FACTORS ASSOCIATED WITH TT (TETANUS TOXOID) IMMUNIZATION AMONG PREGNANT WOMEN, IN SAPARUA, MALUKU, INDONESIA

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Abstract. A cross sectional study was conducted at Saparua Health Center to determine factors associated with the administration of tetanus toxoid. In all, 64 pregnant women were recruited. The majority of the women were housewives, aged 17 to 30 years old, and having more than one child. They were educated to high school, knew some information on tetamus toxoid, and knew at least one of the tetanus symptoms. Almost all did not know the cause of tetanus.

The logistic regression of knowledge on tetanus and TT immunization: mothers who heard of TT were 1.54 more likely to have been immunited than those who did not, while mothers who knew the use of tetanus toxoid were 2.15 times more likely to have been immunized than those who did not, and those who knew at least one of the tetanus symptoms were 1.86 times more likely to have been immunized than those who did not, respectively controlling other variables constant. Furthermore, women who had antenatal care were 30 times more likely to have been immunized than those who did not. Enhancing mothers knowledge on tetanus is important to increase the coverage of tetanus toxoid. Moreover, antenatal care would cause contact with sources of tetanus toxoid and hence increase the chance of having the immunization. At the same time, this decreases tetanus neonatorum. Considering the majority of pregnant women received information on tetanus from health workers, the use a variety of media would be advantageous.

INTRODUCTION

Tetanus neonatorum (TT) is one of the underreported notifiable diseases because its incidence tends to occur in areas which are out of reach of health facilities. In 1991 an estimated tetanus neonatorum (TN) deaths in the world were 433,000 infants. And for some developing countries, it caused more than half of the infant mortality.

Tetanus neonatorum is endemic in 90 countries, with 80% of the incidence estimated to occur in developing countries. It was estimated by the WHO that Africa and Southeast Asia had the highest tetanus neonatorum mortality rate at 5 per 1,000 live births. The WHO is attempting to decrease the mortality rate to 1 per 1,000 live births by the year 2000.

In 1991 Indonesia TN deaths (37,375) were estimated to compose 8.5% of TN deaths worldwide. This result was found according to the methods developed by the WHO in previous mortality surveys in the community (Galazka *et al*, 1989; Stanfield and Galazka, 1984).

Based on "The Indonesia Health Profile 1991" tetanus neonatorum occurred in only 1,503 infants, while for other types of tetanus 8,105 cases occurred. The case fatality rate from cases treated in hospitals was 64% (844/1503). This rate was the highest compared to other immunization preventable diseases (Department of Health, 1992).

Tetanus neonatorum is effectively prevented by tetanus toxoid and clean deliveries. Based on "The Indonesia Demographic and Health Survey 1991" 80% of all deliveries occurred at home and 65% of those deliveries were assisted by non health workers. In Maluku the situation is very similar. Tetanus neonatorum treated at the Ambon General Hospital in Maluku showed that among 142 cases, corresponding deliveries were all assisted by non-health workers. In particular, it was estimated that more than a half (65.5%) were assisted by trained traditional birth attendants (TBA), the rest (34.5%) by untrained TBA (Puapella, 1989; Maricar, 1988).

In the view of the fact that in developing countries the majority of deliveries are assisted by non-health workers, increasing coverage of tetanus toxoid is desirable. High tetanus toxoid coverage

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of women of childbearing age is extremely effective. For example in the Pidie district, Indonesia, an increase of tetanus toxoid coverage from 10% to 84% would decrease the tetanus neonatorum deaths from 32.1 to 4.9 per 1,000 live births.

In Indonesia the 50% tetanus toxoid coverage is almost the same nationwide. It was 57% for the whole Indonesia and 51.6% for the Maluku (Central Bureau of Statistics, 1993; Maluku Provincial Health Office, 1992). Hence the tetanus toxoid coverage should be increased in order to decrease tetanus neonatorum deaths. It should also be kept in mind, at the global level, that the increase in tetanus toxoid coverage among pregnant women is slowly progressing (Omran *et al*, 1987; Kessel *et al*, 1991).

METHODS

Study area

This study was conducted in the work area covered by Saparua Health Center, Middle Maluku, Indonesia. This center serves 4 villages which cover about 47 km^2 and a population of 7,290 people in 1991. The socio-economic characteristics were low level. The main occupations was agriculture and traditional fishery. A small proportion was in trading, local industries, or were civil servants. The transportation within the center is good, there is public transport in the day time while at night people have to charter a vechicle. There is daily water transport available to Ambon (the capital of Maluku Province) and to Masohi (the capital of Middle Maluku). Both are located in other islands. So people could seek health services, either to local or referral facilities outside the island.

In 1991 the Center's twice tetanus toxoid coverage was 47%.

Study design

A cross sectional study was carried out among all pregnant women living in the area covered by the center in October to December 1992. They were residents of the villages based on antenatal registration of health services (Saparua Health Center, Saparua Hospital, village midwives, village integrated health posts) and based on health cadres' information on the presence of pregnant women in their monitoring areas.

Response rate and data analysis

The response rate among pregnant women visiting the center and integrated health posts was 100%. No one visited at home refused to be interviewed.

The tetanus toxoid status was validated with the registration data. The status among women who did not keep the "Road to Healthy Card" (noted tetanus toxoid status), was determined from the registration data. This procedure was taken because many who had been immunized kept their cards in the health facilities, not at home.

Interviews were conducted by the investigator and the midwife of the center who had been trained for interview. The interview schedule was pretested at the center.

Epi-Info package was used to do the univariate analysis. The STATA software was used to do the multivariate analysis.

RESULTS

The majority of pregnant women were 17-30 years old, with an average age of 26 years. The youngest was 17 years while the oldest was 45 years. More than half (57.8%) of the women had attained high school. A high percentage (72%) of the women were housewives. All who worked in offices were civil servants.

Most (67.2%) of the women were not members of any social organization, including Pendidikan Kesejahteraan Keluarga (PKK) or the Family Welfare Promotion organization. The majority (80%) of the women had more than one child. The average number of children was 2.78, and only one female was in her first pregnancy. The highest number of children was 9.

Based on the obstetric history, 85% of the women had never had the experience of having lost a child. Among those who had lost a child, there was only one whose child died under 1 year old. Eighty percent of the women had information on tetanus toxoid. The main source was midwives, followed by other health workers, and a combination of doctor and midwife. About half (55%) of the women knew about the use of tetanus toxoid to prevent tetanus. Only 37% of the women knew any of tetanus symptoms. Of these most knew one of the tetanus symptoms, seizure. Almost all (95%) did know the cause of tetanus.

Fifteen percent of the women never had antenatal care. The average antenatal visit was 2.93 times. Most visited site was the health center antenatal care, followed by midwife practices. Among

Table 1
Variables associated with tetanus toxoid.

Variables No. (%)	Non TT No. (%)	TT	cOR (95%CI)	p-value
Obstetric history :				
No death	20 (83)	37 (93)	1.0	
Any death	4 (17)	3 (7)	0.41 (0.08-1.99)	0.44
Age :				
17-30 years	20 (83)	33 (83)	1.0	
> 30 years	4 (17)	7 (17)	1.06 (0.23-5.08)	0.93
Participation in organization :				
No	17 (71)	26 (65)	1.0	
Yes	7 (29)	14 (35)	1.31 (0.38-4.55)	0.63
Education :				
Elementary	12 (50)	15 (38)	1.0	
High school	12 (50)	25 (62)	1.67 (0.52-5.33)	0.33
Occupation :				
Housewives	19 (79)	26 (65)	1.0	
Workers	5 (21)	14 (35)	2.05 (0.55-7.99)	0.23
Number of children :				
> 1 child	21 (88)	30 (75)	1.0	
0-1 child	3 (12)	10 (25)	2.33 (0.49-12.4242)	0.23
Knowledge on tetanus				
Hear of TT :				
No	8 (33)	6 (15)	1.0	
Yes	16 (67)	34 (85)	1.83 (0.72-11.5)	0.09
Use of TT :				
Do not know	17 (71)	7 (18)	1.0	
Know	7 (29)	33 (82)	3.29 (0.98-11.4)	0.03
Cause of tetanus :				
Do not know	23 (96)	37 (93)	1.0	
Know	1 (4)	3 (7)	1.86 (0.15-50.38)	0.60
Symptoms of tetanus :				
Do not know	19 (79)	21 (52)	1.0	
Know	5 (21)	19 (48)	3.34 (0.94-13.2)	0.03
Antenatal care :				
Never	10 (42)	0 (0)	1.0	
Ever	14 (58)	40 (100)	30.07 (3.43-677.8)	0.00

cOR : crude odds ratio
CI : Confidence interval

40 women (62%) who had tetanus toxoid during their pregnancies, only 4 persons kept the card denoting tetanus toxoid status. Table 1 shows variables associated with tetanus toxoid. Table 2 shows the logistic regression of knowledge on tetanus for p-value below 0.2 and TT immunization.

DISCUSSION

The twice tetanus toxoid schedule for pregnant women was best given at the sixth and the eighth month of pregnancy in the third trimester (Chen, 1983). It is supposed that the two month

Table 2
The logistic regresstion of knowledge on tetanus and TT practice.

Variables	Coeff	Std error	Student's *t*-test	p-value	aOR (95% CI)
Hear of TT	0.43	0.71	0.62	0.54	1.54 (0.37-6.37)
Use of TT	0.62	0.70	1.09	0.28	2.15 (0.46-7.60)
Symptoms of TT	0.77	0.70	0.89	0.38	1.86 (0.53-8.71)

aOR: adjusted odds ratio, CI: Confidence interval

duration of tetanus toxoid in which the second dose was given one month before delivery produce sufficient anti-tetanus serum to protect the child from tetanus neonatorum.

In this study the tetanus toxoid was just differentiated as yes or no without determining of how many times the immunization was administered. It is very common for pregnant women to consult health workers about their pregnancies, especially one month before delivery. So of those who had had tetanus toxoid once, we can assume they received the second immunization later in their pregnancy. However, only 4 (4%) of the women had already had tetanus toxoid twice. Women in the third trimester of the gestational period are due to have the immunization. The third trimester of the gestational period was a confounder to the association of variables to tetanus toxoid. All pregnant women in the center were included because of the limitation of sample size. This caused some underestimation of the associations.

As far as the population was concerned, the majority of the pregnant women aged 17 to 30 years old, housewives, and not members of any social organization. A high percentage of the women had more than one child. It is common practice that girls get married after finishing high school. So at the age of 30 years, the majority had already had one child besides their current pregnancy. The majority of the women did not do any work, nor participate in any social organization.

Many (56%) of the pregnant women graduated from high school, so they had enough basic knowledge, and received some information on TT. But as tetanus is specific for health, only about half of the women knew about use of tetanus toxoid for preventing tetanus neonatorum. Among those who knew some tetanus symptoms, most mentioned only one symptom, seizure. Only 4 (6%) of the women knew the right cause of etiology, tetanus (bacterium living in the soil). Seven women (18%) of those who did not know gave answers regarding unclean cord treatment.

Mothers who had lost a child were motivated to be more aware of threats to their pregnancies, but almost all (88%) had never lost a child.

Women under the age of 30 are at an optimal period for delivery, so they were more aware of their pregnancies. The proportion of cases and controls aged 30 years old or younger, who had tetanus toxoid were the same (83%). Age was not associated with tetanus toxoid, possibly the pregnant women were mainly aged 30 years old or younger.

Having had high school education or participating in social organizations were associated with tetanus toxoid. These associations were not significant. It should be considered, however, that there was still a large random variation involved. The sample was only 64 women. Having already had one child had a higher tendency to practice tetanus toxoid vaccination. Women with a small family were more aware of their pregnancies. The association was not significant, a p-value of 0.23. The family planning program promotes having 2 children. The woman who had 9 children was the oldest, aged 45 years old.

Those who had information on tetanus toxoid tended to practice the immunization 2.83 times more compared to those who did not receive any information. The association was significant at the p-value 0.09. The intuitive explanation is that those who had information would be more motivated to have tetanus toxoid.

Those who had antenatal care had the highest tendency to practice tetanus toxoid. Women who had antenatal care were 30 times more likely to practice tetanus toxoid immuization compared to those who did not have an antenatal care. As Arnold *et al* (1989) showed, antenatal care caused contact with sources of tetanus toxoid. The majority of women visited the health center for antenatal care.

The possible reason is that the treatment cost in the center is inexpensive. So it is very important to have midwives in the existing health, centers who do the antenatal care. With doctors' supervision, midwives could also monitor and enhance the capabilities of the TBA to do clean deliveries, since some proportion of pregnant women still visit the TBA for their deliveries.

Because the adjusted odds ratio of each independent variable* differs more than 10% from the crude odds ratio, a certain amount of confoundings can be suspected which in controlled in the logistic model.

Having knowledge on tetanus toxoid and antenatal care tended to have a higher chance of receiving tetanus toxoid. These results could be used to support the health education program enhancing knowledge on tetanus toxoid and promoting antenatal care among pregnant women. Considering the majority of pregnant women received information on tetanus from health workers, using a variety of media is expected.

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*hear of TT, know use of TT and symptoms of TT.