

Risk Analysis Of The Predictors Of Infant Mortality In Lagos Island, L.G.A, Lagos State, Nigeria

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Abstract: *This study explored the factors associated with infant mortality in Lagos Island, LGA of Lagos State, Nigeria. The purpose of this study was to investigate whether poverty (income), health related interventions and socio-environmental factors affect infant mortality. Population studied were mothers that have had at least 2 pregnancies in their life time. Questionnaire was used for data collection using purposive sampling technique and 225 respondents from Lagos Island Local Government Area of Lagos State were sampled. Pearson's Chi Square analysis was used to test for association between infant mortality and the factors considered and Odd Ratio analysis exposed the likelihood of the outcome of the factors resulting to infant mortality. The chi-square results showed that some of the studied variables are significantly associated with infant mortality while the Odds Ratio revealed the likelihood of infant mortality with respect to: Income [O.R: 5.456 (95% C.I, 1.948 - 15.284)], Self - Medication [O.R: 1.113 (95% C.I, 1.058 - 1.170)], Prolonged labour [O.R: 0.899 (95% C.I, 0.854 - 0.946)], use of contraceptives [O.R: 0.883 (95%, C.I. 0.832 - 0.937)], family planning [O.R: 0.039 (95% C.I, 0.005 - 0.299)], access to public services, smoking [O.R: 6.778 (95% C.I, 2.388 - 19.236)], use of traditional portion (Agbo) [O.R 0.274 (95% C.I., 0.100 - 0.756)] and work status [O.R: 0.879 (95% C.I, 0.827 - 0.938). Based on the findings, poverty, health factors and certain socio-environmental factors have significant effect on infant mortality.*

Keywords: *Risk analysis, Infant mortality, predictors, Odd ratio, likelihood*

I. INTRODUCTION

Maternal and child health are crucial measures of progress in developing nations especially in the monitoring and evaluation of various developmental agenda such as Millennium Development Goals 4 and 5 (MDG-4 & MDG-5). Poor maternal health remains a major concern in sub-Saharan Africa with Nigeria occupying a position among the countries with the highest infant mortality rates in the world. The influence of working conditions on maternal health in the face of poor provision of amenities and infrastructural decay ravaging developing countries, particularly those of sub-

Saharan Africa, have seldom been recognized as important factors in maternal health. Non-Governmental Organizations (N.G.O), government health ministries and international organization such as W.H.O have adopted many strategies in an attempt to improve maternal health outcomes around the world. These have mainly been through the provision of maternal and child health (M.C.H) programmes, aimed at improving primary prevention through education and services, early detection and treatment. Specific programme interventions include emphasizing prenatal attention, clean and safe deliveries, postnatal care, family planning, and essential obstetric care (Fadeyi, 2007; Lubbock & Stephenson,

2008). While these programmes encourage women's access to maternal health services, women continue to be susceptible to health complications due to some extraneous social and cultural factors. Various studies have increasingly pointed out that urban health conditions are not as rosy as many people may assume (Friel *et al*, 2011; Takano, 2003). Takano (2003) specifically noted that urbanisation triggers new problems and issues bearing on multiple aspects of urban life, including food security, housing, living environment, health of future generations, etc. The conditions of the diverse health determinants in urban areas are becoming increasingly complex especially in developing nations. On the whole, the varied health problems challenging cities are intricately interrelated with the background of general urban problems. The fast pace of urban growth has affected different groups of people in different ways. Urban life is most fascinating but it is also demanding especially on pregnant women who do not only contend with their own health but also with the life they are foisted to carry for nine months. Such experience is especially daunting for pregnant women in Lagos State, Nigeria, who are faced with poor provision of social amenities and infrastructural decay. The paper examines the influence of working conditions in Lagos State, Nigeria. It describes the extent to which urbanism has impacted on maternal health in the face of poor provision of amenities and infrastructural decay ravaging the city of Lagos.

II. LITERATURE REVIEW

Infant mortality has been a major concern in Nigeria as the country has one of the highest infant/child mortality rates in the world. Health care facilities and services are concentrated in Lagos, but big hospitals do not necessarily improve people's health. Maternal mortality rate in Lagos State was put at 650 per 100, 000 live births in 2012 and this high rate is a source of concern to the Lagos state government. Health care is about identifying the health problems of a population and designing an integrated health policy to improve the challenge (National Mirror, 2012; Radio Lagos 2009). The health of a pregnant woman working in Lagos could be compromised by a wide range of factors. On one hand, economic pressures on the households have led to more women to seek paid work. Many households find that two incomes are required in order to sustain a desired lifestyle (Giddens, 2002).

For any country willing to achieve the objectives of the World Health Organization (WHO), in reducing the risk associated with child birth and childbearing must equip all the health care services in her country. Despite the establishment of the institution of safe motherhood initiative in the health sector, maternal mortality in Nigeria was still very high, hence, this work investigated the factors responsible for infant rate in Lagos Island L.G.A, Lagos State.

Lawn *et al*. (2005) did a study on why, when and where 4 million babies dies each year. They observed that every year an estimated 4 million babies die in the first 4 weeks of life (the neonatal period) while a similar number are stillborn and 0.5 million mothers die from pregnancy-related causes. The results of the study indicated that the main direct causes of

neonatal death were pre-term birth (28%), severe infections (26%), asphyxia (23%) and neonatal tetanus (7%) while low birth weight is an important indirect cause of death. Maternal complications in labor carry a high risk of neonatal death. They concluded that poverty is strongly associated with an increased risk.

The WHO (2006) noted that babies are more susceptible than mothers and infections in infants are more difficult to detect. It estimated that 26% of newborn infants who die is as a result of infections that occur during birth. Also, during pregnancy, the uterus that protects the baby from environmental infections, this safety barrier is broken through by infections like syphilis and HIV and the foetus affected. In countries where maternal syphilis is prevalent, many babies are stillborn, die soon after birth or are infected themselves (WHO, 2006).

Kumar & File (2005) used data from the Ethiopia Demographic and Health Survey [EDHS] conducted in 2005 to investigate the predictors 'of child [0-5 years] mortality in Ethiopia. The cross-tabulation technique was used to estimate the predictors of child mortality and they found that birth interval with previous child and mothers' standard of living index were the vital factors associated with child mortality.

Goro (2007) using 1993, 1998, and 2003 DHS surveys in Ghana examined the determinants of infant and child mortality in three northern regions using multivariate logistic regression model and found that education of mothers, birth order of child and marital status of mothers are powerful significant determinants for infant mortality, while only mothers education have a significant impact for child mortality.

Mustafa & Odimegwu (2008) in their study in Kenya, with 2003 DHS data set for children using logistic regression models examined socio-economic determinants of infant mortality rate both urban and rural setting. They found like in Tanzania that regional variation exists in infant and child mortality between the different provinces of Kenya. Most of the socioeconomic factors are not associated with the risk of infant and child mortality while children born in the richest household has lower probability of infant mortality relative to children born in the poorest households.

Women of the child bearing age, 15-49 years old are at risk of maternal mortality during pregnancy and child birth as a result of complication arising from pregnancy and child birth. In developing nations, the average maternal mortality rate 480 deaths per 100,000 live births (UNDP, 2004). The available health services are characterized by inefficiency, wasteful use of resources and low quality of services (Ademiluyi & Arowole 2009).

The focus of this study was to identify those factors that impacts infant mortality in Lagos Island L.G.A of Lagos State, Nigeria with specific objectives which include: to identify how measures of poverty affect infant mortality in Lagos Island L.G.A of Lagos State, Nigeria, to ascertain the health factors that influences infant mortality in Lagos Island L.G.A of Lagos State, Nigeria. And to investigate the effect of socio-environmental factors on infant mortality in Lagos Island L.G.A of Lagos State, Nigeria. This study also provided information on the factors responsible for infant mortality rate in Lagos Island L.G.A. The outcome will be useful both to the

government, policy makers, health personnel and expectant mothers alike.

III. METHODOLOGY

The research design adopted for this study is the survey research design. The population for the study comprised all childbearing mothers in Lagos Island L.G.A, who attended antenatal, postnatal and infant welfare in some hospital and health centres in the metropolis. Equally the population the nurses, mothers, paediatrician and gynaecologist in the community. Purposive sampling was used to focus on women who met the inclusion criterion and a sample size of 225 was used based on the proportion obtained from the pilot study. The instrument for data collection was a self - designed literature-based questionnaire. The reliability (The Cronbach's Alpha) coefficient of 0.63 was obtained for the research instrument. The content and face validity of the instrument was ascertained through experts who have knowledge of survey research design. In order to gain access to the respondents, a letter of introduction was presented to the health officers in charge of the hospital/maternity homes who in turn introduced the investigator to the mothers. The investigator gave out the questionnaire to literate mothers to fill and also used direct interview to help the illiterate mothers fill out the questionnaires. The quantitative and qualitative data gathered were analysed using descriptive and inferential statistical method after the questionnaires returned were edited, coded and enter with the aid of Statistical Package for Social Sciences (SPSS 20). Chi-Square analysis was performed to ascertain the association between the tested variables and infant mortality. Also, Odd Ratio (OR) was adopted to obtain the odds of infant mortality given a particular exposure.

IV. RESULTS

The results show that 3.6% of the mothers were aged 15 - 24 years, 32.4% were aged 20 - 24 years, 33.3% were 25 - 29 years, 19.6% were 30 - 34 years, 9.8% were 35 - 39 years and 1.3% were 40 and above. Also, 63.1% of the women were married, 17.3% were divorcees, 2.7% were widowed 16.4% were single parents. The results also showed that 55.1% of the mothers were Moslems, 44.4% were Christians and only 4% belong to the traditional religion. Lastly, 75.6% of the mothers were Yorubas, 18.7% were Igbos, 3.6% were Hausas, 2.1% belonged to other ethnic nationalities and only 63.1% of the mothers were working.

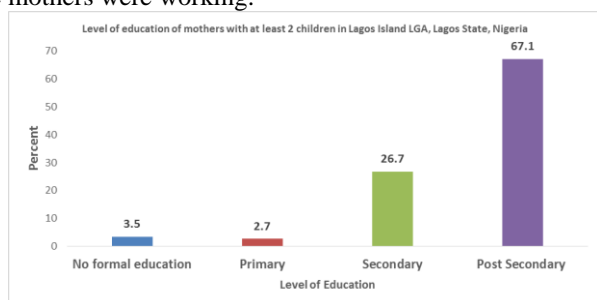


Figure 1

Demography Characteristics	Frequency	Percentage	
Distribution of Income (NGN)	< 20000	92	40.9
	21000-50000	34	15.1
	51000-100000	62	27.6
	Above 100000	37	16.4
	Total	225	100.0
Distribution of Number of Persons per household	0-4	182	80.9
	5-8	32	14.2
	above 8	11	4.9
	Total	225	100.0
Distribution of Self-Medication	No	56	24.9
	Yes	169	75.1
	Total	225	100.0

Table 1: Percentage Distribution of the mothers by the measure of well - being

Table above showed that 16.4% of the mothers earn #100,000 and above while 83.6% earn below #100,000. Also, it showed that 80.9% of the mothers reported 0 - 4 persons in their household, 14.2% reported 5 - 8 persons and only 4.9% had above 8 persons in their households. Lastly, it showed that 75.1% of the mothers engaged in self-medication.

Demography Characteristics	Frequency	Percentage	
Distribution of birth interval	12-24 months	84	37.3
	25-36 months	41	18.2
	> 36 months	30	13.3
	Non - response	70	31.1
	Total	225	100.0
Distribution of birth interval between last and previous child	< 12 months	6	2.7
	12-24 months	71	31.6
	25-36 months	48	21.3
	> 36 months	29	12.9
	Non - response	71	31.9
	Total	225	100.0
Distribution of breast feeding	No	10	4.4
	Yes	214	95.1
	Non - response	1	0.5
	Total	225	100.0
Antenatal visits	< 4 times	53	23.6
	4 times	10	4.4
	> 4 times	161	71.6
	Non - response	1	0.4
	Total	225	100.0
Postnatal visits	< 4 times	103	45.8
	4 times	15	6.7

	> 4 times	104	46.2
	Non – response	3	1.3
	Total	225	100
Child birth weight	< 2.3 kg	15	6.7
	2.5-3.3kg	68	30.2
	3.4-5kg	141	62.7
	Non – response	1	0.4
	Total	225	100
Variable	Yes (%)	No (%)	Non – response
Infant mortality	17 (7.6)	207 (92.0)	1 (0.4)
Prolonged labour	56 (24.9)	169 (74.7)	1 (0.4)
Use of contraceptives	77 (34.2)	146 (64.9)	2 (2.9)
Family planning	128 (56.9)	95 (42.2)	2 (0.9)

Table 2: Percentage Distribution of the mothers by the health factors

This showed that 95.1% breastfed their children regularly, 7.6% had experienced infant mortality, 34.2% use contraceptives and 56.9% practice family planning. It also showed that 71.6% of the mothers made more than 4 antenatal visits, 23.6% had less than 4 antenatal visits while 4.4% attended exactly 4 times. The table further showed that while 46.2% of the mothers had more than 4 postnatal visits, 45.8% had less than 4 postnatal visits and 6.7% attended just 4 times while 24.9% of the mothers had prolonged labour during delivery.

Lastly, it showed that 15 (6.7%) of the respondents had children whose birth weight was less than 2.3kg, 68 (30.2%) were between 2.5 - 3.3kg and 141 (62.7%) were above 3.3kg.

Variable	Yes (%)
Access to public services	173 (76.9)
Smoking	32 (14.2)
Alcohol	151 (67.1)
Use of traditional concoction	159 (70.7)

Table 3: Percentage distribution of the socio-environmental factors

Table 3 revealed that 76.9% of the women had access to public services, only 14.2% were smokers, 32.9% of them use of alcohol and 70.7% of them use of traditional herbal portion (Agbo).

Variables		Ever lost a child under 5 years		Total	Chi Square (p); [OR (95% CI)]
		No (%)	Yes		
Income	Less than #100,000	178 (95.2)	9 (4.8)	187 (100.0)	12.444 (0.002); 5.456 (1.948 – 15.284)
	#100,000 and above	29 (78.4)	8 (21.6)	37 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	
Number of persons per household	0-4	164 (90.6)	17 (9.4)	181 (100.0)	0.043 (0.112)
	5-8	32 (100.0)	0 (0.0)	32 (100.0)	
	above 8	11 (100.0)	0 (0.0)	11 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	
Ever engaged in self-medication	No	56 (100.0)	0 (0.0)	56 (100.0)	6.132 (0.013); 1.113 (1.053 – 1.170)
	Yes	151 (88.3)	17 (10.1)	168 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	
Child birth	12-24	68 (81.0)	16 (19.0)	84 (100.0)	12.366

interval	months				(0.002);
	25-36 months	40 (97.6)	1 (2.4)	41 (100.0)	
	> 36 months	30 (100.0)	0 (0.0)	30 (100.0)	
	Total	138 (89.0)	17 (11.0)	155 (100.0)	
Child birth interval between last and previous child	12-24 months	61 (79.2)	16 (20.8)	77 (100.0)	14.958 (0.001);
	25-36 months	47 (97.9)	1 (2.1)	48 (100.0)	
	> 36 months	29 (100.0)	0 (0.0)	29 (100.0)	
	Total	137 (89.0)	17 (11.0)	154 (100.0)	
Regular child breast feeding	No	10 (100.0)	0 (0.0)	10 (100.0)	0.040 (0.447) 1.08 (1.030 – 1.044)
	Yes	197 (92.1)	17 (7.9)	214 (100.0)	
	Total	208 (92.9)	17 (7.6)	224 (100.0)	
Number of antenatal care before delivery	< 4 times	36 (67.9)	17 (32.1)	53 (100.0)	59.354 (<0.001) 0.679 (0.565 - 0.817)
	4 times and above	171 (100.0)	0 (0.0)	171 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	
Had a prolonged labour during delivery	No	151 (89.9)	17 (10.1)	168 (100.0)	6.132 (0.013) 0.899 (0.854 - 0.946)
	Yes	56 (100.0)	0 (0.0)	56 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	
Use contraceptives between births	No	128 (88.3)	17 (11.7)	145 (100.0)	9.776 (0.001) 0.883 (0.832 - 0.937)
	Yes	77 (100.0)	0 (0.0)	77 (100.0)	
	Total	205 (92.3)	17 (7.7)	222 (100.0)	
Engage in family planning	No	79 (83.2)	16 (16.8)	95 (100.0)	19.974 (<0.001) 0.039 (0.005 - 0.299)
	Yes	127 (99.2)	1 (0.8)	128 (100.0)	
	Total	206 (92.4)	17 (7.6)	223 (100.0)	
Child birth weight	< 3.4kg	83 (100.0)	0 (0.0)	83 (100.0)	10.910 (0.004) 0.205 (0.122 - 0.345)
	3.4-5kg	123 (87.9)	17 (12.1)	140 (100.0)	
	Total	206 (92.4)	17 (7.6)	223 (100.0)	

Table 4: Distribution of Infant Mortality and Income of the mothers

Table 4 showed that 4.8% of those that earn less than #100,000 had experience the loss of child aged less than 5 years (infant mortality) while 21.6% of those than earn #100,000 and above have experience same. There is a significant association between infant mortality and income level of mothers in Lagos Island LGA, Lagos State ($\chi^2_1 = 12.444$, $p < 0.05$). The Odd Ratio of obtained was 5.456 (1.948 - 15.284) which implied that mothers who earned #100,000 and above are over 5 times more likely to experience infant mortality than those that earn #100,000 and above.

Also, while 9.4% of households with 4 persons or less had experienced infant mortality, none among those with household number above 4 had experienced same and there is no significant association between infant mortality and number of persons per household ($\chi^2_2 = 0.043$; $p > 0.05$).

In addition, while 10.1% of women that had ever self – medicated experience infant mortality, none from those who do not self – medicate did and there is significant association between infant mortality and self-medication ($\chi^2_1 = 6.132$; $p < 0.05$). The odd ratio of infant mortality for self-medication was 1.113 (1.058 - 1.170) which implied that those who engaged in self - medication were 11% more likely to experience infant mortality.

Furthermore, while 19% of mothers who space 12 – 24 months experienced infant mortality, 2.4% of those with 25 – 36 months spacing experienced same and none among mothers with greater than 36 months spacing do. Hence, there

is significant association between infant mortality and child birth interval ($\chi^2_2 = 12.366$; $p < 0.05$). Similarly, 20.8% of mothers who space 12 – 24 months between their last previous children experienced infant mortality, 2.4% of those with 25 – 36 months spacing experienced infant mortality and none among mothers with greater than 36 months spacing do. Hence, there is also a significant association between infant mortality and child birth interval between last and previous child ($\chi^2_2 = 14.958$; $p < 0.05$).

Among mothers who regularly breastfed their babies, 7.9% experienced infant mortality while none did among those whose breastfeeding was irregular. There is no significant association between infant mortality and breast feeding of children ($\chi^2_1 = 0.040$; $p > 0.05$). The Odd Ratio of infant mortality for breast feeding was 1.08 (1.03 – 1.044) which means that those that who breastfeed regularly are 8% more likely to experience infant mortality than those who do not regularly breastfeed.

The table also show that 32.1% of mothers with less than 4 times antenatal visits experienced infant mortality while those with 4 or more visits do not. There is a significant association between infant mortality and the number of antenatal visits (frequency of antenatal visits) ($\chi^2_1 = 59.354$; $p < 0.05$). The Odd Ratio of infant mortality for frequency of antenatal visits is 0.679 (0.565 – 0.817) which implied that those who frequent antenatal visits (4 or more times) are 22.1% less likely to experience infant mortality.

It was also seen that 10.1% of mothers without prolonged labour during delivery experienced infant mortality while none among those who had prolonged labour did. However, there is significant association between infant mortality and experience of prolonged labour during delivery ($\chi^2_1 = 6.132$; $p < 0.05$). The Odd Ratio of infant mortality for prolonged labour was 0.899 (0.854 - 0.946) which means that those that experienced prolonged labour during delivery were 10% less likely to experience infant mortality than those that have not had prolonged labour during delivery.

Also, 11.7% of mothers who do not use contraceptives experienced infant mortality while none among users of contraceptives dido not and there is significant association between infant mortality and the use of contraceptives ($\chi^2_1 = 9.776$; $p < 0.05$). The Odd Ratio of infant mortality for the use contraceptives was 0.883 (0.832 - 0.937) which means those that use of contraceptives were 12% less likely to experience infant mortality.

The table further showed that 0.8% of mothers who engage in family and 16.8% of those who do not engage in family respectively experience infant mortality and there is a significant association between infant mortality and family planning ($\chi^2_1 = 19.974$; $p < 0.05$). The Odd ratio of 0.039 (0.005 - 0.299) was obtained which implies that those who did family planning were 96% less likely to experience infant mortality.

Lastly, 12.1% of children with 3.4 – 5 kg birth weight and none with less than 3.4kg died before their fifth birthday and there is significant association between infant mortality and child birth weight ($\chi^2_1 = 19.974$; $p < 0.05$). The Odd ratio of infant mortality for child birth weight of 0.205 (0.122 - 0.345) was obtained which implied that those weighing less than

3.4kg at birth were 79.5% less likely to experience infant mortality.

Variables		Ever lost a child under 5 years		Total	Chi Square (p); [OR (95% CI)]
		No (%)	Yes		
Access to public services	No	40 (83.3)	8 (16.7)	48 (100.0)	6.955 (0.014); 0.274 (0.100 – 0.756)
	Yes	164 (94.8)	9 (5.2)	173 (100.0)	
	Total	204 (92.3)	17 (7.7)	221 (100.0)	
Smoking	No	183 (95.3)	9 (4.7)	192 (100.0)	16.136 (0.001) 6.778 (2.388 - 19.236)
	yes	24 (75.0)	8 (25.0)	32 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	
Take alcohol	No	141 (94.0)	9 (6.0)	150 (100.0)	1.635 (0.156) 1.899 (0.701 - 5.143)
	Yes	66 (89.2)	8 (10.8)	74 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	
Work status	Working	124 (87.9)	17 (12.1)	141 (100.0)	10.828 (<0.001) 0.879 (0.827 - 0.938)
	Not working	83 (100.0)	0 (0.0)	83 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	
Use of traditional portion (Agbo)	No	66 (100.0)	0 (0.0)	66 (100.0)	7.684 (0.002) 1.121 (1.062 - 1.183)
	Yes	141 (89.2)	17 (10.8)	158 (100.0)	
	Total	207 (92.4)	17 (7.6)	224 (100.0)	

Table 5: Distribution of Infant Mortality and socio – environmental factors

The table above show that 16.7% of mothers without access to public services and 5.2% with such access respectively experienced infant mortality and the association between infant mortality and access to public services is significant ($\chi^2_1 = 6.955$; $p < 0.05$). The Odd ratio is 0.274 (0.100 - 0.756) which means that mothers that have access to public services are 73% less likely to experience infant mortality.

Also, 25% of mothers who smoke and 4.7% of those who do not smoke respectively experienced infant mortality and there is significant association between infant mortality and smoking ($\chi^2_1 = 6.955$; $p < 0.05$). The Odd Ratio of infant mortality for smoking was 6.778 (2.388 - 19.236) which implied that smokers are 7 times more likely to experience infant mortality than those who do.

Furthermore, 10.8% of mothers who take alcohol and 6.0% of those who do not take alcohol respectively experienced infant mortality and there is no significant association between infant mortality and alcohol consumption (1.635; $p > 0.05$). The Odd Ratio of infant mortality for smoking was 1.899 (0.701 - 5.143) which means that those that take alcohol are 2 times more likely to experience infant mortality.

The table further reveal that 12.1% of working mothers and 0% of non-working mothers experienced infant mortality and there is significant association between mothers' work status and infant mortality (10.828; $p < 0.05$). The Odd ratio of infant mortality and work status is 0.879 (0.827 - 0.938) which means that those that do not work were 13% less likely to experience infant mortality than those that did.

Lastly, 10.8% of mothers that use traditional portion and those who do not experienced infant mortality and there is significant association between infant mortality and the use of traditional portion (Agbo), (7.684; $p < 0.05$). The Odd Ratio of infant mortality for the use of traditional portion (Agbo) was 1.121 (1.062 - 1.183) which means that those that who use of traditional portion (Agbo) are 12% more likely to experience infant mortality than those that did not.

V. DISCUSSION

The study has investigated the predictors of infant mortality in Lagos Island, LGA of Lagos State.

Income was significantly associated with infant mortality as mothers who earned #100,000 or more were 5 times more likely to experience infant mortality [O.R = 5.456 (95% C.I, 1.948 – 15.284)] and is in agreement with Lawn et al. (2005). However, number of persons per household has no significant effect on infant mortality. In addition, health factors like self-medication by mother, child birth interval, birth interval between the last and previous child, number of antenatal visits, prolonged labour during delivery, use of contraceptives, engagement in family planning, and child birth weight were all significantly associated with infant mortality. These findings were in line with the findings of Fadeyi (2007); Lubbock & Stephenson (2008) and Kumar & File (2005) who all discovered that specific interventions significantly impact on infant mortality. However, the study discovered that breastfeeding has no significant effect on infant mortality.

Lastly, socio – environmental factors such as access to public services, smoking habit of mother, mothers' work status and taking of traditional portions (Agbo) were significantly associated with infant mortality while alcohol usage was not. These outcomes were in agreement with Ademiluyi & Arowole (2009) that low quality of service or lack of access to service affects infant mortality but however, negates the discoveries of Mustafa & Odimegwu (2008) who opined that socio-economic factors are not significantly associated with infant mortality.

VI. CONCLUSIONS

From a practical view point, and in line with the findings above, the following conclusions were drawn from the study:

- ✓ Based on the findings, it has been discovered that there was significant relationship between and infant mortality and income because those that have high income were 5 times more likely to experience infant mortality.
- ✓ Also, infant mortality was significant association with health - related interventions child spacing, birth interval between last and previous child, antenatal visits, postnatal visits, prolonged labour, the use of contraceptive, family planning, and birth weight of child.
- ✓ Lastly, the result also indicates that socio-environmental factors like access to public services, smoking, and the use of traditional portion (Agbo) were significantly associated with infant mortality.

REFERENCES

[1] Abe J.B (2002): Sampling Techniques: (Vol. 1). Lagos: Chairman Academy Ltd.

- [2] Ademiluyi, A. S. & Arowole, A. O. S., (2009). Infrastructural Distribution of Health Services in Nigeria: An Overview. *Journal of Geography and Regional Planning*, 2 (5), 104 - 106.
- [3] Fadeyi, A. O. (2007). Determinants of Maternal Health Care in Lagos, Nigeria. *Ife Social Sciences Review*. 22 (1): 38 - 48.
- [4] Friel, S., Akerman, M., Hancorck, T., Kumaresan, J., Marmot, M., Melin, T. & Vlahov, D. (2011). Addressing the Social and Environment Determinants of Urban Health Equity: Evidence for Action and Research Agenda. *Journal of Urban Health of the New York Academy of Medicine*, 88 (5): 860 - 873.
- [5] Giddens, A. (2002). *Sociology* (4th Edition). UK: Polity Press.
- [6] ILO. (2010). *Maternity Protection at Work: A key Human Right to Prevent Maternal Mortality and Morbidity*. www.ohchr.org/english/issues/women/docs/responses/ilo.
- [7] Goro, M. (2007). The stalling child mortality: the case of three northern regions. *The 5th Conference of Union for African population, Tanzania*.
- [8] Kumar, P. P. & File G. (2010). Infant and Child Mortality in Ethiopia: A Statistical Analysis Approach. *Ethiopian Journal of Education and Science*, 5 (2): 51 – 57.
- [9] Lawn J.E., Cousens S., Bhutta Z.A., Darmstadt G.L., Martines J., Paul V., Knippenberg R., Fogstadt H., Shetty P., and Horton R. (2004): Why are 4 million new borns dying each year? *The Lancet* 362: 399401
- [10] Lubbock, L. A. & Stephenson, R. B. (2008) Utilization of Maternal Health Care Services in the Department of Matagalpa, Nicaragua: *Rev Panam Salud Publica*. 24 (2): 75 - 84.
- [11] Mabogunje, A. (1995). "The Challenges of poverty for Effective Urban Governance". In: O. Adepaju & F. Adetoye (eds.) *Governance and Urban Poverty in Anglophone West Africa*, CASSAD, Ibadan, pp. xiv-xxi.
- [12] Mustafa, E. & Odimegwu, C. (2008). Socioeconomic determinants of infant mortality in Kenya: Analysis of Kenya DHS 2003.
- [13] National Mirror (2012). High Maternal, Infant Mortality Worry Lagos Government. *National Mirror*, March 23, 2012: 10.
- [14] Radio Lagos (2009). Health Care: Lagos State will curb Maternal Mortality. <http://www.radiolagosekofm.net>
- [15] Takano, T. (2003). Development of Healthy Cities and Need for Research. In Takano, T. (ed.) *Healthy Cities and Urban Policy Research*. New York: Sponpress, Pp. 1.
- [16] World Health Organization (2006). *Neonatal and Perinatal Mortality; Country, Regional and Global Estimates*. WHO