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Original Article

An Analysis of Risk Factors for Incomplete Immunization for Children in Côte d'Ivoire: Examination of 1998-1999 and 2011-2012 Demographic and Health Survey

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ABSTRACT

In 2012, the global number of children who did not receive the third dose of Diphtheria, Pertussis and Tetanus vaccine was estimated to 22.6 million. Factors associated with immunization status among children in Côte d'Ivoire were examined in order to determine the trends of these factors and inform health policy makers. The study was a retrospective one using 1998-1999 and 2011-2012 Côte d'Ivoire Demography and Health Surveys data. The sample included 3878 children aged 12 to 59 months representing 1326 children from 1998-1999 data, and 2552 children from the 2011-2012 data. The outcome variable was vaccination status defined as "not fully immunized".   A child defined as not fully immunized if he/she did not received at least one of the following vaccines: BCG, the third dose of pentavalent, the third dose of polio, and measles vaccine. Data was analyzed using SPSS. Chi-square test was computed and Spearman correlation analysis were used to describe the sample. Univariate analysis, and multivariate analysis using logistic regression were performed to unclose the factors. Findings showed that not fully immunized children increased significantly (P<0.0001) from 1998-1999 (41.9%) to 2011-2012 (48.9%). Children who did not received BCG, DPT3, polio3 and measles vaccine increased significantly from 1998-1999 to 2011-2012. Child birth place (adjusted OR = 2.57, CI_{95}=1.96, 3.37), media access (adj. OR = 1.82, CI_{95}=1.38, 2.38), literacy (adj. OR = 1.95, CI_{95} = 1.19, 3.20), place of residence (adj. OR = 1.38, CI_{95} = 1.04, 1.83), and religion (adj. OR = 1.89, CI_{95} = 1.28, 2.79) were associated with odds of not being fully immunized in 1998-1999 as well as in 2011-2012. Health officials should take into account these factors in immunization strategies and policy making in Côte d'Ivoire.

KEYWORDS: Factors, immunization, children, Côte d'Ivoire

INTRODUCTION

Immunization has a huge impact on populations' health worldwide. Due to immunization, small pox which accounted for 300 to 500 million deaths [1] was eradicated in 1980 as reported by Henderson [2], and Etana and Deressa [3]. To build on small pox eradication, the World Health Organization (WHO) established the Expanded Program on Immunization (EPI) in 1974 as reported by WHO [4], and Bugvi et al. [5]. Vaccination plays a major role in infectious disease prevention. It is said to be the most effective public health intervention to prevent morbidity, complications, and mortality due to infectious disease among children as reported by the National Institute of Public Health of Quebec [6], Antai [7]. According to the WHO, each year, immunization prevents an estimated 2.5million child deaths [4]. Knowing the importance of vaccination in terms of infectious disease prevention, and its good cost-effective ratio, international organizations, governments, and donors have intensified their efforts to increase immunization coverage globally [8] in general, and particularly in countries with less than 80% coverage at district level, and less than 90% at national level. Despite these joint efforts, in 2012, the global number of children who did not receive the first dose of Diphtheria Pertussis and Tetanus (DPT) vaccine, and those who did not receive the third dose were

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estimated to 12.6 and 22.6 million respectively [9]. Studies have been conducted in different countries to identify determinants of childhood immunization [10-12]. These studies examined socio-demographic factors associated with immunization in a given year but not over the time. Therefore, it appears useful to identify factors associated with immunization status among children in Côte d'Ivoire, and determine the trends of these factors over time. The findings will inform health policy makers in general, and particularly Expanded Program on Immunization (EPI) managers and help achieve immunization coverage objectives.

METHODS

Data Source
The 1998-1999 and 2011-2012 Côte d'Ivoire Demography and Health Surveys (DHS) data were used for this study. These data were obtained from DHS data at http://www.dhsprogram.com/data/dataset_admin/download-datasets.cfm, after a written request explaining the purpose of the study. This request was followed by a written agreement, from the Demographic and Health Survey Program and Inner City Fund (ICF) International, which authorized the data use.
Côte d'Ivoire DHS was based on a random sampling with two level. The first level was regions selection. A list of urban and rural areas was obtained from the selected regions. The second level was the selection of households from the list of urban and rural areas of selected regions. The number of households selected in each region was proportional to the total number of households by region [13, 14].

Study sample
The study sample was based on children data set from 1998-1999 DHS which included 1992 cases, and children data set from 2011-2012 DHS which included 7776 cases. Only children aged 12 to 59 months were eligible for the study. In addition, cases with missing data were excluded from the data sets. The sample was 3878 children representing 1326 children from 1998-1999, and 2552 children from the 2011-2012 DHS.

Dependent variable
The outcome variable was vaccination status was defined as "not fully immunized". A child defined as not fully immunized if he/she did not received at least one of the following vaccines: BCG, the third dose of pentavalent (DTP-HepB-Hib 3), the third dose of polio (polio 3), and measles vaccine.

Independent variables
Independent variables in the study included child's sex, age, birth place, birth ranking, number of under-five children in the household, mother's age, mother's highest education, mother's access to media (radio, television, and/or newspaper), mother's literacy, head of the household, type of place of residence, and religion.

Statistical analysis
Statistical analysis was performed using SPSS. Descriptive analysis was performed to examine the rate of non-immunization by year. The Chi-square test was computed to compare differences among variables subgroups across years. Differences in rates of BCG, DPT3, polio3, and measles vaccinations were computed to determine the trend of children who remains unimmunized for these vaccines. Spearman correlation analysis was performed to examine the relation between studied variables over the two periods. Univariate logistic regression analysis was performed. Variables with a p-value less than .05 in the univariate analysis were included in the multivariate logistic regression analysis. Multivariate analysis was performed to determine predictors of immunization status using stepwise method of the logistic regression analysis.

RESULTS

Descriptive results

Distribution of selected variables for year 1998-1999 and year 2011-2012 are presented in table 1. Distribution of selected variables varied across years.

There was statistically significant difference between subjects' maternal education, maternal literacy, media access, place of residence, and religion in 1998-1999 and year 2011-2012   (p < .001) as shown in table 2.

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Proportion of eligible subjects' mothers living in urban setting, and of Catholic religion were greater in 1998-1999. Fewer subjects had access to media in 2011-2012 compared to 1998-1999, and subjects' mothers without education were greater in 2011-2012 compared to 1998-1999.

Table 1. Distribution of under 5 children according to year of Demographic Health Survey and selected sociodemographic variables, Côte d'Ivoire.

Variables	Total	1998-1999 N (%)	2011-2012 N (%)	P*
Number of children aged 12-59 months				
	3878	1326 (100)	2552 (100)	
Not fully immunized children	1805	556 (41.9)	1249 (48.9)	0.0001
Child sex				
male		652 (49.2)	1264 (49.5)	0.832
female	3878	674 (50.8)	1288 (50.5)	
Child age (months)				
12-23		351 (26.5)	718 (28.1)	
24-35	3878	371 (28.0)	693 (27.2)	0.451
36-47		306 (23.0)	612 (24.0)	
48-59		298 (22.5)	529 (20.7)	
Child birth place				
Home		542 (40.9)	1149 (45.4)	0.007
Health facility	3855	784 (59.1)	1380 (54.6)	
Child birth order				
1^{rst}		324 (24.4)	518 (20.3)	
2nd		247 (18.6)	498 (19.5)	
3rd	3878	195 (14.7)	405 (15.9)	0.025
4th		145 (11.0)	333 (13.0)	
≥5th		415 (31.3)	798 (31.3)	
		Mean (SD)	**Mean (SD)**	**t***
Number of under-five children in the household		2.30 (1.69)	2.37 (1.44)	0.20

*P value is from the Chi-square test comparing 1998-1999 to 2011-2012 data
*t value is from the independent samples t test

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Table 2. Distribution of under 5 children according to year of Demographic Health Survey and selected sociosdemographic variables, Côte d'Ivoire.
  (Continued)

Variables	Total	1998-1999 N (%)	2011-2012 N (%)	P
Mothers' age (years)				
15-24		392 (29.5)	690 (27.0)	
25-34		636 (48.0)	1253 (49.1)	
35-44	3878	268 (20.2)	543 (21.3)	0.381
45-49		30 (2.3)	66 (2.6)	
Mothers' education				
No education		786 (59.3)	1751 (68.6)	
Primary	3878	371 (28.0)	587 (23.0)	0.0001
Secondary and higher		169 (12.7)	214 (8.4)	
Mothers' literacy				
Can read	3877	467 (35.2)	556 (21.8)	0.0001
Cannot read		858 (64.8)	1996 (78.2)	
Head of the household				
Man	3878	1146 (86.4)	2181 (85.5)	0.415
Woman		180 (13.6)	371 (14.5)	
Access to media				
No	3878	426 (32.1)	1008 (39.5)	0.0001
Yes		900 (67.9)	1544 (60.5)	
Place of residence				
Urban	3878	777(58.6)	849 (33.3)	0.0001
Rural		549 (41.4)	1703 (66.7)	
Religion				
Catholic		284 (21.4)	412 (16.1)	
Protestant	3878	184(13.9)	527 (20.7)	0.0001
Muslim		584 (44.0)	1170 (45.8)	
Traditional, no religion		274 (20.7)	443 (17.4)	

Table 3 provides distribution of under 5 children who were not immunized in Cote d'Ivoire, in 1998-1999 and 2011-2012. The rate of non-immunization for BCG, measles were higher in 2011-2012 compared to 1998-1999 (p < 0.001). The rate of non-immunization for polio 3 was higher in 1998-1999 than 2011-2012 with rates of 34% and 29.1% respectively. However, there was no difference in the rate of non-immunization for DPT 3 for the study period (p = 0.133).

Table 3. Distribution of not immunized under 5 children according to year of Demographic and Health Survey and vaccine, Côte d'Ivoire.

Vaccine	1998-1999		2011-2012			
	Sample size	Not immunized N (%)	Sample size	Not immunized N (%)	P	*Absolute difference
BCG	1326	194 (14.6)	2552	461 (18.1)	0.007	3.5
DPT 3	1326	432 (32.6)	2552	893 (35.0)	0.133	2.4
Polio 3	1326	458 (34.5)	2552	743 (29.1)	0.001	-5.4
Measles	1326	314 (23.7)	2552	783 (30.7)	0.0001	7.0

*Absolut difference is the difference of not fully immunized percentage between 2011-2012 and   1998-1999

Table 4 provides Spearman's correlation coefficient for 1998-1999 and 2011-2012 variables. There was a significant positive correlation between incomplete immunization and children birth ranking, place of residence, maternal literacy, and religion in 1998-1999. There was a significant negative correlation between incomplete immunization and child birth place, access to media, and maternal education in 1998-1999. In 2011-2012, there was a significant positive correlation between incomplete immunization and number of children in the household, place of residence, maternal literacy, and religion. However, there was a significant negative correlation between incomplete immunization and child birth place, maternal age group, access to media, education, and sex of household head.

Univariate analysis

Table 5. Univariate analysis of selected variables and Odds of not being fully immunized, Côte d'Ivoire, 1998-1999 and 2011-2012 Demographic Health Survey.

| | Not fully immunized | | | |
| Variables | 1998-1999 | | 2011-2012 | |
	OR (95% CI)	P-value	OR (95% CI)	P-value
Child sex				
male	1		1	
female	1.00 (.80, 1.25)	.966	1.04 (.89, 1.21)	.600
Child age (months)				
12-23	1.05 (.77, 1.44)	.737	1.02 (.81, 1.28)	.83
24-35	.93 (.68, 1.27)	.680	.79 (.63, 1.00)	.05
36-47	.95 (.69, 1.32)	.783	1.03 (.82, 1.30)	.76
48-59	1		1	
Child birth place				
Home	3.95 (3.13, 4.98)	.0001	2.26 (1.92, 2.65)	.0001
Health facility	1		1	
Child birth order				
1^{rst}	1		1	
2nd	.93 (.66, 1.32)	.709	1.02 (.80, 1.31)	.819
3rd	1.04 (.725, 1.50)	.818	.98 (.75, 1.27)	.887
4th	1.15 (.77, 1.72)	.483	.98 (.74, 1.29)	.903
≥5th	1.62 (1.21, 2.18)	.001	1.14 (.91, 1.42)	.231
Mother's age (years)				
15-24	.52 (.24, 1.11)	.094	1.72 (1.03, 2.89)	.038
25-34	.50 (.24, 1.05)	.076	1.37 (.82, 2.27)	.219
35-44	.68 (.32, 1.47)	.337	1.48 (.88, 2.50)	.135
45-49	1		1	
Mother's education				
No education	5.38 (3.46, 8.37)	.0001	2.45 (1.81, 3.31)	.0001
Primary	3.37 (2.11, 5.38)	.0001	1.42 (1.02, 1.98)	.037
Secondary and Higher	1		1	
Media access				
No	2.92 (2.30, 3.71)	.0001	1.92 (1.63, 2.25)	.0001
Yes	1		1	
Literacy				
Can read	1		1 2.48 (2.03, 3.03)	
Cannot read	2.80 (2.19, 3.58)	.0001		.0001
Head of the household				
Man	1		1	
Woman	1.06 (.77, 1.46)	.682	.67 (.54, .84)	.001
Place of residence				
Urban	1		1	
Rural	2.83 (2.26, 3.55)	.0001	1.97 (1.66, 2.33)	.0001
Religion				
Catholic	1		1	
Protestant	1.63 (1.09, 2.41)	.015	1.48 (1.14, 1.93)	.003
Muslim	1.97 (1.44, 2.67)	.0001	2.01 (1.59, 2.54)	.0001
Traditional/no religion	3.33 (2.34, 4.73)	.0001	2.71 (2.06, 3.58)	.0001

The result of the univariate analysis of the association between selected child variables and odds of not being fully immunized in 1998-1999, and 2011-2012 is presented in Table 5. With the exception of child birth place, child sex, and age were not to be significantly associated with child immunization.

In 1998-1999, and 2011-2012 child birth place was associated with increased odds of not being fully vaccinated. In 1998-1999, and 2011-2012, birth at home, was associated with increased odds of not being fully immunized, with odds ratio of 3.95 (95% CI=3.13-4.98) and 2.26 (95% CI=1.92-2.65), respectively.

In 1998-1999 as well as in 2011-2012, the number of children not fully immunized was associated with mother's education, media access, literacy, place of residence, and religion. The dependent variable was associated with the variable "Head of the household" in 2011-2012 only. However, the number of children not fully immunized was not associated with mother's age in 1998-1999 and in 2011-2012 also.

Multivariate analysis

Table 6. Multivariate analysis of selected variables and odds of not being fully immunized, Côte d'Ivoire 1998-1999, and 2011-2012 Demographic Health Survey

	Not fully immunized			
	1998-1999		2011-2012	
Variables	Adj. OR(CI$_{95}$)	P-value	Adj. OR(CI$_{95}$)	P-value
Child birth place				
Home	2.57 (1.96, 3.37)	.0001	1.72 (1.44, 2.05)	.0001
Health facility	1		1	
Media access				
No	1.82 (1.38, 2.38)	.0001	1.27 (1.06, 1.53)	.009
Yes	1		1	
Literacy				
Can read	1		1	.0001
Cannot read	1.95 (1.19, 3.20)	.008	1.59 (1.27, 1.99)	
Place of residence				
Urban	1		1	
Rural	1.38 (1.04, 1.83)	.023	1.29 (1.06, 1.58)	.002
Religion				
Catholic	1		1	
Protestant	1.72 (1.12, 2.64)	.013	1.32 (1.00, 1.74)	.049
Muslim	1.71 (1.21, 2.43)	.002	1.74 (1.36, 2.23)	.0001
Traditional and no religion	1.89 (1.28, 2.79)	.001	1.82 (1.36, 2.44)	.0001
Mother's education				
No education	1.17 (.59, 2.30)	.650		
Primary	1.85 (1.12, 3.07)	.016	NA	
Secondary and higher	1			
NA = Not applicable				

The result of the multivariate logistic regression analyses of the association between selected variables and odds of not being fully immunized in 1998-1999, and 2011-2012 are presented in Table 6. Child birth place, media access, literacy, place of residence, and religion were associated with odds of not being fully immunized in 1998-1999 as well as in 2011-2012.

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DISCUSSION

The findings of our study should be interpreted in the light of some limitations. Recall bias cannot be ruled out as possible explanation for the findings of this study. During data collection in this study, mothers provided information about the immunization status of their children when the health card of the child was not available. We cannot therefore ascertain full validity of such information and over or underestimating rate of not fully children cannot be discarded. In addition, wealth index of household was not included in the analysis because 1998-1999 data set did not encompass it. Excluding wealth index, which has been found associated with immunization status in other studies, could have an impact on immunization predictors found in our study.

In this study we examined the trend of socio-demographic factors that are associated with immunization status among children aged 12 to 59 months using DHS data from 1998-1999 and 2011-2012. The number of not fully unimmunized children in 2011-2012 sample (1249, 48.9%) compared to those of 1998-1999 (556, 41.9%) was statistically significant (P = .0001). This difference could be explained by many reasons.

The first reason might be due to the insufficiency of supply of immunization service. The strategy Reach Each District has been implemented in all the health districts through the country using first contact health facilities which offer immunization services. A study conducted in 2010 in Côte d'Ivoire found that the strategy Reach Each District was insufficiently implemented in some health districts. Immunization supply service was insufficient for all types of immunization strategy: fixed, advanced, and out of reach strategy. Some vaccines were not administered during immunization session mainly because health personnel wanted to reduce vaccine wastage, and because of vaccines shortage [15].

The second reason may be attributed to insufficiency in immunization service use. The study conducted in 2010, mentioned above, found that the access to immunization program which is assessed by DPT1 and TT1 coverage was high (more than 90% for each of them). However, continuity of immunization service which is assessed by dropout rates of DPT1-DTC3, DPT1-MCV, TT1-TT2, and TT1-TT3 was low. Dropout rates were far beyond the threshold of 10% [16-18].

The third reason may be due to vaccines shortage. The country experienced vaccines shortages for months and in different years. For instance, in 2010, BCG, TT, yellow fever, and measles vaccine were out of stock for 2, 2, 5, and 1 months respectively. The following year, 2011, pentavalent vaccine (DPT-HepB-Hib) was out of stock for 3 months, and auto-disabled syringes were out of stock for 5 months [19].

The fourth reason may be due to financial problems. Almost all financial institutions and private companies had to close for security reasons, and for the cessation of financial operations of the Central Bank of West African Countries with Côte d'Ivoire during the post-electoral crisis. This situation severely affected the economy of the country. Consequently, vaccines suppliers did not get paid. Therefore, vaccines supply was suspended. This suspension led to vaccines shortage over the time [19].

The fifth reason may be due to the social and military crisis. Côte d'Ivoire experienced a sociopolitical crisis since 2002. This crisis worsened after the presidential election, in November 2010, which led to a war between March 2011 and May 2011. The crisis had a negative impact on health system in general, and especially on immunization system. For example, the government decreased his contribution on health expenses. In addition, losses of cold chain equipment, vehicles, and motorbikes were reported in the vast majority of health districts. Moreover, vaccines and syringes shortage was reported [19].

Concerning determinants of immunization status, birth place was associated with immunization status. Children born at home were 2.5 times and 1.72 times more likely not to be fully immunized compared to those born at health facilities in 1998-1999 and in 2011-2012 respectively. Our findings are similar to those of previous studies [11, 20, 21]. In Sub-Saharan African region, many women often give birth at home for reasons such as lack of transport and/or funds, long distance to reach health facilities, and lack of motivation (not necessary to deliver in a health facility) [22, 23]. The lack of motivation to deliver in a health facility could be explained by social and cultural beliefs as reported by Montagu et al. [22].

Children living in rural area were 1.38 more and 1.29 times more likely not to be fully immunized compared to those of urban area in 1998-1999 and in 2011-2012 respectively. Our findings confirmed those of previous studies conducted in Malawi [24], and in Benin [25]. However, other studies conducted in Gambia [26], and in other Sub-Saharan African countries [27] found that children living in rural areas were more likely to be not fully immunized compared to those of urban areas. In rural areas, children incomplete immunization status could be explained by the long distance between the place of residence and health facilities [24] which poses a problem of transport and cost of transport [28]. In urban areas, mothers' concern about being absent from work [26, 28], and parents' concern about vaccine adverse effects could explain children incomplete immunization status.

Children of women who had no access to media were 1.82 times and 1.06 times more likely to be not fully immunized compared to those whose mothers had access to media in 1988-1999 and in 2011-2012 respectively. Our findings

confirmed those of previous studies which reported that lack of mothers' access to media increased the likelihood of their children to be not fully immunized [5, 27, 29]. Media played an important role in health in general, and especially in children immunization. In Philippines, a communication campaign for Expanded Program on Immunization focused on measles, in Metro Manila region, increased not only measles coverage (from 21 to 45 percent) but also all other vaccines coverage (from 20 to 24 percent) within five months [30]. Access to media influenced immunization completion through behavior change [31, 32]. Information sprayed through media increases parents awareness about immunization. Therefore, parents' care-seeking behavior change; eventually, they get their children vaccinated.

Children of women who could not read were 1.95 times and 1.59 times more likely to be not fully immunized compared to those of women who could read in 1998-1999 and in 2011-2012 respectively. Like our study, previous research found that women's literacy was associated with a higher likelihood of having a child vaccinated [11, 33]. Literacy can be seen as a proxy indicator for education level and consequently has the same added value as mother's education [33]. Education increases women's understanding of health and consequently augments their use of maternal and children health services [34].

Children of women with protestant, Muslim, and no religion were more likely to be incompletely immunized compared to those of women with Catholic religion. A study about religion and immunization fund that no religion in the world opposes to immunization. In addition, the authors reported that for most of religious groups which opposed to immunization, the reasons where more social or cultural than religious. For instance, in Kano region in North of Nigeria, vaccination refusal during polio immunization campaigns pointed out as religious refusal hid deep reasons related to political power, insufficiency of health services, and a controversial clinical trial of an experimental antibiotic [35].

IMPLICATIONS/RECOMMENDATIONS

Our study showed that birth place, place of residence, access to media, literacy and religion are the strongest predictors of immunization status in Côte d'Ivoire. Therefore, to address the issue of children incomplete immunization, health officials and particularly the director of the Expanded Program on Immunization, and health districts directors should promote delivery at health facilities, access to media, literacy through education, focus immunization effort in rural area, and work in collaboration with religious leaders.

Future studies such as qualitative studies are needed to deepen the reasons of incomplete immunization in order to redirect efforts to get children vaccinated.

CONCLUSION

This study which examined the trend of socio-demographic factors associated with children aged 12 to 59 months using 1998-1999 and 2011-2012 DHS data of Côte d'Ivoire found that incompletely immunized children increased over the time. Looking at the factors associated with immunization status, birth place, place of residence, access to media, literacy and religion were the strongest predictors of immunization status. Health minister and other health officials should take into account these immunization status predictors, and work in cooperation with education minister, communication minister, and religious leaders in order to address the issue of children incomplete immunization in Côte d'Ivoire. Finally, future studies are needed to reexamine the trend of socio-demographic factors associated with children immunization status in order to redirect efforts to get children vaccinated.

AUTHORS' CONTRIBUTIONS
- Alfred Douba participated in conception and design of the study, acquisition of data, analysis, interpretation and drafting the article.
- Lepri Bernadin Nicaise Aka participated in analysis, interpretation and drafting the article.
- Attoh-Toure Harvey participated in analysis, interpretation and critical review of the manuscript.
- Bangaman Christian Akani participated in critical review of the manuscript.
- Gnissan Henry Auguste Yao participated in critical review of the manuscript.
- Konan N'guessan participated in critical review of the manuscript.
- Petronille Accray-Zengbe participated in critical review of the manuscript.

All the authors read and approved the version to be submitted.

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Table 4. Spearman's correlation coefficient for selected variables, Demographic Health Survey, 1998-1999 and 2011-2012, Côte d'Ivoire

	Variable	Not fully vaccinated	Child's age in months	Birth order number	Number of children 5 and under	Place of delivery	Sex of child	Type of place of residence	Age 5-year groups	Access to media	Highest educational level	Literacy	Religion	Sex of household head
								Year 2011-2012						
	Not fully vaccinated	1	.007	.023	.142**	-.200**	.010	.157**	-.038*	-.158**	-.150**	.181**	.151**	-.068**
	Child's age in months	-.009	1	.017	.054**	-.036	.006	.006	.148**	.004	-.017	.018	-.001	-.011
	Birth ranking	.100**	.027	1	.116**	-.139**	-.017	.135**	.698**	-.098**	-.207**	.158**	.045*	-.088**
	Number of under 5 children	.036	.010	.159**	1	-.138**	.012	.181**	-.017	-.085**	-.102**	.128**	.113**	-.069**
Year	Place of delivery	-.326**	.015	-.115**	-.104**	1	-.032	-.344**	-.034	.258**	.238**	-.218**	-.092**	.055**
1998-	Sex of child	.001	.049	-.027	-.008	-.008	1	.031	-.013	-.024	-.009	.009	-.002	-.021
1999	Type of place of residence	.251**	.005	.087**	.176**	-.481**	.009	1	.021	-.332**	-.215**	.252**	.080**	-.072**
	Age 5-year groups	.050	.130**	.708**	.084**	-.027	.017	.021	1	-.048*	-.108**	.059**	-.013	-.050*
	Access to media	-.247**	-.055*	-.175**	-.047	.269**	-.024	-.294**	-.178**	1	.316**	-.308**	-.183**	.058**
	Highest educational level	-.212**	-.006	-.225**	-.133**	.285**	-.041	-.215**	-.137**	.369**	1	-.776**	-.261**	.129**
	Literacy	.230**	.002	.218**	.131**	-.273**	.051	.220**	.136**	-.356**	-.863**	1	.242**	-.130**
	Religion	.186**	.010	.081**	.149**	-.221**	.055*	.145**	.014	-.146**	-.292**	.303**	1	-.132**
	Sex of household head	.011	-.022	-.069*	-.078**	.020	.033	-.043	.020	.060*	.038	-.072**	-.087**	1

**. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed)