

# OCCURRENCE OF ACUTE RESPIRATORY INFECTIONS (ARI) IN CHILDREN UNDER FIVE YEARS IN IGBO-ORA DURING THE PERIOD JANUARY 1-28, 1999

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## ABSTRACT

A descriptive study to determine the occurrence of ARI in children under five years and the management given by mothers in Igbo-Ora, a town in Western Nigeria was undertaken. A total of 186 mothers were interviewed to determine prevalence, predisposing factors, identification of symptoms and subsequent management of the condition.

Occurrence of ARI was 23.7% of sample population out of which 68.2% were below two years of age. Significant predisposing factors associated were site of cooking, type of cooking fuel and ventilation of the home.

29% of mothers were able to correctly identify symptoms of ARI and there was a statistically significant association between the age of mother and correct identification of symptoms.

Concerning management, 36% of mothers claimed they would present at a health center, 32.8% would buy drugs from the chemist and 15.1% would use herbal concoctions.

**KEY WORD** - ARI: Acute Respiratory Infection

## INTRODUCTION

Acute respiratory tract infections (ARIs) include all the infections involving either the upper or lower respiratory tract ranging from common cold to lung infections and include conditions such as sinusitis, otitis media, tracheobronchitis, laryngitis, tonsillitis, epiglottitis and pneumonia. They are the most common of all childhood infections afflicting children in all countries several times a year<sup>1,2,3,5</sup>.

In developing countries, ARIs are among the leading cause of childhood deaths as well as diarrhoeal disorders, malaria and malnutrition. ARIs are estimated to be the cause in 25-30% of deaths occurring in under five year old children in developing countries such as Nigeria<sup>1,4,7,11</sup>. This is attributable to the occurrence of more severe disease, the presence of risk factors such as low birth weight, malnutrition, indoor air pollution, overcrowding, poor immunization coverage and lack of access to adequate treatment<sup>1,10,14</sup>.

The magnitude of morbidity and mortality from these conditions leave no doubt that this is a major health problem facing Nigerian communities.

## RATIONAL AND JUSTIFICATION

Based on all recent findings, the magnitude of mortality caused by ARIs is in doubt one of the major challenges of public health confronting Nigerian communities today. Therefore it is pertinent since most of the mortality risks associated with ARI is preventable to determine the occurrence and risk factors associated with ARI in order to improve health care delivery to those at risk especially children under five years. The study would also aid in being in a better position to educate mothers on risk factors and how to prevent the disease in general.

In addition, it will act as a point of reference to assess the effectiveness of health care delivery programmes in the particular community under study, that is, Igbo Ora and as a basis for further study on ARI and related health problems.

In the words of Gabriela Mistral;

*"We are guilty of many errors and many faults, but our worst crime is abandoning the children, neglecting the fountain of life. Many of the things we need can wait. The children cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him, we cannot answer 'Tomorrow'. His name is today".*

It is believed that this project is well timed and will improve the well being of children in our environment.

## OBJECTIVES

### Broad Objectives

To determine the occurrence of ARI in children under five years and management given by their mother in Igbo-Ora.

### Specific Objectives

1. To determine occurrence of ARI in children under five years
2. To assess the mother's knowledge and ability to recognize symptoms accurately
3. To identify common predisposing factors in the environment
4. To find out beliefs about the causes and prevention of ARI as well as management practices among mothers of affected children
5. Based on the above objectives, to make recommendations for prevention and control of ARI in the general populace

## LITERATURE REVIEW

Acute respiratory Infections (ARIs) are a leading cause of morbidity and mortality in children all over the world. Globally, ARIs account for 2.9 million childhood deaths and are ranked with diarrhoeal disease as the major causes of childhood mortality<sup>1-7,11-14</sup>. In Nigeria, under five mortality rates are among the highest in the world and ARIs are responsible for 25-30% of all deaths in this age group<sup>3,5,8,11</sup>.

Also apart from being childhood's most common ailment with five to eight episodes per year for each child; these infections account for 40-50% of hospital visits and 20-40% of paediatric admissions<sup>1,4,5,7,9</sup>.

Though the incidence of ARIs in developing and developed countries is similar, mortality rates are about thirty times higher in developing countries from lower respiratory tract infections especially pneumonias which have the highest case fatalities<sup>5,8</sup>. In addition, though most ARIs are usually self limiting, a significant influence on weight gain for growing children over six months can lead to growth retardation<sup>9</sup>. The disparity in developed and developing countries may be attributed to severity of disease from effects of risk factors such as low birth weight, malnutrition, overcrowding, poverty and illiteracy<sup>5,12,14,15,16,17-21</sup>.

Various studies have been conducted in the determination of risk factors for ARI. O. Oyejide and K. Osinusi in 1990, conducted a longitudinal community based study on occurrence of ARI in children under five years in Ibadan, Nigeria. Incidence was found to be 6.1-8.1 episodes per child yearly, highest in first two years of life and decreasing with increasing age. Incidence was higher in male children than in female ones. Most common symptoms were cough, nasal discharge and fever.

Another study in Uganda by S.G Tumwesigera and T. Banon in 1995 was a community based cross-sectional survey in five army camps and showed significant associations between environmental factors such as number of persons per house, bed sharing and house ventilation<sup>14</sup>. Overcrowding and indoor pollution were rife and contributed to incidence of ARIs.

Rahman and Rahman (1997) conducted a longitudinal survey on a Bangladesh rural community and revealed a prevalence of 58.7%. Risk factors identified were malnutrition, illiteracy, poverty, overcrowding and parental smoking among victims of ARIs.

Studies geared towards perception and management of ARIs are very useful in order to design and monitor effective ARI control strategies<sup>13,22</sup>. In this vein, a study on management of pneumonias and attitudes of mothers towards illness in children under five years in Igbo-Ora was conducted in 1993 by group II Group D '91<sup>18</sup>. It was a descriptive random survey similar to this study, revealing a prevalence of 12% in the population. Significant links were made between older mothers and accurate recognition of symptoms. Most mothers attributed pneumonias to various drugs from chemists and herbal concoctions before the child would be brought in to the hospital. Similar results were documented in Idikan by K. Osinusi and O. Oyejide in 1988, World Health Organisation (WHO) Focus Ethnographic Study in Ile Ife in 1991 as well as studies carried out in Gambia<sup>18,19</sup>.

These previous studies show a high prevalence of ARIs in children under five years with risk factors like poverty, overcrowding, malnutrition, infancy, poor ventilation, air pollution and illiteracy associated. Most cases occur under two years of age and tend to be male children. There was a low level of awareness as to significant symptoms that could be pointers to more serious forms of ARI and influence management as well as cause and prevention of the disease.

## METHODOLOGY

### (I) DESCRIPTION OF STUDY AREA

Igbo Ora is the largest of two towns in the present Ibarapa Central Local Government Area, located about 135km from Ibadan in the outskirts of Oyo State in Western Nigeria. It was formerly under Ifelolu Local Government Area which constituted of six other towns - Ayete, Idere, Tapa, Igangan, Lanlate and Eruwa.

The population of Igbo Ora based on 1963 census was 33,000 but it has now an estimated population of 60,000 with farming and trading being the predominant occupation. The town is divided into six blocks which are further subdivided into 62 enumeration areas and contain varying numbers of family compounds. There is also a Primary Health Care numbering system used by the Local Government based on number of political wards.

### (II) STUDY DESIGN

The study is a descriptive cross sectional one designed to find

out the occurrence of ARI over a period of four weeks from January 1-28, 1999 among children under five years in Igbo-Ora with a view to having an insight into predisposing factors, types of treatment administered and beliefs about causes and prevention of the condition.

### (III) SAMPLING PROCEDURE

The procedure used a multistage sampling technique. Two blocks were selected by simple random sampling using balloting method. The two blocks contained enumeration areas 9 and 12 and one in three enumeration areas were selected from each making a total of seven enumeration areas (that is, 3 and 4 enumeration areas from each respective block).

Thus, the formal sampling unit used was an enumeration area as all the compounds in the selected enumeration areas were visited and 86 questionnaires administered to the mother or appropriate care giver. The study unit was thus all mothers with children under five years in house within these compounds.

The Sample size was calculated using formulae:

$$n = \frac{z^2 pq}{d^2}$$

with p = 12 from previous survey in Igbo Ora and was 186.

### (IV) MATERIALS: Development and Administration

Based on already established objectives we proceeded to frame an appropriate questionnaire but structuring each question strictly around our specific aims and objectives. These questions were then translated into the local language, Yoruba, with the assistance of staff personnel in the health facility we, students, were residing.

### (V) PRETESTING METHOD

Dividing ourselves into 4 groups of two persons each, we proceeded to test the questionnaire in a selected enumeration area in Block 10, outside our study area, with each group going separately out into the field.

4 questionnaires were administered by the group to four women totally. Some errors were discovered and necessary adjustments were made.

Using our sampling technique, a questionnaire was administered to every mother with a child under five at home at the time of visit. One person asked the questions in the local language while the other recorded the response under the corresponding English translation.

### (VI) VIABILITY AND RELIABILITY

The questionnaire was effectively tested using mothers with children under five outside our sample field in Block 10. Also, back translation of particular terms from local language was carried out to avoid ambiguity and to enhance uniformity in communication.

### (VII) METHODS OF DATA ANALYSIS

1. Tables and charts were used for the descriptive aspect of the study
2. Pictorial representations: pie chart
3. Chi-square test of significance on proportion was used to determine the significant association between independent variables

## LIMITATIONS

The study project has been an interesting one though not without its limitations viz:

1. Unwillingness of mothers to give information about illness of their children
2. The likelihood of a biased response by the mother as we identified ourselves as medical students from the General Hospital, Igbo-Ora
3. Reluctance in giving information concerning age, details of family and home environment
4. No adequate means of ascertaining the validity of answers given by the mothers
5. Limited man power as a large sample size would increase the efficiency of results obtained

Despite these limitations, we were able to retrieve substantial and relevant information as will be stated in the results.

## RESULTS

### DEMOGRAPHIC DESCRIPTION OF STUDY GROUP

A total of 186 mothers aged between 16 and 45 years were interviewed. The respondents were mainly of parity 3 or less (78%). In terms of the educational status of interviewed mothers, 123 mothers (68%) had primary or no formal education while just 48 mothers (23%) had secondary education and 15 mothers (8%) had tertiary education. A greater majority of the respondents were traders (55.9%) while 14.5% were artisans and 4.8% were farmers. The occupation of the concerned fathers revealed 26% were traders, 17% farmers and 15% vehicle operators. These and many more demographic information are contained in Table 1-5.

### OCCURRENCE OF ARI IN UNDER FIVES IN IGBO-ORA

The prevalence of ARI in under fives in the previous 4 weeks of the study (Jan. 1-28, 1999) was 23.7% based on a total of 44 cases of ARI recorded out of the 186 respondents. This is represented in Fig 1.

### PREDISPOSING FACTORS

Various environmental factors were included in the checklist for the sample population. These are maximal number of occupants in each room, ventilation, site of cooking, type of cooking fuel, family size and size of living quarters. Table 6 shows our findings, the summary of which is given in the next paragraph.

The statistically significant variables were: ventilation, site of cooking and cooking fuel. (Tables 7-10)

For children that had ARI, 20 cases (45.5%) were found to be less than a year old and 30 cases (68.2%) were less than 2 years of age. The overall male to female ratio was 3:2. 24 (55%) of the positive cases had full doses of the National Programme on Immunization (NPI) schedule. 23 cases (over 50%) had been breastfed for over a year while only 7 cases (16%) of the positive cases had been treated for less than 6 months. The aforementioned facts are depicted in Tables 11-16.

### ACCURATE RECOGNITION OF SYMPTOMS

Commonly recognized symptoms were cough (76.9%), nasal discharge (50%), fever (48.9%) and difficult or fast breathing (33.3%). Other symptoms recognized by the respondents were poor appetite, malaise, vomiting, shivering, restlessness and convulsions. This is shown in Table 15.

Table 18 shows factors associated with accurate recognition of symptoms by respondents of which only the

maternal age of greater than or equal to 30 years was found to be significant. 29% of the respondents were able to recognize at least 3 accurate symptoms including fast breathing as symptoms of ARI. 67 (36%) of the respondents claimed they would present at the nearest hospital for treatment upon noticing significant symptoms. 61 (32.8%) would use drugs including cough mixtures, vitamin C, paracetamol and antibiotics obtained from patent drug sellers, 34 (18.3%) thought warmth as provided by warm clothing would be the answer, 28 (15.1%) would use herbs while 14 (7.5%) would use menthol rub application. This is contained in Table 6.

From Table 20, 92 of the respondents attributed ARI to exposure to cold weather (59.7%), 50 (26.9%) attested to it being caused by poor hygienic practices while 40 (21.5) thought feeding of children with cold food caused it. Some mothers, 15 (8.1%), thought it had to do with tooth eruption while 41 (22.0%) of the respondents had no idea what the causes of ARI would be. A good majority of the mothers, 146 (78.5), thought the disease ARI was preventable (Table 18). Of those who thought it was preventable, 100 (53.8%) agreed to the fact that provision of warmth through clothing would be useful, 55 (29.6%) thought adequate sanitation and hygienic practices was the answer while 27 (14.5%) cited adequate nutrition. 29 (15.6%) of the respondents had no idea at all how ARI could be prevented even though they believe it is preventable.

## TABLES OF RESULTS

Table 1: Age Distribution of Mothers

Age Distribution	+ve ARI	-ve ARI	Total %
16-20	5	18	12.36%
21-25	13	38	27.42%
26-30	13	38	27.42%
31-35	7	30	19.89%
36-40	5	11	8.6%
>40	1	7	4.3%
Total	42	142	100%

Table 2: Parity of Mothers

Parity	+ve ARI	-ve ARI	Total %
1	14	41	29.6%
2	7	37	23.7%
3	14	32	24.7%
4	5	19	12.9%
5	2	8	5.4%
6	1	3	2.2%
7	13	2	1.6%
Total	144	142	100%

Table 3: Educational Status of Mothers

Level of Education	+ve ARI	-ve ARI	Total %
Informal	10	35	24.2%
1 <sup>st</sup>	16	62	42%
2 <sup>nd</sup>	13	35	26%
3 <sup>rd</sup>	5	10	8%
Total	44	142	100%

Table 4: Mother's Occupation

Occupation	Freq.	%
Trader	104	55.9
Farmer	89	4.8
Artisans	27	14.5
Teachers	13	7
Food-sellers	16	8.6
House Wives	6	3.2
Civil Servants	6	3.2
Others	5	2.7
Total		100%

Table 5: Father's Occupation

Occupation	Freq.	%
Trader	48	26
Farmer	32	17
Artisans	19	10
Vehicle Operators	28	15
Vehicle Repairers	30	16
Teachers	13	7
Civil Servants	11	6
Others	5	3
Total		100%

Table 6: Environmental risk Factors

	No of respondents	+ve ARI	-ve ARI	X <sup>2</sup>	P value
Max. no of Occupants					
<4	138	29 (21%)	109 (79.0%)	2.066	0.2 < p > 0.1
>4	48	15 (31.3%)	33 (69.7%)		
Ventilation					
<2 windows	79	25 (31.7%)	54 (69.3%)	4.854	0.05 < p > 0.02
>2 windows	107	19 (17.8%)	88 (82.2%)		
Site of Cooking					
Inside House	69	25 (36.2%)	44 (63.8%)	9.6	0.01 < p > 0.001
Outside House	117	19 (16.2%)	98 (83.8%)		
Cooking Fuel					
Wood/Charcoal	105	20 (17.4%)	95 (82.6%)	6.536	0.02 < p > 0.01
Kerosine	52	20 (38.5%)	32 (61.5%)		
Both	19	4 (25%)	15 (74%)		
Socio-Economic Status					
Low	158	35 (22.7%)	123 (77.8%)	1.115	0.3 < p > 0.2
Middle	28	9 (32.1%)	19 (67.9%)		
High	-	-	-		
Family size					
<6	132	31 (23.5%)	101 (77.8%)	0.0074	0.8 > p > 6.7
>6	54	13 (24%)	41 (75.9%)		
No of Rooms					
<2	102	26 (25.5%)	78 (74.5%)	0.421	0.7 < p > 0.5
>2	84	18 (21.4%)	66 (79.6%)		

Table 7: Association between ARI and Overcrowding

Max no of occupants	+ve ARI	-ve ARI
<4	29 (21%)	109 (79%)
>4	15 (31.3%)	33 (69.7%)
Total	44	142

$P > 0.05$  (not significant)

Table 8: Association between ARI and Ventilation

No of windows	+ve ARI	-ve ARI
<2 windows	25 (31.7%)	54 (69.3%)
>2 windows	19 (17.8%)	88 (82.2%)
Total	44	142

$P > 0.05$  (not significant)

Table 9: Association between ARI and site of cooking

Site of cooking	+ve ARI	-ve ARI
Indoor	25 (36.2%)	54 (63.8%)
Outdoor	19 (16.2%)	98 (83.8%)

$P > 0.05$  (not significant)

Table 10: Association between ARI and type of cooking fuel

Cooking Fuel	+ve ARI	-ve ARI
Wood	20 (17.4%)	95 (82.6%)
Kerosine	20 (38.5%)	32 (61.5%)
Total	40	127

$P > 0.05$  (not significant)

Table 11: Age Distribution of Children with ARI

Age (YRS)	Freq.	%
0-1	20	46
1-2	10	23
2-3	5	11
3-4	5	11
4-5	4	9
Total	44	100

Table 12: Male/Female Distribution of Children with ARI

Age (YRS)	Male	Female	Total (%)
0-1	32%	14%	46
1-2	14%	9%	23
2-3	9%	2%	11
3-4	9%	2%	11
4-5	4.5%	4.5%	9
Total	68.5%	31.5%	100

Table 13: Immunisation status of children with ARI

Age (YRS)	Frequency	%
Nil	3	7
BCG only	1	2
BCG, OPV, DPT	5	11
BCG, OPV1-2, DPT2	4	9
BCG, OPV1-3, DPT (3)	7	16
Full Dose	24	55
Total	44	100

Table 14: Duration of Breastfeeding

Duration	Frequency	%
<6 moths	7	16
6 months	14	32
1-2 yrs	19	43
>2yrs	4	9
Total	44	100

Table 15: Recognition of Symptoms

Symptoms	Freq.	%
Cough	1437	76.9
Fast breathing	62	33.3
Fever	91	48.9
Nasal discharge	83	50
Poor appetite	7	3.8
Malaise	6	3.2
Vomiting	8	4.3
Restlessness	4	2.2
Shivering	5	2.7
Others	6	3.2
No idea	10	5.4

Table 16: Commonly employed treatment modalities

Treatment	Freq.	%
Hospital	67	36
Drug demist	61	32.8
Warm clothing	34	18.3
Herbs	28	15.1
Menthol rob	14	7.5
Tepid sponging	10	5.4
Hot food/drink	6	3.2

Table 17 Methods of prevention

Method	Freq.	%
Hospital	100	53.8
Warm clothing	55	29.6
Adequate sanitation	27	14.5
Proper nutrition	17	9.0
Hospital care	17	9.0
Wash food	11	5.9
Immunisation	4	2.2
Adequate Ventilation	4	2.2
Drugs	8	4.3
No Idea	29	15.6

Table 18: Factors associated with accurate recognition of symptoms

	Accurate	Inaccurate	P value
>Para 3	37 (28%)	95 (72%)	P>0.005
<Para 3	17 (31%)	38 (69%)	
>30 years	32 (23%)	106 (72%)	P>0.005
<30 years	22 (46%)	26 (54%)	
Minimal Education	34 (29%)	84 (71%)	P>0.05
Well Educated	20 (29%)	41 (71%)	

Table 19: Preventability of ARI

Response	Freq.	% Mothers
Yes	146	78.5
No	22	11.8
No idea	18	9.7
Total	186	100

Table 20: Causes of ARI

Causes	Frequency	%
Cold Weather	111	59.7
Poor Hygiene	50	26.9
Cold Food	40	21.5
Teething	15	8.1
Dust	9	4.8
Fever	9	4.8
Hereditary	4	2.2
Inadequate	6	3.2
Fumes	1	0.4
No idea	41	22.0

## DISCUSSION

The major implications of our findings are that occurrence of ARI in children under five years old over the period of study is much lower (23.7%) than expected in comparison to results of previous studies done in other developing countries (58.1%), though it is higher than the value got from a similar study in Igbo-Ora by Group D91 (12%)

This could be due to the fact that most children (over 50%) of total sample were breastfed for more than six months and had completed the National Programme on Immunization (NPI) schedule.

The risk factors found to be associated with positive cases include underventilation, indoor site of cooking and use of kerosene as cooking fuel. There was a trend noticed with overcrowding and the occurrence of ARI but it was not statistically significant probably due to small sample size.

Most of the preschool children (63.6%) who had ARI within the study period were less than two years old and occurrence decreased as they approached the age of five years. This is very likely due to the fact that it is the age of less than one year some of the children were not yet fully immunised. Also, after 6 months, the influence of maternal antibodies imparted to the child have greatly reduced.

More male children (68.5%) were found to be affected than female children (31.5%). Ratio of males to females, 3:2. This corresponds with results of previous studies<sup>16</sup>. Most of the mothers (15%) of the affected children were below the age of thirty years and had a parity of three and less (78%). Also most of the mothers (68%) had either no education or only primary school education.

Majority of the mothers (71%) interviewed were not able to recognize the important symptoms of ARI such as fast breathing that would indicate a severe disease. Older mothers were able to recognise symptoms and signs of ARI more correctly as compared to younger mothers and this tallies with the results of similar studies<sup>18,19</sup>. However, parity or educational status were not found to be significantly associated with correct recognition of symptoms.

A significant percentage (36%) of mothers had a positive attitude towards modern health care and claimed that they would present at a hospital once symptoms were noticed whether they were severe or not but this could have been a biased answer since the mothers knew we were coming from a health centre.

However, a percentage of mothers 32.8% would still have used drugs from patent chemist stores and herbs before presenting the hospital and this could expose the children to a worse outcome.

Majority of the mothers (59.7%) attributed cold weather to ARI although a few mothers still believe that ARIs could be caused by various abstract things while a significant percentage (22%) were completely ignorant about the causes. This reflects a low level of knowledge about causes of the disease condition. Most of the mothers (78%) thought that the disease was preventable and a significant percentage (53.8%) recognised correct methods of preventions and only a few had no idea at all.

### CONCLUSION AND RECOMMENDATION

In view of the above literature review and discussion, we hereby conclude that the occurrence of ARI in Igbo-Ora now is higher than occurrence found in previous similar study in Igbo Ora several years ago.

Mothers could not identify symptoms and signs of serious disease though they have a positive attitude to modern health care and will take their children to the hospital at onset of symptoms.

Environmental factors have been found to play a major role in predisposing children to ARI in confirmation of previous studies. It is recommended that health education strategies targeted towards younger mothers should be geared up instead to improve correct identification of symptoms of more severe ARI. Also the role of clean fuels and proper ventilation be further clarified in aetiology of ARI to these women.

ARIs are a major cause of morbidity in pre-school children but further studies such as case control studies need to be done in order to clearly establish more predisposing factors.

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