

Supplementary Material: Joint Modeling of Hypertension Measurements and Time-to-Onset of Preeclampsia Among Pregnant Women Attending Antenatal Care Service at Arerti Primary Hospital, North Shoa, Ethiopia

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Table 4.1: Summary of Baseline Characteristics of Pregnant Women at Arerti Primary Hospital

Variables	Overall	Censored	event
Multiplicity			
Twin	29 (14.4%)	8 (4.9%)	21 (53.8%)
Singleton	172 (85.6%)	154 (95.1%)	18 (46.2%)
Marital Status			
Unmarried	26 (12.9%)	3 (1.9%)	23 (59.0%)
Married	175 (87.1%)	159 (98.1%)	16 (41.0%)
Abortion			
No	177 (88.1%)	158 (97.5%)	19 (48.7%)
Yes	24 (11.9%)	4 (2.5%)	20 (51.3%)
Gravidity			
1	26 (12.9%)	7 (4.3%)	19 (48.7%)
≥2	175 (87.1%)	155 (95.7%)	20 (51.3%)
Parity			
≥2deliveries	124 (61.7%)	110 (67.9%)	14 (35.9%)
Nulliparous	21 (10.4%)	5 (3.1%)	16 (41.0%)
1 Delivery	56 (27.9%)	47 (29.0%)	9 (23.1%)
Diabetes			
Yes	23 (11.4%)	4 (2.5%)	19 (48.7%)

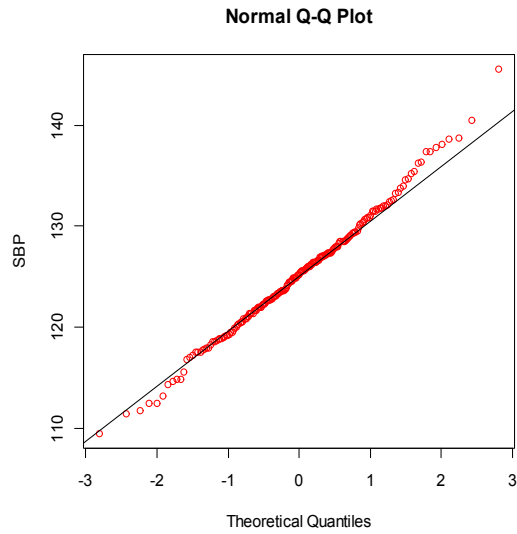
No	178 (88.6%)	158 (97.5%)	20 (51.3%)
PE			
No	172 (85.6%)	154 (95.1%)	18 (46.2%)
Yes	29 (14.4%)	8 (4.9%)	21 (53.8%)
Substance			
No	176 (87.6%)	157 (96.9%)	19 (48.7%)
Yes	25 (12.4%)	5 (3.1%)	20 (51.3%)
Age			
Mean (SD.)	26.0 (4.42)	27.3 (3.67)	20.7 (3.10)
Weight			
Mean (SD.)	58.2 (11.4)	54.7 (9.54)	72.8 (5.05)

Distribution of Longitudinal Systolic and Diastolic Blood Pressure

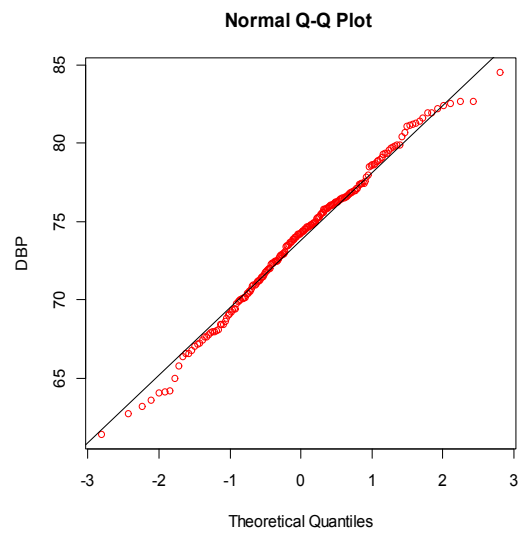
Before fitting the univariate and bivariate linear mixed-effects models, first we should checked the assumption of normality of the data. To check normality assumption of linear mixed effects model, normal Q-Q plots of the BP measurements with corresponding Shapiro-Wilk tests of normality (Table 4.2 and Figure 4.1) were checked. The normal Q-Q plots of the SBP and DBP (Figure 4.1a and Figure 4.1b respectively) show normality of the distributions of BP measurements. Similarly result from Shapiro-Wilk test are not significant for SBP and DBP (p - value = 0.9466 and p - value = 0.652 respectively in Table 4.2) implying that the BP data set appear to follow a normal distribution.

Table 4.2: Result of Normality Test for Longitudinal BP Measurements

	Shapiro-Wilk Normality test	
	Statistic	p-value
SBP	0.995	0.9466
DBP	0.986	0.652



(a) Normal Q-Q Plot of SBP



(b) Normal Q-Q Plot of DBP

Figure 4.1a and 4.1b: Normal Q-Q Plots of BP measurements of Pregnant Women under ANC

Table 4.4: Comparison of Co-variance Structure for Linear Mixed-Effects Model of SBP and DBP

Covariance structures	Response variable	AIC	BIC
CS	SBP	4651.6	4668.2
	DBP	4543.7	4560.2
AR(1)	SBP	4637.0	4668.2
	DBP	4526.7	4553.2
UN	SBP	4646.5	4686.1
	DBP	4536.2	4569.2

Table 4.5: Random Effects Selection for Each Univariate Longitudinal Response Model

Response variable	Random effect	AIC	BIC
SBP	Random intercept	4954.9	4961.5
	Random intercept and linear slopes	4814.7	4821.3

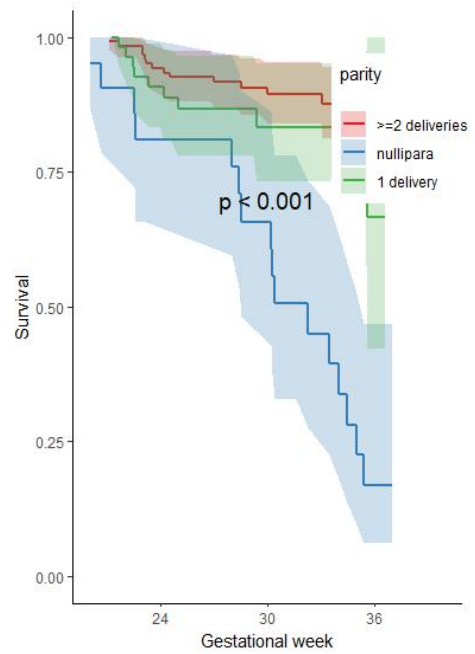
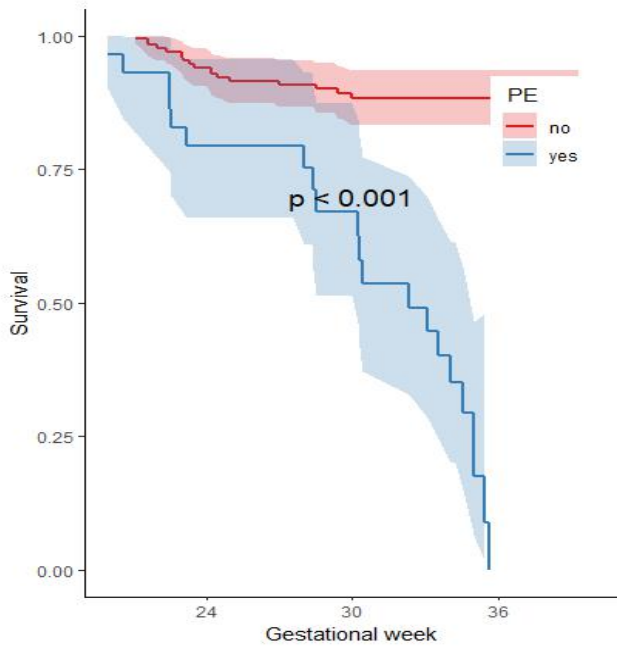
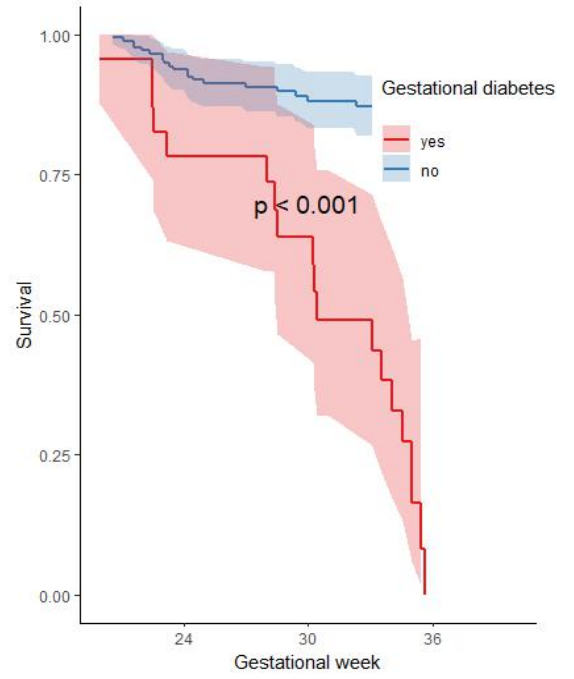
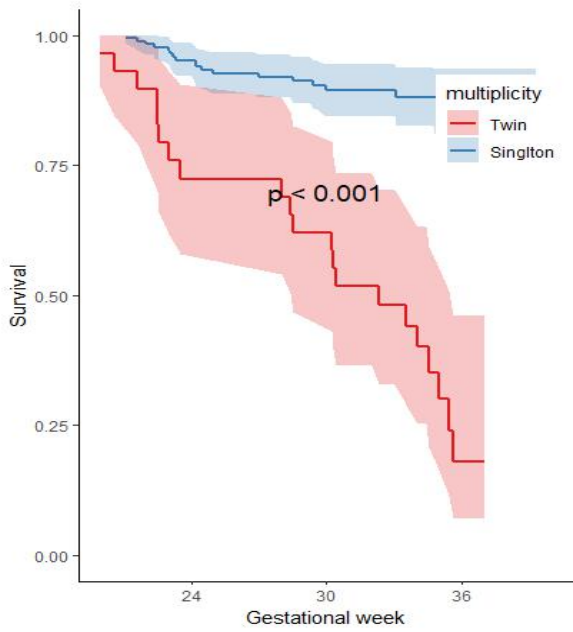
	Random intercept and quadratic slope	5069.9	5076.5
DBP	Random intercept	4909.8	4916.4
	Random intercept and random slope	4859.8	4866.5
	Random intercept and quadratic slope	5011.1	5017.7

Table 4.8: The Result of Log Rank Test for Categorical Variables

Variables	Chi square	Df	P-value
Marital Status	70.2	1	<0.0001
PE	54.4	1	<0.0001
Multiplicity	106	1	<0.0001
Gravidity	78.9	1	<0.0001
Parity	48.8	2	<0.0001
Diabetes	49.2	1	<0.0001
Substance	77.15	1	<0.0001
Abortion	66.4	1	<0.0001

Table 4.9: Parameter Estimate of Cox Proportional Hazard Model

Variables	Categories	Estimate	HR	Std. Error	Z	P
Age		0.360	1.43	0.07441	4.838	<.0001
Weight		0.172	1.188	0.038	4.526	<.0001
PE	No	Ref.				
	Yes	0.715	1.074	0.065	11.00	0.0004
Marital Status	Married	Ref.				
	Unmarried	0.986	2.66	0.546	1.830	0.0003
Multiplicity	Singleton	Ref.				
	Twin	0.968	2.633	0.64065	2.283	0.0307
Parity	≥2 deliveries	Ref.				
	Nulliparous	-0.467	0.626	0.68645	0.464	0.4954
	1 delivery	0.618	1.857	0.241	1.581	0.2086



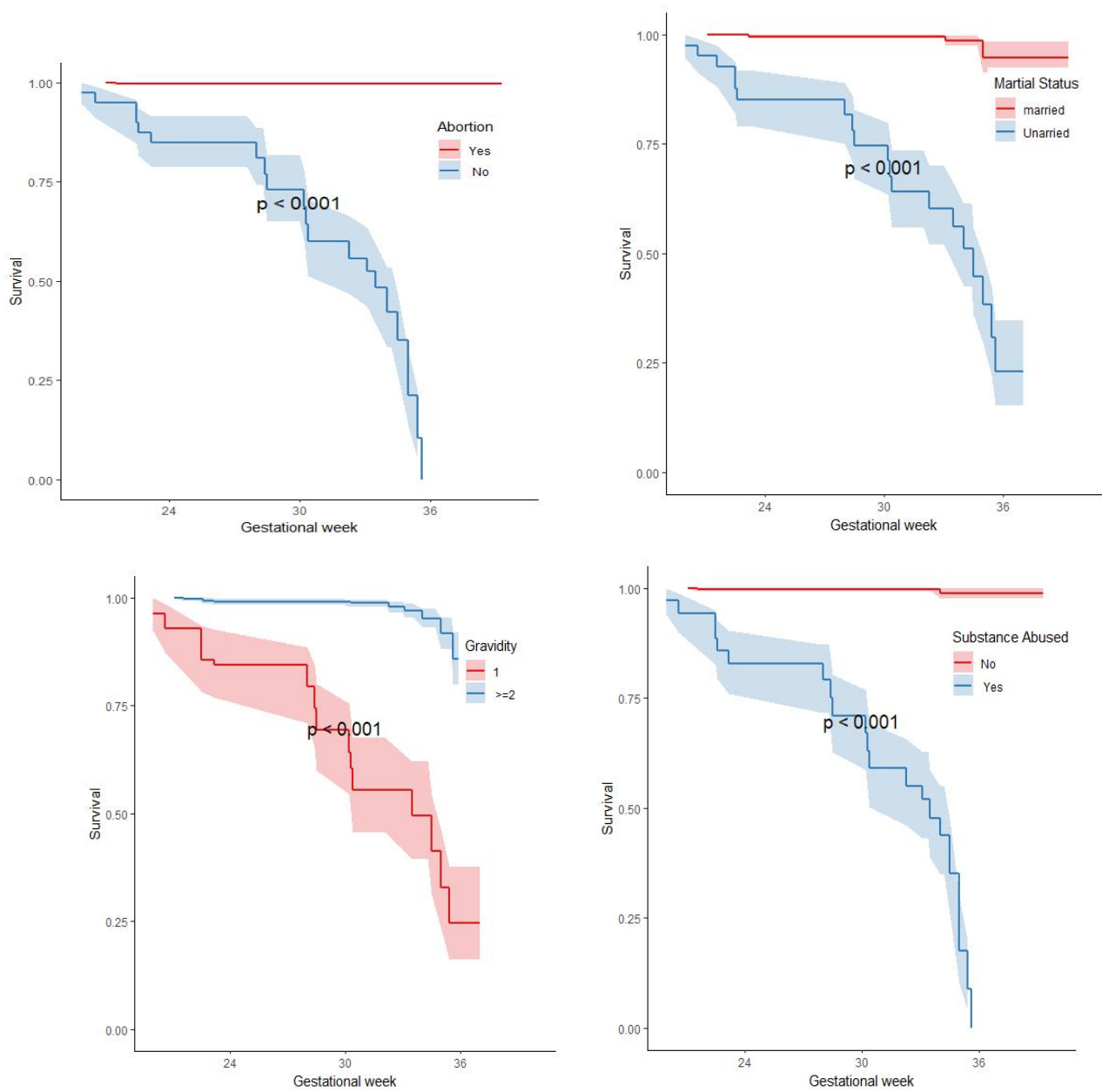


Figure 4.2: Kaplan-Meier Survival Plots of Survival Probability of Pregnant Women versus Categorical Variables.