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Abstract

Background: Birth weight and gestational age are important determinants of an infant’s survival and future development. The main objective of this research was to identify the determinants of birth weight and gestational age simultaneously based on Ethiopia's demographic health survey in 2016 which implemented in statistical package R.

Methods: Cross-sectional study design was used from Ethiopia's demographic health survey in 2016. The bi-variate linear regression model was used to identify factors of birth weight and gestational age simultaneously which had small standard errors as compared to a separate model.

Results: Bi-variate models of birth weight and gestational age determined the effect of predictors. Therefore, the model shows that the number of tetanus injections before pregnancy, educational level of husband, desire for more children, drink alcohol, and region are statistically significant at 5% level of significance for gestational age in Ethiopia. Similarly, the size of a child, preferred waiting time for birth, the number of tetanus injections before pregnancy was statistically associated with birth weight at 5% level of significance.

Conclusion: From our finding, we concluded that the number of tetanus injections before pregnancy, educational level of husband, desire for more children, drink alcohol, size of child, preferred waiting time for birth and region were significant predictors of birth weight and gestational age simultaneously at 5% level of significance. Hence, special care should be given to the pregnant during antenatal care for minimizing the risk of low birth weight and small gestational age.

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Study area and design

is study was carried out in Ethiopia based on demographic and health survey 2016. e study included pregnant women who participated in the demographic and health survey of the country.

Data collection procedure

is research utilized Ethiopia demographic and health survey in 2016 which is the fourth comprehensive and nationally representative population and health survey.

It is an important feature of the data set that avails in-depth information on demographic and health aspects of households. e data was collected by the central statistical agency at the request of the ministry of health. Data collection took place from January 18, 2016, to June 27, 2016 [3].

Inclusion and exclusion criteria for the study

Mothers who are pregnant and remember her child birth weight and gestational age which record from January 18, 2016, to June 27, 2016, were included in the study.

Variables included in the study

Response variable: e response variables for the study are birth weight and gestational age.

Explanatory variable: e predictor variables of birth weight and gestational age simultaneously were included the size of child at birth, number of tetanus injections before birth, number of tetanus injections before pregnancy, age, HIV status of the mother, timing for rst antenatal care, total children ever born, antenatal care at the private and governmental clinic, toilet facility, preferred waiting time, desire for more children, live birth between birth, mother drink alcohol, source of water supply, wealth index, place of residence and region.
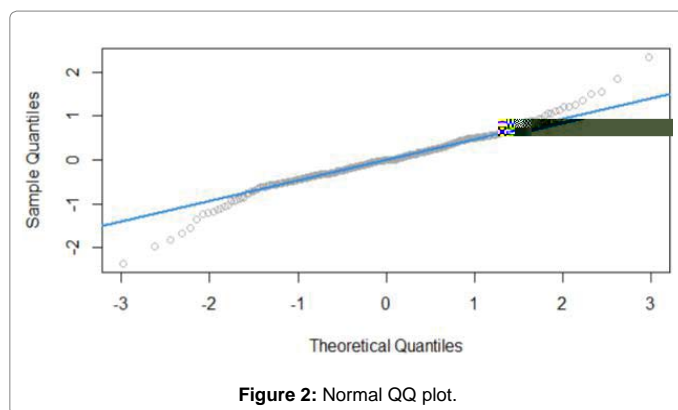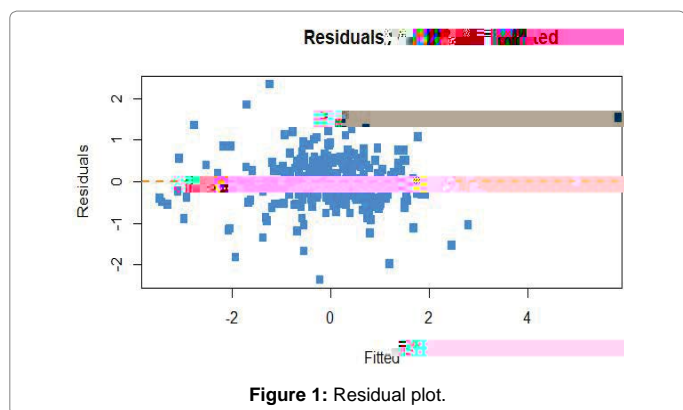e description of those variables is shown in Table 1 below.

Statistical Analysis

		Gestational Age		Birth Weight	
Variables	levels	Mean (SE)	SD	Mean (SE)	SD
Mother Educational Level	No education	35.98 (0.03)	0.58	3.22 (0.04)	0.90
	Primary	35.9(0.04)	0.97	3.32(0.03)	0.89
	Secondary	35.78(0.06)	1.18	3.24(0.04)	0.71
	Higher	35.71(0.08)	1.38	3.30(0.04)	0.70
Region	Tigray	35.96(0.03)	0.54	3.30(0.05)	0.78
	Afar	35.58(0.29)	1.81	3.03 (0.16)	0.96
	Amhara	35.86(0.08)	0.75	3.00(0.10)	0.87
	Oromiya	35.82(0.10)	1.20	3.35(0.09)	1.05
	Somali	35.97(0.03)	0.33	3.31(0.08)	0.93
	Benishangul	36.03(0.07)	0.87	3.19(0.06)	0.75
	Gambela	35.52(0.11)	1.44	3.18(0.06)	0.80
	SNNPR	35.98(0.07)	0.98	3.50(0.08)	1.12
	Dire Dewa	35.86(0.07)	1.07	3.30(0.05)	0.76
	Addis Abeba	35.81(0.06)	1.25	3.16(0.03)	0.66
	Harari	35.96(0.04)	0.56	3.43(0.05)	0.72
Husband Educational Level	No education	35.96 (0.04)	0.72	3.24 (0.05)	0.95
	Primary	35.84(0.06)	1.18	3.25(0.03)	0.71
	Secondary	35.84(0.06)	1.18	3.25(0.03)	0.71
	Higher	35.86(0.05)	1.02	3.30(0.04)	0.70
Size of Child at birth		35.9(0.04)	0 .75	3.97(0.04)	0.92
	Very large	35.93(0.03)	0.83	3.12(0.02)	0.57
	Average	35.92(0.03)	0.63	3.50(0.03)	0.58
	Large than average				
	Smaller than average	35.87(0.09)	1.01	2.59(0.05)	0.61
	Very small				
	Donít know	35.41(0.14)	2.03	2.44(0.05)	0.66
		36.00(0)	0	3.10(0)	0
Preferred waiting time for birth	<1 year	35.80(0.08)	1.06	3.30 (0.06)	0.87
	2 year	35.86(0.06)	0.92	3.29(0.06)	0.84
	3 year	35.92(0.06)	0.86	3.20(0.05)	0.81
	4 year	35.89(0.08)	0.94	3.17(0.07)	0.83
	5year	35.82(0.07)	1.06	3.28(0.06)	0.84
	>6 year	35.79(0.12)	1.44	3.21(0.06)	0.80
Desire for more children	Wants within 2 years				
	Wants after 2 years				
	Wants, unsure timing				
	Undecided				
	Wants no more				
	Sterilized				

Residuals
Residuals
2
1
0
-1
-2
-2
0
2
4
Fitted

Figure 1: Residual plot.

Sample Quantiles
2
1
0
-1
-2
-3
-2
-1
0
1
2
3
Theoretical Quantiles

Figure 2: Normal QQ plot.