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Research Article

Acute respiratory infections in the children of the Southern states of India, with a special focus on the newly carved states

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ABSTRACT

Background: Southeast Asia stands first in number for ARI incidence, accounting for more than 80% of all incidences together with sub-Saharan African countries. In India, more than 4 lakh deaths every year are due to pneumonia. In June 2014, state of Andhra Pradesh has been divided into two new states of Telangana and Andhra Pradesh. Both the new states will face the challenges of new born states in the coming years. India's progress on the MDGs (Millennium Development Goals) for 2015 requires that the new states overcome the challenges effectively. An attempt is made to analyze the available data in the field of ARI Control which can serve as a baseline to monitor the progress in field in the newly carved sates. Objectives: To study the awareness and treatment seeking behaviour of mothers on ARI in children of the Southern states of India with a special focus on the newly carved states.
Methods: Secondary data published in the district level household and facility survey-4 is analyzed.
Results: Awareness about danger signs of ARI was better in Kerala followed by Telangana and Andhra Pradesh. Mothers in Tamil Nadu seek government facilities more often than those of other states for ARI management.
Conclusions: Early diagnosis and treatment is the corner stone for controlling Under-5 mortality attributable to ARI. Kerala sets an example for the rest of the southern states by its higher awareness levels and better treatment seeking behaviour following an episode of ARI.

Keywords: Acute respiratory infections, ARI, Telangana, Andhra Pradesh

INTRODUCTION

Acute respiratory infections can occur in any part of the respiratory system, from the middle ear to the nose to the lungs. Pneumonia is a severe form of acute lower respiratory infection that specifically affects the lungs. Most acute respiratory infections result in mild illnesses, such as the common cold. But in vulnerable children, infections that begin with mild symptoms may sometimes lead to more severe illnesses, such as pneumonia - especially when they coincide with other illnesses like diarrhoea or malaria. Because pneumonia kills more children than any other illness, any effort to improve overall child survival must make the reduction of pneumonia's death toll a priority. And preventing children from developing pneumonia in the first place is critical to reducing its death toll. Prevention efforts include many well-known child survival interventions, such as expanding vaccine coverage, promoting adequate nutrition and reducing indoor air pollution. But once a child develops pneumonia, a caregiver must recognize the symptoms and seek appropriate care immediately. Since a large proportion of severe pneumonia cases in children of the developing world are caused by bacterial pathogens, prompt treatment with a full course of effective antibiotics is key to reducing pneumonia deaths. This

approach is proven, affordable and relatively straightforward to implement.[1] Acute Respiratory Infections or ARIs are the major cause of mortality among children aged less than 5 years especially in developing countries.

Pneumonia is the leading infectious cause of death in children worldwide, accounting for 15% of all deaths of children under 5 years old. Pneumonia killed an estimated 935000 children under the age of five in 2013.[2] Pneumonia can be caused by viruses, bacteria or fungi. Pneumonia can be prevented by immunization, adequate nutrition and by addressing environmental factors. Pneumonia caused by bacteria can be treated with antibiotics, but only one third of children with pneumonia receive the antibiotics they need

Southeast Asia stands first in number for ARI incidence, accounting for more than 80% of all incidences together with sub-Saharan African countries.[3] In India, more than 4 lakh deaths every year are due to pneumonia accounting for 13%-16% of all deaths in the pediatric hospital admissions.[4,5] Million deaths study based on the register general of India mortality statistics had reported 369000 deaths due to pneumonia among children 1-59 months at the rate of 13.5/1000 live births. More number of deaths due to pneumonia was reported from central India.[6]

India is a federal union of states comprising twenty-nine states and seven union territories. In 2014, the new state of Telangana was carved out from the North-Western regions of the state of Andhra Pradesh. In 1956, the Hyderabad state was dissolved as part of the linguistic reorganisation of states, and the Telugu speaking part of Hyderabad state, known as Telangana, was merged with Andhra State to form Andhra Pradesh. On 2 June 2014, Telangana was separated from Andhra Pradesh as a new 29th state of India, with the city of Hyderabad as its capital for ten years.[7]

Both the new states of Telangana and Andhra Pradesh will face the challenges of new born states in the coming years. India's progress on the MDGs (Millennium Development Goals) for 2015, requires that the new states overcome the challenges effectively as the new sates can contribute in their own way to the progress. ARI Control is a priority and is essential in achieving MDG-4, to reduce the under-five mortality rate by two thirds by 2015, compared to 1990.

An attempt is made to analyze the available data in the field of ARI Control which can serve as a baseline to monitor the progress in field in the newly carved sates.

Objectives

The objectives of the study were to study the awareness and treatment seeking behaviour of mothers on ARI in children of the Southern states of India and to map the geographic variations of ARI awareness in the different districts of Telangana and Andhra Pradesh.

METHODS

Secondary data published in the District Level Household and Facility Survey-4 is analyzed.[8-17] District Level Household and Facility Survey (DLHS) have been undertaken by the Ministry of Health and Family Welfare, Government of India with the main objective to provide reproductive and child health related database at district level in India. The data from these surveys have been useful in setting the benchmarks and examining the progress the country has made after the implementation of RCH programme. In addition, the evidence generated by these surveys has also been useful for the monitoring and evaluation of ongoing programmes and planning of suitable strategies by the central and state governments. The Ministry of Health and Family Welfare, Government of India, initiated the process of conducting DLHS-4 during 2012-2013 and has designated the International Institute for Population Sciences (IIPS) as the nodal agency to carry out the survey. Fieldwork in Telangana was conducted during June 2013 to February 2014, gathering information from 13927 households, 12432 ever married women and also from 587 health facilities.[8] Fieldwork in Andhra Pradesh was conducted during August 2013 to January 2014, gathering information from 20490 households, 16498 ever married women and also from 1040 health facilities.[9]

The terms Erstwhile Andhra Pradesh, used in this document depicts the state of Andhra Pradesh before bifurcation in 2014. The term New Telangana is used to depict the newly carved state of Telangana in 2014 and New Andhra Pradesh depicts the residual state after the bifurcation in 2014.

Variables under study:

1. Awareness about ARI (%):
    a. Women aware about danger signs of ARI (Acute Respiratory Infection)
    b. Danger signs of Acute Respiratory Infection (ARI): Difficulty in breathing, pain in chest and productive cough wheezing/ whistling rapid breathing, not able to drink or take a feed, excessive drowsy and difficulty to keep awake, running nose and others.
2. Treatment of childhood diseases (based on last two surviving children born during the reference period) (%)
    a. Prevalence of ARI in last 2 weeks for children under 5 years.

b. Children with acute respiratory infection or fever in last 2 weeks and sought advice/treatment.

3. Source of treatment: Among children who sought advice/treatment.

a. Utilization of Government Health Services (%): Treatment for children with ARI.

b. Government health facility: Includes government hospital or dispensary, urban health centre/urban health post/urban family welfare centre, community health centre or rural hospital, primary health centre, sub-centre, ICDS and Govt. AYUSH hospital/clinic.

c. Private health facility: Includes non-governmental hospital/trust hospital or clinic, private hospital/clinic and private AYUSH hospital/clinic.

RESULTS

There awareness about acute respiratory tract infection (%) - Women aware about danger signs of ARI (Figure 1 and 2)

Awareness about danger signs of ARI was better in Kerala (67.2 percent of mothers) followed by Telangana and Andhra Pradesh. Mothers in Tamil Nadu were least aware regarding the danger signs of ARI with only 15 percent of mothers being aware.

Treatment of childhood diseases (based on last two surviving children born during the reference period) (%) - Prevalence of ARI in last 2 weeks for children under 5 years (Figure 1)

Though the mothers of Kerala state were well aware of the danger signs of ARI, the under 5 children of Kerala state had a high prevalence of ARI (7.1 percent) in the two weeks prior to the survey followed by Andhra Pradesh and Karnataka. Children of Telangana state had the least prevalence of ARI in the weeks prior to the survey (3.4 percent).

Treatment of childhood diseases (based on last two surviving children born during the reference period) (%) - Children with acute respiratory infection or fever in last 2 weeks and sought advice/treatment... (Figure 1)

Children with ARI who sought active treatment were higher in Kerala (89.4 percent) followed by Karnataka. The treatment seeking behaviour was lowest in the state of Andhra Pradesh (73.6 percent).

Utilization of Government health services (%) - Treatment for children with ARI (Fig 1)

Government health facilities were being approached for the management of ARI in nearly fifty percent of the cases in the State of Tamil Nadu which is the highest utilisation rate in any of the southern states. Most number of ARI cases are being managed in the Private sector in the state of Telangana (74.5 percent) followed by the states of Karnataka and Andhra Pradesh.

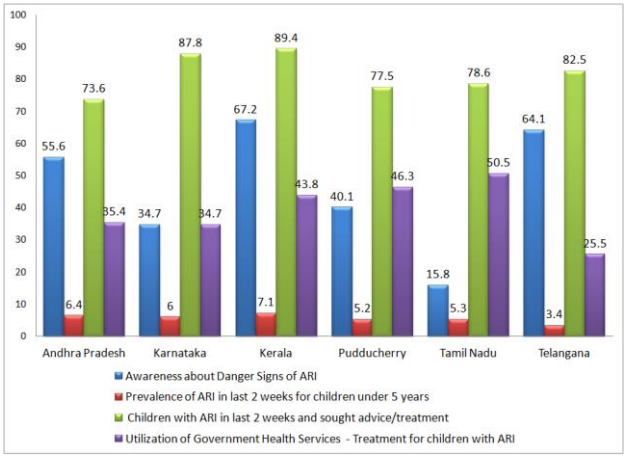

Figure 1: Southern states: awareness and treatment seeking behavior of mothers regarding ARI in under 5 children.

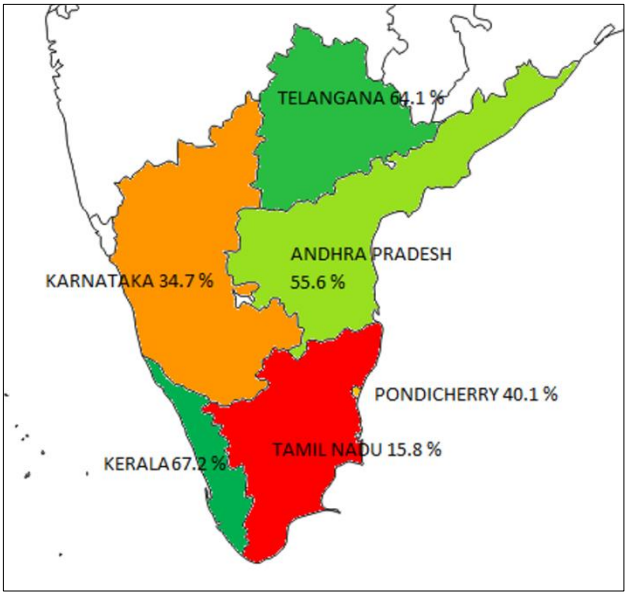

Figure 2: Map showing Southern states: awareness of mothers regarding ARI in under 5 children.

Comparison of the newly carved states with the erstwhile state of Andhra Pradesh (Table 1 and 2)

The mean awareness levels regarding ARI has increased in both the new states of Telangana and Andhra Pradesh compared to corresponding districts of the erstwhile state of Andhra Pradesh. While in the state of Telangana the overall awareness levels have jumped by 21 percent (from 42.56 to 64.1 percent), in the state of Andhra Pradesh in has jumped by 25 percent (from 30.2 to 55.6 percent).

The ARI prevalence has come down by 0.5 percent in Telangana state from 3.93 to 3.4 percent. While, in the state of Andhra Pradesh, the ARI prevalence has increased by 2.2 percent, from 4.2 to 6.4 percent. Children with ARI or fever in last 2 weeks and sought advice/treatment have increased in Telangana state from 79.82 to 82.5 percent. While in the state of Andhra Pradesh, the children with ARI or fever in last 2 weeks and sought advice/treatment have decreased from 79.6 to 73.6 percent.

Utilization of Government health services - Treatment for children with ARI is very low in the districts of Rangareddi, Mahbubnagar and Nalgonda in the state of Telangana. While in the state of Andhra Pradesh. The districts of Guntur, Nellore, East Godavari and Kurnool have a low utilization of Government health services for the treatment for children with ARI. While the overall utilization rates of government health facilities are lower in Telangana than Andhra Pradesh.

Table 1: Telangana state: district wise awareness and treatment seeking behavior of mothers regarding ARI in under 5 children.

Telangana	Awareness about ARI - Women aware about danger signs of ARI		Prevalence of ARI in last 2 weeks for children under 5 years		Children with ARI or fever in last 2 weeks and sought advice/treatment		Utilization of Govt. health services (%) - Treatment for children with ARI	
Districts	**DLHS 3**	**DLHS 4**	**DLHS 3**	**DLHS 4**	**DLHS 3**	**DLHS 4**	**DLHS 3**	**DLHS 4**
Adilabad	57.4	52.2	6.5	3.9	86.3	81	NA	29.4
Nizamabad	49.1	48.2	6	2.9	88.2	75	NA	66.7
Karimnagar	49.1	58.6	8.2	2.2	92.5	85.7	NA	NA
Medak	36	71	2	1.7	78.6	85.7	NA	33.3
Hyderabad	49.5	62.7	0.4	2.7	50	100	NA	28.6
Rangareddi	42.9	69.6	1.6	3.6	93.3	86.7	NA	15.4
Mahbubnagar	22.5	80.9	1.7	2.9	79.3	90.9	NA	10
Nalgonda	39.6	63.5	4	3.8	80	76.9	NA	10
Warangal	57.1	59.1	5.1	5.8	66.7	93.3	NA	21.4
Khammam	22.4	89.8	3.8	3.8	83.3	77.8	NA	50
Total	42.56	64.1	3.93	3.4	79.82	82.5	NA	25.5

All figures in percentages

Table 2: Andhra Pradesh state: district wise awareness and treatment seeking behavior of mothers regarding ARI in under 5 children.

Andhra Pradesh	Awareness about ARI - Women aware about danger signs of ARI		Prevalence of ARI in last 2 weeks for children under 5 years		Children with ARI or fever in last 2 weeks and sought advice/treatment		Utilization of Govt. health services (%) - Treatment for children with ARI	
Districts	**DLHS 3**	**DLHS 4**	**DLHS 3**	**DLHS 4**	**DLHS 3**	**DLHS 4**	**DLHS 3**	**DLHS 4**
Srikakulam	30.5	39.4	5.5	14.1	62.7	78.6	NA	36.4
Vizianagaram	29.6	71.2	6.5	14.2	81.4	76.7	NA	26.1
Visakhapatnam	28.6	45.9	6.9	6.7	77.1	62.5	NA	53.3
East Godavari	21.9	67.5	4.2	1.7	86.4	85.7	NA	16.7
West Godavari	32.4	75.4	3.3	9.1	94.7	88	NA	54.5
Krishna	35.2	75.7	2.4	7.9	84.6	94.4	NA	88.2
Guntur	33.6	47.6	2.7	3.8	81.3	76.5	NA	14.3
Prakasam	34	67.9	5.2	3.6	75.0	77.8	NA	57.1
Nellore	32.2	49.2	6.0	5.6	88.0	69.6	NA	11.8
Cuddapah	31	47.3	1.8	5.2	76.5	50	NA	57.1
Kurnool	26.8	32	2.5	9.2	65.2	65.5	NA	16.7
Anantapur	28.4	56.8	2.9	4.7	82.4	80	NA	50
Chittoor	28	70.8	NA	6.2	79.2	77.3	NA	38.9
Total	30.2	55.6	4.2	6.4	79.6	73.6	NA	35.4

All figures in percentages

Mapping of districts that have high risk of suboptimal awareness levels among the Mothers about danger signs of ARI. (Figure 3 and 4)

In the state of Andhra Pradesh the districts Kurnool and Srikakulam have a very low level of awareness regarding ARI followed by Vishakhapatnam, Guntur Cuddaph and Nellore.

In the state of Telangana while the districts Khammam (89.8 percent) and Mahbubnagar (80.9 percent) have good awareness about ARI, the districts Nizamabad (48.2 percent) and Adilabad (52.5 percent) have poor awareness levels. The state capital, Hyderabad has suboptimal awareness levels (62.7 percent).

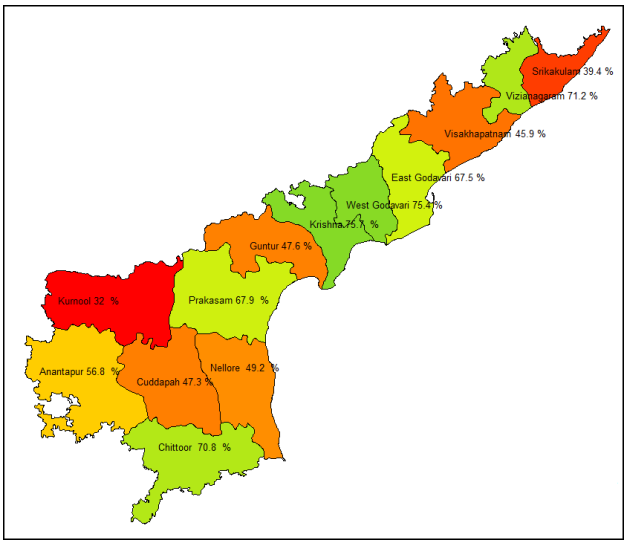

Figure 3: Map showing awareness of mothers regarding ARI in under 5 children in Andhra Pradesh state.

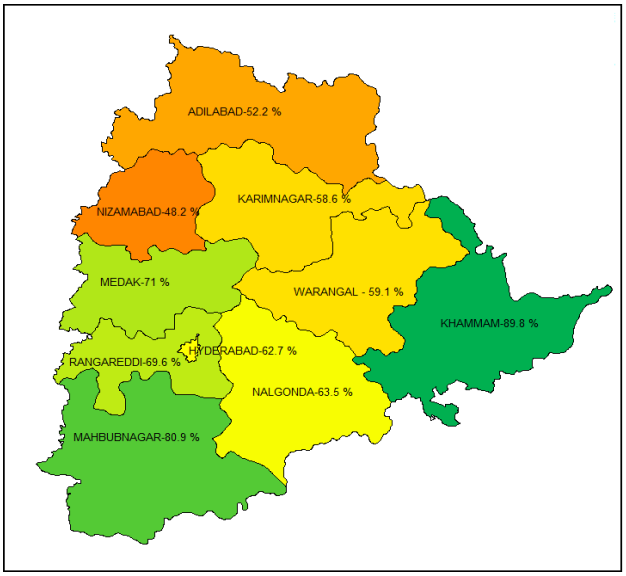

Figure 4: Map showing awareness of mothers regarding ARI in under 5 children in Telangana state.

DISCUSSION

On the basis of burden and effectiveness of simple primary health care interventions shown from the field, ARI control program was started in India during 1990. Since then, various community-based interventions are implemented under ARI control program. Identification of severe respiratory infections by health care worker from rural area, wide access to antibiotics, and its administration by health care workers, was seen as a successful model.

Awareness about danger signs of acute respiratory tract infection among Women is basis for seeking early treatment. A very low level of awareness about the danger signs of ARI in the state Tamil Nadu is a surprise especially as the state is known for its high literacy rate of 80.33.[18] The awareness regarding danger signs of acute respiratory infection (ARI) like difficulty in breathing, pain in chest and productive cough wheezing/whistling Rapid breathing, not able to drink or take a feed, excessive drowsy and difficulty to keep awake, need a wider advocacy and awareness levels in every state. In the primary health care model the DEO (District Extension Education officer) and the Mandal extension officer have a major role in spreading this awareness along with other mass media campaigns under ARI Control Program.

Prevalence of ARI in the 2 weeks prior to survey for children under 5 years may vary across different states based on the timing of the surveys as ARIs have seasonal trends. Although the higher prevalence of ARIs in Kerala state and lower levels in Telangana state need further evaluation for the epidemiological determinants of same.

Similarly the higher treatment seeking behavior rates in Kerala may be explained both by higher awareness levels of mothers in Kerala as well as the highest literacy levels. The state of Andhra Pradesh requires that both the awareness levels and treatment seeking behavior patterns be addressed wisely. Especially the state of New Andhra Pradesh with its newly acquired statehood post division, with probable limitations in the health care infrastructure can have a bearing on both the mortality and morbidity due to ARIs adversely affecting the achieving of MDG 4 of reducing the under 5 mortality . The higher utilization rates of Government in the state of Tamil Nadu can reflect on the public demand and faith in the government sector which is a positive determinant for that state. While the increasing awareness levels of ARI in both the new states is an encouraging factor the falling trends in the treatment seeking behavior in New Andhra Pradesh is an issue to be addressed. Similarly in the state of Telangana it is required that public faith in Government treatment facilities be raised as public demand is a determinant for providing quality health care services.

In the new state of Andhra Pradesh the districts Kurnool, Srikakulam, Vishakhapatnam, Guntur, Cuddaph and

Nellore are the priority districts for increasing the awareness among the mothers about the danger signs of ARI. In the new state of Telangana the districts Nizamabad, Adilabad and the state capital Hyderabad are the priority.

CONCLUSION

Early diagnosis and treatment is the corner stone for controlling Under-5 mortality attributable to ARI. While high index of suspicion is required among health care workers, knowledge regarding danger signs of ARI in general public, especially among mothers is of paramount importance. This is the basis for seeking early health care intervention by the mothers. The social determinants for increase in prevalence of ARI need to be explored and addressed. The increasing awareness levels of mothers regarding the danger signs of ARI in the two newly formed states is a positive sign. Kerala sets an example for the rest of the southern states by its higher awareness levels and higher treatment seeking behaviour following an episode of ARI. Tamil Nadu governance needs mention for its maintenance of faith and demand of the people over the government sector. The strength of Telangana in its lower prevalence of ARI needs to be explored. Andhra Pradesh state with almost all the indicators near the sub optimal levels can pose a risk of ARI unless explored and rectified. The need of strengthening immunization against Measles, Influenza, Pertussis, H. influenza, Pneumococcus and Chickenpox apart from control of Indoor air pollution can contribute to lowering mortality related to ARIs.

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