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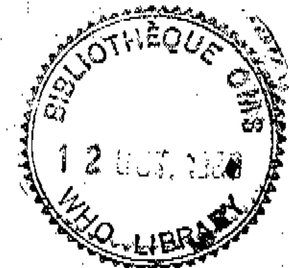
MEETING ON HOSPITAL INFECTION PREVALENCE SURVEY

(Geneva, 20 - 22 October 1986)



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A WHO consultation on Hospital Infection Prevalence Survey was held in Geneva from 20 to 22 October 1986. The purpose of the consultation was to discuss the results of the international collaboration on prevalence surveys of hospital-acquired infections conducted in hospitals of 14 countries. Dr F. Assaad, Director, Division of Communicable Diseases welcomed the participants on behalf of the Director-General of the World Health Organization. Professor J. Cervenka was elected Chairman, Dr D. Greco, Vice-Chairman, Dr R. Mayon-White and Professor T. Kereselidze, Rapporteurs.

1. INTRODUCTION

Hospital-acquired infections constitute a serious problem since they cause significant morbidity and mortality throughout the world. The problem persists despite many efforts for the control and prevention of such infections, and the multiple risk factors associated with this phenomenon continue to affect patients and hospital staff.

WHO has long recognized the magnitude of the problem and its impact upon all peoples of the world. It has provided support both from headquarters and at regional levels in the form of educational activities, discussions, meetings, investigations and consultations.

2. BACKGROUND

In 1981 a WHO Advisory Group met in Geneva to consider future plans for the surveillance, control and prevention of hospital-acquired (nosocomial) infections. The Group recommended that a WHO collaborative evaluation of hospital infections be conducted to assess the worldwide importance of the problem and that data be provided to countries. A protocol for a prevalence survey was thus prepared and distributed through the WHO Regions to the participating countries. Favourable responses were received from 33 countries in the Eastern Mediterranean, European, South-East Asian and Western Pacific regions. To date, surveys have been conducted in 14 countries, covering 47 hospitals and concerning 28 861 patients. The reports of these surveys were presented and discussed at the present consultation.

A prevalence survey presents a picture of the situation at a given moment within a hospital. The surveys were based on carefully selected criteria, as explained in the protocol (BAC/NIC/81.6 Annex) and the results constitute important and relevant data not previously available. The diversity of hospitals in the survey, however, prevent detailed inter-hospital comparisons. The statistics provided by the survey concern minimum infection rates, partly because an infection was not considered as being hospital-acquired, if there was any doubt about the source. Additionally, some infections may not be noted in the patients' records because of the lack of laboratory diagnosis. Nevertheless, the data provide a clear indication of the need for control and prevention programmes.

3. RESULTS OF THE SURVEY

The results of the survey showed the following:

- The volume of information provided varied from country to country, ranging from 304 patient cases in one country to 9 136 cases in another. The mean number of patients seen per hospital was 614, ranging from a minimum of 227 to a maximum of 1 501.

- Figures on sex and age distribution indicated that, of all hospital populations studied, 49.2% were males and 50.8% were females, and that the over 64 years and 25-34 years of age constituted the largest age groups (16.7% and 16.2% respectively). The 0-4 year age group represented 13.3% of the hospital population in the study.

According to the prevalence survey, on average, 8.7% of hospital patients suffered from nosocomial infection. The range of prevalence rates in individual hospitals was 3.0-20.7%. Since some patients had more than one infection, the hospital prevalence infection rate may be 9.9%. The variations in rates depend on the hospital, the type of patient, and above all, the type of care provided. The highest prevalence of nosocomial infections by ward was found in intensive care units (mean - 13.3%, range 0-72.7%), followed by acute surgical wards (mean - 13.1%, range - 1.6-23.9%) and orthopaedic wards (mean - 11.2%, range - 0-33.3%).

Analysis of the age distribution of patients with hospital-acquired infections showed that the highest percentage of infections occurred in the 1-12 month age group (13.5%), followed by the over 64 year age group (12.0%), the 1-4 year age group (9.3%) and the under one month age group (8.8%).

The most frequent hospital-acquired infections were in surgical wounds (25.1% of all infections), followed by urinary tract infection (22.1%) and lower respiratory infection (20.6%).

The most common organisms causing the infections were Escherichia coli, Staphylococcus aureus, and Pseudomonas aeruginosa.

Most of the hospitals reported on the use of antibiotics in their various wards. The highest frequency of antibiotic usage was reported from intensive care units, followed by paediatric, acute surgical and orthopaedic wards.

The major sites of infection varied widely depending on the age group. The most common sites of infection in children under one year of age were the skin, the lower respiratory tract and the gastro-intestinal tract, whereas the predominant site of infection in children aged 1-4 years was the lower respiratory tract. In adults, age and sex, the nature and course of the underlying diseases and conditions have a major effect on infection rates.

The survey showed marked similarities in the types of infections and their causative organisms. This suggests that many hospital-acquired infection problems are common to all the participating countries.

4. DISCUSSIONS

The problem of hospital-acquired infection has been insufficiently recognized and the countries that took part in the survey should be commended for their interest and participation in the prevalence survey programme. Some other countries have recently made surveys of hospital infections which support the results of this consultation. The group encouraged all countries to consider the benefits of conducting prevalence surveys in hospitals and to report their findings to WHO.

The prevalence survey constitutes an inexpensive method of study with relatively low observer variation which can be easily repeated. The following, however, should also be taken into consideration:

- The sample size affects outcome (limited information is obtained if only small numbers of patients are surveyed).
- Hospital representation can be improved by stimulating participation in areas which lack volunteers.
- The use of standard protocols, as used in the WHO survey, will reduce variance and ensure repeatability.
- Diagnostic definitions should be used.

The group agreed that the results of the international survey were a reasonable illustration of hospital-acquired infections in the 47 hospitals in 14 countries and 4 WHO regions. The measurement of the prevalence rate in those hospitals taking part is relevant too, but may underestimate the worldwide problem of hospital-acquired infections. Nevertheless, the close similarity between the mean and range of the prevalence rates found in this international survey and those in previous national surveys shows clearly that hospital-acquired infections are a significant problem.

The variations between the rates of infection in the various hospitals in the survey are the consequence of many factors, such as the age of the population served by the hospital, climate and season, the types of hospital and their infection control capabilities and the diseases that affect local populations. The multiplicity of factors prevent direct comparison between hospitals, and are listed to show the complexity of the subject. However, the data indicate that there is room for improvement in the control of infection, i.e., by concentrating on the major types of infection revealed by the survey.

The proportion of patients on antibiotics in these prevalence surveys and the increase in antimicrobial resistance observed elsewhere should be seen as another measure of the magnitude of the problem of infection in hospital. Although analysis of the survey does not distinguish between antibiotics administered for prophylaxis and those for treatment of existing infection, the main point is that hospital-acquired infection results in a considerable consumption of often expensive drugs, some of which may have side-effects.

The group agreed that the central importance of the overall results needs emphasis: a mean prevalence rate of 9% means that, at any one time in the world there are more than 1.4 million people suffering from hospital-acquired infection. It was concluded therefore that hospital-acquired infection is one of the major infectious diseases occurring in developing and developed countries.

During the course of the meeting, discussions also took place on some organizational aspects of the programme. These suggestions were passed on to the appropriate Assistant Director-General for his information.

5. RECOMMENDATIONS

5.1 Faced with such a serious problem, there is a need for action, not only to improve infection control in hospitals but also to raise awareness of the need of such improvement. The survey itself can only have a very limited impact even when its results are published. In order to obtain the full value of the survey, further action must be taken. Such action should include guidelines on procedures that prevent and control infection, educational programmes for the health service professionals, and information to international agencies, national governments, and patients and their relatives.

5.2 Prevention methods need not entail elaborate technology. Good hospital practice and good hygiene, supported by regular instruction and supervision, constitute the basis of infection control. There should be international collaboration for the promotion of education and training in hospital-acquired infection control. In report BAC/NIC/81.6, it was recommended that WHO set up an education programme that would include the preparation and distribution of guidelines on the major universal principles and practices of infection control, namely:

- aseptic techniques;
- disinfection and sterilization techniques;

- antibiotic policies;

- surveillance;

- evaluation of prevention and control measures.

5.3 In view of extensive use of antibiotics, including modern and expensive drugs, a very special effort should be devoted to the microbiological methods used for identifying pathogenic agents and for evaluating resistance to antibiotics.

5.4 Health authorities should set up regular surveillance in every hospital, however modest its resources. The surveillance methods may vary, but a routine compilation of statistics should be developed.

In order to ensure that the surveillance programme be effective and productive, it could be based on certain key points which would serve as indicators of the quality of care provided in an establishment, with due consideration to differences in patient risk factors. Some examples are as follows:

- surveillance of clean operations;

- surveillance of all infections that may complicate invasive techniques, e.g., urinary and intravenous catheterisation, intubation, tracheostomy, artificial ventilation;

- recording and analysis of all cases of bacteraemia;

- monitoring antibiotic resistance.

Depending on the resources available, this monitoring could be based on successive prevalence figures or better still, on incidence.

5.5 The results of the prevalence survey should be published in WHO publications and other journals and should be reported back to the staff of participating hospitals and to health administrations in participating and all other countries.

6. CONCLUSIONS

6.1 Strategies of control

6.1.1 Surveillance

Surveillance - that is, the collection, collation, analysis and reporting (feedback) of data concerning the occurrence of hospital-acquired infection - is one of the cornerstones of any hospital infection control programme. Surveillance activities must be followed by action if such a programme is to be meaningful and viable. Of the many methods available for the collection of the basic data, the method to be used in any hospital must be selected by the hospital itself, taking into account the objectives of the hospital's surveillance programme, its infection problems and its available resources. Surveillance should be performed on a regular basis in accordance with the same variables.

The surveillance programme, conducted by the hospital's clinical departments in conjunction with its infection control committee, should be under the day-by-day direction of a qualified coordinator such as the infection control officer. Microbiological departments play a central role in this context.

Prevalence surveys play an important role in hospital infection control programmes, both at the national and local levels. For example, prevalence survey methods can be supportive of the surveillance programme, can assist in portraying the disease problems, can help in evaluating trends, and in monitoring the accuracy of the hospital's regular surveillance programme.

6.1.2 Control activities

In order to combat the major infection problems identified by the survey, action should be taken on the following:

6.1.2.1 Laboratory services

Microbiological techniques will play an increasingly important role in the detection and control of nosocomial infections in the future.

In view of this, the Health Laboratory Technology Unit of the World Health Organization can assist by:

(a) Organizing the training of technologists in laboratory techniques and management.

(b) Organizing external quality assessment programmes.

(c) Developing technology for the local production of reagents and materials.

(d) Developing and applying newer techniques.

6.1.2.2 Neonatal infections

The WHO survey indicates that about 9% of infants in hospital under one month of age manifest an infection. The figure may be an underestimate of the real situation as some neonatal infections are known to be difficult to diagnose since signs of infection may be non-specific.

The most common infections reported in this survey were skin and lower respiratory tract infections, bacteraemia and gastro-enteritis. Meningitis was not classified separately, but is a serious infection which requires attention.

The methods of control of infection in neonatal units are identical to those regularly used in other parts of the hospital. Hand-hygiene is extremely important as babies are handled a great deal. In addition, the hygienic preparation, handling and storage of foods are of utmost importance.

In neonatal intensive care units, environmental control measures are particularly necessary. Measures to prevent the transmission of pathogens from mother to child are still under evaluation and their effectiveness has to be determined. Prevention of infection in neonatal departments helps reduce infant mortality and serious long-term consequences.

6.1.2.3 Surgical wound infections

Of all hospital-acquired infections identified in the WHO survey, 25% are related to surgical wounds and one in seven patients in acute surgical and orthopaedic departments develops a hospital-acquired infection.

It is recommended that surgical departments be assisted in their surveillance activities by infection control teams, microbiologists, epidemiologists or other specialists.

Surveillance provides the best basis for establishing priorities for preventive measures and for setting targets. The mere process of surveillance alone has also been found to reduce post-operative infection rates in several countries.

Finally, training courses and other educational activities on the prevention of hospital-acquired infections with special emphasis on post-operative infection will motivate the implementation of measures for reducing surgical wound infections.

Some guidelines on measures that can reduce hospital infection in small rural hospitals in developing countries are available in the handbook Surgery and anaesthesia at the first referral hospital. These guidelines were prepared with input from the Centers for Disease Control, Atlanta, USA.

6.1.2.4 Urinary tract infection

Urinary tract infection is one of the most common hospital-acquired infections. In the WHO survey, 22% of infections were of the urinary tract. Infection is associated in particular with the use of indwelling catheters. Methods of preventing infection include the following:

1. Avoiding the use of a catheter whenever possible.
2. If catheterisation is required, it should be for as short a time as possible.
3. A closed-drainage system should be used and maintained throughout the period of catheterisation.
4. Good aseptic technique in the introduction of the catheter and an effective hygienic technique in the routine management of the catheterised patient.
5. The aseptic technique and indications for the use of catheters should be regularly assessed.
6. Urinary cultures should be made when infection is suspected and resistance to commonly used antibiotics determined when facilities are available.

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