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# BASIC CONCEPTS OF EPIDEMIOLOGY

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Knowledge of the basic concepts of Epidemiology is essential for the successful implementation of a Health Programme, as it helps not only in understanding the problems but also in evolving the best ways of combating them The Expanded Programme of Immunization is no exception to the rule. We must therefore ascertain thoroughly whether the prerequisits, according to epidemiological concepts, have been taken care of, as otherwise we may be expending our efforts and resources unnecessarily with few tangible results.

The basic concepts require that before embarking on a control programme we must be sure.

(i) that the knowledge of the diseases with regard to time, place and individuals exists, not only to justify the programme but also to plan it;

(ii) that the methodology being adopted is the best suited in the circumstances and has already been tested by experiment,

(iii) that an element of epidemiological evaluation of the results has been included in the programme.

1. Knowledge of the Diseases - In view of the limited resources of the developing countries, it is essential that we ascertain that the undertaking of the Expanded Programme of Immunization is fully justified. This can only be done if we have

knowledge of the existence and magnitude of the six immunizable diseases in the Region. Knowledge of the occurrence of these six diseases with regard to time, place and individuals is essential in order to have an epidemiological assessment, justifying the undertaking of the programme As we shall see later, knwoledge of the occurrence of these diseases is also essential in order to adopt the correct remedial measures, so as to achieve the maximum benefits in the most economical manner. Knowledge of them is also essential to serve as the baseline for an assessment of the results achieved.

As we have already seen, knowledge of the magnitude of the occurrence of these diseases in the Region is very limited. The available data are not only sketchy but grossly under-reported. Based on the available data, it may not be possible to justify adequately the initiation of a programme requiring substantial financial resources It is quite likely that the governments and agencies concerned may not be liberal in allocating resources for such a programme which, though otherwise essential, lacks support for want of epidemiological information. It is therefore essential that, in addition, the programme should include the establishment of a system whereby more accurate information on the occurrence of these six diseases in individual countries becomes available. It may be worthwhile if the programme insists upon the authorities in the various countries directing the responsible division or section to make available to them the baseline information on these diseases, by conducting special surveys and/or studies. It will be in the interests of the immunization programme to have such information as, otherwise, it will again face problems at the time of evaluation of results.

It is therefore imperative to know that these diseases exist in the Region, and that their incidence is of such a magnitude that it calls for some remedial measures. After having satisfied ourselves with regard to undertaking remedial actions, the whole strategy needs to be worked out on the knowledge based on the epidemiological assessment of these diseases. It is also essential that we ascertain the target population, the most vulnerable age groups, the areas heavily

affected, the seasonal or secular trends and so on.

We have therefore to know, at what age measles, whooping cough, poliomyelitis and for, to that matter, all the six immunizable diseases affect the population. The vaccination schedule should therefore commence at the age most suitable to obtain the minimum incidence, if any, below that age. Selection of the lowest age to commence vaccination will also have to be justified insofar as vaccination below that age is expensive in terms of cost-benefit analysis. Similarly, the maximum age limit, beyond which undertaking of vaccination is of little or no use, needs to be established through studies on the biological characteristics of the population, as well as of cost-effect analysis. As an example it may be noted that in Yemen Arab Republic, vaccination against polio, diphtheria and whooping cough are carried out up to the age of 12 years. Such an undertaking needs to be justified.

2. Methodology of the Programme - As pointed out earlier, it is through analysis of the existing information or through fresh experimental studies that the correct target population can be determined. Similarly, the methodology to be adopted in order to achieve the desired results needs to be based on techniques and methods, which have since been tested and proved useful. Inclusion of any new approaches should always be tested first on limited groups to prove their effectiveness, before adopting them for the whole programme. The concepts of achieving the desired coverage through mass vaccination by the mobile teams for the Expanded Programme of Immunization needs to be thoroughly examined. We have before us the vast experience of the smallpox eradication campaign in many countries of the World. Were the results achieved through the concepts of total coverage of the population, or through focal coverage whereby extensive surveillance was established and vaccinations done on the contacts and the population around a case? The question may be difficult to answer. Or was it a combination of the two methodologies? Whatever the case may be, the question arises. Are the two programmes comparable? And can we use the experience gained from the one for the other, with or without modifications?

In the two studies conducted in Yemen Arab Republic on the performance of vaccination activities, one finds a number of questions requiring serious consideration.

One of the studies was undertaken in Taiz, when static health centres had been carrying on vaccination activities for a number of years. The data made available on the performances indicated a minimum coverage of six per cent of the child population in the town. This tempted the authorities to modify their expanded programme of immunization according to the lines on which immunization was being carried out in Taiz. However, the study conducted showed that in two of the three areas of the town the coverage was only fifteen per cent, while for the town as a whole the coverage stood at 21.7 per cent.

The second study was undertaken in the town of Ibb and some of the surrounding villages. The vaccination campaign in Ibb itself was carried out at collection point centres, area by area. Extensive propaganda was used to get the population to their fixed centres. In the villages the mobile units carried out vaccination by arranging dates for visits through the head of the village. Extensive propaganda was also used during the campaign. The results obtained however, gave a coverage of about seventeen per cent for Ibb town and over twenty-two per cent for the surrounding villages. The striking point in these studies is that, at the time of the first visit, only about 50 per cent of the child population turned up to take the vaccinations. However, at the time of the second visit, there was a drop of almost 50 per cent of the children when compared with the number taking the first dose. At the time of the third visit the absentation was about 33 per cent of the second dose receivers.

Therefore, the questions arising are.

(i) Which method may be adopted so as to achieve the targets of the expanded programme of immunization, i.e , vaccinations at the static centres, collection point vaccinations or through mobile vaccination teams, whether alone or in combination?

(ii) How can one improve the coverage of the first dose and for that matter, the subsequent doses?

Whatever the methods adopted, it appears essential that ways be found to pin point the absentee children, so as to improve the second and third dose coverage.

One may be inclined to say that the situation could be improved by a combination of methods, including health education. There is no doubt that health education will improve the situation substantially. But, again, the question arises as to the type of health education and/or propaganda needed to motivate the population.

Whatever is decided, there still remains the need for a concurrent assessment of the progress being achieved by the programme, so as to change and/or amend the approach if and when required.

It may not be out of place to mention that, as planned, the expanded programme of immunization is going to take care of the child population up to five years of age to start with. Thereafter, the programme will confine itself to the newborn, as these will be the only susceptible additions. It is hoped that the proposition has full justification based on cost-benefit analysis and that due consideration has been given to various aspects of the undertaking. One point which comes to mind is that in the countries of the Region with limited financial resources, limited trained manpower and even limited experience, would it not have been proper to limit the programme only to children under one year or at most two years of age? This perhaps would have given better chances of success to the programme. It needs to be assessed whether, in the initial stages, when the whole programme is in its starting phase and the staff not well experienced, by giving a higher workload, we are not adversly affecting the prospects of the development of the programme.

3. Evaluation of the Programme - No country or agency is going to embark on an undertaking unless it is hopeful of its effectiveness. Similarly no country or agency would be willing to continue with the undertaking unless the benefits resulting from it are visible and proven.

Evaluation, therefore, is an important aspect of the programme. An element of evaluation may therefore be built into the programme, for checking its various inputs. In addition, independent evaluation will also be needed to check the progress of the programme at different intervals.

The built-in evaluation system will help to check whether the administrative machinery and other facilities, such as equipment and transport, is working satisfactorily. Ways will have to be found to check that the vaccine being utilized is potent. A proper second-keeping system of all activities will have to be maintained, not only to assess performance but also to help trace causes in the case of unexpected results.

A continuous system of determining the public attitude towards co-operation in the programme will have to be instituted in order to find ways and means of motivating the population towards the success of the programme. The limit in system of evaluation/assessment will give clues as to whether the programme needs some changes and/or amendments to boost its performance. Unless such a continuous system of programme assessment is built in, it may be too late to find out whether or not the programme is doing well.

The independent assessment machinery is essential to check whether the objectives laid down have really been achieved. Such an assessment would need baseline information on various demographic characteristics of the high-risk population. Information on the morbidity/mortality trends of these six diseases will have to be provided and maintained to make the final assessment. Such

information, when kept, will help the programme authorities to make concurrent assessment as to whether the programme is proceeding satisfactorily.

Finally, it may be added once again, that, unless the programme authorities take care of these basic concepts, the future of the expanded programme of immunization cannot be ensured.