A study on the prevalence of acute respiratory tract infections and its association with the socio demographic features among the children under 5 years of age in Surendranagar district of Gujarat

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ABSTRACT
BACKGROUND: Acute Respiratory Infection (ARI) is an acute infection of any part of the respiratory tract and related structures including paranasal sinuses, middle ear and pleural cavity with a wide range of combination of symptoms & signs. It is considered as one of the major public health problems and it is recognized as the leading cause of mortality and morbidity in many developing countries. Aims and objectives: To find out the prevalence of Acute Respiratory Infections (ARI) among children (under five years of age) in urban and rural areas. To assess the severity of ARI among these children. To study and compare the socio-demographic profile of the subjects (Urban-Rural). To explicate the association of morbidity with the socio-demographic characteristics of these children.
Setting and design: Community based- Cross sectional study. MATERIAL AND METHODS: This study was conducted in the urban and rural area of Surendranagar district of Gujarat state India. Based on the prevalence of ARI derived from pilot study in 0-5 years population, which was found to be 20%, the sample size of study as per statistical calculation (4pq/l², where p = 20 and l= 20% of p) came out to be 400. Data analyzed: The obtained data was analyzed using appropriate test. RESULTS: Out of 302 families surveyed, majority of families 66.56% were joint families. In the rural area the joint family system was predominantly found (62.69%). The percentage of Hindus families in the rural area was much higher than urban area (60.07%). Out of 400 children, maximum were from 4-5 years age group (19.25%). The prevalence of ARI among these children. To study and compare the socio-demographic profile of the subjects (Urban-Rural). To explicate the association of morbidity with the socio-demographic characteristics of these children.

RESULTS: Out of 302 families surveyed, majority of families 66.56% were joint families. In the rural area the joint family system was predominantly found (62.69%). The percentage of Hindus families in the rural area was much higher than urban area (60.07%). Out of 400 children, maximum were from 4-5 years age group i.e. 140 (35%) followed by 1-2 years age group 77 (19.25%) and lowest belonged to the age group of 2-3 years i.e. 45 (11.25%). When the prevalence of ARI was assessed were seen that 26% of the children in urban & 34% of children in rural area had ARI. The prevalence was higher in male (56.56%) as compared to female (43%). CONCLUSION: Out of 302 families surveyed, majority of families 66.56% were joint families. Houses in urban area had good ventilation with nearly 61% having presence of cross-ventilation. Majority of children having ARI (68%) had the disease of the milder degree followed by 28% who had moderate ARI. Where as in the rural areas it was GOVT. health institute (54.59%).

Key words: ARI, Under 5 years, Urban area, Rural area, Family.

INTRODUCTION
Acute Respiratory Infection (ARI) is an acute infection of any part of the respiratory tract and related structures including paranasal sinuses, middle ear and pleural cavity with a wide range of combination of symptoms & signs. Out of an estimated 15 million deaths occurring annually under five children in developing countries, one third is due to ARI alone. India has a huge population of children. The under-5s constitute about 11% of population, a larger number than the population of some countries. It is estimated that, about 0.75 million of children under the age of five die of ARI every year in India. ARI contributes to about one-fourth to one-third of all under five deaths in India, most of these deaths are preventable. It further influences utilization of available health facilities, alters the course of management and ultimately the outcome of disease.

Aims and objectives: 1) To find out the prevalence of Acute Respiratory Infections (ARI) among children (under five years of age) in urban and rural areas. 2) To assess the severity of ARI among these children. 3) To study and compare the socio-demographic profile of the subjects (Urban-Rural). 4) To explicate the association of morbidity with the socio-demographic characteristics of these children.

MATERIALS AND METHODS
Study area: The present study was community based cross sectional study. This study was conducted in the urban and rural area of Surendranagar district of Gujarat state India.
Study period: This study was carried out from August 2011 to January 2012.
Study group: Under five years of age children (≤5yrs).

Sample size: Based on the prevalence of ARI derived from pilot study in 0-5 years population, which was found to be 20%, the sample size of study as per statistical calculation (4pq/l², where p = 20 and l= 20% of p) came out to be 400. This sample size was further sub grouped into two parts Urban and Rural According to (census 2001) distribution of rural and urban population in Gujarat state were 62.65% and 37.35% respectively. The sample size was therefore divided in urban and rural groups as per the above data.

Sampling in urban area: Surendranagar city was selected for the urban study. The city has 14 wards and by simple random technique, Ward No.12 was selected. Total population of this ward is 11800 (as per estimates of municipal corporation, Surendranagar city Census 2001)\(^6\), which was sufficient to give required sample 149 for the study. The houses in area were listed and a randomly selected house was taken as the first house to be surveyed. Houses were selected only from one direction of the lane to avoid cross selection and duplication, and continued till the blind end was reached. In the next lane the same procedure was followed till the entire sample size was achieved.

Sampling in rural area: Out of the ten talukas in the district, Sayla was selected through simple random technique. Sayla village is situated around 32 km away from Surendranagar city. Out of the total villages under the taluka, Sayla village was selected which had population 15,376 and gave required sample of 251 for the study\(^7\). For the selection of the first house, the same technique was followed as in urban.

Method of study: The study was carried out through oral questionnaire method and anthropometric as well as clinical examination using prestructured and pretested proforma by undertaking house to house visit of the study area. Diagnostic criteria: calculating prevalence of ARI amongst children and for gradation of pneumonia, WHO criteria was applied.

Data analyzed: The collected data was tabulated and analyzed in terms of proportion using SPSS. Chi-squared test was applied to study the relationship between occurrence of accidents and different socio-demographic variables, P-value less than 0.05 were considered significant.

RESULTS AND DISCUSSION
Out of 302 families surveyed, majority of families 66.56% were joint families. In the rural area the joint family system was predominantly found (62.69%). While study done by Koch et al\(^8\) (2002) in their studies noted the higher percentage of children belonging to nuclear families (56.75%). About 68% of families had 5-10 family members in their families, whereas nearly 10% of the families had >10 family members. About 80% of the families having >10 members were in the rural areas. In the urban area majority of the subjects belonged to social class I & II (48.36% &25.41%) whereas in the rural area majority were from social class IV and V (26.67% & 43.33%). In studies carried out by DevangRaval\(^9\) (1990), it was noted that a larger percentage of children belonged to lower socio economic class (90.67% respectively) as compared to observations of present study. Majority 92.05% were Hindus followed by Muslims (5.63%) and then other religions (2.32%). The percentage of Hindus families in the rural area was much higher than urban area (60.07%). Similarly in a study done by DevangRaval\(^9\) (1990) included that majority of children were Hindus. The reason may be similarly in socio demographic profile of Surendranagar with Gujarat.

Majority of children having ARI (68%) had a milder degree of illness followed by 28% who had moderately severe ARI. The percentage of cases moderate and mild ARI were much higher in rural as compare to urban.

Table 1: Distribution of children according to grading of ARI (n=122)

<table>
<thead>
<tr>
<th>GRADING OF ARI</th>
<th>URBAN</th>
<th>RURAL</th>
<th>TOTAL (N=122)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Mild</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>71.79</td>
<td>33.73</td>
<td>55</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>23.07</td>
<td>26.47</td>
<td>25</td>
</tr>
<tr>
<td>Severe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>05.13</td>
<td>40.00</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>39</td>
<td>100</td>
<td>83</td>
</tr>
</tbody>
</table>
The above table shows that, Out of 400 children, maximum were from 4-5 years age group i.e. 140 (35%) followed by 1-2 years age group 77 (19.25%) and lowest belonged to the age group of 2-3 years i.e. 45 (11.25%). In urban area, maximum were belonged to the age group of 1-2 years i.e. 33 (21.85%) and lowest in the age group of 2-3 years i.e. 26 (17.22%), while in rural area maximum and lowest were belonged to the age group of 4-5 years and 2-3 years i.e. 140 (43.78%) and 45 (07.63%) respectively.DevangRaval\(^9\) (1990) in his study observed that 23.10% of children between 4-5 years. Percentage of males was higher in urban area, i.e. 56.23%, while in rural area percentage of female were higher (55.82%). Similarly, Sahu et al\(^{10}\) (2002) in their studies found higher percentage of males more than females (57.69% respectively). The observations of present study showed that the proportion of females was higher compared to others study may be because the preference for male gender did more pregnancy and more female.

The Overall prevalence of ARI was 30.50% (Mild- 20.75%, Moderate- 08.50% and Severe-1.25%). 69.50% of children had no ARI. Males had higher prevalence (35.38%) as compared to females (25.85%) but association was not statistically significant. The observations of present study showed female were more compared to other studies. Table also shows highest around 40% prevalence of ARI in age group of one or less than one year than followed by 1-2 yrs, 2-3yrs and above i.e. 33.76%, 31.11% and 53.36% respectively. The association observed was statistically not significant. (\(X^2=5.213, \text{df}= 4, P<0.2661\)). DevangRaval\(^9\) (1990) in his study observed that 23.10% of children between 4-5 years. On comparing the age composition of sample study with the above mentioned studies it is noted that the percentage of infants in present study is relatively lower. It may be because of lowering of birth rate in the last decade in Gujarat.

### Table 3: Distribution of children according to number of episodes of ARI in the preceding one year (n= 400)

<table>
<thead>
<tr>
<th>No. of episodes</th>
<th>Urban (n=151)</th>
<th>Rural (n=249)</th>
<th>Total (n= 400)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0)</td>
<td>38</td>
<td>25.17</td>
<td>33.93</td>
</tr>
<tr>
<td>(1-3)</td>
<td>72</td>
<td>47.68</td>
<td>43.90</td>
</tr>
<tr>
<td>(4-6)</td>
<td>32</td>
<td>21.19</td>
<td>31.07</td>
</tr>
<tr>
<td>(&gt;6)</td>
<td>9</td>
<td>05.96</td>
<td>42.86</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>151</td>
<td>100</td>
<td>37.75</td>
</tr>
</tbody>
</table>

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\(^{8}\) Sahu, R. (2002). Distribution of children according to number of episodes of ARI in the preceding one year (n= 400).

\(^9\) DevangRaval, D. (1990). The distribution of children according to number of episodes of ARI in the preceding one year (n= 400).
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Table no. 4: Association between social class and prevalence of ARI (n=400)

<table>
<thead>
<tr>
<th>SOCIAL CLASS</th>
<th>PREVALENCE OF ARI</th>
<th>CHILDREN WITH NO ARI</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MILD</td>
<td>MODERATE</td>
<td>SEVERE</td>
</tr>
<tr>
<td>I</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4.76</td>
<td>2</td>
</tr>
<tr>
<td>II</td>
<td>6</td>
<td>10.91</td>
<td>3</td>
</tr>
<tr>
<td>III</td>
<td>13</td>
<td>20.31</td>
<td>4</td>
</tr>
<tr>
<td>IV</td>
<td>18</td>
<td>22.22</td>
<td>11</td>
</tr>
<tr>
<td>V</td>
<td>42</td>
<td>36.21</td>
<td>14</td>
</tr>
<tr>
<td>TOTAL</td>
<td>83</td>
<td>20.75</td>
<td>34</td>
</tr>
</tbody>
</table>

(X^2 = 48.168, df=4, p= <0.0001)

Observations show that out of 400 children, 112(28%) of children had not had a single episode of ARI during preceding one year. Only 21(5.25%) children had more than six episode of ARI. In urban area, majority 72(47.68%) of children had one to three episode of ARI during preceding one year and then followed by four to six and more than six, i.e. 21.19% and 5.96% respectively. In rural area, majority 92(36.95%) of children had one to three episode and then followed by 28.51% and 4.28% of four to six and more than six respectively.

The observations from the above table indicate that there is inverse relationship between social class and prevalence of ARI in children. It was noted that prevalence was least in social class I (7.13%) and it was highest in social class V (50.50%). As the social class decline percentage of prevalence of ARI rise. The difference was statistically highly significant (X^2 = 48.168, df=4, p=<0.0001). Similar observations were noted by Biswas et al11 (1995).

CONCLUSION

It can be concluded from the above study that the prevalence of ARI is associated with a wide range of social factors like Gender, Social class, type of locality etc. thus planning the intervention services should be done keeping these factors into consideration and intensive planning in rural areas which lack in appropriate availability of timely medical care is a must. Govt. of India strongly recommends the management of ARI using the IMNCI guidelines at the village level. Thus refresher training and capacity building of the already trained staff is that much more significant and the supportive supervision holds the key towards the successful implementation of the program and eventually in the reduction of under-5 mortality.

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5. Census 2001 urban- rural distribution of population.