

ORIGINAL ARTICLE

Neonatal Tetanus in the Department of Child Health Dr. Pirngadi Hospital, Medan in 1983-1984

by

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Abstract

From January 1983 to December 1984 there had been prospective investigations of neonatal tetanus contracted by newborn infants treated at the Department of Child Health Dr. Pirngadi Hospital Medan. Seventy eight cases (4,28%) contracted neonatal tetanus out of 1821 hospitalized infants. Fifty cases were identified in 1983 and 28 cases in 1984. Forty nine cases (62,82%) were delivered by traditional birth attendant (TBA), 18 cases (23,8%) by midwife/nurse and 11 cases (14,10%) by others. The instruments used to cut the umbilical cord were razor blade (34,62%), scissor (33,33%) and sharp sliver bamboo (29,49%). There were 23 cases (29,49%) who used traditional medicine made from herb for umbilical cord treatment. None of the mothers was vaccinated with tetanus toxoid. Most of the parents had only elementary school education, 42,32% fathers and 71,79% mothers.

Based on this study it is suggested to increase tetanus toxoid immunization to pregnant mothers, health education for the community and a brief course provided for the traditional birth attendant (TBA) should be enhanced to reduce the incidence and mortality rate of neonatal tetanus.

Introduction

Neonatal tetanus just like tetanus, is a common health problem in the world especially in developing countries (Dibyosubroto, 1980; Hasan, 1981). Khoo (1981) estimated 80 - 320 cases out of 1.000 live births. In developed countries such as the United States and the United Kingdom, this disease had rarely been prevalent (Hutchison, 1984).

The neonatal tetanus mortality rate in some hospitals in Indonesia reached 35% - 96% (Sunarto and Budiman, 1972; Tjajj and Sembiring, 1972; Marwoto and Surjono, 1976; Napitupulu, 1976; Husada et al., 1976; Ruspanji, 1981; Sudaryat et al., 1981; Ismudijanto et al., 1981; Saragih et al., 1981; Hamid et al., 1985), indicates a high percentage of deaths. In 1983 the number of cases and deaths caused by neonatal tetanus was estimated to be 89,250 and 80,325 cases respectively (quoted from Umpan Balik EPID 1984). The high frequency of neonatal tetanus in Indonesia is

caused by several factors. The predominant ones are the insufficient immunization upon pregnant mothers or fertile women while 80-90% of deliveries were attended by traditional birth attendants (TBA). This indicated that the role of TBA is still dominant (Marwoto and Surjono, 1976; Prawirohujo, 1980). Other factors that caused the high occurrence of neonatal tetanus are environmental sanitation, ignorancy of health and sterility, the existence of traditional beliefs or habits, the low level of socio economic condition. (Dibyosubroto et al., 1978; Prawirohujo, 1980; Ruspanji, 1981; Sudaryat et al., 1981). The purpose of this study is to investigate neonatal tetanus with respect to following aspects: the person attending the delivery, the instruments used for cutting the umbilical cord, parents education, mortality rate and immunization status of the mothers whose babies suffered from neonatal tetanus.

Materials and Methods

This study was conducted prospectively on neonates admitted with neonatal tetanus in the Department of Child Health, Dr. Pirngadi Hospital during the period of 23 months between January 1983 and December 1984.

The informations including age, birth attendant, kinds of instruments used for cutting umbilical cord, material used for the treatment of the umbilical stump, parent's educational back ground and mother's immunization status were re-

corded in a special form.

All cases were regularly reported to the Provincial Health Department of North Sumatera and to the Municipal Health Service or District Health Service. Detailed information concerning labor procedures, cutting of umbilical cord and material used for the treatment of umbilical stump was taken from the birth attendant. Report on these cases were then sent to the Department of Child Health, Dr. Pirngadi Hospital, Medan.

Result

During the above mentioned period, 78 cases of neonatal tetanus were treated in

the Department of Child Health, Dr. Pirngadi Hospital, Medan.

Table 1 : Number of cases

Year	Total cases			Neonatal tetanus			%
	M	F	Total	M	F	Total	
1983	516	397	913	24	26	50	5,48
1984	538	370	908	15	13	28	3,08
Total	1054	767	1821	39	39	78	4,28

M = male F = female

Fifty cases out of 913 infants and 28 cases out of 908 admitted in 1983 and 1984 respectively. They were 39 males and 39 females suffered from neonatal tetanus (table 1).

Table 2 : Birth attendant and neonatal tetanus

Birth Attendant	1983		1984		Total	%
	Number	%	Number	%		
T B A	30	38,46	19	24,36	49	62,82
Midwife/nurse	12	15,38	6	7,70	18	23,08
Doctor	-	-	-	-	-	-
Others	8	10,26	3	3,84	11	14,10
Total	50		28		78	100,00

Table 2 shows that 49 cases (62,82%) were delivered by TBA, 18 cases (23,08%) by midwife/nurse. There were 11 cases (14,10%) attended by mothers, fathers, grandmothers and neighbours (others). Only 3 out of 49 TBa were trained (6,01%).

Table 3 : *Instrument used for cutting the umbilical cord*

Instrument	T B A		Mid/Nur		Rel		Total	%
	Number	%	Number	%	Number	%		
Scissor	6	7,69	18	23,08	2	2,56	26	33,33
Bamboo	20	25,64	-	-	3	3,85	23	29,49
Razor blade	22	28,21	-	-	5	6,41	27	34,62
Unknown	1	1,28	-	-	1	1,28	2	2,56
T o t a l	49		18		11		78	100,00

Mid / Nur : Midwife/Nurse

Rel : Relative

The instruments mostly used for cutting the umbilical cord were razor blade (34,92%), scissor (33,33%) and bamboo (29,49%) (table 3). In twenty two (44,92%) out of 49 cases who were attended by TBA, the umbilical cord was cut by razor

blade, in 20 cases (40,80%) by a sharp sliver bamboo and in 6 (12,39%) by scissors. For tying the umbilical cord after cutting, most of them used unsterile wool ligature. Most of them didn't dress the umbilical stump.

Table 4 : *Material used for umbilical stump*

Material	T B A		Mid/Nur		Rel		Total	%
	Number	%	Number	%	Number	%		
Alcohol/Spiritus	11	14,10	14	17,95	1	1,28	26	33,33
Herbal origin	21	26,92	-	-	2	2,56	23	29,49
Sulfa powder	5	6,41	-	-	1	1,28	6	7,69
Dermatol	3	3,85	-	-	1	1,28	4	5,13
Salicyl talcum	1	1,18	-	-	-	-	1	1,28
Betadine	-	-	4	5,13	-	-	4	5,13
Nothing	-	-	-	-	1	1,28	1	1,28
Unknown	8	10,26	-	-	5	6,40	13	16,67

In 26 cases (33,38%) they used alcohol/spiritus for the care of the umbilical stump, while in 23 cases (29,49%) they used ingredients of herbal origin. In 21 cases (26,92%) helped by TBA the ingredient of herbal

origin was used (table 4). This ingredient consisted of safron, grinded or whole Piper Betle's leaf, salt and coconut oil. The most common ingredient consisted of safron, Piper Betle's and salt.

Table 5 : *Education status of the parents*

Educational status	1983		1984		Total		%	
	Fa	Mo	Fa	Mo	Fa	Mo	Fa	Mo
Illiterate	2	3	-	1	2	4	2,56	5,13
Elementary school	21	34	12	22	33	56	42,32	71,79
Secondary school	14	6	11	4	25	10	32,05	12,82
High school	9	3	3	-	12	3	15,38	3,85
Academy/university	1	-	-	-	1	-	1,28	-
Unknown	3	4	2	1	5	5	6,41	6,41
T o t a l	50	50	28	28	78	78	100,00	100,00

Fa = Father

Mo = Mother

Table 5 shows that most of the parents had elementary education, namely, fathers (42,32%) mothers (71,79%). There was

one case (1,28%) in which the father graduated from high school.

Table 6 : Mortality

Year	No of cases	Rec		Dis		Death	
		N	%	N	%	N	%
1983	50	17	34	13	26	20	40
1984	28	6	21,43	12	43,07	10	35,50
Total	78	23	29,41	25	32,05	30	38,54

Rec = Recovery Dis = Discharged request

Cases discharged on parent's request were not discussed in this study.

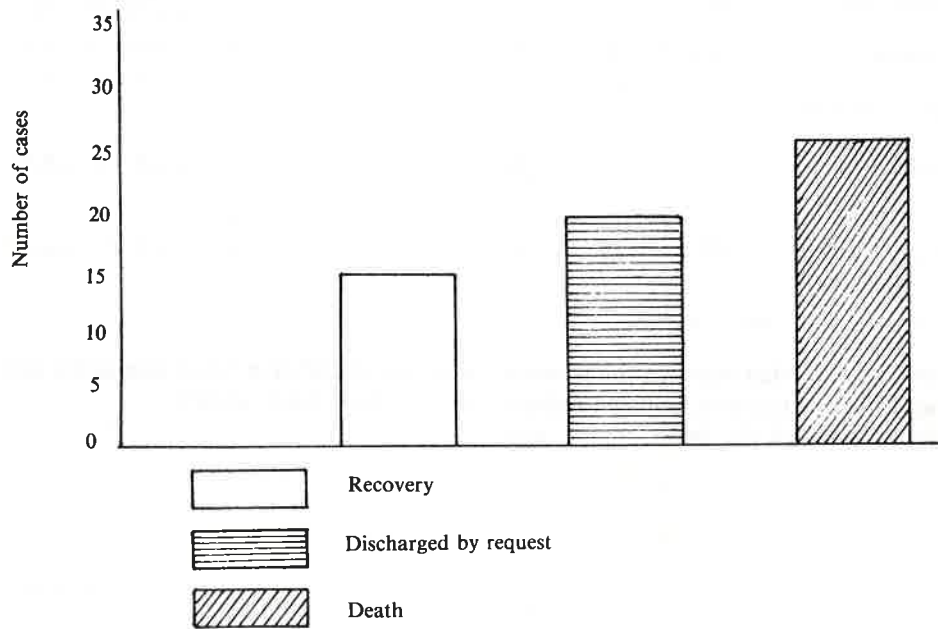


Figure 1 : The ultimate condition of neonatal tetanus cases

Table 6 and figure 1, show that 25 out of 78 cases were not investigated any longer since they were discharged by request. The mortality rate in our cases was 38,54%.

Table 7 : Incubation period and mortality

Incubation period (day)	Case	Rec	Dis	Death	
				N	%
1	1	-	1	-	-
2	1	-	-	1	100,00
3	4	1	-	3	75,00
4	7	1	3	3	42,86
5	20	1	5	14	70,00
6	14	3	4	7	50,00
7	12	8	4	-	-
8	9	4	4	1	11,11
9	2	1	-	1	50,00
10	2	-	2	-	-
11	3	3	-	-	-
12	1	1	-	-	-
15	1	-	1	-	-
17	1	-	-	-	-

Table 8 : Mother's immunization state

Year	No of mother	T T vaccination	
		Number	%
1983	50	0	0
1984	28	0	0
Total	78	0	0

Discussion

Neonatal tetanus is a disease with typical clinical manifestations. As a result the diagnosis is very easy. However the treatment is difficult especially in developing countries (Hasan, 1981; Krugman et al., 1977). Contamination of the umbilical cord with spores of *Clostridium tetani* is the most common mode of infection in newborn infants whose mothers have never been vaccinated (Balakrishnan and Radhakrishna, 1983; Dibyosubroto, 1980; Krugman et al., 1977). Most of the newborn infants with neonatal tetanus have been delivered outside the hospital from unimmunized mothers. Unsterile techniques were used during delivery. The cutting and tying of the umbilical cord were done without mentioning sterility (Huchthinson, 1984; Vaughan et al., 1979).

In this study it was found that 49 out of 78 neonatal tetanus cases (62,82%), the delivery were carried out by TBA (table 2).

Other investigators discovered such an occurrence ranging from 60-90% (Ruspanji, 1981; Sudaryat et al., 1981; Saragih et al., 1981; Hamid et al., 1985; Ismudijanto et al., 1981; Marwoto and Surjono, 1976). Only 23,08% were attended by a midwife/nurse. Marwoto and Surjono (1976) reported 6,70%; Ismudijanto et al., (1981) 12,5%; Sudaryat et al., (1981) 20%; Hamid et al., (1985) 24,39% and Saragih et al., (1981) 31%. Napitupulu (1976) in his study in 1971-1975 in Dr. Pirngadi General Hospital and PTP IX Hospital Medan found 69 occurrences out of 283 neonatal tetanus cases in which deliveries were attended by midwives/nurses. Considering the high percentage of the cases whose deliveries were attended by midwife/nurse, it is suggested that a more appropriate control over the labor procedures should be

emphasized by the competent officials. Marwoto and Surjono (1976) and Sudaryat et al., (1981) found that the instrument mostly used to cut the cord was bamboo while Hamid et al., (1985) reported the application of scissors.

In our study it was found that the instrument used for cutting the umbilical cord in most of the cases was razor blade; however 25.64% of cases attended by TBA the umbilical cords were cut by bamboo (table 3). It is clear that the cause of neonatal tetanus originates from the use of unsterile instruments and the negligence of the nurse in attending deliveries. Therefore, the problem must be handled by medical trainers and staff because it is part of their responsibilities. However, regulations must be reinforced and warning be issued to ignorant medical staff. In addition, control over the location should be carried out and the improvement of courses should be provided. The ignorance about umbilical care and the influence of local customs and traditional beliefs resulted in the use of traditional or local medicine made from herb in 29,49% of cases. The most common ingredient consisted of safron, Piper Betle's leaf and salt. It is lower than the findings of Hamid et al., (1985; Marwoto and Surjono (1976); Dibyosubroto (1980) and Sudaryat et al., (1981) who found that in 31,70-100% of the cases, ingredient made of herbs was used. Most of the educational status of parents in our study were elementary school. Dibyosubroto (1980) found that 63,6% of cases had parents who were graduated from elementary school, whereas Hamid et al., (1985) got 59,76% of the father educated in elementary school. Dibyosubroto et al., (1981) studied that there is a relationship between educational status and delivery support.

The mortality rate is related to the quality of medical and nursing care given to the patients and also upon the severity of the disease on admission and incubation period. In our study the highest mortality was in cases with an incubation period below 7 days (table 7). The mortality rate of neonatal tetanus in several hospitals in Indonesia is presented in table 9.

Table 9 : *The mortality rate of neonatal tetanus in several hospitals in Indonesia*

Investigator	Year	City	Mortality rate (%)
Sunarto and Budiman (1972)	1968-1969	Yogyakarta	68,5
Tjaj and Sembiring (1972)	1968-1970	Medan	73,1
Husada et al., (1976)	1972	Manado	75
	1973	Manado	50
	1974	Manado	72,2
	1975	Manado	61,4
Napitupulu (1976)	1971-1975	Medan	73,1
Saragih et al., (1981)	1977	Medan	76,6
	1978	Medan	64,7
	1979	Medan	66,3
Ruspanji (1981)	1979-1980	Banyuwangi	35
Sudaryat et al., (1981)	1979-1980	Denpasar	43,75
Hamid et al., (1985)	1981	Medan	66,6
	1982	Medan	70,00
Marbun et al., (This study)	1983-1984	Medan	38,54

The use of intermittent positive pressure ventilation (IPPV) reduced the mortality rate to 18,5% - 20% (Khoo, 1981; Balakrisnan and Radhakrisna, 1983). At the intensive care unit of the Department of Child Health Dr. Cipto Mangunkusumo Hospital 2 neonatal tetanus cases could be saved by using mechanical ventilation (Hasan, 1981). The expensive cost of modern therapy/management make look forward for more effective and practice procedure in eliminating neonatal tetanus. Neonatal tetanus is a preventable disease. Primary immunization of pregnant women with 2 doses of absorbed tetanus toxoid (TT), administered 3 times in one month interval would completely protect the newborn infants against tetanus (Department Kesehatan R.I., 1979; Khoo, 1981; Krugman et al., 1977; Morley, 1977). In Indonesia, TT immunization was given to 900.000 expectant mothers in 1982/1983 and to 993.450 in 1983/1984. Despite the increasing number of recipients it is not sufficient when compared with the popu-

Conclusion

1. The occurrence of neonatal tetanus in neonates delivered by TBA was still high (62,82%).
2. The percentage of TBA trained in North Sumatera was 60%.
3. There were also neonatal tetanus in neonates who were attended by midwives/nurse (23,08%).
4. The mortality rate of neonatal tetanus

lation to be vaccinated. The percentage for TT in 1983/1984 was 19,6%. Data from the Direktorat of Communicable Disease Control Provincial Health Department of North Sumatera showed that the outcome of the immunization of TT was 23,3% of the target while in 1983/1984 was 35%. It can be concluded that immunization programme must be encouraged and enhanced, because this method is an effective way of preventing neonatal tetanus.

The TBA plays an important role in the occurrence of neonatal tetanus. Therefore health education must be given to the TBA especially about how to help the women in delivering a baby and the proper handling of the umbilical cord (Krugman et al., 1977; Prawirohujo, 1980). The data from the Mother and Child Directorate Provincial Health Department of North Sumatera showed that 3213 (57,33%) of TBA had been trained while in 1984, 3594 (60,05%) out of 5985 registered TBA had been already trained. In 1982-1984 there were 286 TBA in Medan and 225 of them have been trained.

5. The coverage the TT immunization for pregnant women was relatively small; so the programme must be encouraged and enhanced.
6. Health education for community and continuing courses for the TBA should be enhanced.

REFERENCES

1. BALAKRISHNAN, S.; RADHAKRISNA, S.: Neonatal Tetanus. *J. Pediatr. Obstet. Gynaec.* 9 : 11-16 (1983).
2. Departemen Kesehatan R.I.: Petunjuk Pelaksanaan Pengembangan Imunisasi hal 1-15, Jakarta (1979).
3. DIBYOSUBROTO, S.: Management of neonatal tetanus. *Mother and Child* 6 : 25-29 (1980).
4. DIBYOSUBROTO, S.; RUSKANDI, M.; AZHALI, M.S.: Attitude and knowledge of the parents of neonates admitted with tetanus neonatorum. *Paediatr. Indones.* 18 : 67-74 (1978).
5. HAMID, E.D.; DAULAY, A.P.; LUBIS, C.P.; RUSDIDJAS; SIREGAR, H.: Tetanus neonatorum in babies delivered by traditional birth attendants in Medan, Indonesia. *Paediatr. Indones.* 25 : 167-174 (1985).
6. HASAN, R.: Pengobatan tetanus neonatorum dengan ventilasi mekanik, Naskah lengkap Diskusi Kelompok Tetanus Neonatorum Konika V, Medan (1981).
7. HUTCHISON, J.H.: Practical Paediatric Problem; 5th ed., pp. 87-88 (Lloyd - Luke, Asian Ed. 1984).
8. HUSADA, T.J.; RAMPENGAN, T.M.; HARIANTO, I.G.N.; ARIF, I.D.; MUNIR, M.: Neonatal tetanus. Evaluation of treatment and a proposal for classification of severity, *Paediatr. Indones.* 16 : 345-354 (1976).
9. HUSADA, T.J.; MUNIR, M.: Neonatal tetanus analysis of 108 cases using a scoring system *Paediatr. Indones.* 18 : 263-268 (1978).
10. ISMUDIJANTO; KOESWARDJO; SOEJOSO, D.A.; SOEGIJANTO, M.F.; GDE RANUH, I.G.N.: Diazepam dosis tinggi pada tetanus neonatorum. Naskah Lengkap Diskusi Kelompok Tetanus Neonatorum Konika V, Medan, 1981.
11. KHOO, B.H.: Present day treatment of neonatal tetanus, Naskah Lengkap Diskusi Kelompok Tetanus Neonatorum Konika V, Medan, 1981.
12. KRUGMAN, S.; WARD, R.; KATZ, S.L.: *Infectious Disease in Children*; 6th ed., pp. 371-378 (Mosby, Saint Louis 1977).
13. MARWOTO and SURJONO, A.: Tetanus neonatorum in the Bethesda Hospital Yogyakarta. *Paediatr. Indones.* 16 : 337-344 (1976).
14. MORLEY, D.: Pediatric Priorities in the Developing World, pp. 383-385 (1977).
15. NAPITUPULU, A.: Kejadian tetanus neonatorum di RSUP Medan dan RS PTP IX Medan (1971-1975), *Maj. Fak. Ked. USU No. 2/VI*, pp. 2-6, Juni (1976).
16. PRAWIROHUJO, S.: Mengembangkan pelayanan kesehatan ibu dan anak sampai ke desa, Pidato orari dalam Mukhtar ke XVIII IDI Manado Oktober 1980, *Medika* 11 : 645-648 (1980).
17. RUSPANJI, T.: Peranan keluarga pada perawatan tetanus neonatorum, Naskah Lengkap Diskusi Kelompok Tetanus Neonatorum Konika V, Medan, 1981.
18. SARAGIH, M.; HARAHAP, E.S.; HAMID, M.; LUBIS, C.P.; SIREGAR, H.: Kejadian tetanus neonatorum di Bagian Ilmu Kesehatan Anak RS Dr. Pirngadi Medan 1977-1979, Simposium Tetanus, Medan (1981).
19. SUNARTO; BUDIMAN, D.: Valium in the treatment of tetanus neonatorum. *Paediatr. Indones.* 12 : 221-228 (1972).
20. SUDARYAT; WIADNYANA, Ny. S.; SUGITHA, I.N.; WESTA, I.N.; MADRA, D.G.: Pemberian tetanus immunoglobulin human sebagai tambahan pengobatan pada tetanus neonatorum, Naskah Lengkap Diskusi Kelompok Tetanus Neonatorum Konika V, Medan, 1981.
21. TJAII, J.K.; SEMBIRING, L.: Modified treatment of neonatal tetanus. *Paediatr. Indones.* 12 : 229-234 (1972).
22. VAUGHAN, V.C.; MC. KAY, R.J.; BEHRMAN, R.E.: Tetanus, in *Nelson Text Book of Pediatrics*, 11th. ed. pp. 804-807 (Saunders, Igaku Shoin, Philadelphia/London/Toronto/Tokyo 1979).
23. UMPAN BALIK E.P.O.D. Penyakit-penyakit Pengembangan Program Imunisasi, 47 (1984).