PREVALENCE AND RISK FACTORS OF ACUTE RESPIRATORY INFECTION (ARI) IN UNDER-FIVES IN EDO STATE, NIGERIA.

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ABSTRACT

Background: Acute Respiratory Infection (ARI) commonly present as frequent episodes of respiratory symptoms which although commoner at certain times of the year may sometimes be present all year round. This is associated with a lot of distress, morbidity and mortality, with attendant wastage of resources and loss of man hour by caregiver. Therefore, the need to assess the community prevalence and associated risk factors of ARI in under-fives in Edaiken community.

Methodology: This study was a descriptive cross-sectional community-based study carried out in Edaiken community as part of a broad ARI study in that community. Caregivers were selected by systematic multi-stage sampling. Pretested researcher administered questionnaire was used to obtain data.

Results: 346 caregivers of under-five children took part in the study. Prevalence of ARI was 92.2%, concerning frequency of ARI in children the range was 1 – 8, with a median of 2 in a year. 181 (52.3%) of the children studied were second in order of seniority amongst their siblings. Number of persons in a room ranged from 2 – 12, with a median of 4. Of the 346, 344 (99.4%) were breastfed and 310 (90.1%) were exclusively breastfed. 342 (98.8%) were fully immunized while 108 (31.2%) attended day-care centres. Most respondents 153 (44.2%) cook in kitchen outside the house. Concerning cooking fuel, 281 (81.2%) used kerosene stove.

Conclusion: The prevalence of ARI in Egor LGA is high with some under-fives having ARI all year round. Some of the risk factors identified in the community included type of fuel for cooking, place of cooking and overcrowding.

Keywords: *Prevalence, risk factors, under-fives, acute respiratory infection.*

BACKGROUND

Acute respiratory infection (ARI) is a common problem among under-five aged children. It is a spectrum of disease comprising simple conditions like common cold and at the other extreme very fatal conditions like pneumonia. A case of simple respiratory tract infection that may be taken for granted by the mother can easily progress to become a very fatal disease within a very short time. Frequent respiratory tract infections is very common in communities and very irritating to the patient, parents spent a lot of man hours away from work looking after their under-fives during such episodes. In a study in Benin by Oviawe and Oviawe,[1] a full term infant experienced 11 episodes of ARI of average duration of 8.7 days of range 3 – 18 days over the course of the first 1 year of life.[1] The fewer the cases of ARI among these children, the less resources the parents are likely to divert towards the care of such under-five children. The recurrent nature of the disease is most likely due to exposures to risk factors in our communities that are likely to encourage the development and the spread of the organism responsible for an individual case of ARI.[2-4]

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These risk factors, though present among caregivers in the communities, most of the caregivers may not recognise them and as such further indulge in activities that will help to perpetuate these risk factors in our communities. It is impotent to evaluate the presence of these risk factors in our communities, since some of them are modifiable and can easily be remedied and as such indirectly reducing the frequency of ARI in our communities.[3,4]

However, the prevalence of ARI in most of our communities has not be documented and we may have no idea of the burden of the disease and the amount of morbidity and mortality that results from this condition.[4-6] Furthermore, the presence of risk factors that encourage the frequency of ARI in under-fives in our communities have not been evaluated. Most mothers may engage in activities that are detrimental to the health of their children without knowing, modifying the type of fuel for cooking may just be all that is required to reduce the frequency of this condition in our community.[7-9] In the same vein, encouraging breastfeeding and immunization may also drastically reduce the prevalence, hence the need for this study to determine the prevalence and evaluate the presence of certain risk factors in Edaiken community to enable us plan a health education programme for mothers aimed at reducing the prevalence of ARI.

Methodology

The study was a cross-sectional community-based survey. The study population was caregivers of under-five children who gave consent. The study was carried out in Uselu 2 Ward of Egor Local Government Area of Edo State, Nigeria as part of a broad ARI study in the LGA. Egor Local Government Area has a total of 10 wards. It occupies an area of 93km^2, population is 339,899 (2006 census) and postal code is 300.[10] With a population growth rate of 2.8% (2006 census), the current projected population of the Local Government is 428,273.[10]

A multi-staged sampling technique was employed to select the caregivers and households.

A pre-tested researcher administered questionnaire was used for this study. The questionnaires were filled following an interview of selected recipient. The questionnaire contained a preamble and an introduction explaining the reason for the study and the need for confidentiality. This was followed by the sections on biodata (Section A). Section B contained questions relating to the under-five, Section C contained questions on the possible risk factors present in the household.

Data Analysis

Data from the questionnaire were entered into Microsoft Excel 2007 and transferred into SPSS version 20.0 for analysis. The entered data were checked for inconsistency and errors. Continuous variables were summarised and categorical variables were grouped, frequencies and means were determined for socio-demographic characteristics of the caregiver and the underfive.

Ethical Considerations

Institutional approval for the study was given by the Ethics and Research Committee of the University of Benin Teaching Hospital.

Community consent was gotten from the Odionwere and elders of Edaiken community, while written and signed individual consent were obtained from caregivers recruited for the study.

Results

The prevalence of ARI, 319 (92.2%) caregivers agree that their children had had symptoms of ARI at one time or the other. On the range of frequency of ARI in children, the range was 1 – 8, with a median of 2 in a year. ARI was considered by 110 (34.5%) as a serious illness thereby requiring intervention. Mean (range) number of persons in a room 4 (2 – 12). The median interquartile range (IQR) for number of children was 2 (2 – 3) while that of age of last child was 2 (1 – 3) **(Table 1).**

Of the 346 respondents, the second child, third child, first child, four child, fifth child and above within the family, accounted for 181 (52.3%), 82 (23.7%), 48 (13.9%), 26 (7.5%) and 9 (2.6%) respectively, of the children studied. Number of persons in a room ranged from 2 – 12 with a median of 4. Of the 346 children, 344 (99.4%) were breastfed, and of this number, 310 (90.1%) were exclusively breastfed. Children who were fully immunised were 342 (98.8%) while 108 (31.2%) attended day-care centres. Most of the respondents 153 (44.2%) cook in the kitchen outside the house, 145 (41.9%) cook in the kitchen inside the house, while 41 (11.8%) of the respondents cook in the passage, and 7 (2.0%) cook inside the room. Concerning the fuel for cooking, 281 (81.2%) used kerosene stove, gas 103 (29.8%), while fire wood was used by 15 (4.3%) of the respondents. Concerning the smoking habit of caregivers, a total of 38 (11.0%) smoked cigarettes but only 15 (39.5%) smoked cigarette in the house **(Table 2).**

Table 3 shows the relationship between birth order and presence of ARI symptoms shows that birth order 2 – 4 had majority of those with symptoms (93.8%), this was followed by birth order 1 with 85.4% and birth order ≥ 5, 77.8%. This association was statistically significant (p=0.025). In terms of persons per room, although the association with presence of ARI symptoms was not significant, equal proportion with ≤4 and >4 had presence of ARI symptoms (92.2%) and equal proportions also had no symptoms (7.8%). While place of cooking and presence of ARI symptoms exhibited a non-significant association, but those that cooked in the passage had a larger proportion with symptoms of ARI (97.6%) this was closely followed by those that had their kitchen outside the house (94.1%) and those that had their kitchen 89.7%, surprisingly those that cook inside the room had only 71.4% of ARI. In terms of the type of fuel used for cooking and presence or absence of symptoms, those that cook with firewood contributed 80%, this was closely followed by those that cook with kerosene stove (64.4%) and gas was 45.6%. The association between presence of ARI and type of fuel was statistically significant (p=0.001). In terms of cigarette smoking and presence of ARI symptoms, a larger proportion of caregivers (94.7%) that smoked had under-fives with ARI, while 91.7% of those that were not smokers also had symptoms of ARI, the relationship was not statistically significant (p=0.753). Apart from cigarette smoking, in terms of place of smoking (whether in or outside the house), 100% of those that smoked in the house had under-five with ARI, while 91.3 of those with ARI did not have caregiver that smoke in the house.

In terms of immunisation 92.1% of those with ARI symptoms that were fully immunised, while 7.9% of those that were fully immunised had no symptom of ARI. However, a 100% of those that were not fully immunised had symptoms of ARI. Child's day care attendance had a statistically significant relationship with presence of ARI (p=0.001). 85% of children that attended day care had symptoms of ARI while 14.8% had no symptom, however, out of those with symptoms of ARI 95.4% had no attendance at day care. In terms of exclusive breastfeeding, 92.2% of those that were exclusively breastfed also had symptoms of ARI, while 91.2% of those that were not breastfed had symptoms of ARI. The relationship was not statistically significant (p=0.740) (Table 3).

Table 1: General characteristics and frequency of ARI symptoms in under five children of respondents

Variables	Frequency	Percent
Child ever had symptoms of ARI (n=346)	319	92.2
Median (range) frequency of ARI in child in past 1 year(n=319)	2(1 – 8)	
Considered episodes of child's ARI as serious (n=319)	110	34.5
Median (range) number of persons in a room	4(2 – 12)	
Number of children (median, IQR)	2(2 – 3)	
Age of last child in years (median, IQR)	2(1 – 3)	

Table 2: Risk factors for ARI among Under-five Children in Edaiken Community

Risk factors	Variables	Frequency (n = 346)	Percent
Child related	**Birth order of index child**		
	1	48	13.9
	2	181	52.3
	3	82	23.7
	4	26	7.5
	5+	9	2.6
	Child fully immunized	342	98.8
	Child attend day -care centre	108	31.2
	Child breastfed	344	99.4
	Child exclusively breastfed (n = 344)	310	90.1
Environmental	**Place of cooking at home**		
	Kitchen outside the house	153	44.2
	Kitchen inside the house	145	41.9
	In the passage	41	11.8
	Inside the room	7	2.0
	Type of fuel for cooking*		
	Kerosene stoves	281	81.2
	Gas	103	29.8
	Firewood	15	4.3
Lifestyle of Caregivers	**Smoked cigarettes**	38	11.0
	Smoked cigarettes in the house (n = 38)	15	39.5

***multiple responses**

Table 3: Risk factors for ARI and presence of ARI symptoms in children of respondents.

Variables	Had ARI		p-value*
	Yes (%) n = 319	No (%) n = 27	
Birth order			
1	41 (85.4)	7 (14.6)	
2 – 4	271 (93.8)	18 (6.2)	0.025
≥5	7 (77.8)	2 (22.2)	
Persons / room			
≤4	225 (92.2)	19 (7.8)	0.986
>4	94 (92.2)	8 (7.8)	
Place of cooking			
Inside the room	5 (71.4)	2 (28.6)	
Kitchen inside the house	130 (89.7)	15 (10.3)	0.058
Kitchen outside the house	144 (94.1)	9 (5.9)	
In the passage	40 (97.6)	1 (2.4)	
Fuel for cooking			
Kerosene stove	181 (64.4)	100 (35.6)	
Gas	47 (45.6)	56 (54.4)	0.001†
Firewood	12 (80.0)	3 (20.0)	
Smoked cigarette			
Yes	36 (94.7)	2 (5.3)	0.753
No	283 (91.9)	25 (8.12)	
Smoked in the house			
Yes	15 (100.0)	0 (0.0)	0.509
No	21 (91.3)	2 (8.7)	
Child fully immunized			
Yes	315 (92.1)	27 (7.9)	0.558
No	4 (100.0)	0 (0.0)	
Child attends day care			
Yes	92 (85.2)	16 (14.8)	0.001†
No	227 (95.4)	11 (4.6)	
Child breastfed			
Yes	317 (92.2)	27 (7.8)	0.680
No	2 (100.0)	0 (0.0)	
Child breastfed exclusively			
Yes	282 (92.2)	24 (7.8)	0.740
No	31 (91.2)	3 (8.8)	

***Fischer÷s exact test†,Chi-square test**

DISCUSSION

The prevalence and frequency of ARI symptoms based on the cumulative presence of symptoms in the under-fives of caregivers interviewed was very high. Some children had up to 8 episodes of ARI yearly. This reflects a scenario of frequent repetitive ARI episodes in the under-fives. The presence of reported risk factors may be responsible. Poor environmental and personal hygiene may also play a part. Many of the households were overcrowded and cooked with stove. Some caregivers smoked in their houses. Furthermore, the current economic downturn may have contributed negatively by causing more cases of malnutrition due to high cost of living. This is similar to the findings by Oyejide et al.[2] in Idikan community in Ibadan, Nigeria. In the Ibadan study, houses typically comprise 3 to 10 families, with some families having 2 to 3 children less than 5 yrs old. In the study, the annual incidence of ARI ranged from 6.1 to 8.1 episodes per child per year.

The prevalence in the index study is high (97.4%) when compared with a previous study from Jos Nigeria by Yilgwan et al.[3] They reported a prevalence over a 1-year period of 4.3%. This is low compared with the index study. Another Nigerian study done by Ide and Uchenwa-Onyenegecha[11] in Port Harcourt reported a monthly prevalence of ARI of 10.7%, which is comparable to the Jos study but lower than the index study. However, while the study from Jos and from Port-Harcourt that had low prevalence was based on hospital data, the index study was a community-based study. Hospital-based studies may not reflect the true prevalence in the community since only cases that are considered to be serious will present in the hospital, others are likely to be treated at home with drugs bought from patent medicine stores.[12]

Prevalence studies from other parts of Africa were closer to the index study than that of Jos and Port Harcourt studies.[5,6] Sikolia et al.[5] while working in a village in Kenya, with presence of several risk factors like mud-walled houses, overcrowding, use of fire wood in cooking and cooking inside the house, similarly reported high prevalence of ARI (69.7%) like the index study. Other African studies include the study by Kibuule and Kagoya[13] in a community-based cross sectional observational study, carried out in Kampala, Uganda, they reported a household prevalence of ARI of up to 98%. The common cold with cough was the most common ARI syndrome reported in the Kampala study. In this study, all respondents reported at least one ARI episodes among the under-fives in the last four weeks, of which 99% was common cold. The high level of prevalence of ARI in these African studies agrees more with the index study than the previously reported studies in Nigeria. The previously reported prevalence of ARI in Nigeria, for instance that by Johnson et al.[8] was in a health centre in the community. They also studied mainly children with pneumonia. This means that only seriously ill children with pneumonia were enumerated as having ARI in that community. This may account for the low level of prevalence recorded in this study.

The risk factors identified in this study were mainly, 2nd birth order, kitchen located inside the home, day care attendance, use of kerosene stove and smoking of cigarette by some parent. An attempt to consider the relevance of the this risk factors in the presence of ARI symptoms among under-five reveals that birth order 2 – 4 had a higher proportion of those with symptoms of ARI and the higher the birth order (≥5) the proportion reduced. This may be due to the fact that in the birth order range 5 and above proportion of under-fives that may be in the household may be few, however, more children are expected to be in the house, which supposedly will support more frequent symptoms, but this does not appear to be the case. So also the place of cooking shows that those that cooked in kitchen outside the house and in passage had greater proportions of children with ARI symptoms. This place of cooking may be related to the types of materials used for cooking, those that cook outside are likely to use wood which may have more deleterious effect than those that cook inside with gas. This may explain why the type of fuel used in cooking showed that those that cook with firewood contributed a

larger percentage to children with ARI symptoms. An Ethiopian study by Alemayehu et al.[9] demonstrated that household's use of high pollution biomass fuels is significantly associated with ARI in under-fives studied. Similar findings were recorded in India, where Sharma et al.[14] conclusively identified use of smoky fuel for cooking and history of parental smoking as major risk factors. In the index study, malnutrition was not a major risk factor for ARI unlike the study by Ujunwa and Ezeonu,[15] where malnutrition was a major risk factor for ARI. The high exclusive breastfeeding rate recorded in the index study may account for this difference. However, they also identified poor immunization status and day care attendance. Although, the current study had high day care attendance, the immunization status was very high and as such not a risk factor.

The difference between the risk factors identified in Edaiken community and the risk factors in a previous study in Nigeria by Ujunwa and Ezeonu,[15] may be due to the level of socioeconomic development of the individual and the community involved. Edaiken community had many of the inhabitants in the middle and the high socioeconomic class and mothers had secondary education and were generally young caregivers, this was not the picture in Ujunwa and Ezeonu[15] study.

Considering the contribution of immunisation, although not statistically significant in the index study, those that were fully immunised contributed a large proportion to those symptoms of ARI 92.1%, while 7.9% of those that were fully immunised with without symptoms of ARI. However, all those that were not immunised had symptoms of ARI. The reason for this is not immediately apparent.

Furthermore in the present study, exclusive breastfeeding had no significant association with symptoms of ARI. Those that were exclusive breastfeed (92.2%) had symptoms of ARI which is contrary to findings by the previous study in Nigeria by Ujunwa and Ezeonu.[15] They reported that exclusive breastfeeding protected against ARI. The presence of health facilities in Edaiken community may have made the immunization level to be high and information of breastfeeding available to the mothers, but effectiveness of the breastfeeding and immunisation in preventing ARI may not be immediately apparent.

Conclusion

The prevalence of ARI in Egor LGA is very high, standing at 92.2%. Several risk factors identified in Egor LGA include place of cooking, fuel for cooking and overcrowding. There is therefore need for constant health education by the health department of the LGA.

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Conflict of Interest

NIL

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