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The Relationship of Gender in the Pattern and Risk of Acute Respiratory Infection among Infants in Rivers State, Nigeria

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Abstract

Statement of the problem: Gender had a much wider influence on disease than is usually acknowledged. More so, relative contributions of social and biological factors had not been clearly delineated for many diseases. Higher mortality rates are usually observed in male infants with lower acute respiratory infections (ARIs) and pneumonia particularly during the first month of life than the female infants due to immature lungs in males. The rate declines between 6 and 12 months after birth. The study aims to determine the existence and pattern of relationship between risk of ARI and gender.

Methodology and theoretical orientation: The study was designed as a community based retrospective case-control study of 1,100 infants randomly selected from 12 communities out of 6 Local Government Areas of the 3 senatorial districts of Rivers State. A multistage random sampling technique was used in selecting the subjects up to the community level. Descriptive method was used to represent the characteristics of the subjects and the differences in ARI between male and female infants were tested in a bivariate logistics regression at 5% level of significance. Odds ratio (OR) were used to interpret the size effect measures of ARI on gender differences.

Findings: A total of 275 Cases of ARI and 825 controls were included in the study. The ARI cases were found to be slightly higher in Female infants (27.8%) than in the Male infants (22.4%). For the Female infants, the odds for ARI were 1.3 times significantly higher compared to those of their Male counterparts (OR=1.32, p=0.048, 95%CI=1.003-1.735).

Conclusion and significance: Understanding such differences between Male and Female infants will enhance the knowledge about the epidemiology, outcome and effectiveness in prevention and control of ARIs.

Recommendation: Awareness creation on gender differences in susceptibility to acute-respiratory infection among infants requires sustainable attention.

Keywords: Immature lungs; Para-nasal sinuses; Hypothesis

Introduction

Acute respiratory infections (ARIs) are broadly classified as upper respiratory infections (URIs) or lower respiratory infections (LRIs). The upper respiratory tract consists of the airways from the nostrils to the vocal cords in the larynx, including the para-nasal sinuses and the middle ear. The lower respiratory tract covers the continuation of the airways from the trachea and bronchi to the bronchioles and the alveoli.

ARI is defined as presence of cough with or without fever for less than two weeks. Severe acute lower respiratory tract infection (ALRTI) is defined as presence of lower chest in-drawing with respiratory rates of 60 per minute or more in an infant less than 2 months, 50 per minute or more in infants between age group 2-12 months and 40 per minutes or more in children between 12-60 months of age, [1].

Pattern in an epidemiological point of view refers to occurrence of health related event by time, place and person. Disease pattern is also an indication of varying degree of seriousness in the manifestation characteristics of the disease or its absence within a defined period of consideration in the host by virtue of geographical locations among other factors.

The cause of ARI could be from bacterial or viral origin, but some conditions may increase the risk of developing it, gender is one of such factors. Fundamental differences between males and females exist at any biological level-cells; organs; organ systems, and whole organism which may confer advantages to either males or females depending on the infectious agent. Anatomical and hormonal differences between males and females can influence the infectious disease process [2].

Gender had a much wider influence on disease than is usually acknowledged. More so, relative contributions of social and biological factors had not been clearly delineated for many diseases. Higher mortality rates are usually observed in male infants with lower acute respiratory infections, pneumonia in particular during the first month of life than the female infants due to immature lungs in males. The rate declines between 6 and 12 months after birth.

Available literatures on size effect measures of ARI on gender differences across the globe revealed mixed report, basically, among Under 5 year's children with few of such reports within the exclusive study population of this work. It is therefore necessary to determine the relationship of gender in the pattern and risks of acute respiratory infections among infants in the context of this research work which may direct preventive measures that will complement efforts directed at case management.

Aim of the study

The study aims to determine the existence and pattern of relationship between risk of ARI and gender.

Research question

Is there any relationship between the pattern and risks of Acute-Respiratory Infection and Gender among infants?

Research hypothesis

Null Hypothesis H0-There is no relationship between pattern and risk of ARI and gender among infants.

Alternative Hypothesis H1-There is relationship between pattern and risk of ARI and gender among infants.

Material and Methods

Area of study

This research work was carried out in both rural and urban settings, covering 12 communities in 6 Local Government Areas (LGAs), out of 23 LGAs in the 3 senatorial districts in Rivers State, Nigeria. Rivers State, with coordinates, 40451N 60 501E (Wikipedia, 2017) is one of the 36 states in Nigeria, with Port Harcourt as the State capital. It occupies an area of about 37,000 square kilometers and bounded in the north by Imo and Abia States; in the south by the Atlantic Ocean; to the east by Akwa Ibom State and to the west by Bayelsa and Delta States.

The 12 communities, randomly selected that make up the points of sample include, Akinima and Okarki in Ahoada West LGA, Buguma City and Krakrama in Asari-Toru LGA, in Rivers West Senatorial District; Okehi and Chokocho in Etche LGA, Rumuwoji and Town city slum areas in Port Harcourt City LGA, in Rivers East Senatorial District; Oyigbo and Okoloma in Oyigbo LGA, Botem/Genebue-e and Nonwa in Tai LGA, in Rivers South East Senatorial District.

Research design

The design used for the study was community-based retrospective case-control method, aimed at determination of the pattern and risk of Acute-Respiratory Infection (ARI) in relation to gender among infants in the study areas.

The inclusion criteria for cases was children not up to 12 months of age in the study areas with at least any two of the signs and symptoms of cough, running nose or fever less than three (3) days duration among others in two (2) weeks prior to the commencement of interview. While the inclusion criteria for controls was children not up to 12 months of age in the study areas without such signs and symptoms in two (2) weeks prior to the commencement of interview.

The exclusion criteria were removal of any case or control with difficulty in extracting complete information required for the study. See schematic diagram of the design in Figure 1.

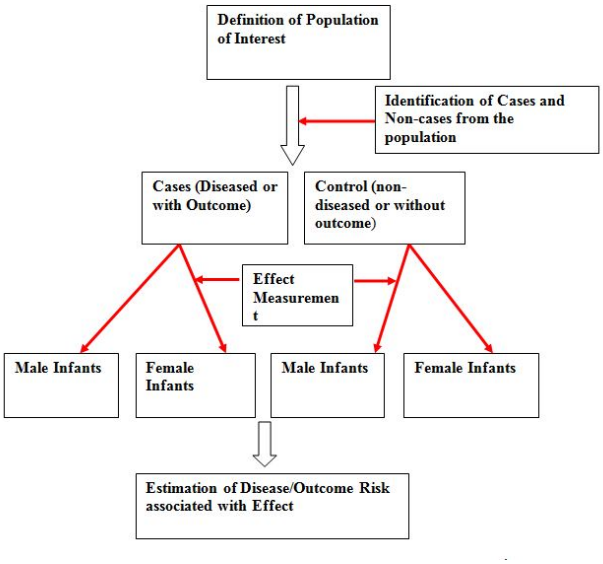

Figure 1: Schematic diagram of case-control study (observational study).

Study Population

The population used in this study was children less than 1 year old in 12 selected communities in 6 LGAs in the 3 senatorial districts of Rivers State. The population of Nigeria is estimated to be at about 167 million (2006 census report) and children under 1 year of age constitute 4% (6.6 million) of the total population (NPHCDA) [3]. According to Nigeria Demographic and Health Survey (NDHS) [4], prevalence of ARI is 4.4% in less than one year children in Nigeria, giving an estimate of about 290,400 ARI cases. In developing countries where Nigeria is located, 10%-15% of all ARI may progress to disease of moderate to severe intensity [5], giving an estimate figure of such intensity to 29,040 to 43,560 cases in Nigeria annually with geographical zones and urban/rural settings variation.

Determination of sample size

The sample size for this study was based on formula [6].

$$\text{Sample size} = r + 1\ (p^*)\ (1-p^*)\ (Z_\beta + Z_{\alpha/2})^2 / (P_1 - P_2)^2$$

Where;

r=Ratio of Control to Case, 1 for equal number of Case and Control

p^*=Average proportion exposed=Proportion of Exposed Cases + Proportion of Control Exposed/2

Z_β=Standard normal variant for power = for 80% power it is 0.84 and for 90% power value is 1.26

$Z_{\alpha/2}$=Standard normal variant for level of significance = 1.96

P_1-P_2=Effect size or different proportion expected based on previous studies. P_1 is proportion in cases and P_2 is proportion in control. Therefore, from Equation 1 and assuming power of study of

80% (0.84), expected proportion in case group and control group to be 0.35 and 0.20 respectively and substituting values we have;

Sample size = $1+1\ (0.275)\ (1-0.275)\ (0.84 + 1.96)^2 / (0.35-0.20)^2$

= 138.9

≈ 139 Cases and Control each gives a total of 278 at least.

For a matching power of 1-3, the minimum sample size required for this study is;

$139 \times 3 = 417 + 139 = 556$ Cases and Controls

However, for a representative sample population for the study, the number was increased proportionally from the selected communities, giving 1,100 infants which are greater than 3% of the prevalence value considering the lower prevalence rate of 10% that may progress to moderate to severe cases.

Sample and sampling techniques

The sample was selected using multi-stage simple random sampling techniques from the LGAs up to the community level through division of each of the communities into convenient zones, followed by selection of a ward in each zone by simple random technique. Also through simple random technique one area of each ward was selected and study carried out starting from number 1 house in an order, after its determination by simple random techniques till the required number of infants was found (see schematic presentation in Figure 2).

The techniques for sampling also include Stratified Sampling in which the sample population was divided into Strata or subgroups, example-age, place of residence. In addition, simple random sampling was used in picking required caregivers/infants of the sample population. In the simple random sampling, balloting was used in choosing the caregivers/infants and the control group (non-cases infants) who took part in the study, in this manner; every infant/mother/caregiver of the population was given a chance of being selected.

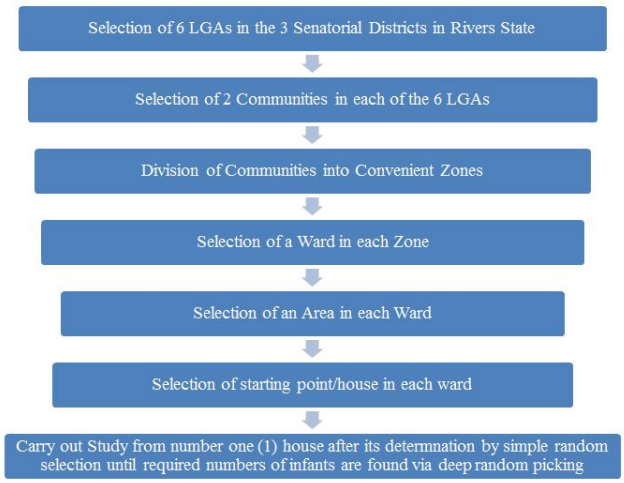

Figure 2: Schematic presentation of study sample selection process through multi-stage simple random sampling.

On the whole 1,100 infants comprising 275 cases and 825 control group (1:3) were picked proportionally, among the communities using proportional allocation factor of 6:4 (660:440) for urban and rural communities for both cases and control, reflecting the size or population density of study population of the communities, and a proportional allocation factor of 1:4.5:4.5 (100:500:500) for the age classification or group of <2 months, 2 months-6 months and 7 months up to 12 months.

The sampling points gave 42 study population for cases and 126 study population for control in Ahoada West LGA; 44 study population for cases and 132 study population for control each in Asari-Toru, Etche, Oyigbo and Tai LGAs and 57 study population for cases and 174 study population for control in Port Harcourt City LGA.

Instrument for data collection

The instruments used for data collection was set of structured questionnaires. The items were based on demographic characteristics, knowledge and attitude of the target/study population as it had to do with gender in the pattern and risks of Acute-Respiratory Infections. To collect data on ARI, mothers/caregivers were asked whether their child under one (1) year of age had been ill with at least any two (2) of the three (3) signs and symptoms; cough, running nose or fever less than three (3) days duration in the two (2) weeks prior to the interview.

Those answering yes were additionally asked if their child, when ill with cough, breathed faster than usual with short, rapid breaths among other signs. Those infants who suffered from such outcome attributes of ARI (cough accompanied by short, rapid breathing, running nose or fever less than three (3) days duration among others) at any time during the two (2) weeks prior to the time of interview were identified or defined as having ARI as cases.

Data from control group of the study was generated from matched study population to the cases of ARI from the same referent population using an uncontrollable variable (age), grouped as less than two (2) months, two (2) months-six (6) months, seven (7) months up to twelve (12) months that ensures as much as possible that the 5% chance of erroneously rejecting the null hypothesis is not increased when making comparism of study variable between cases and control groups of the study.

Development and validation of the instrument

The questionnaire as developed was reviewed for content validity. Pilot-testing for understanding of items by target/study population was done, using 10 caregivers/infants who did not form part of the sample used for the study.

Administration of the instrument/procedures

The questionnaires was personally administered on the mothers/caregivers of the randomly selected infants for relevant information, by the researcher with the help of recruited Community Health Practitioners after one-day training on the pattern of administration of the questionnaires and retrieved on the same day.

Ethical approval

Ethical approval for the study was obtained from the University of Port Harcourt Teaching Hospital Ethical Committee and the Research

Ethics Group of the Centre for Medical Research and Training, College of Health Sciences, University of Port Harcourt. The nature and purpose of the study and level of participation of the respondents (mothers/caregivers) and their infants was clearly explained and their informed consent sought before the interview. Participation in the study was voluntary even after providing consent.

Methods and techniques for data analysis

Data from responses was collated and presented in a tabular form with nominal scale, showing values for cases and non-cases (control) for the variable of study (gender). The entries were double checked for possible error of recording. Statistical analysis was performed using SPSS, version 21.0, to test the hypothesis for result at 5% significant level and also to show distribution of difference in male and female infants. Descriptive method was used to represent the characteristics of the subjects and the differences in ARI between male and female infants were tested in a bivariate logistics regression at 5% level of significance. Odds ratio (OR) was used to interpret the size effect measures of ARI on gender differences.

Results

Table 1 showed that a total of one thousand, one hundred infants were studied in this research work, in which the age distribution revealed that majority, 506 (46.0%) were within 2-6 months age bracket, against 491 (44.6%) within 7-11 months age group and 101 (9.2%) within less than 2 months, whereas the age of 2(0.2%) were unknown. The gender distribution showed that majority, 566 (51.4%) were male infants, against 532 (48.4%) female infants.

In Table 2, showing pattern of ARI and gender among infant cases (N=110) in rural communities of the study area, indicated that majority of the cases were mild, 28(25.5%) and it occurred among the female infants against 22(20.0%) of their male counterpart, followed by severe cases 19(17.2%) that occurred among the male infants, slightly higher than, 18(16.4%) among female infants, while the least of the cases as classified as moderate 11(10.0%) occurred among the male infants, slightly lower than 12(10.9%) among the female infants.

Variables/Factors	Frequency	Percentage (%)
Age		
<2 months	101	9.2
2-6 months	506	46
7-11 months	491	44.6
Unknown	2	0.2
Total	1,100	100
Gender		
Male	566	51.4
Female	532	48.4
Unknown	2	0.2
Total	1,100	100

Table 1: Distribution of demographic characteristics of study population.

Gender	Cases (N)	Seriousness	(n)	Percentage (%)
Male	52	Mild	22	20
		Moderate	11	10
		Severe	19	17.2
Female	58	Mild	28	25.5
		Moderate	12	10.9
		Severe	18	16.4
Total	110		110	100

Table 2: Patterns of Acute Respiratory Infection and Gender among Cases in Rural Communities.

Table 3, which reflects the pattern of ARI and gender among infants cases (N=165) in urban communities of the study area, also indicated that majority of the cases were mild, 47(28.5%) and it equally occurred among the female infants, against 40(24.2%) of their male subjects, also followed by severe cases 28(17.0%) that occurred among the female infants, against 26(15.7%) among the male infants. However, the least of the cases came under moderate category 11(6.7%), which equally occurred among the female infants, slightly lower than 13(7.9%) among the male infants.

Gender	Cases (N)	Seriousness	(n)	Percentage (%)
Male	79	Mild	40	24.2
		Moderate	13	7.9
		Severe	26	15.7
Female	86	Mild	47	28.5
		Moderate	11	6.7
		Severe	28	17
Total	165		165	100

Table 3: Patterns of acute respiratory infection and gender among cases in urban communities.

The Table 4, reflects patterns of acute respiratory infection and gender among the study Subjects N=1,100, indicating that, for the females category N=532; n=148 (27.8%) of the cases were females, against 384 (72.2%) of the controls who were females as well, at the two weeks preceding the interview for the study.

For the category of males N=566; n=439(77.6%) of the controls were males, against, 127(22.4%) cases.

However, N=2; n=2(100%) of the infant's control record of sex were missed, against none of the cases. In the midst of the evidence provided by the data in this table, it reflects a slightly higher effect measure of 27.8% between Female infants and acute respiratory infection, against 22.4% for the Male infants; therefore by this difference we can infer that there exist patterns relationship between acute respiratory infection and gender among infants (5.4% Statistical difference in size effect measure).

Gender	Total (N)	Cases (n)	Percentage (%)	Control (n)	Percentage (%)
Male	566	127	22.4	439	77.6
Female	532	148	27.8	384	72.2
Unknown	2	0	0	2	100
Total	1,100	275	25	825	75

Table 4: Patterns of Acute Respiratory Infection and Gender among Subjects.

The data in Table 5 presents relationship between gender and acute respiratory infection among infants by comparing, infants presenting signs and symptoms of ARI as cases, against infants without signs and symptoms of ARI as controls within 2 weeks preceding interview of the study. The data indicated that out of total infants (N=532) that were females, (n=148) of them presented with signs and symptoms of ARI as cases, against (n=384) without signs and symptoms of ARI as controls.

Similarly, the data showed that out of a total infants (N=566) that were males, (n=127) presented with signs and symptoms of ARI as cases, compared to (n=439) who were without signs and symptoms of ARI as controls.

Gender	Cases (n)	Control (n)	Total (N)
Female	148	384	532
Male	127	439	566
Total	275	823	1098
Ref. Gender: Male; Female OR-Unadjusted: 1.32, (p=0.048, 95%CI=1.003-1.735)			

Table 5: Relationship between gender and acute respiratory infection among infants.

On subjection of the data as presented above to bivariate logistic regression analysis for odds ratio (unadjusted) to determine if there is a relationship between gender and acute respiratory infection, showed a significant association (p=0.048, 95% CI=1.003-1.735), in that the odds of having ARI among infants was found to be 1.32 lower for male infants compared to female infants. Conversely, female infants are more than 1 time higher at risk of contracting ARI (OR=1.32) than it would by male infants.

Findings

The gender distribution showed that majority, 566 (51.4%) were males, against 532 (48.4%) females. The ARI cases were found to be slightly higher in Female infants (27.8%) than in the Male infants (22.4%). Majority of the mild cases (28.5%) and moderate cases (10.9%) of ARI occurred among female infants in urban communities and rural communities respectively, while more of the severe cases (17.2%) occurred among the male infants in rural communities. For the Female infants, the odds for ARI were 1.3 times significantly higher compared to those of their Male counterparts (OR=1.32, p=0.048, 95%CI=1.003-1.735).

Discussion and Interpretation of Results

Null Hypothesis H0: There is no relationship between pattern and risk of ARI and gender among infants.

Alternative Hypothesis H1: There is relationship between pattern and risk of ARI and gender among infants.

It interested researcher to know to what extent is occurrence of acute respiratory infection, is associated with gender among infants in this part of the globe, having observed varying findings concerning gender in the risk of acute respiratory infection at different geographical locations, by studying 1,100 infants, in which 275 infants as cases of ARI were compared or matched with 823 infants as controls (non-cases) of ARI.

Reports had it that gender had a much wider influence on disease than is usually acknowledged. It influenced the etiology, diagnosis, progression, prevention, treatment, and health outcomes of disease as well as health-seeking behaviours and exposure to risk. Gender and its consequences had also been stated to influence differential risks, symptom recognition, severity of disease, access to and quality of care, and compliance with care.

Report had also shown that exposure potential to infectious disease is similar in both female and male infants, but susceptibility is more among males because naturally they have weaker immune system [7]. It had equally been stated that differences in nutrition between males and females, where they exist, may be important determinants of susceptibility and resistance to infectious disease. However, there is conflicting evidence about nutritional differences between male and female children in developing countries. Although, numerous small studies provide evidence of discrimination against girls in feeding practices (particularly in parts of Asia) a comprehensive review of the evidence from 41 National Demographic and Health Surveys found no single country in which female nutritional status was consistently worse than male nutritional status during childhood [8]. Also, immunization is recognized to play very important role in reducing susceptibility to many infectious diseases, particularly childhood diseases. Therefore, differences between males and females in immunization status during infancy, where they exist, were likely to be important determinants of differences in susceptibility.

In the midst of these, this research work, is aimed at discussing evidence of differences in the acute respiratory infectious disease process between males and females, and goes to show how, by taking such differences between the male infants and female infants into account, the possibility of improving the understanding of the epidemiology, clinical course and outcome of acute respiratory infections, that will aid in their detection and treatment, and to increase public participation as well as the effectiveness of prevention and control activities.

Studies, as reported in [9], showed that male patients were more infected with ARI than female. They were 1.5 times more likely to suffer ARIs than female patients, but there was no significant association between gender and the severity of ARIs. They further stated that these findings were in agreement with the works of [10,11], in Iraq, but against the result found by [12,13], also against the result found by [14], in Iraq but found that male gender was significantly associated with ARI severity. Bangladesh study reported that ARI in the rural community was 14.9% and 14.4% in males and females respectively in the ARI episodes [15].

However, a community-based cross-sectional study undertaken in 21 registered urban slums of Guwahati in Assam, India to determine the prevalence and risk factors associated with ARI among 370 under-five children from 184 households and 370 families, from 15th September to 30th December 2004, as reported by [16], the prevalence of ARI was found to be 26.22%; infants and female children were more affected, (27.35%) than males (25.69%). The study from Zambia observed that in the under-five children, ARI was significantly associated with sex of child [15].

Also, a prospective cohort study conducted on Incidence, Pattern, and Severity of Acute Respiratory Infections among Infants and Toddlers of a Peri-Urban Area of Delhi, India; [17], reported that, the incidence of ARI, according to gender, showed no difference in incidence of ARIs among the two genders. Incidence of pneumonia was, nevertheless, noted to be higher in boys (0.9 episodes/100 child-weeks) as compared to girls (0.6 episodes/100 child-weeks). Similar pattern was seen for severe pneumonias (0.1 for boys as compared to 0.05 for girls). In contrast, the incidence of "no pneumonia, cold or cough" as well as otitis media were found to be higher in girls. The observed differences were, however, not found to be statistically significant.

In view of the foregoing mixed findings of gender as a risk factor in contracting acute respiratory infection, the data collected and collated was subjected to test of hypothesis analysis by bivariate logistic regression against the null hypothesis at 5% probability level (∞=0.05), and Odds ratio (OR) was used to interpret the size effect measures of ARI on gender differences among infants, wherein a significant relationship was found, therefore, it may be stated that the occurrence of acute respiratory infection is related to gender. For the infant females, the odds for ARI were 1.3 times significantly higher compared to those of their males counterparts (OR=1.32, p=0.048, 95%CI=1.003-1.735).

The finding of this research work corroborates with some documented body of knowledge as reported in the works of [16], in Guwahati of Assam, India though study was conducted among under 5 years children in which infants are composite age group; and in the study [17], of Delhi, India, in the case of incidence of "no pneumonia, cold or cough, though without statistical significance. The occurrence of more of the moderate cases among infant female cases and severe cases among infant male cases in rural communities may be associated with poor health seeking behaviour and ignorance about ARI among mothers/caregivers of infants. The finding equally revealed the specific trend in the risk of Acute Respiratory Infection and gender among infants, in our setting, Nigeria to enable intellectuals and health care practitioners to know how to direct and focus their intervention strategies as in gender disaggregated preventive measures, in the resolution of risk of Acute Respiratory Infection and gender via high risk group classification, right from the infancy, noting that in human growth and development cycle, infants grow to become young children.

Conclusion

The findings indicated that there is a relationship between pattern and risk of ARI among infants and gender. Understanding such differences between male and female infants will enhance the knowledge about the epidemiology, outcome and effectiveness in prevention and control of ARIs.

Recommendation

Awareness creation on gender differences in susceptibility to acute-respiratory infection among infants requires sustainable attention.

References

1. WHO (1991) Technical Basis for WHO recommendations on the management of pneumonia in children at first level health facilities. Geneva.
2. Institute of Medicine (2001) Exploring the biological contributions to human health: Does sex matter? National Academy Press, Washington.
3. NPHCDA (2012) National guidelines for development of primary health system in Nigeria (4th edn). Danmori Nigeria Limited. Abuja.
4. National Population Commission (2013) Nigeria demographic and health survey. Maryland, USA
5. Lal S, Adarsh, Pankaj (2010) Textbook of community medicine, preventive and social medicine (2nd edn) India. CBS Publishers and Distributors New Delhi.
6. Charan J, Biswas T (2013) How to calculate sample size for different study designs in medical research? Indian J Psychol Med 35: 121-126.
7. WHO (2007) Addressing sex and gender in epidemic-prone infectious diseases. Geneva.
8. LeGrand T (1998) Too young to die: Genes or gender? New York.United Nations.
9. Thamer K, Khaleq BA (2006) Epidemiology of acute respiratory tract infections (ARI) among children under five years old attending tikrit general teaching hospital.
10. Al- Jassar NF (1994) Epidemiological study of acute respiratory infections (ARI) in children under 5 years of age. The Iraqi Journal of medical science 10: 200-207.
11. Al-Karaguily TS (1998) Risk factors of pneumonia in children under 6 years of age. J Saddam University. 2: 103-104.
12. Ali S (1989) Study of the prevalence of acute respiratory tract infections and the value of some laboratory test in the diagnosis of lower respiratory tract infections. Int J epidemiol 6: 102-111.
13. Zhang ZJ, Gao GL, Wang Z (1985) Acute respiratory infections in childhood in Beijin: Epidemiological studies at Dong Guan Brigade. Sydney 65-69.
14. Al-Humairy EH (1998) Risk factors of severe pneumonia in children: A thesis submitted to the Iraqi committee for medical specialization in partial fulfillment of the requirement for the degree of fellowship of Iraqi committee for medical specialization- pediatrics. The Iraqi J med sciences 4: 20-25.
15. Siziya S, Muula AS, Rudatsikira E (2009) Diarrhoea and acute respiratory infections prevalence and risk factors among under-five children in Iraq in 2000. Ital J Pediatr 25: 35:38.
16. Islam F, Sarma R, Debroy A, Kar S, Pal R (2013) Profiling acute respiratory tract infections in children from Assam, India. J Glob Infect Dis 5: 8-14.
17. Walke SP, Das R, Acharya AS, Pemde HK (2014) Incidence, pattern, and severity of acute respiratory infections among infants and toddlers of a peri-urban area of Delhi: A 12-month prospective study. Int Scholarly Research.