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The Effect of Parental Factors on Under-Five Mortality in Borno State, Nigeria.

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Abstract: Nigeria is one of the countries with highest U5MRs in the world. North Eastern Nigeria where Borno state is located has highest under-five mortality rate in Nigeria. The country has been making efforts to reduce under-five mortality especially since the year 2000 millennium declaration. However, progress has been too slow to meet the 2015 goal of child mortality reduction. The objective of the study was to examine the parental factors that determine under-five mortality rate in Borno State. The Multistage Sampling Method was used to draw a sample of 370 ever married women in the reproductive ages from six local government areas in the three senatorial districts in the state. The period of study covers the five year period between 2009 and 2013. Logistic Regression was used to determine the parental factors which had the most effect on under-five mortality. Parental factors considered in this study are maternal education, maternal employment status, kind of work she does, as well as paternal education and kind of work. Results of the study show that among the five parental factors under study, maternal education had the greatest influence on under-five mortality reduction although paternal education did not have the same effect. Improving the educational status of women and girls in the state will go a long way to bring down the high under-five mortality rate.

Keywords: Borno State, parental characteristics, under-five mortality

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I. INTRODUCTION

The under- five Mortality Rate (U5MR) is the probability of a child dying between birth and exactly five years of age (0 – 59 months), expressed per thousand live births. It is one of the most sensitive and commonly used indicators of the social and economic development of a population (UNDP, 2007; Abimbola *et al*, 2012). Childhood mortality is used as a measure of infant health and child well-being, as well as an indicator of economic development, general living conditions and social wellbeing (Reidpath and Allotey, 2003; Walz, 2008). It reflects the life expectancy of a population and the overall level of health and ability to manage the socioeconomic and physical environment. High levels of U5M are not only undesirable, but also indicate a decline in general living standards (Caldwell, 1996).

It was estimated that under-five mortality worldwide was 11.9 million in 1990. By 2011 it had declined to 6.9 million deaths (UN Inter-agency group, 2012) although the decline has not been uniform around the world. The region with the highest Under-five Mortality was and still is Sub-Saharan Africa (SSA) both in 1990 and 2011. Many countries still have very high under-five mortality, particularly those in Sub-Saharan Africa and Southern Asia (UNICEF, 2010). Because of its great impact on human lives, under-five mortality is frequently on the programme of public health and international development agencies. Attention on the issue was revived when it was made part of the United Nation's Millennium Development Goals (MDGs) (Lay and Robilliard, 2009). The MDGs target was to reduce world child mortality by two thirds in 2015. This is significant because the progress and future of any country depends on the health of the children. The welfare of the under-five in societies is reflected in their access to basic health care, nutritious food and a protective environment. Where these are not available, the country's mortality rates would increase and economic potentials diminish (WHO, 2008).

The leading causes of death among children under the age of five worldwide are pneumonia (18%), preterm birth complications (14%), diarrhoea (11%), complications during birth (9%), and Malaria (7%) (UN Inter-agency Group, 2012). Numerous studies (Black *et al*, 2003; Jones *et al*, 2003;Bry*ce et al*, 2005) on infant and under-five mortality in developing countries have confirmed that most of these deaths are from preventable causes. Globally U5M reduced because of interventions targeted at communicable diseases such as malaria, measles, diarrhoea, respiratory infections and other immunizable childhood infections which were major causes of child mortality. However, these health gains were short lived especially in Africa because disease oriented

programmes alone were not effective. Environmental, maternal and socioeconomic factors were acknowledged as additional important determinants of child survival (Mesike and Mojekwu, 2012) which need to be addressed for continued U5M reduction. Hong (2006) showed that levels of infant and child mortality in many developing countries remain unacceptably high.

Mosley and Chen's (1984) child survival model shows how socioeconomic characteristics of individual parents are important determinants of under-five mortality. The model identifies a set of proximate determinants or intermediate variables that directly influence the risk of morbidity and mortality. All social and economic determinants operate through these variables to affect child survival. They argue that the mother's skill, health and time operate directly on the proximate determinants of U5M. For example, the mother's educational level can affect child survival by influencing her choices and increasing her skills in health care practices related to contraception, nutrition, hygiene, preventive care and disease treatment. Father's educational level usually correlates with occupation, income, choice of consumption goods and place of residence to impact on child health and survival (Ahmed *et al*, 1999; Caldwell, 1979).

Uddin *et al* (2009) in their study investigated child mortality in Bangladesh using the logistic regression model. The results showed that father's education and occupation, occupation of mother, standard of living index, breastfeeding status and birth order were significant determinants of child mortality. Kembo (2009) in his study of U5M in Zimbabwe also found that paternal education indicated improvement in child survival. The study also shows that children born to mothers with secondary or higher education are less likely to die than those born to mothers with no education. Boco's (2010) study on Sub-Saharan African countries confirms the strong relationship between increased maternal education and improved child survival independent of wealth. These studies cited suggest a relationship between maternal education and child survival. The objective of the study is to examine the effect of some parental factors on U5M in Borno State to find out if they have any impact as shown in studies in other parts of the world.

II. STUDY AREA AND RESEARCH METHOD

2.1 Study Area

This research work was based in Borno State; one of Nigeria's 36 states. It is one of the largest states in the country covering 69,435 squared kilometres located at the extreme North-eastern end. The State is divided into 27 Local Government Areas which are divided into three senatorial districts. Geographically, the state is located under arid climatic conditions and for this reason, the weather remains hot and dry for the greater part of the year. Drought, famine and pests invasion occur often. Rivers are often dry, ground water is depleted, and desiccation is wide spread (Borno State Statistical Year Book, 2004).

In 2006 Borno State had a population of 4,151,103 people according to the census figures (National Population Commission, 2006). By 2011 the population of the state had increased to 4,986,233 as estimated by the UNFPA which was based on 3.4% annual growth rate of the 2006 census figure. The Total Fertility Rate for the North-East where Borno state is located averages 7 children per woman (National Population Commission and ICF Macro, 2009). According to the same report the population of children 0-15 years constitutes 46.3 per cent of the population in the state indicating a youthful population.

The economy of the state is predominantly agricultural. Majority of the people in the state live in the rural areas and depend on agriculture as a means of sustenance. Majority of these are small-holder traditional farmers who mainly produce staple food crops for household consumption. Major economic activities are crop production, animal grazing, mineral excavation and fishing. Trading activities with other states in the country and with neighbouring countries is significant (Borno State Statistical Year Book, 2004).

2.2 Research Method

The Multi-stage Sampling Method was used in this study. In the first stage two Local Government Areas (LGAs) were randomly selected in each of the three Senatorial Districts of Borno-North, Borno-Central, and Borno-South. The sample LGAs include Magumeri and Monguno in Borno North, Maiduguri and Ngala in Borno Central and Hawul and Askira/Uba in Borno South. In the second stage, the LGA headquarters and one rural settlement were purposively chosen to represent rural and urban areas. In the third stage a sample of 190 rural and 180 urban ever married women constituting 370 respondents were picked using the Systematic Sampling Method. The interview schedule was administered by the researcher and six trained assistants in which respondents were contacted in their homes for interview. The questions were based on birth histories of women between 2009 and 2013 and the under-five mortality of children born during the period. The data were analysed using descriptive and inferential statistics. Descriptive statistics used include the use of frequencies and percentages presented in tables and used to describe the socioeconomic characteristics of the respondents. Crude U5MRs for parental characteristics were computed and Chi-Square test of association was applied to draw conclusions regarding the variables that have significant influence on under-five mortality in the study. To determine the degree of contribution of each of the independent variables to U5MR in the state, a Logistic

regression model was computed.

III. RESULTS

3.1 Socio-demographic Characteristics of Respondents

Table 1: Socio-demographic Characteristics of Respondents by Urban and Rural Settlement

Variables	**Urban Borno**		**Rural Borno**	
Age: Years	No	%	No	%
Less than 15	1	0.6	1	0.6
15-19	7	3.9	39	20.5
20-24	50	27.8	37	19.5
25-29	36	20.0	34	17.8
30-34	32	17.8	28	14.7
35-39	34	18.9	17	8.9
40-44	16	8.9	19	10.0
45-49	4	2.2	15	7.9
Total	**180**	**100.0**	**190**	**100.0**
Educational Status:				
No Western education	38	21.1	73	38.4
Primary	46	25.6	34	17.9
Secondary	70	38.9	56	29.5
Tertiary	26	14.4	27	14.2
Total	**180**	**100.0**	**190**	**100.0**
Marital Status:				
Married				
Widowed				
Divorced	124	68.9	161	84.7
	30	16.7	14	7.4
	26	14.4	15	7.9
Total	**180**	**100.0**	**190**	**100.0**
Respondent's Employment Status:				
Employed	109	60.6	98	51.6
Unemployed	71	39.4	92	48.4
Total	**180**	**100.0**	**190**	**100.0**
Occupation:				
Civil service	33	18.3	36	18.9
Trading	45	25.0	30	15.8
artisans	33	18.3	13	6.8
Farming	1	1	19	10
Total	**180**		**190**	

Source: Field work, 2013.

Demographic and social characteristics of the respondents highlighted in Table 1 show that there is one respondent in the rural and one urban under the age of fifteen. The largest age group is the 20-24 (27.8%) in the urban and the 15-19 (20.5%) age category in the rural areas. However, 52.3 per cent in the urban and 58.4 per cent in the rural areas are all 29 years and below. The educational status among these women shows that 21.1 per cent in the urban and 38.4 per cent in the rural areas have no Western education (Table 1). Among the educated, those with secondary level education are the highest with 38.9% urban, and 29.5 rural.

The Table shows that majority of the women in both the urban (67.2%) and rural (86.3) areas are currently married, although there are more currently married women in the rural areas. The percentage of divorced and widowed population is higher in the urban areas. Respondents' employment status shows that 62.8 per cent in the urban areas and 51.6 per cent in the rural parts are engaged in income-generating work. Among the working respondents majority are traders (31%) in urban Borno, while civil servants form the majority (35.3%) in the rural areas. Farming which is the mainstay of the economy in the state shows low values (0.8% urban and 12.7% rural).

Table 2: Socio-demographic Characteristics of Respondents by Senatorial Districts.

Variables	**Borno-North**		**Borno-Central**		**Borno-South**	
Age:	No	%	No	%	No	%
< 15	0	0	0	0	2	2.0
15-19	18	18.4	12	7.1	16	15.7
20-24	20	20.4	49	28.8	18	17.6
25-29	16	16.3	32	18.8	22	21.6
30-34	14	14.3	28	16.5	19	18.6
35-39	17	17.3	23	13.5	11	10.8
40-44	10	10.2	13	7.6	11	10.8
45-49	3	3.1	13	7.6	3	2.9
Total	**98**	**100.0**	**170**	**100.0**	**102**	**100.0**
Educational Status:						
No Western education	60	61.2	33	19.4	18	17.6
Primary	11	11.2	44	25.9	26	25.5
Secondary	20	20.4	62	36.5	44	43.1
Tertiary	7	7.1	31	18.2	14	13.7
Total	**98**	**100.0**	**170**	**100.0**	**102**	**100.0**
Marital status:						
Married	81	82.7	122	71.8	82	80.4
Widowed	9	9.2	26	15.3	9	8.8
Divorced	8	8.2	22	12.9	11	10.8
Total	**98**	**100.0**	**170**	**100.0**	**102**	**100.0**
Employment:						
Employed	55	56.1	90	52.9	67	65.7
Unemployed	43	43.9	80	46.1	35	34.3
Total	**98**	**100.0**	**170**	**100.0**	**102**	**100.0**
kind of work:						
Civil servant	25	43.1	26	28.9	19	27.9
Trader	18	31.0	39	43.3	17	25.0
Artisan	2	3.4	25	27.8	21	30.9
Farmer	13	22.5	0	0.00	11	16.2
Total	**58**	**100.0**	**90**	**100.0**	**68**	**100.0**

Source: Field work, 2013.

The distribution of age according to the three Senatorial Districts shows that the two under 15 women came from Borno-South (Table 2). The age distribution shows that, the 29 years and lower are dominant with 55.1%, 54.7%, and 56.9% in Borno-North, Borno-Central, and Borno-South respectively. The educational status of the respondents indicates that Borno-North is the least educated part of the state with 61 per cent of the respondents without formal education. The values for those who are not educated for Borno-Central and Borno-South are 19.4% and 17.6% respectively. Those who have attained secondary education are 20%, 36.5% and 44% for Borno-North, Borno-Central, and Borno-South respectively.

Table 2 shows the distribution of marital status by senatorial district. It shows that the married respondents are highest in Borno-North (82.7%) and lowest in Borno-Central (71.8%). Percentage of widowed respondents is about the same for Borno-North (9.2%) and Borno-South (8.8%) but the number of the divorced is highest for Borno-Central (12.9%). Among those respondents working, the civil servants are highest in Borno-North with 43.1 per cent, traders are highest in Borno-Central with 43.3 per cent and artisans are highest in Borno-South with 30.9 per cent.

3.2 Parental Factors and Under-five Mortality in Urban and Rural Areas

Table 3: Association between Parental Variables and Under-five Mortality by Rural/Urban Residence.

Parental Variables	Borno-Urban							Borno-Rural						
	No. of Live Births	%	No. of Deaths	%	U5MR	X^2	P-value	No. of Live Births	%	No. of Deaths	%	U5MR	X^2	P-value
Maternal Education:														
No Education	61	23	25	24	410			127	41	29	41	228		
Primary	78	29	33	32	423	3.556	0.314	59	19	18	26	305	18.513	0.000*
Secondary	90	33	35	34	388			94	30	9	13	96		
Tertiary	41	15	10	10	243			32	10	14	20	438		
Maternal Employment status:														
Employed	154	57	64	62	416	0.140	0.827	156	50	39	56	250	0.678	0.410
Unemployed	116	43	39	38	336			156	50	31	44	199		
Kind of Employment:														
Civil Servant	57	37	18	28	316	1.268	0.827	55	35	10	26	182	7.420	0.115
Trader	66	43	26	41	394			47	30	19	49	404		
Farmer	0	00	0	00	00			35	22	8	21	229		
Artisan	31	20	20	31	645			19	12	2	05	105		
Paternal Education:														
No Education	45	17	18	17	400			65	21	19	27	292		
Primary	19	07	06	06	316	6.056	0.109	47	15	10	14	213	3.184	0.364
Secondary	69	26	31	30	449			52	17	07	10	135		
Tertiary	137	50	48	47	350			148	47	34	49	230		
Paternal Employment type:														
Civil Servant	116	44	40	39	345	1.844	0.764	132	42	28	40	212	6.022	0.198
Trader	85	31	40	39	471			45	14	08	11	178		
Farmer	11	04	2	2	182			84	27	13	19	155		
Artisan	4	01	2	2	500			07	02	00	00	00		
Others	54	20	19	18	333			44	14	21	30	477		

*Significant values at 0.05%

Source: Field work, 2013

This section presents U5MR according to parental variables by urban and rural residence. Table 3 shows the under-five mortality rates for rural and urban areas. The urban rates showed a steady decline in the risk of U5M with increase in level of education although the result is not statistically significant. However, the rural rates show no clear pattern although the least rate is still for people with secondary education. Under-five mortality rate for unemployed mothers is lower than for those who are employed in both rural and urban areas. However, there is no significant difference between the two. Under-five mortality by maternal employment type shows that the civil servants have the lowest rate for urban areas (316/1000). Those in artisans had the lowest rate for the rural areas (105/1000).

The Under-five mortality by paternal education did not show any clear pattern in both rural and urban areas. The relationship of under-five mortality and paternal education is not in the expected direction with fathers in the primary level having the lowest rate (316/1000) in the urban areas. Fathers with secondary education have lowest rate in the rural areas (135/1000) but both have no statistical significance in the Chi-Square test result. Paternal occupation showed that the farmers have lowest rate in both urban (182/1000) and rural (155/1000) areas but not statistically significant.

3.3 Under-five Mortality and Parental Factors by Senatorial Districts

Table 4: Association between Parental Variables and Under-five Mortality by Senatorial Districts.

Parental variables	Borno-North							Borno-Central							Borno-South						
	No. of live births	%	No. of deaths	%	U5 MR	X^2	P-value	No. of live births	%	No. of deaths	%	U5 MR	X^2	P-value	No. of live births	%	No. of deaths	%	U5MR	X^2	P-value
Maternal Education:																					
No Educ.	103	60	26	55	252			61	24	21	21	344			23	15	**06**	**24**	261	17.250	0.001*
Primary	21	12	06	13	285	7.618	0.844	70	27	32	32	457	7.618	0.055	45	29	**13**	**52**	289		
Secondary	40	23	12	26	300			77	30	28	28	364			68	44	**04**	**16**	63		
Tertiary	8	05	03	06	375			48	19	20	20	417			18	12	**02**	**08**	111		
Maternal Employment:	86	50	33	70	384	1.141	0.285	132	52	55	54	417	0.141	0.707	98	64	19	76	193	0.981	0.322
Employed	86	50	14	30	163			124	48	46	46	371			56	36	06	24	107		
Unemployed																					
Maternal work type:																					
Civil Servant	42	49	13	39	310			45	34	12	22	267			25	26	04	21	160	2.408	0.661
Trader	22	26	12	36	545	5.606	0.231	72	55	29	53	403	1.523	0.677	25	26	05	26	200		
Farmer	18	21	05	15	278			00	00	00	00	00			17	17	04	21	235		
Artisan	4	04	03	09	750			15	11	14	25	933			31	31	06	32	194		
Paternal Education:																					
No Educ.	64	37	20	43	313			32	13	16	16	500			13	08	03	12	231	2.170	0.538
Primary	18	10	06	13	333	9.611	0.022*	20	08	05	05	250	2.406	0.493	27	18	04	16	148		
Secondary	32	19	12	26	375			55	21	21	21	382			34	22	04	16	118		
Tertiary	58	34	09	19	155			149	58	59	58	396			80	52	14	56	175		
Paternal Employment:																					
Civil Servant	78	45	17	36	218			118	46	42	42	356			53	34	08	32	151		
Trader	37	22	15	32	405	9.426	0.024*	63	25	26	26	413	3.785	0.436	30	19	06	24	200	3.580	0.466
Farmer	45	25	06	13	150			06	02	01	01	167			46	30	08	32	174		
Artisan	0	00	00	00	00			04	02	03	03	750			07	05	00	00	00		
Others	14	08	09	19	643			65	25	29	29	446			18	12	03	12	167		

*Significant values at 0.05

Source: Field work, 2013.

This section presents Under-five mortality in the three senatorial districts by parental variables. Maternal level of education shows that there is a steady increase of U5MR from those with no education to those with tertiary education in Borno North (Table 4). Under-five mortality rate by maternal level of education in Borno Central and Borno South did not show a clear trend nevertheless, there appears to be some inverse relationship because respondents with secondary level education had lowest rate in Borno South and second lowest in Borno Central Senatorial districts. Based on occupation of respondents the farmers have the lowest under-five mortality rate in Borno North, civil servants in Borno Central and artisans in Borno South but the relationships are not statistically significant.

Under-five mortality by paternal education shows that, fathers with tertiary education have lowest rate in Borno North (155/1000). The lowest U5MR by paternal education in Borno Central is primary education (250/1000) and secondary education in Borno South (118/1000). The Chi-Square result shows that paternal education is significantly associated with U5M in Borno North only. Paternal occupation and under-five mortality shows that farmers have lowest rate in Borno North (150/1000) and Borno Central (167/1000), while the civil servants have lowest rate in Borno South (151/1000).

3.4 Results of the Logistic Regression of the Parental Determinants of Under-Five Mortality

In this analysis, child mortality is the dependent variable which takes the value of 1 if mortality occurs and 0 if otherwise among under-five year old children of respondents. The odds ratio scores between 1 and 0 indicate an inverse relationship between the predictor and the outcome variable. Scores at 1 indicate no real relationship between the predictor and the outcome variable. Scores above 1 indicate positive relationship between the predictor and the outcome variable. For positive relationships when the odds ratio is greater than 3 the relationship is considered as strong, if it is between 1.6 and 3.0 it is considered to be moderate, but if it is between 1.1 and 1.5 it is regarded as weak (Wang, 2011). The Statistical Package for Social Sciences (SPSS) 16.0 version was used to run the statistics.

Table 5: Logistic Regression Model Showing Effect of Parental Variables on Under-five Mortality.

Variables	Odds Ratio		
	B	Exp(B)	Sig.
Maternal Education:			
Primary	0.386	1.471	0.238
Secondary	-0.765	0.465	0.029***
Tertiary	0.102	1.107	0.812
**No education			
Maternal Employment:			
Yes	0.145	1.156	0.713
**No			
Maternal Occupation:			
Civil servant	0.094	1.098	0.842
Trader	0.265	1.303	0.535
Farmer	0.184	1.202	0.771
**Artisan			
Paternal Education:			
Primary	0.183	1.201	0.681
Secondary	0.296	1.345	0.441
Tertiary	0.004	1.004	0.991
**No Education			
Paternal Occupation:			
Civil servant	-0.195	0.823	0.572
Trader	-0.248	0.780	0.475
Farmer	-0.803	0.448	0.069
Artisan	-0.203	0.816	0.800
**Others			

**Reference category
***Significant values at 0.05
Source: Field work, 2013.

Table 5 shows the logistic regression model of the parental determinants of U5M. In the model the result indicates that the odds of U5M for maternal education are reduced only for respondents with secondary education (0.465) and it is the only significant outcome in the model. The other two educational categories have increased risk in relation to those who are not educated (i.e. the reference category). For the employment status of respondents the odds of U5M increases by 15% for children of working mothers against those who are not working. There is a slight increase in risk of mortality for children of all occupations in relation to those of the artisans. However the increase in risk is least for the children of the civil servants (1.098).

Paternal education does not show reduction effect on U5M as the fathers who are educated have a higher under-five mortality rate than those of the uneducated. Risk of U5M is reduced for all occupational categories in relation to those who are in the services. Among the parental variables in the model only maternal secondary education showed lowered effect on U5M.

IV. DISCUSSION

Some parental factors which have been shown to affect U5M were highlighted to determine their impact on U5M. The parental factors include maternal education, employment status and kind of occupation as well as, paternal education and kind of work. Among the five variables maternal education is the strongest factor in U5M reduction with odds ratio of 0.465 for mothers with secondary education. The rural/urban analysis shows that there is inverse relationship between maternal education and under-five mortality rate in the urban areas but not in the rural areas. Under-five mortality by senatorial district showed that, maternal education did not reduce under-five mortality in Borno-North, while in Borno-Central and Borno-South the results are mixed. Paternal education and under-five mortality showed mixed trends in the three senatorial districts, but lowest rate is among those with tertiary education in Borno-North.

The negative relationship between U5M and maternal education is a finding that is consistent with several other studies in the developing countries (Bhattacharya, 1999; Caldwell, 1979; Majumder *et al*, 1997; Ssewanyana and Younger, 2007; Omariba *et al*, 2007; Lay and Robilliard, 2009; Uddin*et al*, 2009). According to Lay and Robilliard (2009) mother education advantage comes about as a result of better care and diet these children enjoy as against children of non-educated mothers.

The negative relationship is not evident throughout all educational levels in this study as could be seen in Table 6 which shows the odds ratios. Other studies have suggested that the association between mother's education and child survival was weaker in SSA than in Asia or Latin America, where socioeconomic differentials were generally more favourable for child survival (e.g. Lavy *et al*, 1996, Brokerhoff and Derose, 1996, Lalou and LeGrand, 1997). Hobcraft (1993) suggests that the reason for this is perhaps poorer health infrastructure in SSA. Another possible explanation is that, as Derose and Kulkarni (2005) found in a study in Kenya, community level effect of education is also important in child mortality reduction. That is the overall number of women who are educated in the community also influence U5M in addition to the individual-level education of the mother. Further, Kembo (2009) also found in a study in Zimbabwe that, women's average educational level in a community exerts even greater impact on infant survival than the individual mother's educational level. This finding supports the assertions that child survival is strongly influenced by mass education, a condition that is lacking in SSA.

Maternal employment status shows that working mothers have higher U5M with increased odds ratio of 15%. This differs from the study carried out by Uddin *et al* (2009) in Bangladesh which showed lower mortality for working mothers. However, a study by Kayode *et al* (2012) in Nigeria using the Demographic Health Survey data indicated that the odds of U5M decreased for mothers who worked in business or as clerics (0.96) but increased for manual workers (1.02). There is a slight increase in risk of mortality for children of all occupations in relation to those of the artisans, though it would be expected that children of the civil servants would have had a reduced risk because of the higher socioeconomic status they enjoy in society. However the increase in risk is least for the children of the civil servants (1.098).

Paternal education in this study did not have the same effect on under-five mortality as mother's education. There was no reduction in under-five mortality for educated fathers when compared with that of uneducated fathers. Conversely, some studies suggest that infant and child mortality in sub-Saharan Africa decreased with greater paternal education ((Tabutin and Akato, 1992; Caldwell, 1994). These studies indicated that educated parents are more likely to have food reserves for their children during famine periods and fathers with higher education are expected to have better coping strategies and better economic resources. According to Cleland and Ginneken, (1988) the father's socioeconomic status may even be more influential in societies where female education is universally low and where mothers have little or no autonomy. Uddin *et al* (2009) in their study, also investigated child mortality in Bangladesh using the logistic regression model in which results of the analysis showed that father's education and occupation, are significant determinants of child mortality in Bangladesh. Risk of U5M is reduced for all paternal occupational categories in relation to those who provide services ('others' category) e.g. security, tailoring and cleaning. It is lowest for the farmers and not the civil servants who are considered to be elites and should have lower rates.

V. CONCLUSION AND POLICY IMPLICATIONS

Under-five mortality by parental variables shows that generally there is a high and significant relationship between maternal education and under-five mortality in the state. Unemployed mothers have lower under-five mortality rate than employed mothers hence, employment of the mother is shown to be detrimental to child survival in this study. Mother's type of occupation indicated that those who are farmers had lowest under-five mortality rate. Father's educational status did not portray a clear relationship. For the occupational categories civil servant fathers had lowest under-five mortality rate.

The result of this study indicates that generally there is reduction of under-five mortality for educated mothers in the state as found in many studies but paternal education did not have the same effect. This is an indication that improving mother education will help greatly in reduction of U5M in this state.

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