Thirtieth Session (1982)
Agenda item 13(b)

NEONATAL TETANUS
Tetanus of the newborn (TTN) is common in many countries of the Region, but accurate data have not hitherto been available due to inadequate reporting. There are also other direct and indirect influences which have a bearing on the lack of information about the extent of the problem. Directly, it can be linked with the very nature of the disease itself, which may vary with socioeconomic factors as well as being considered an occupational or environmental hazard rather than a contagious disease per se. The indirect factors include the variations in development of health, maternity and educational services in unplanned urbanization, traditions, population growth and the priority accorded to the prevention of tetanus in comparison with other diseases.

Besides these, efforts towards improving the quality of information have been largely inadequate. Reporting of the incidence of the disease has represented only a small fraction of the true incidence. The fact that tetanus occurs predominantly in less developed countries with weak reporting systems further emphasizes this point. During the years 1974, 1975, 1976 and 1977 out of the 23 countries of the Eastern Mediterranean Region, only 9 countries reported tetanus, making a total of 1,639 cases. Half of these were from one country and almost two thirds of the rest from another country, leaving 297 cases in the remaining 7 countries.

It became obvious that, in order to have more factual information about the magnitude and severity of the problem, concerted efforts were required to study all aspects of it in depth and evolve an effective strategy for the control of neonatal tetanus.

In order to develop appropriate strategies it was essential to conduct epidemiological surveys in selected countries of the Region, where there were indications of a high incidence of the disease.

In the latter part of 1981, retrospective surveys on TTN were conducted in six countries of the Region, viz: Democratic Yemen, Pakistan, Somalia, Sudan, Syria and Yemen Arab Republic. A related study was also done in Alexandria (Egypt) where an analysis was performed of hospital and health office records of TTN and anarca.

In the country surveys, although methodology differed in some details, on the whole the following were common factors:

1. Selected areas chosen for the study represented different ecological/geographical areas in each country.
2. The cluster sampling technique was used, collecting data on births, in thirty randomly selected sites within each survey population (region).

3. A recall period of one year (between August 1980 - July 1981) was defined.

4. Detailed data were gathered on at least 5,000 births, by house-to-house visits by trained personnel.

Detailed data generated from three surveys are presented in Tables 1, 2 and 3.

Neonatal tetanus mortality rates showed substantial differences both within and between countries (Table 2). Overall estimates of TTN mortality rates varied from 3 per thousand live births in Yemen Arab Republic to a high of 31 per thousand births in Punjab (Pakistan). Deaths from TTN contributed substantially to neonatal mortality, recording 60% in Pakistan, 32% in Sudan, 20% in Democratic Yemen and 8% in Yemen Arab Republic. The mortality rates were generally higher in rural than in urban areas. Particularly high rates (42.2 per 1000 live births) were found in the rural areas of Punjab, among the semi-nomadic population engaged in cattle and horse rearing, and in the rural agricultural parts of Southern Sudan. In the urban areas, differences were also noted. In Democratic Yemen, the mortality rates were approximately four times higher in slum quarters than in built-up areas. On the outskirts of Alexandria, where there is a predominantly agricultural population, deaths from TTN were twice as numerous in comparison with the central parts of the city.

Based on the mortality rates found in the surveys, it is estimated that some 130,000 neonatal tetanus (TTN) deaths occur annually in the countries surveyed. Of these, nearly 110,000 deaths, or even more, occurred in Pakistan alone, as minimal (2.64 per 1000 live births) and not the highest rates were used in the calculations. An application of similar rates for the rest of the unsurveyed countries would provide an additional 11,000 TTN deaths, with a total number of 140,000 for the whole Region. Given an 85% per cent case fatality rate for TTN, it may be assumed that there is an annual incidence of at least 165,000.

Annually (1981), 11 million children are born in the Region. Of these, with an estimated infant mortality rate of 100 per thousand, 1.1 million die in the first year of life. It can be deduced that nearly 15% of these deaths are due to TTN.

There are some other interesting findings which merit our attention. Most of the deliveries of live births in the survey occurred at home and/or in rural
surroundings, accounting for 98.1% in Pakistan, to 95.5%, 96%, 96.3% in Sudan, Somalia and Yemen Arab Republic respectively.

Cumulatively 93.2% of deliveries were conducted by untrained personnel in Pakistan, Sudan, Somalia and Syria. Only in one country, 43.2% of deliveries were attended by a trained person.

It is also noticed from country returns of the Expanded Programme of Immunization (EPI), that only 4% of pregnant women have been immunized with tetanus toxoid, compared with 22% coverage of the target groups with DPT/Polio, BCG, and measles vaccines.

Figure 1 shows the age at death in neonatal tetanus cases according to the results obtained in the surveys. The majority of deaths occurred in the first week of life: 45 per cent in Sudan, 50 per cent in Pakistan, 68 per cent in Alexandria, and over 80 per cent in Somalia. However, only two out of thirteen neonatal tetanus deaths recorded in the Yemen Arab Republic occurred in the first week of life.

The average day of death was 7.47 in Alexandria, and 10.28 in Sudan. The maximum number of deaths was recorded 6-7 days after birth (Figure 1). However, a significant number of deaths also occurred earlier, and also later in the neonatal period, as was the case in Pakistan, where 8 per cent of deaths were recorded as early as the third day of life, and in Sudan where 18 per cent of deaths were in the third and fourth weeks.

Data from Sudan (Figure 2) show the day of onset of neonatal tetanus and day-specific distribution of neonatal tetanus and non-tetanus deaths. Neonatal non-tetanus deaths, probably caused mostly by birth injury, occurred very early; 40 per cent of them were recorded within the first three days after birth. The average incubation period in tetanus cases was 6.3 days and the average age at death was 10-28 days. The duration of the symptoms before death averaged four days.

During the surveys it became apparent that circumcision practices in unhygienic conditions may be an important contributory factor in the increase in deaths among male infants, but specific questions on this subject were not asked. The ratio of male to female tetanus deaths was recorded in several surveys. This ratio always showed a predominance of males and ranged from 1.4:1 in Sudan to 2.6:1 in Alexandria (Egypt). Following these surveys, which were also held in eight SEAR countries,
a joint EMRO/SEARO meeting on the Prevention of Neonatal Tetanus was held in Lahore, Pakistan, 22-25 February 1982, at which the strategies for the control of neonatal tetanus were elaborated and recommended.

Strategy for the Control of Neonatal Tetanus

In principle, recommendations made by participants at this EMRO/SEARO Meeting were the following:

A. General Strategy

1. Ministries of Health should now give a high priority to the control of neonatal tetanus. Neonatal tetanus should become a notifiable disease and should be reported separately from non-neonatal tetanus.

2. The control of neonatal tetanus and of other diseases included within the Expanded Programme on Immunization (EPI) can and should be used as a spearhead in the development of Primary Health Care.

3. Disease-reduction targets should be adopted by each country. Each significant administrative sub-division should aim for a neonatal tetanus mortality rate of less than one per 1000 live births by 1990 and zero deaths by the year 2000.

4. Neonatal tetanus levels should serve as an index of the quality and utilization of maternal health services, of the impact of the immunization programme, and of progress being made in achieving "Health for All by the Year 2000".

B. Immunization Strategy

1. Target Groups

Immunization of pregnant women is an effective measure in controlling neonatal tetanus in areas where most pregnant women seek prenatal care early enough in pregnancy to be given two doses of tetanus toxoid.

However, in many countries the routine coverage of pregnant women with antenatal care is still very low. In such countries, therefore, all females of childbearing age visiting any health facility for any reason should be immunized with tetanus toxoid, consistent with their previous tetanus immunization history. All health providers should be made aware of the importance of and need for their collaboration in this.
Depending on circumstances, immunization at school entry and school leaving should be offered to all girls. (Boys might also be included, if resources permit, since they represent a captive audience). As a result, women will require fewer doses of tetanus toxoid for protection during the child-bearing years. Immunization of children in the first year of life with DPT already exists as a priority within the EPI.

2. Schedule of Immunization

For previously unimmunized women, two doses of an adsorbed tetanus toxoid meeting WHO requirements should be administered. These doses should be spaced at least four weeks apart, with the second dose, in the case of pregnant women, at least two weeks before delivery. Intervals shorter than these will lead to lower protection but should be used if necessary. In the case of previously unimmunized pregnant women, the first dose should be given at the first contact.

Additional doses should be given with each pregnancy. If women have received a third dose, children born within five years will be protected. If women have received a fourth dose, children born within ten years will be protected. A fifth dose is likely to provide life-long protection.

3. Delivery of Immunization

Although services might be easiest to deliver in urban areas, rural areas contain most of the population and generally have the highest incidence rates of neonatal tetanus. Whenever feasible, tetanus immunization could be offered through outreach clinics to congregations of women attending markets or festivals. Every point of contact with a health institution should be used to increase coverage. Although some rural populations can be covered using outreach services from hospital and health centres, many rural areas cannot at this time be covered this way. Mobile teams may have to be considered for reaching such remote areas. If used, mobile teams should ideally be multi-purpose, providing a core of primary health care services of highest relevance to the communities in question.

C. Improved Maternity Care

1. Improved maternity care has a vital role to play in the reduction of neonatal tetanus as well as in the general reduction of neonatal and maternal morbidity and mortality.
All countries with high neonatal tetanus rates are also countries where a large proportion of babies are delivered by untrained and unsupervised traditional birth attendants. The policy of governments should be to increase the percentage of deliveries attended by trained persons, the ultimate goal being 100 per cent coverage.

2. All governments should consider registering all TBAs so that training can begin with emphasis on the referral of high-risk cases, safe delivery and adequate hygiene, including care of the cord.

3. Supervision of all birth attendants should be strengthened.

D. Public Participation

1. Public information and health education in support of the national strategy for neonatal tetanus prevention should be promoted. The principal target of the education is the mother.

2. The participation of the community in controlling this disease should be secured. Specific information concerning neonatal tetanus should be given to community leaders (including religious leaders). Their help should be sought in teaching birth attendants and mothers to recognize cases of neonatal tetanus. The entire community should be aware that tetanus is a major killer of newborns and that it can be prevented by (1) immunizing the mother prior to delivery, (2) assuring that the delivery is carried out and the cord cut under clean conditions, and (3) by ensuring that no unclean dressings are placed on the cord while it is healing.

If appropriate measures are undertaken by member countries, this unnecessary and highly preventable disease can be eliminated within the next decade, making a significant contribution towards lowering of infant mortality which is excessively high in the Region at present.

There is an effective and safe vaccine available against tetanus and every effort should be made to ensure that all females of child-bearing age be offered this vaccine at the first opportunity. Along with these specific measures, the quality of maternal care has to be improved in the Region, since the majority of deliveries are undertaken by untrained birth attendants. It is highly desirable that national programmes be organized to train this category of health worker improving their skills with particular reference to proper hygiene during the birth process.

We are made aware of the gravity and magnitude of the situation. There is consequently an urgent need for action to meet the challenge and eliminate a killer disease, so unnecessary and so very preventable.
| COUNTRY (Area)        | No. of Live Births Surveyed | History of Delivery | | | |
|-----------------------|----------------------------|---------------------|---|---|---|---|
|                       | Urban | Rural | Total | Z Delivered at | Qualifed person | Utrained Attendant | Family Member or Other | |
| Pakistan (Punjab)     | 2 37  | 6 21  | 13 858| 1.4 | 98.1 | 13.6 | 76.9 | 8.1 |
| Sudan                 | 5 15  | 1 17  | 9 632 | 4.5 | 95.5 | 22.7 | 48.5 | 28.8 |
| Somalia               | -     | -     | 5 781 | 3.2 | 96.0 | 11.2 | 57.6 | 29.6 |
| Syrian Arab Republic  | -     | -     | 6 762 | -   | -   | 43.2 | 56.7 | -   |
| Yemen Arab Republic   | 804   | 4 387 | 5 191 | 3.7 | 96.3 | 6.3  | 93.2 | -   |
| Democratic Yemen      | 4 054 | 2 170 | 6 224 | -   | -   | -    | -    | -   |

1Deliveries of total live births surveyed
Table 2

Number of Neonatal Deaths, Neonatal Tetanus Deaths and Mortality Rates per 1 000 Live Births

(Results of Surveys Conducted in Seven Countries of the Eastern Mediterranean Region in 1981)

<table>
<thead>
<tr>
<th>COUNTRY (Area)</th>
<th>No. of Live Births Surveyed</th>
<th>Neonatal Deaths</th>
<th>Neonatal Tetanus Deaths</th>
<th>Proportion of Neonatal Deaths due to Tetanus (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Deaths</td>
<td>Mortality Rate per 1 000 Live Births</td>
<td>No. of Deaths</td>
<td>Mortality Rate per 1 000 Live Births</td>
</tr>
<tr>
<td>Pakistan (Punjab)</td>
<td>13 858</td>
<td>724</td>
<td>52.2</td>
<td>432</td>
</tr>
<tr>
<td>Sudan</td>
<td>9 632</td>
<td>206</td>
<td>29.2</td>
<td>66</td>
</tr>
<tr>
<td>Somalia</td>
<td>5 781</td>
<td>-</td>
<td>-</td>
<td>120</td>
</tr>
<tr>
<td>Syrian Arab Republic</td>
<td>6 762</td>
<td>-</td>
<td>-</td>
<td>33</td>
</tr>
<tr>
<td>Yemen Arab Republic</td>
<td>5 191</td>
<td>160</td>
<td>31.7</td>
<td>13</td>
</tr>
<tr>
<td>Democratic Yemen</td>
<td>6 224</td>
<td>118</td>
<td>19.0</td>
<td>24</td>
</tr>
<tr>
<td>Egypt (Alexandria)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>228</td>
</tr>
</tbody>
</table>

\(^1\) Adjusted according to urban/rural characteristics of the population
<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated Number of Live Births&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Neonatal Tetanus Mortality Rate per 1,000 Live Births as found in the Survey</th>
<th>Estimated Number of Neonatal Tetanus Deaths for the whole Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakistan</td>
<td>3,515,600</td>
<td>31.7</td>
<td>111,445</td>
</tr>
<tr>
<td>Sudan</td>
<td>823,400</td>
<td>8.9</td>
<td>7,328</td>
</tr>
<tr>
<td>Somalia</td>
<td>168,000</td>
<td>20.8</td>
<td>3,494</td>
</tr>
<tr>
<td>Syrian Arab Republic</td>
<td>369,600</td>
<td>4.9</td>
<td>1,811</td>
</tr>
<tr>
<td>Yemen Arab Republic</td>
<td>276,400</td>
<td>2.6</td>
<td>724</td>
</tr>
<tr>
<td>Democratic Yemen</td>
<td>91,200</td>
<td>3.9</td>
<td>356</td>
</tr>
<tr>
<td>Egypt</td>
<td>1,542,800</td>
<td>2.84</td>
<td>4,382</td>
</tr>
<tr>
<td>Total</td>
<td>6,789,000</td>
<td>-</td>
<td>129,540</td>
</tr>
</tbody>
</table>

<sup>1</sup>Population estimates (mid-1979) and birth rates according to "1979 World Population Data Sheet of the Population Reference Bureau, Inc." Washington, D.C., USA
AGE AT DEATH IN NEONATAL TETANUS CASES
NEONATAL TETANUS SURVEYS IN PAKISTAN, SUDAN, ALEXANDRIA (EGYPT), AND SOMALIA, 1981

AGE IN DAYS
CASES AND DEATHS FROM NEONATAL TETANUS AND NON-TETANUS DEATHS, BY AGE (IN DAYS), SUDAN 1981

Figure 2

CASES, NEONATAL TETANUS

DEATHS, NEONATAL TETANUS

NON-TETANUS DEATHS