Chapter 4

Further Statistical Analysis

The associations between twin status and the determinant variables were analyzed further in this chapter. Logistic regression was used to fit a model.

4.1 Logistic regression model

Since the outcome variable is binary, logistic regression is an appropriate method for assessing the effects of the determinants on the outcome. This modeling strategy involved initially including all determinants as factors and subsequently omitting in turn determinants with overall p-values greater than 0.05 (based on the reduction in residual deviance using the chi-squared test). Adjusted odds ratios (OR) and the 95% confidence intervals (CI) of the OR were estimated from the main effects logistic models. The odds ratios are obtainable by exponentiation of the coefficients, so that if the coefficient is *b*, the corresponding odds ratio is exp(*b*). In the first step, we fit a model with all variables of interest as shown in Table 4.1.

Determinants	OR	(95% CI)	*p*-value
Fiscal			0.287
1997			
1998	0.47	(0.23-0.96)	0.037
1999	0.46	(0.23-0.93)	0.031
2000	0.75	(0.36-1.60)	0.461
2001	0.50	(0.23-1.11)	0.089
2002	0.65	(0.31-1.39)	0.267
2003	0.73	(0.34-1.55)	0.412
2004	0.69	(0.32-1.47)	0.336
2005	0.52	(0.24-1.14)	0.103
Address			0.122
Bana			
CityEast	1.05	(0.51-2.17)	0.898
CitySouth	1.10	(0.56-2.16)	0.783
CityCenter	0.76	(0.36-1.60)	0.468
Sabarang	0.77	(0.42-1.42)	0.402
Anakru	1.18	(0.59-2.37)	0.637
Rusamilae	0.88	(0.42-1.83)	0.727
Yaring	1.34	(0.77-2.32)	0.299
NongChik	1.84	(1.06-3.20)	0.031
KhokPho + Maelan	1.47	(0.77-2.82)	0.246
PattaniEast	1.92	(1.04-3.52)	0.036
Yarang	0.86	(0.37-2.02)	0.732
PattaniSouth	1.89	(0.86-4.14)	0.113
Songkhla	0.80	(0.28-2.33)	0.685
Narathiwat+Yala+NS	1.25	(0.59-2.63)	0.562

Table 4.1: Model of association between determinants and twin status

Determinants	OR	(95% CI)	*p*-value
Parity			0.960
0			
1	1.03	(0.72-1.48)	0.858
2+	1.06	(0.71-1.57)	0.777
Occupation			0.478
Housewife			
Gardener or farmer	0.96	(0.38-2.42)	0.936
Worker+	0.77	(0.54-1.09)	0.142
Government office+	0.74	(0.37-1.48)	0.394
Education			0.190
Not stated			
Primary	0.91	(0.43-1.94)	0.812
Secondary	0.70	(0.32-1.52)	0.368
Other	0.65	(0.35-1.21)	0.175
Age of mother			**0.032**
< 20			
20-24	1.81	(0.88-3.75)	0.108
25-29	2.18	(1.05-4.54)	0.037
30-34	2.81	(1.32-5.97)	0.007
35+	1.92	(0.85-4.33)	0.114
Religion			**0.000**
Other			
Islamic	1.74	(1.26-2.40)	

Deviance: 2418.9

Table 4.1: Model of association between determinants and twin status (Cont.)

Table 4.1 shows the results after fitting a logistic regression model, based on the reported twins born in Pattani Hospital: 1996-2005. The model initially fitted contained additive effects for address, parity, fiscal year, mother's occupation,

mother's education, age of mother and mother's religion. This model is giving a residual deviance of 2418.9 with 22,649 degrees of freedom.

4.2 Reduced Model

Table 4.2 gives the results of the logistic regression analysis after omitting determinants with *p*-values more than 0.05, using backward elimination.

Determinants	OR	(95% CI)	*p*-value
Age of mother			0.011
< 20			
20-24	1.80	(0.88-3.69)	0.106
25-29	2.17	(1.08-4.36)	0.030
30-34	2.84	(1.41-5.71)	0.003
35+	2.02	(0.96-4.24)	0.064
Religion			0.000
Other			
Islamic	1.82	(1.36-2.44)	

Deviance: 2455.8

Table 4.2: Reduced model of association between determinants and twin status

Since we refitted a model contain age of mother and religion, giving a residual deviance of 2455.8 with 22679 degrees of freedom. When comparing the values of the deviance from the models reported in Tables 4.1 and 4.2, it was found that the difference between the deviances is 36.9, and the number of parameters omitted is 5, corresponding to the *p*-value 0.000.

We choose this model because all variables are statistically significant. The final model, reported in Table 4.2 shows that two variables, age of mother and religion were associated with twin status in Pattani hospital, after adjusting for the other

determinants. Mothers aged 30-34 years were more likely to have twin status than those of aged less than 20, by factor of 2.84 (95% CI:1.41-5.71). Muslim mothers were more likely to have twins than other religion mother 1.8 (95% CI: 1.36-2.44).