FIGURE 3

ADMISSION RATE FOR TETANUS BY AGE & SEX
IN BAHRAIN (1970 - 1984)

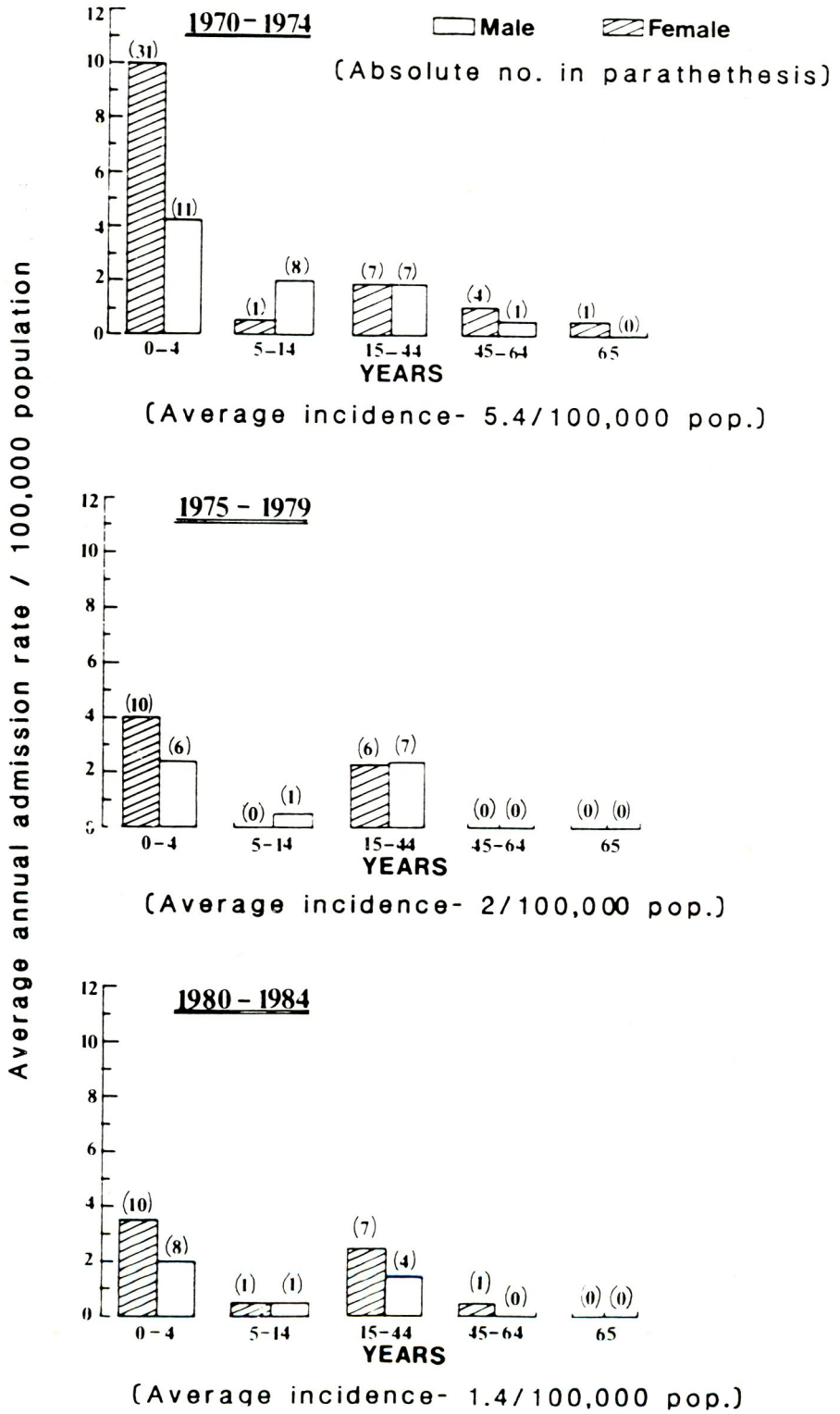

Table 2

Neonatal Tetanus Cases Between 1970-84 and Their Outcome

Year	*No. of Cases*	*Deaths*	*Mortality Percentage*
1970-74	37	7	18.9%
1975-79	15	8	53.3%
1980-84	8	1	12.5%
Total	**60**	**16**	**26.4%**

* There have been no cases of neonatal tetanus since 1984

Table 3

Cases of Tetanus in Children * and their Outcome 1970-86

Year	*No. of Cases*	*Death*	*Percentage*
1970-74	9	0	0%
1975-79	4	1	25%
Total	**13**	**1**	**7.6%**

*(* Age : 4 weeks – 14 years)*

Table 4

Impact of Immunization on Incidence of Tetanus (8)

Year	*Rate per 100,000 Population*	*Vaccinations/ Persons*	*Coverage*
1960	5	212 doses	not available
1965	15	7175 doses	not available
1970	5	4114 children received more than one dose	" "
1975	4	7389 doses	" "
1980	1	9076 children received at least one dose	75%
1981	1	7305 three doses (< 2 years)	69%
1982	0	8590 three doses (< 2 years)	77%

TETANUS IN CHILDREN

The overall incidence and mortality in children, who had tetanus, has been much lower than any other age group (Table 3). One of the children in 1978 had tetanus as a complication of otitis media. Since 1980, no cases of tetanus have been reported among children aged 4 weeks to 14 years. There was a steady decline in the rate of tetanus among children as childhood immunization increased (Table 4).

Tetanus in the Adult Male Group

Fewer and fewer patients are being reported by the WHO to have developed tetanus post-operatively. In Bahrain none of the cases among the male adults have occurred after surgery. The main cause in this group seems to be farms or industrial injuries, or as a complication of sepsis. Few of the cases did not give any history of previous injury or sepsis.

Half of the cases among adult males occurred between 1970 and 1974 with the mortality rate of 16.6% (Table 5).

Table 5

Tetanus Among Adult Males 1970-84

Year	*No.*	*Age*	*Death*	*Percentage*
1970-74	12	18 – 70 Yrs	2	16.6%
1975-79	8	20 – 52 Yrs.	2	25.0%
1980-84	4	not available	0	0%
Total	**24**		**4**	**16.6%**

Table 6

Tetanus Among Adult Females (1970-84)

Year	*Total of Tetanus Cases*	*Age*	*Death*	*Cause of Death*
1970-74	6	(18-50)	2	Incomplete Abortion
1975-79	5	(18-35)	3	2 Abortions 1 Postnatal sepsis
1980-84	5	(20-45)	1	Septic Abortion
Total	**16 Cases**		**6**	**(Average mortality 35.2%)**

TETANUS IN ADULT FEMALES

Over the past 17 years we have had six maternal deaths due to tetanus complicating either childbirth or abortions (spontaneous or induced) (Table 6). In 1970, 2 Bahraini women were admitted to the ICU with tetanus complicating incomplete abortions, aged 20 and 35 years. One of them died despite intensive treatment. Out of 3 women, admitted in 1973, one Bahraini also died in the aftermath of septic abortion. The peak of maternal deaths occurred in 1975 when three women, one of them Bahraini and two Indian housemaids (19, 22 and 35 years old) two of which died after developing tetanus complicating septic abortions. There was no further recorded maternal death until 1981 when a Sri Lankan housemaid died of tetanus secondary to self induced abortion (Table 7).

Table 7

Death Among Adult Women with Tetanus by Nationality

Year	*No. of Cases*	*Death*	*Nationality*
1970-74	7	2	Bahrainis
1975-79	5	3	1 Bahraini
			2 Indians
1980-84	5	1	Sri Lankan

DISCUSSION

It seems that the disease has almost been eliminated in children under the age of 5 from 1974. This has been mainly due to the availability of routine immunization against tetanus for children in the sixties and early seventies as well as vaccination after injury.

From 1975-79, though the incidence of neonatal tetanus declined by more than half, the mortality rate rose to 53.3 percent. One could extrapolate from this that although tetanus is on the decline it is still a very serious disease in the neonates. In other words there is no place for complacency in continuing support for the vaccination programme. It would appear to be a wise step also to make it compulsory for the pre-school years in order to maintain the excellent results which have so far been achieved.

It appears that, although the actual number of tetanus cases among adult males have declined, starting from the second half of the seventies by one third, this decline was not proportional to the incidence fall in other categories. This merely represents the section of males who did not get any tetanus vaccination and who are not motivated to get vaccinated prophylactically.

Since 1976, there has been no maternal death among Bahraini women due to tetanus. However, most of the cases in the following 10 years were among housemaids from the Indian Sub-Continent secondary to abortions. Generally speaking, it has been noticed that despite the meticulous care in the Intensive Care Unit and all the improvements in the treatment of cases of septic abortion, the mortality rate was very high (66.6 percent). Amongst those who survived the ordeal, the morbidity cannot be underestimated. We can only hope that with the current availability of contraceptive methods and counselling services, the present trend of no tetanus cases being reported in this category will continue for the foreseeable future.

As Esdall puts it, tetanus is the "inexcusable disease" [11] : yet it still persists in many parts of the world. In Bahrain, through a major effort on the part of the preventive and curative services, we have had no neonatal cases since 1984 [12]. Indeed, the Public Health Directorate has achieved the (EPI) target of reducing the incidence of neonatal tetanus to less than 1 per 1000 live births 20 years earlier (Table 8). Moreover, since the elimination of neonatal tetanus is regarded as a sensitive critical index of adequacy of primary health care, it goes without saying that this is a bonus in favour of the quality and the coverage of community health care on this island. In order to maintain and consolidate this standard, we have to follow two main lines of action:

1. The strict asepsis and cleanliness at childbirth which includes birth in sanitary environment, and in particular by hygienic cutting of the umbilical cord and hygienic care of the umbilical stump after the birth, must be maintained. This basically implies increasing the coverage of assistance at delivery by trained persons.