

Research Article

Determinant of Timely First-shot Hepatitis B Immunization in East Lombok, West Nusa Tenggara, Indonesia

Determinan Pemberian Imunisasi Hepatitis B0 secara Tepat Waktu di Kabupaten Lombok Timur, Nusa Tenggara Barat, Indonesia

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ABSTRACT

Hepatitis B remains as one of health problems in the world. The results of several studies related to factors in predicting of the timely first-shot hepatitis B immunization were still inconsistent. Aim of this study is to identify determinant factors of the timely first-shot hepatitis B immunization in East Lombok, Indonesia. We used a cross sectional design study, and data derived from immunization coverage survey at six districts/cities in 2013. A Total of 227 children aged 12 to 23 months who already got immunization of a first-shot hepatitis B vaccine and well documented were included as samples in this study. Timely first-shot hepatitis B immunization was defined as the first-shot of hepatitis B immunization within 24 hours after birth. Data were analyzed by using a logistic regression analysis. The result of this study showed only 60.4% of infants who got the timely first-shot hepatitis B immunization. Mother's behavior was the only factor that had a statistically association with the timely first-shot hepatitis B immunization (P-value 0.007 CI 95% 1.94-3.62). Meanwhile, other factors i.e. sex, socio-economic status, parent's education, knowledge and attitude of mother and place of immunization service had no statistically association with the first-shot of hepatitis B immunization.

Keywords: Immunization, Hepatitis zero dose, Timely

ABSTRAK

Hepatitis B masih menjadi salah satu permasalahan dalam bidang kesehatan di dunia. Hasil beberapa penelitian terkait faktor yang berperan dalam memprediksi pemberian imunisasi hepatitis B secara tepat waktu masih belum konsisten. Penelitian ini bertujuan untuk menggali determinan pemberian imunisasi hepatitis B0 secara tepat waktu di Kabupaten Lombok Timur. Studi ini menggunakan design studi potong lintang yang bersumber dari data survey cakupan imunisasi di 6 kota/kabupaten tahun 2013. Sebanyak 227 anak berusia 12 sd 23 bulan yang mendapat imunisasi hepatitis B0 dan terdokumentasi dengan baik diikutkan sebagai sampel dalam penelitian ini. Status pemberian imunisasi yang tepat waktu dinilai berdasarkan jarak antara waktu kelahiran dengan waktu pemberian imunisasi hepatitis B0 pada anak yaitu 24 jam pertama kelahiran. Analisis data menggunakan uji Kai-kuadrat dan Regresi Logistik pada tahap multivariate. Hasil penelitian menunjukkan 60.4% anak yang mendapatkan imunisasi hepatitis B0 secara tepat waktu. Faktor perilaku ibu terhadap program imunisasi merupakan satu-satunya faktor yang dapat mempengaruhi pemberian imunisasi hepatitis B0 secara tepat waktu (Pvalue 0.007 CI 95% 1.94-3.62). Sedangkan untuk faktor lainnya yaitu jenis kelamin, sosial ekonomi, pendidikan ayah dan ibu, pengetahuan dan sikap ibu serta tempat pelayanan imunisasi secara statistik belum mampu memprediksi outcome pada studi ini. Disarankan kepada pemangku kepentingan, adanya upaya dalam meningkatkan pelayanan optimal yang berdampak pada peningkatan perilaku ibu secara positif terhadap program imunisasi.

Kata Kunci : Imunisasi, Hepatitis B0, Tepat waktu

Background

Morbidity and mortality, caused by chronic Hepatitis B are still a problem in the world. This disease is transmitted from person to person either among the adult or neonatal aged. Mothers who carry Hepatitis B virus are the most sensitive and potential carrier to infect their babies.¹

One of the preventive program with a highly achievement in reducing the occurrence of Hepatitis B is a routine immunization with hepatitis B vaccine within 24 hours after birth, which refer to timely first-shot Hepatitis B immunization and some times is continued in the certain ages of adulthood with a particular indication. Giving the timely first-shot Hepatitis B immunization is the important way to protection the mother-child transmission of hepatitis B infection.^{2 3} Furthermore, the timely first-shot Hepatitis B immunization has a long protection effect on the continuation of hepatitis B infection until

adulthood.⁴ Based on previous study in Bulgaria, which showed that the implementation of the timely first-shot Hepatitis B immunization program can reduce 82% of the incidence of Hepatitis B infection in infants in their first years.⁵ Another similar study showed that risk of transmission of hepatitis B due to loss of the opportunity of getting the timely first-shot Hepatitis B immunization in the early birth will be increased by 8.29 times compare to children who get this vaccine timely.⁶ Although these programs have a good chance to reduce morbidity and mortality rates of this chronic disease, the timely first-shot Hepatitis B immunization coverages are still low.

In 2008, globally, the immunization coverage was relatively low (69%). In the same year, the immunization coverage in South Asia was the lowest (40%) among

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the WHO region. Meanwhile, the immunization coverage in the region of America, Europe, East Mediterania, West Pasific and African was 85%, 78%, 84%, 89%, and 74%, respectively.⁷

Based on Health Demographic Survey in 2013, the overall immunization coverage in Indonesia was very low (59%), with the timely first-shot Hepatitis B immunization coverage was 79.1%. The three highest provinces with the timely first-shot Hepatitis B immunization coverage were Yogyakarta (98.4%), Bali (93.4%), and West Nusa Tenggara (91.7%).⁸

Furthermore, the survey showed that the timely first-shot hepatitis B immunization coverage was 40.5% in Mataram city, 23% in Padang city, 15.9% in South Pesisir district and 26.4% in Hulu Sungai Tengah district (West Kalimantan).⁹

The timely immunization of first shot hepatitis B vaccine is one of factors, that may affect the vaccine efficacy and the impact of vaccine protection, against the high vertical transmission of Hepatitis B.^{10,11} The result of the previous meta-analysis study, which showed that the effectiveness of vaccine protection from the timely first-shot Hepatitis B immunization was influenced by several factors, including DNA materials of vaccine and the precise of timely immunization.¹² In addition to the value of the effectiveness, the timely first-shot Hepatitis B immunization also has a positive impact on the cost-effective value related to the increased of life expectancy and medical saving of the financing in this chronic disease.¹³ This is also applies for others immunization programme, which timely immunization is an important thing in the provision of quality and effectiveness of immunization programme.¹⁴

There are several factors, that may be associated with the timely first-shot hepatitis B immunization including, age of infant, ethnic, place of birth, residence of family, health worker's services, birth attendant, mother perception toward the severity of disease due to not to get timely first-shot hepatitis vaccine, socio-economic status of family, education, knowledge and behavior of mother toward the immunization programme. The family ethnic, may culturely influence in making a decision to get the first-shot hepatitis B immunization timely;; place of birth may affect the availability of Hepatitis B vaccine; and residence of family (rural or urban) can impact indirectly on access to information about the first-shot Hepatitis B immunization.¹⁵ The other factors such as health worker services, birth attendant and mother perception toward the severity of disease due to not get immunization on the right time also affected the timely first-shot hepatitis B immunization.¹⁶ The previous study has also shown that socio-economic of family and mother factors (such as education, knowledge, attitude and behavior toward the immunization programme), involvement of health worker, place of delivery, residence, and culture are also related to the timely first-shot hepatitis B immunization coverage. Only few studies have assessed the quality

of immunization timeliness. In addition there were many studies with inconsistent results in determining factors related to the timely first-shot hepatitis B immunization.

Based on immunization coverage survey previously, the district of East Lombok Indonesia, already has a highest coverage of immunization, that was 99.8% for the overall immunization and 95.8% for the timely first-shot hepatitis B immunization.³ The inconsistent results from many previous studies encouraged us to investigate factors that may be associated with the timely first-shot hepatitis B immunization in East Lombok as one of the district in West Nusa Tenggara.

Methods

This study used a cross sectional study design and secondary data obtained from the immunization coverage survey in three cities, of Padang, Banjarmasin, Mataram, and three districts of South Pesisir, Hulu Sungai Tengah and East Lombok.

Data were collected from 40 villages that randomly selected by multistage sampling technique. Populations of this study were children aged 12 to 23 months who had been already immunized by first-shot hepatitis B vaccine. A total of 560 children were selected randomly in the survey in East Lombok district, but only 227 children were able to be included in this study. Some of them were not involved in this study due to many reasons; including one child was not immunized, 317 children had not immunization record book and 15 children had not well documented in the history of their immunization date. This number was 30% beyond the minimal sample calculated for testing the hypothesis that there was an association between each predictor variable and the timely first-shot hepatitis B immunization.¹¹

In this study, the timely first-shot hepatitis B immunization was defined as receiving a first-shot hepatitis B vaccine within 24 hours after birth.¹⁷

Some variables related to the timely first-shot hepatitis B immunization were included in this study, that were variables of sex, socio-economic status of the family, parent's formal education, mother's knowledge, mother's attitude and mother's behaviour related to immunization programme and place where the infant received the first-shot hepatitis B immunization.

In this study, the socio-economic status of the family was assessed from several factors; including the total of household income (per month), ownership of electronic instruments and vehicles as family transport. Based on these factors, the socio-economic status of family was divided into three categorical levels: low, middle and high-level.¹⁸

Variable of parent's formal education was also divided into 3 categories High education means completed high school level of formal education.¹⁹

Measurement of mother's knowledge related to the first-shot HB immunization was assessed by asking mother what diseases can be prevented by

immunization and what normal effects may occur after the vaccine was given. Measurement of mother’s attitude related to the first-shot HB immunization was assessed by asking mother about her permission and feeling when her infant should get immunization by injection, and her response when her infant may get fever and irritable after an immunization. Measurement of mother’s behavior related to the first-shot HB immunization experience was assessed by asking mother about her experience when she immunized her infant, both in public and private services, and her willingness to return for the next immunization schedule and to pay for immunization (in some case). The assessment of mother’s knowledge, attitude and

behavior were scored and then the mean values of these scores of each assessment was used as a cut-off point for defining the status of mother’s knowledge, attitude and behavior.

Multiple logistic regression analysis was used in this study to determine factors related to the timely first-shot Hepatitis B immunization.²⁰

Result

A total of 227 children who had a complete record of their immunization were selected for analysis. The prevalence of the timely first-shot HB immunization in East Lombok was 64%.

Table 1. The Proportion of Timely First-shot Hepatitis B Immunization

Variable	Category	Timely Fir- shot Hep B immunization	Not timely first- shot Hep B immunization	Total	
		%	%	n	%
Sex	Male	64.2	35.8	123	54.2
	Female	55.8	44.2	104	45.8
Socio-economic status of family	High	43.8	56.3	16	7.0
	Middle	62.0	38.0	192	84.6
	Low	51.9	42.1	19	8.4
Father’s Education	High	58.3	41.7	103	45.5
	Low	62.1	37.9	124	54.6
Mother’s Education	High	57.9	42.1	76	33.6
	Low	61.6	38.4	151	66.5
Mother’s Knowledge	Good	69.2	30.8	13	5.7
	Less	59.8	40.2	214	94.3
Mother’s Attitude	Good Support	61.2	38.3	178	78.4
	Less Support	57.1	42.9	49	21.6
Mother’s Behavior	No Risk	63.3	36.7	47	20.7
	Risk	48.9	51.1	180	79.3
Place of Immunization	Public	60.6	39.4	221	97.4
	Private	50.0	50.0	6	2.6

Table 1 showed the distribution of the proportion of timely first-shot hepatitis B immunization according to variables in the study. It appears that male infants had a greater percentage (64.2%) of getting the timely first-shot hepatitis B immunization than female-infants (55.8%). Infants with of lower education parents were more likely to get the timely first-shot hepatitis B immunization than infants with high education parents.

There were only 5.7% of mothers who had a good knowledge, and the rest (94,3%) were mothers with less knowledge about the first-shot hepatitis B immunizatio. Mothers with a good knowledge had a higher proportion (69,2%) of infants who got the timely first-shot HB immunization than mothers with less knowledge (59.8%). There were 78.4 % of mothers who had a good support, and the rest (21.9%) were mother with less support to the timely first-shot hepatitis B immunization. Mothers with a good support had a higher proportion (61,2%) of infants who got the timely first-shot hepatitis B immunization than mothers with less support (57.1%). There were 20.7% of mothers who had a good behavior, and the rest

(79,3%) were mothers who had not good tbehavior to the timely first-shot hepatitis B immunization. Mothers with a good behavior had a higher proportion (63,3%) of infants who got the timely first-shot hepatitis B immunization than mothers with no good behavior (48.9%). Based on place of immunization, 97.4% of infants got the timely first-shot hepatitis B immunization in public services (Hospital, Clinic, Health center and Posyandu). Infantswho got immunization in public services were more likely to have a the timely first-shot HB immunization than infants who got immunization in private services (60.6% vs 50.0%).

Based on bivariate analysis, variable of sex, socio-economic status, parent’s education, mother’s knowledge, mother’s attitude, mother’s behavior and place of immunization were not statistically associated with the timely first-shot hepatitis B immunization (each of these variables had a P value > 0.05). In the multivariate analysis this study showed that variable of mother’s behavior had a statistically significant association with the timely first-shot hepatitis B immunization, where infants of mother’s with a not good behavior were more

likely not to have a timely first-shot HB immunization than infants of mother's with a good behavior (PR

adjusted 1.8; P value 0.007; 95% CI: 1.34-3.62. Below is the chart of 95% CI values of each determinant.

Table 2. Determinant Factors of The Timely First-shot Hepatitis B Immunization

Variabel	Kategori	Crude*			Adjusted**		
		Pvalue	POR	CI 95%	Pvalue	POR	CI 95%
Sex	Male	0.245	1.0	0.83-2.43	0.181	1.0	0.84 - 2.54
	Female		1.4			1.4	
Socio economic status of family	High	0.227	1.0	0.15-1.56	0.201	1.0	0.17 - 1.45
	Middle		0.2			0.4	
	Low		0.169			0.3	
Father's education	High	0.650	1.0	0.49-1.45	0.953	1.0	0.55 - 1.88
	Low		0.8			1.0	
Mother's education	High	0.694	1.0	0.49-1.50	0.605	1.0	0.43 - 1.62
	Low		0.8			0.8	
Mother's knowledge	Good	0.702	1.0	0.45-5.06	0.384	1.0	0.48 - 6.62
	Not good		1.5			1.7	
Mother's attitude	Support	0.724	1.0	0.62-2.50	0.654	1.0	0.59 - 2.25
	Less support		1.2			1.1	
Mother's behaviour	Good	0.103	1.0	0.94-3.44	0.007	1.0	1.34 - 3.62
	Not good		1.8			1.8	
Place of immunization	Public services	0.684	1.0	0.30-7.80	0.540	1.0	0.30 - 9.80
	Private services		1.5			1.7	

* Bivariate analysis result

** Multivariate analysis result

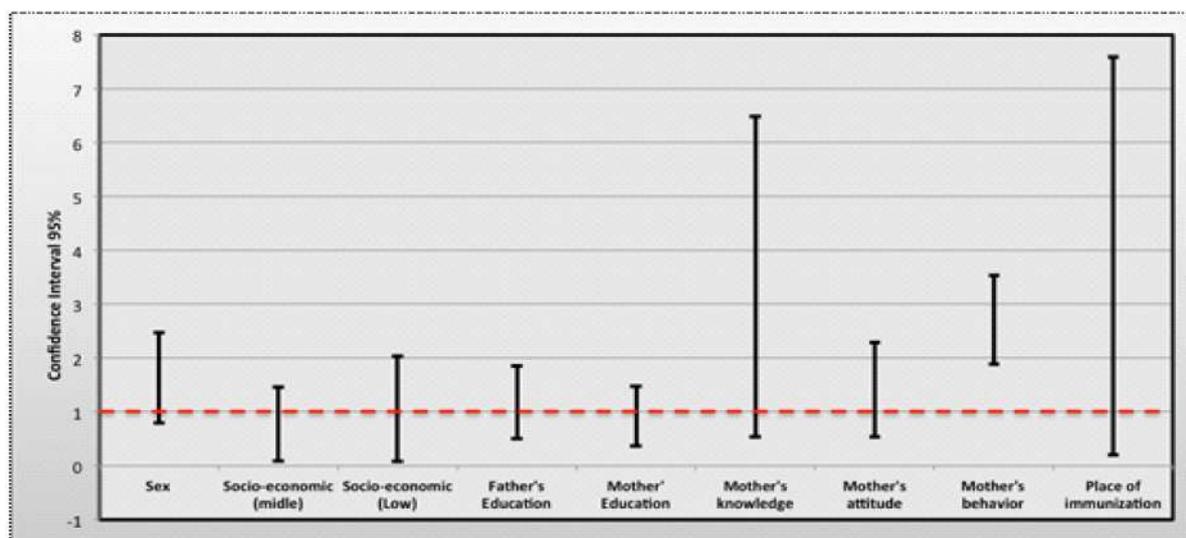


Figure 1. Chart of 95% Confidence Interval in Multivariate Analysis from Determinant Factor of Timely Hepatitis B Zero Dose Immunization

Discussion

The response rate of this study was low, only less than 50% of data were able to be analyzed, it was due to incomplete data of immunization records. The presence of selection bias cannot be ruled-out in this study.¹ In addition there was also a possibility of information bias (non-differential misclassification), derived from the instruments. Instruments used for assessing variables of knowledge, attitude and behavior of mothers, were not able to assess the timely first-shot hepatitis B immunization accurately, due to the

instruments were not specifically designed for the purpose of assessing the knowledge, attitude and behavior of the first-shot HB immunization, rather for immunization in general.²²

Furthermore, this study did not assess several variables which were considered to have strong association with timely first-shot HB immunization including, variables of place of birth and the involvement of health worker. These two variables may have a strong influence in increasing the timely first-shot HB immunization coverage (within 24 hours after birth).^{23, 24, 25}

Other variable that may also had an association with the timely first-shot hepatitis B immunization was residence of the family, which was related directly to the accessibility to the immunization programme.^{24, 26, 35, 36} Several studies which were conducted previously showed that variable of culture had a strong association with the immunization coverage both in quantity and quality.^{27, 28, 29} All of these variables can not be included in this study because of the limitation of secondary data.

The proportion of the timely first-shot HB immunization in East Lombok District was low, only 60.4% of infants received first-shot hepatitis B immunization timely (within 24 hours after birth), the similar results were found in other districts/cities in the same survey. This result was much lower than in other survey such as in Republic of Korea in 2008 that showed that 96.9% of infants in this country received timely first-shot hepatitis B immunization.³⁰ Different result showed from other previous study in developed country such as USA. They conducted a cohort study that suggested there was a good progress of immunization coverage during the ten years.³¹

Gender is one of variable, which considered as an influence factor for the timely first-shot Hepatitis B immunization. In this study, sex variable had no association with the timely first-shot Hepatitis B immunization. The result of this study was in line with the previous study in China, which showed that the sex variable also had no association with the timely first-shot Hepatitis B immunization (P value 0.79).¹⁰ Study in Uganda, showed that sex of infant was one of predictor factors which may influence the immunization program.³²

The result of this study showed that socio-economic status of family had no association with the timely first-shot HB immunization. The previous study that was conducted in India 2013, had shown that socio-economic status of family was not associated with the immunization coverage (P value = 0.71).³³ While, the other study that was conducted in Virginia-USA found that family with low socio-economic status had been associated with the timely first-shot Hepatitis B immunization (P value = 0.02) but family with a middle socio-economic status, had no association with the timely first-shot HB immunization (P value = 0.38).³⁴ Several studies also suggested that socio-economic status of family was one of predictor variables which statistically related with the immunization program.^{32, 35, 36}

In this study, variable of father's education had no association with the timely first-shot HB immunization (P value = 0.95). Our result was in line with the previous study in Delhi 2007, which showed that father's education was not associated significantly with the timely first-shot HB immunization.³⁷ Similar result was also reflected in mother's education variable. In this study, there was no association between mother's education and the timely first-shot HB immunization (P value = 0.60). Other previous study that was conducted in Bantul District of Indonesia

in 2006 also showed the same result with P value = 0.88.¹¹ Moreover, several studies also showed that parents education was not associated with the immunization program for their children.^{32, 36, 38}

This study found that mother's knowledge and attitude also had no association with the timely first-shot HB immunization. This was happened might be due to the presence of information bias in this study. The previous study, which was conducted by Mayangsari in Yogyakarta, showed that mother's knowledge was related statistically to the timely first-shot HB immunization (P value = 0.05).³⁹ Another study by Rizani in Banjarmasin city Indonesia in 2009, also showed that mother's attitude was statistically significant associated with the timely first-shot HB immunization.⁴⁰ Several previous studies also proved that improving maternal knowledge through education programme for immunization was statistically related to the positive effect on immunization coverage of the timely first-shot HB immunization.^{41, 42, 43, 44}

Mother's behavior was the only variable which was associated statistically with the timely first-shot HB immunization (P value = 0.007). Similarly with the previous study, conducted by Novitasari in Semarang in 2013, showed that there was a significant association between mother's behavior and the timely first-shot hepatitis B immunization.⁴⁵ Similar result showed from other previous study, where mother's attitude had a strong association with mother's practice in support the immunization programme.^{38, 46, 47}

The other factor that included in this study was place of immunization. The result of this study, showed that this variable was not statistically associated with the timely first-shot hepatitis B immunization. Differ from the previous study, by Odusa and friends in Nigeria in 2008, place of immunization was statistically associated with the timely first-shot hepatitis B immunization.^{48, 49} Other study also showed the similar result, where place of immunization was associated with the timely first-shot hepatitis B immunization.⁵⁰

Conclusion and Recommendation

This study suggested that the timely first-shot hepatitis B immunization coverage in East Lombok district of Indonesia was low. Several variables that included in this study were not associated with the timely first-shot HB immunization, these variables were ; variables of sex, socio-economic status of family, parent's formal education, mother's knowledge, attitude and behavior and place of immunization. Mother's behavior was the only variable that was statistically associated with the timely first-shot HB immunization.

For the further research's, need an improving instrument for assess the determinant factors, which can predict the timely and valid immunization of Hepatitis B zero dose especially assessment of mother's knowledge, attitude and behavior. Also require the complete documentation of immunization (KIA book) in health services so that can be obtaining the percentage of valid coverage in immunization

programmed. In addition, need some intervention or action that focuses on improving mother's behavior positively toward immunization programmed, for example by increasing the optimal services.

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