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Social Determinants of Infant and Child Mortality

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Abstract

Infant and child mortality rate are significant phenomenon closely related to the healthy status of a society. They are major indicators of development. The secondary analysis methodology was adopted in this study while the major source of data was NDHS 2013 report. The ex post-facto research design was used in describing the NDHS 2013 qualitative data. The collected data is centered on Nigeria while empirical studies are not limited to Nigeria.to classify various social determinants of infant and child mortality either as individual and community factors or endogenous and exogenous factors. These social determinants were ex-rayed in relationship to their socio-economic implication. At the macro level, high rate of infant and child mortality are clear indices of poor health care facility and system, unhygienic environment, chronic poverty, enduring illiteracy and intense insecurity. At the micro level, it shows skewed income distribution, ignorance, poor exposure and food insufficiency. The study shows that social exclusion of mothers from decision making, inadequate knowledge about care for pregnancies, attitude toward accessibility of quality and affordable health care and insecurity have influence on morality growth. While there was an inverse relationship between income, residence, education, occupation, age of mothers, mother's experience and infant and child mortality, there was a positive relationship between choice of contraceptives, male preference, mother's non-freedom of choice, attitude toward place of delivery, inaccessibility of antenatal and post-natal care, perception toward acceptance of anti-tetanus treatment during pregnancies, incompetency of health workers and infant and child mortality. The study also shows that increase in per capital GDP is associated with decrease in infant and child mortality.

Keywords: *Infant mortality, Child mortality, Social determinants, Socio-economic implication*

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Background to the Study

Many research has been conducted (Adeyele & Ofoegbu, 2013; Naveed et al, 2011) to examining the causality and casualty of infant and child mortality but few have been able to explore the socio-economic implication. Using expo-facto research design, the NDHS 2013 qualitative data was descriptively analyzed to determine causality premises range from social, cultural, environmental, economic, health and policy. In examining policy as a causal factor, the one child policy of China has led to undisclosed mortality through infanticide at the micro and macro levels. However, this work is concerned with the social determinants of infant and child mortality.

Social determinants are characteristics that describe how members of the society grow, work, live and their sense of control and utilization of resources within their milieu to their benefits. Lorch and Enlow (2016) subdivided social determinants into individual and community factors. However, Hummer (1993) on the other hand categorized social determinant of infant mortality into endogenous and exogenous factors. While the categorization of the later will be used in the course of this work, the former will be used as a guide in explaining the socio-economic implication of infant and child mortality. The socioeconomic consequences of mother's status determine the health state of the child and the chances of survival before its first 28 days, first birthday or its fifth birthday. The objectives of this work are to examine the exogenous and endogenous social determinants of infant and child mortality in Nigeria.

Every society is determined to reduce infant and child mortality through policy formulation and implementation. In Nigeria, the health policy is aimed at reducing under-5 mortality rate by two third between 1990 and 2015 (Revised National health policy 2004). Though this is still a mirage, considerable reduction has been recorded. In the same direction, the overall goal of the Nation's population policy which is to reduce infant mortality rate to 1 in every 29 live birth and child mortality to 1 in every 22 live birth (NPC, 2014), has in reality, not yet been attained. As evaluated in NDHS (2013) report, 1 in every 14 infant dies before the first birthday and 1 in every 8 child dies before the fifth birthday. This report shows that Nigeria is far from reaching its target and much is yet to be done in attaining this goal.

According to Naveed et al (2011), infant mortality rate is a significant phenomenon closely related to the health of a society. In support of this, Adeyele and Ofoegbu (2013) posit that studies have shown that infant mortality is a major indicator of development. In examining the above assertions, higher mortality is a clear index of decayed health care facility and system, unhygienic environment, poverty, illiteracy and insecurity. There is a clear relationship between the socio-economic status of a society and the mortality rate of infants. Also infant mortality shows the social state of mothers existing in a society. It is therefore obvious that infant mortality does not only reveal the state of health in a society but its economic and social status. It is on the basis of unattained health and population policy goal that motivates the examination of social determinants of infant and child mortality.

Theoretical perspective

Two theories of infant and child mortality have been adopted in this study – Gender Stratification Theory and Modernization Theory. Proponents of gender stratification theory

argue that the enhancement of women's status, especially through education and other means, will greatly increase women's ability to access the socioeconomic resources and knowledge required for proper infant nutrition and care, resulting in reduced infant deaths (Wang 2014 cited in Frey & Cui, 2016). Educated mothers are not only more likely to delay and space births but they are more likely to have fewer children, which reduces infant mortality.

Also, modernization theorists contend that industrialization and the attendant economic development reduce infant mortality through improvements in health care, education, nutrition, and the like. Frey & Chi (2016) asserts that a number of cross-national researchers have confirmed the validity of modernization theory, reporting that infant and child mortality (as well as gender imbalances in infant mortality) vary in a negative fashion with the level of industrialization and alternative measures of economic development.

Conceptual Review

The concept of infant and child has been grossly misconstrued from its technical point of view. Some see no difference between them while others use them interchangeably. For a lay man, an infant is a child, but demographically, there are five categorization of childhood and three categorizations of infancy. While childhood is a broad concept, under-5 is used to differentiate the boundary in examining child mortality (NDHS age structure). Infancy is a stage between birth and first birthday. In between this stage are neonatal and postnatal. A child demographically toggles between under-5 and the real concept child. Under-5 ranges between zero year and the fifth birthday, while child in the other hand is between the first birthday and the fifth birthday. However, in relating this to mortality, Neonatal mortality is the probability of dying within the first month of life, Infant mortality is the probability of dying before the first birthday, Post-neonatal mortality is the difference between infant and neonatal mortality, Under-five mortality is the probability of dying before the fifth birthday and Child mortality – the probability of dying between the first and fifth birthdays (NDHS, 2013).

However, the challenge plaguing child and infant mortality is differentiating it from other concepts like still birth. According to Sullivan and Tureeva (2002), some miscarriages or still birth in the registration system may be classified as live birth or infant death according to WHO definition. The contending issue is that what is tagged as a life birth may indeed turn out to be infant or child mortality where there is no proper record keeping and monitoring. It therefore shows that the issue of infant and child mortality is under reported or projected. Whereas some classify survivals of early neonatal period as live birth, others evaluate life birth as evidence of life such as beating of the heart or movement of voluntary muscles irrespective of the duration of pregnancy. Whatever the argument, Sullivan and Tureeva (2002), define infant mortality as the death of a live birth under one year of age. Using this definition, child mortality extends beyond first birthday but not exceeding fifth birthday.

Social determinant as used in this essay connotes factors other than biological which are not reported by medical expert- Doctor as causality of infant or child mortality. Although most of them are mediating with biological factors, their major contributions to infant and child mortality are underreported and under examined as causal factors from medical report. Some

of those factors examined in this essay include but not limited to: parental socio-economic status like income, education and occupation, life chances, spousal communication, family size, family sex ratio, sex preference, type of habitation, home environment, perception toward health care, attitude toward accessibility of health care, attitude of health workers etc. The above factors are examined in connection to socio-economic factors like, proximity, availability, accessibility, affordability, acceptability and conditionality of health and welfare services in the society.

Death of infants are always a tragic event for families which sometimes can be avoidable (Narayan and Jon, 2003). The extent of tragedy is evaluated pending on the sex of the child and the parity of the child. The death of an infant as a result of non-proximity, inaccessibility, unavailability and unaffordability of heath care services is more injurious. Infants are helpless and vulnerable, and their fate of birth is determined by factors including socio-economic, which they have no control over. This indicates the unavoidable exclusion of babies in decision of their birth. Jones and Smyth (1999) Social exclusion analysis depict the haplessness and helplessness of not only babies but mothers by virtue of their income and knowledge in accessing best means to safe delivery. Infant and child mortality disparity by residence (Urban and rural) as widely reported in literature, is nothing than the exclusion of mothers from accessing health care facilities, decision to get pregnant and knowledge as well as attitude toward antenatal care.

For Byrne (1999), social exclusion is something that is done by some people to others. This explains why mothers of under-20 experience higher mortality. The bigotry and abuse by health workers are means of excluding them from accessing antenatal care thereby increasing mortality among them. The situation is worse if such pregnancy is borne out of wedlock. Alcock (1997) sees social exclusion as a dynamic concept than poverty. It explains variation in infant and child mortality through the means of denial of social right, discrimination and deprivation from accessing affordable health services by residence, region, education, income, age etc. Lister (2004) added that it explains the relationship between the advantaged and the disadvantaged. Whenever there is deprivation from utilizing the best means to achieve the best expectation either by policy or program, social exclusion exists and the attendant consequences in relationship to mortality is positive mortality growth. It justifies the assertion that Under-5 mortality rate is a leading indicator of the level of child health and overall development in countries (NDHS, 2013). The greater the inclusion, accessibility and affordability of health services, the lesser infant and child mortality.

Methods/Materials

Data for this study were drawn from secondary sources and empirical studies conducted within the scope of the subject of discourse. The secondary analysis was adopted in this study and major source of data was NDHS 2013 report as the raw data was not received before the submission date. The collected data is centered on Nigeria while empirical studies are not limited to Nigeria. These data were thematically sorted for through Google scholar search with the use of key words and phrases like: Infant mortality, child mortality, economic implication of infant and child mortality etc.

Exogenous Social Determinant of Infant and Child Mortality

According to Hummer (1993), exogenous factors are external and originate from the social environment. They are both individualistic and communalistic. Social milieu connotes the interaction and interrelated activities that happens independent of the infant. These are the power relations that exist in form of decision and actions carried out by the social actors. Some of these social determinants include the sex preference of the child, maternal age at birth, maternal in-experience or negligence, preceding birth interval, survival of proceeding child, animal rearing, family size, refuse disposal, residence pattern etc.

The sex of a child is indeed determined by the male and the female chromosomes. The decision toward sexual intercourse is germane to birth. However, the sex of a child is dependent on chance and opportunity. Although more male is born than female, the later chances of survival is greater than the former. The preference of male over female influences attitude and provision of maternal and paternal care toward infant and child up-bring. From table 1 below, the NDHS (2013) report shows that out of infant mortality rate of 69 per 1000 live birth, 1 out of 12 males and 1 out of 14 female dies before first birthday. The disparity in sex mortality is not different in child mortality. Out of Under-5 morality rate of 128 per 1000 live birth, 1 in every 6 males and 1 in every 7 female dies before the fifth birthday. It is imperative to note that under-5 mortality sex disparity seems insignificant but when compared to the total live birth the significance is clear. Furthermore, mother's age at marriage and experience is significant to the infant and child mortality. Those aged below 20 as well as 40 and above had chances of their child dying either before first or fifth birthday. This connotes inexperience among mothers of under-20 and negligence among mothers of over-40. Also, the table shows that the higher birth spacing the lower infant and child mortality. Birth spacing enhances proper care and affords the mothers to replenish the worn-out tissues. Whereas spacing below 2yrs resulted in infant mortality of 1 in every 8 live birth and 1 in every 5-under-5 mortality. However, spacing above four years indicated a reduction in infant mortality of 1 in every 22 live birth and under-5 mortality of 1 in every 13 live births.

Table 1: Showing distribution of Neonatal, infant, child, and under-5 mortality rates for five-year periods preceding the survey, demographic characteristics of sex and age at birth, Nigeria 2013

Years preceding the survey	Approximate time period of estimated rates	Neonatal mortality (NN)	Infant mortality (1q0)	Child mortality (4q1)	Under-5 mortality (5q0)
0-4	2009-2013	37	69	64	128
5-9	2004-2008	43	86	83	162
10-14	1999-2003	46	93	102	185
Child sex					
Male		45	84	73	151
Female		35	70	72	137
Mother's age					
at birth		53	95	93	179
<20		35	71	68	134
20-29		40	73	68	136
30-39		58	100	83	174
40-49					
Previous birth					
interval$_2$		62	122	103	213
<2 years		32	67	78	140 103
2 years		22	46	60	79
3 years		27	45	36	
4+ years					

Source: Extract from NDHS 2013 and computed by the researchers

According to Madise and Diamond (1995) and Sullivan and Tureeva (2002), male children tend to experience a higher mortality rate than female children except where there is a preference for male children. Other studies have shown that chances of a male child survival are slimmer than a female child. However, with the utilization of technology to know the sex of a child before birth, there is high rate of female infanticide and male survival. The wider gap between infant mortality and under-5 mortality is sequel to the exogenous factors stated above. While an infant is within the grip and care of the mother and care givers, a child has the chances of exercising movement. The process of crawling, grabbing and hobbling exposes a child to hazard, bacterial, infection and virus within its reach. Improper disposal of waste and other health hazard truncates the life chances and survival. The presence of animal within the courtyard impact on mortality as it is closely related to the risk of exposure to infectious agents (Jatrana, 2005). One of the giant killers of infants is infectious diseases.

Furthermore, Jatrana (2005), observes that maternal age at birth is a proxy for mother's physiological, mental, and emotional maturity. It therefore connotes mother's experience with childcare. Mother's below 20 years lacks the expressive role towards care giving. Their inexperience is evidential in their treatment, handling and nurturing of infants. It becomes a scenario of a baby taking care of another baby. Therefore, higher infant mortality rate is expected from children of young mothers (Jatrana, 2003 and NDHS, 2013).

First born are at risk of survival as the mother reproductive system is in the process of adapting to pregnancy. "Infant mortality declines with increase in birth order" (Jatrana, 1999). Further studies have shown that increase in parity is as a result of the mortality of the first 2 – 3 infants. It is the subsequent child that survives. However, with improved medical care the chances of the first child surviving in greater. Contrary to this, shorter birth spacing poses a greater risk of survival of infants (Sullivan and Tureeva, 2002). Child spacing attending consequences include maternal depletion, sibling competition and increased infectious transmission (Jatrana, 2005).

Maternal Social Determinant of Infant and Child Mortality

Maternal factors are viewed as proxy factors in the literature (Jatrana, 2005; Sullian and Tureeva, 2002; and Lorch & Enlow, 2016). These factors are more individual than communal though there are connections. This implies that a mother by proxy is the major determinant of infant and child mortality. It however shows that a mother's inaction and action play a major role in determining birth outcome. This is subject to communal factors like availability and accessibility of medical services. A mother is an incubator, and the overall health status of the mother is indicated by income, education attainment, residence, location, health perception and practices. Finch (2003) observed that mothers who are married have nearly half the infant mortality rate of unmarried women. This fact is obvious as the partner's knowledge, exposure and income status could be shared. More so, the husband exerts influence and pressure toward accessing available health care as well as give all necessary support and assistance. In the other hand, teenagers with no husband and no one volunteering to support suffer the same fate as the unmarried.

Maternal social determinants include and not limited to educational status, occupation, income status, number of previous abortions, head of household, decision making, unexpected delivery, attitude toward participation in antenatal care, patronage of skilled or unskilled delivery attendant and place of delivery. In relating the above factors to denial of basic right, the socio-economic situation plays a fundamental contribution. Walker (1997) stated that social exclusion does not only relate to lack of material resources but inadequate social participation, education, inadequate access to services and lack of power. Table 2 below shows the relationships that exist between this background variables and infant and under-5 mortality. There is an inverse relationship between mother's education, income and mortality.

Table 2 showing Percent distribution of live births, infant mortality and under-5 mortality in the five years preceding the survey by place of delivery, post natal check and last birth protection against neonatal tetanus according to background characteristics, Nigeria 2013.

Table 2.

Background characteristic	Percentage delivered in a health facility	Not delivered in health facility	Antenatal care from a skilled provider	No ANC	Post natal check	No post natal check	Percentage whose last birth was protected against neonatal tetanus2	Total of each category	Not protected against tetanus	Number of mothers	Number of births	Infant mortality (1q0)	Under -5 mortality (5q0)
Mother's age at birth<20	24.5	75.5	47.8	46.1	33.9	66.1	36.5	100.0	63.5	2,813	4,726	****	****
20-34	38.3	61.7	63.0	31.5	44.2	55.8	55.7	100.0	44.3	13,877	22,220		
35-49	35.1	64.9	61.0	33.3	39.3	60.7	54.6	100.0	45.4	3,777	4,882		
Birth order													
1	47.8	52.2	66.6	28.4	53.6	46.4	54.6	100.0	45.4	3,721	6,285	83	139
2-3	40.0	60	64.2	30.6	46.4	53.6	56.8	100.0	43.2	6,423	10,311	65	125
4-5	33.8	66.2	61.3	32.7	39.4	60.6	54.2	100.0	45.8	4,899	7,441	72	142
6+	22.4	77.6	51.4	42.5	28.7	71.3	45.7	100.0	54.3	5,424	7,791	103	196
Antenatal care visits1	4.3	95.7	****		****	****	****	100.0	****	****	6,990	****	****
None	28.2	71.8						100.0			2,474		
1-3	60.6	39.4						100.0			10,457		
4+	58.3	41.7						100.0			546		
Don't know/missing													
Residence													
Urban	61.7	38.3	86.0	10.6	62.2	37.8	76.9	100.0	23.1	7,278	11,126	42	100
Rural	21.9	78.1	46.5	46.7	30.8	69.2	39.5	100.0	60.5	13,189	20,702	89	167
Zone													
North Central	45.7	54.3	67.0	26.0	50.4	49.6	56.8	100.0	43.2	2,890	4,340	36	100
North East	19.5	80.5	49.3	40.8	34.3	65.7	40.7	100.0	59.3	3,434	5,578	90	160
North West	11.5	88.5	41.0	55.4	18.3	81.7	32.9	100.0	67.1	7,445	11,775	105	54 185
South East	78.1	21.9	90.6	4.2	62.6	37.4	84.7	100.0	15.3	1,719	2,840	35	131
South South	50.1	49.9	73.0	20.6	64	36.0	73.0	100.0	27	2,002	2,935	31	91
South West	75.0	25	90.4	5.7	76.1	23.9	80.7	100.0	19.3	2,977	4,360		90
Mother's education	11.2	88.8	36.2	57.7	19.9	80.1	28.8	100.0	71.2	9,794	15,657	100	180
No education	41.5	58.5	71.5	20.5	47.1	52.9	63.9	100.0	36.1	3,915	6,127	57	128 91
Primary	65.9	34.1	87.6	8.4	65.9	34.1	78.9	100.0	21.1	5,475	8,211	35	62
Secondary	91.3	8.7	97.3	1.1	86.1	13.9	91.5	100.0	8.5	1,283	1,834	13	
More than secondary													
Wealth quintile	5.8	94.2	24.6	69.4				100.0	82.7	4,699	7,496	108	190
Lowest	17.1	82.9	44.8	47.8	14.4	85.6	17.3	100.0	63.1	4,588	7,355	103	187
Second	37.1	62.9	67.8	25.3	24.6	75.4	36.9	100.0	40.4	3,902	6,001	61	127
Middle	56.8	43.2	85.2	10.3	44.7	55.3	59.6	100.0	23.6	3,674	5,656	38	100
Fourth	79.9	20.1	94.5	3.1	61	39.0	76.4	100.0	12	3,604	5,320	26	73
Highest	35.8	64.2			78.9	21.1	88.0	100.0	47.2	20,467	31,828	****	****
Total					41.9	58.1	52.8						

1 Includes only the most recent birth in the five years preceding the survey

2 Includes mothers with two injections during the pregnancy of their last birth or two or more injections (the last within 3 years of the last live birth), three or more injections (the last within 5 years of the last birth), four or more injections (the last within 10 years of the last live birth), or five or more injections at any time prior to the last birth.

**** Data not available

Source: Extract from NDHS 2013 and computed by the researchers

Maternal role in decision making in relationship to infant and child mortality is essential. According to Sullivan and Tureeva (2002), infant mortality is high among women who do not have a say in decision making. A woman should have a say in accepting sexual intercourse, number of children, spacing of the child and place of delivery. Maternal decision could be subjected to the knowledge of the mother, ability to pay for medical services and contribution to family disposal income. When a woman contributes nothing to family disposal income, her right to decision making is denied and her role in childbirth hampered and deprived. In empirical study conducted in Uzbekistan, infant mortality is high among women who believe that women should not refuse sexual relationship with their husband. Furthermore, households where women are the primary caretakers enjoys high health status, and chances of infant and child survival is high (Sullivan and Tureeva, 2002).

Equipping the mind enhances accurate decision making which is very important in managing challenges. The right tool to equip the mind is education. NDHS (2013) report shows that under-5 mortality among children born to mothers with no education is twice as high as that among children born to mothers with secondary education. Sullivan and Tureeva (2002) also observed that there is a substantial difference in mortality by mother's level of education. Mother's education level affects feeding practice, treatment of diarrhea and disposal of stool. It also prevails in availing the child to immunization interventions which has been seen to be contributive factor toward infant and child mortality decline. Level of education influences maternal healthy lifestyle, a determinant of child survival. However, seemingly positive relationships exist between education, occupation and income. These three-influence mortality in the same direction. Hao (1990) agreed that income and education are related to infant mortality. This fact is contested by Conley and Benneth (2000) that it is not "virtually tested".

Jatrana (2003), added that a woman's resource for nurturing their children is determined by level of education. Education offers mothers the leverage to escape poverty which Johnson et al (2008) believed to be related to most common cause of infant death. In agreement, Olusegun et al (2012) stated that "poverty is related to malnutrition" and a mother's nutrition is subject to income and education.

Furthermore, knowledge, education and income influence accessibility of health care and choices such as place of delivery, delivery attendant(s), utilization of both antenatal and post natal care. These further affect breast feeding and acceptance of tetanus vaccination during pregnancy. The first milk of three day postpartum is very nutritious and serves as anti-infective and provides natural immunity. According to Jatrana (2003), this yellowish, thick breast secretion called colostrum is "very important for infant survival". Poor feeding habit as a result of income affects the nutritious content of colostrum. In contemporary society where inorganic fertilizer has been used to influence food substances, it increases the affectivity and effectiveness of this important breast secretion.

Aside breast milk, Naveed *et al* (2011) hinted that the neonatal, infant and by extension child is sensitive to events during pregnancy, delivery and care given to the mother and the baby after.

Saddening Mojekwu and Ajilola (2011) observed that in sub-Saharan Africa where Nigeria is a part, 1 in every 8 children die before age five. This is nearly 20 times the average of 1 in 167 in developed part of the world. It is an obvious reality showing the result of mother's attitude to health care. As expressed in table 1.2 about 95.7% of women do not attend antenatal care, 88.8% with no formal education and 94.2% of low-income earners do not deliver their babies in a health facility. Level of education and income affect antenatal care accessibility. 57.7 % of mothers with no formal education 69.4% with low income do not attend ANC. The same is obtainable in post natal services. 80.1% of mothers with no formal education and 85.6% of low income do not access post natal service. As a follow up, those mothers with birth order more than five do not access both anti and post natal services. These are indicators why infant and child mortality is high among them. The same category of mothers exhibits the same risk behavior by not protecting their babies against tetanus during pregnancy. The persistency of these groups' behavior is linked to proximity, availability, accessibility and affordability of health care service. In a country like Nigeria, the cost of medicare is high though inventions by international organization and non-governmental organization have made systematic effort to bridge the inequality, this social exclusion variables still play significant role.

Antenatal care provides an avenue to monitor pregnancy, reduce morbidity risk, detect complication for prompt treatment, prevent disease, prepare for birth and gains necessary information that will ensure healthy state of the baby and mother (NDHS, 2013). Access to antenatal services reduces infant and child mortality though influenced by distance and quality of health care services. Attendance of antenatal services gives pre-knowledge of date of delivery for proper preparation. NDHS (2013) report shows that poor knowledge of delivery date is associated with first birth which unfortunately is predominant among women of high education and high income. Also, the same report shows that place of delivery and skill status of health workers determine mortality especially when complication arises. Adeyele and Ofoegbu (2013) stressed that place of delivery is significant to reduction in infant and mortality rate.

Community Social Determinant of Infant Mortality

Consensus habit predominant among social actors exerts pressure and influences behavior. To this end, Naveed et al (2011) opined that the stagnating and perpetuating effect of infant mortality in the rural area is situated on the village psyche of its populace. Communal behavior is contagious and factious. The village psyche is affected by experience and availability of health care facility. Subsistence economy and agriculture prevail, creating a conglomeration of low income and poorly educated people. In areas with advance and modern facility, accessibility and availability of facility enables high standard of living. Although literature queries the extent of livelihood between urban and rural, the urban dwellers are more advantageous than the rural. In relating this to infant mortality, 1 in 6 children die before fifth birthday in the rural area while 1 in 10 dies in urban areas. Also, twice the number of urban infants dies before first birthday in the rural areas. In further examination, 46.7 % of women do not attend antenatal care and 69.2% fail to attend post-natal. Also, 76.9% do not see the need to protect their pregnancy against tetanus.

Above all, 78.1% do not deliver their babies in health centers. This shows a clearer picture why infant and child mortality is higher in the rural area than the urban. Above all, medical facilities are situated far from reach and most of them are not educated enough to access available ones. Utilization of health care is poor leading to the greater risk of infant survival. This indeed creates an inequality in quality medicare. Leigh (2006) observed that more inequality is associated with higher mortality. Kalipeni (1993) examining it from economic activity added that "women engagement in agriculture have higher levels of infant mortality". Although this claim has not been empirically tested, it however gives insight into relationship between occupation and infant mortality. This is why Zakir and Wunnava (1997) stated that "infant and child mortality serves as healthy indicator across and within economy. Poverty stricken community will suffer from infant and child mortality as risk of survival is high.

Variables that surround risk of infant and child survival in rural areas include source of drinking water, sanitation, housing pattern, drainage system, toileting system and ritual killings, while urban centers are not immune to hazards like environmental pollution, industrial activity, accident, incident of fire outbreak, etc. This is why Lorch and Enlow (2016) warned that air pollution may induce maternal lung injury leading to hypoxemia in utero. They posit that the meso level zones in Nigeria contribute differently to the total infant and child mortality index.

While effort is made to reduce it in some zones, others manifest efforts too insignificant to make any serious impact. Infants and child mortality rate is a micro level phenomenon but the effect of this could be felt at the macro level (Naveed et al, 2011). From NDHS (2013), there is a dichotomy between north and south in infant and child mortality. The major disadvantaged zones are Northwest and North East. While North East would have been envisaged to have greater infant and child mortality because of insecurity and infanticide, the reverse is the case. 1 in 5 children die before fifth birthday in North West and 1 in 6 children in North East. The rate is double to what is obtained in the Southern coast. In the other hand, 1 in 9 infants die before first birthday in North West and 1 in 11 infants in North East. The fundamental factors of antenatal and post natal protection against tetanus as well as place of delivery are the rationale behind such high mortality. 9 in 10 women accessed antenatal care in the south while only 2 in 5 women in the north access the same care (NDHS, 2013).

In a study conducted by Baird, Friedman and Schady (2009), an overall contribution of zonal GDP to mortality is shown. The study shows that increase in per capital GDP is associated with increase in mortality between 0.24 – 0.40 infants per 1000 live birth. The underlining explanation is that the more industrial and educated the women folk, the more free and involve in decision making, the lesser fertility and mortality. Previous table (table 1.1) shows that the higher the number of children, the lesser decision of seeking Medicare and greater the risk of survival. The more educated the women, the greater their contribution to per capital GDP and the lower fertility and mortality.

Endogenous social determinant of infant and child mortality

While it may be argued that endogenous determinant of infant and child mortality is internal

and biological. These variables are indirectly mediating and moderating between the mother and the baby. It can be genetic or inherited from the father or the mother. Hummer (1993) expressed that endogenous deaths occur due to genetic makeup of the infant and the condition of life in utero and labor condition. This genetic formation influences the life span of infants and children. The more deformed in genetic composition, the more likely chance of not surviving. These endogenous determinants are low birth rate, blood group etc., and these factors are not independent of other exogenous factors. The relationship between the two is a dynamic one.

Narayan and Jon (2003) observed that fetal under-nutrition is a major determinant of infant birth weight. He added that the birth weight is an indicator of the health of infant at birth. Two major social demographic variables account for low birth weight. NDHS (2013) identified mother's age and birth order. Low birth weight was commonly reported among women of less than 20 years and the higher the birth order, the lesser the birth weight. It accounts for high infant and child mortality rate among women with more than four children. Illiteracy is higher among women of under-20 years and most of them in attempt to avoid stigma, stay away from accessing antenatal services thereby depriving themselves of basic knowledge about child care. In the other hand, low income deprives one from eating balance diet which in turn contributes to the nutrient intake of fetal. Male preference and patriarchy system of our society deprived women in the rural areas and northern zones the opportunity of accessing basic medical care especially when the sex of a child is a female. Many men would deny their wife care if the next fetal is a female and they have three to four females already. Also, babies with AA genotype die faster than those with other genetic composition as their genotype is prone to malaria. Malaria has been acknowledged as the number one killer of infants and children in sub-Saharan Africa.

Discussion

Nigeria is poised to reduce infant and child mortality. However, these social determinants are plaguing the achievement of the Nation's health and population policies. This also negates the achievement of poverty and hunger eradication goals of SDG and subsequently reduce infant mortality by two third. In their avowal, Adeyele and Ofoegbu (2013), made reference to studies showing that infant mortality is one of the major indicators of development. This implies that the development of Nigeria is measure by her reduction of infant and child mortality. UNICEF (2010) had recorded Nigeria and India to account for one third of the total number of under-5 mortality worldwide. This is by no means a positive indicator of development.

The attainment of reduced infant mortality goal is sequel to socio-economic factors. In Nigeria, the health care sector is plagued with corruption, negligence, underfunding, understaffing, underequipped health facility and untrained health workers and an overall decayed health system. The unequal distribution of amenities and its over concentration in the urban leaves the health needs of rural dwellers at the mercies of traditional health practitioners. Where any health facility exists, the challenges of proximity, accessibility, affordability and availability of medical equipment affects utilization. The bane of utilization

has resulted in high infant and child mortality in deprived areas and among deprived groups (Naveed et al, 2011; Adeyele and Ofoegbu 2013, NDHS, 2013).

Aside the medical service, provision of basic amenities like good roads, clean pipe borne water, electricity, recreation service, etc. influence infant and child mortality. Data have not captured the number of children and infants who die as a result of accident. Though water sources have been identified as a community determinant of child mortality, the rate is uncertain. Power failure can plague medical treatment and food preservation. Although technological advancement is two sided, most of these devices are power driven. Appliances to preserve food are dependent on electricity and through social exclusion, many are deprived especially those in the slums leading to high risk of infant and child mortality.

Consequently, education and income level of parents have role in infant and child mortality. The more educated the population, the healthier their lifestyle and the better the chances of such homes to escape infant and child mortality. Knowledge gives insight in the choice of food, acceptance of immunization and the desire for the best medical decision and utilization of the best medical services. Proxy to this is the income. Income is evidential in nutritious quality of food intake, accessibility of quality healthcare and involvement in less risky behavior. A wealthy pregnant mother will not risk the baby by going on a long journey by road neither will she over labor herself in serious stressful ventures (Finch, 2003; Jatrana 2005; and Baird et al 2009).

Conclusion and Recommendation

As a country, Nigeria is yet to attend her health and population policy goals as well as the SDG. There are indeed successes in the reduction of infant and child mortality comparatively from what was obtained ten years ago. Mortality at the infant and child level is a multifaceted and dynamic process between endogenous and exogenous factors. At the exogenous level, the social determinants range from remote micro factors to macro factors having multi-proximate dimension.

Infants and children do not exist in a vacuum. The general socio-economic milieu determines either high or low mortality. Government policies, basic medical facility, education, income, occupation, security and food sufficiency enhance or inhibit infant and child mortality. Availability and accessibility of affordable and properly equipped medical facility is associated with reduction in infant and child mortality. Also, good road network, proximity of health facility and reliability of health workers result in high level of infant and child survival.

Plaguing child survival is the disposable personal income, education level and healthy state of mothers. Women with no education background are deprived of knowledge of caring for pregnancies. Women less than 20 years of age lack the self-confidence to confront stigmatization and abuses when seeking antenatal and post natal care. This risk behavior shortens the chances of survival of either the mother or the baby. The same attitude is extended to place of delivery. The most disadvantaged are those who do not have a say in sexual intercourse, number of children to be born and decision to determine where to deliver.

This deprivation result in high infant and child mortality among them. This is predominant in patriarchal rural areas and northern Zones of Nigeria. Though religion could be thought of as a proximate factor, those in the Central Zone negate this assumption leaving women education and income level as major determinants. Women empowerment, right and self-awareness campaign are necessary way out.

Furthermore, with an economy facing recession, the cost of living is very high. Food sufficiency is a challenge. This affects the quality of food as well as consistency in feeding. Many women face hunger and starvation which affects the weight of the fetal resulting in complication and eventual mortality. The economic situation affects housing pattern and number of persons in a room. The lower the standard of living the higher infant mortality and vise verse. Therefore, parents with large family size, low income and education do not take cognizance of the skill level of the delivery provider. This influences access to antenatal care. It is therefore recommend3d that women receive a healthy check within three days of delivery. Also, the higher the birth order, the higher in decline of the number of women receiving post natal checkup and giving birth in health facility. This is prevalent among women in the urban, irrespective of their education attainment and income. There is need for sensitization and reorientation in the use of contraception.

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