way in universities, training is less related to health matters than in health laboratories, when the trainees have contact with patients and human specimens. Although the practical training is better in laboratories, the technical supervision from the tutor technicians is rather deficient and many times, trainees are being used to perform the routine work due to lack of staff. The "sandwich" type of teaching for technicians, theory and basic practical work in technical institutions and in-service training in a recognized laboratory, has also its advantages and disadvantages, but it seems there is a trend to use these courses more. There is no ideal system and each country should select the one that fits better to their needs and technical facilities, including the teaching staff.

The training of laboratory staff does not finish in the school or teaching institutions, but should be a continuous educational process during his routine work in the laboratory. This idea, although new, is today generally accepted by health authorities, but is not yet well followed. The new methods of education and training - audiovisual, self-instruction, etc., - are only used in large training institutions at central level in most countries. If the career structure of the country concerned does not allow reasonable prospects of promotion, the interest and motivation of the staff is missing and they are not interested in any self-instruction or training.

This lack of staff motivation has also lead to another problem that is bad distribution in most countries between the centre and the periphery. This applies also to laboratory personnel and in many places there is no shortage of trained manpower, but only a bad distribution.

This process of continuous education comprises not only the availability of technical literature on laboratory science, but also the regular provision of modern audiovisual material, such as slides or video tapes and the participation in refresher training and technical seminars.