

## Optimizing Care-Seeking for Childhood Pneumonia: A Public Health Perspective

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Received: January 22, 2020; Initial review: March 09, 2020; Accepted: January 08, 2021.

**Objective:** This study examined the pattern of care-seeking behavior for childhood pneumonia and factors influencing it, in Madhya Pradesh (MP), Uttar Pradesh (UP) and Tamil Nadu (TN).

**Methods:** Using a mixed-methods design, consenting mothers of children less than 5 years with probable pneumonia participated in a household survey to assess their care-seeking behavior. A purposively selected sub-sample participated in semi-structured interviews (SSIs) to understand their perceptions on care sought, decision making abilities and cultural influences that governed these behaviors. Health care providers (HCPs) participated in SSIs and focus group discussions.

**Results:** A total of 2194 children were identified with probable pneumonia during the survey. 40 mothers and 41 HCPs participated in semi-structured interviews and focus group discussions. In MP, utilization of private allopathic care was high

at 74%, about 8% went to unqualified care providers. In UP, 71% went to unqualified care providers and 5% did not seek care at all. In TN, 75% went to private allopathic doctors, and utilization of government care was higher (19%) compared to MP and UP. Qualitative findings revealed that cultural beliefs coupled with poor decision making abilities, poor understanding of illness and inappropriate care-seeking practices resulted in delays in care seeking, particularly in MP and UP. Inadequacies in government health infrastructure also contributed to their poor utilization.

**Conclusion:** Promoting health literacy in communities and strengthening the reach of government health facilities will help in optimizing appropriate health care utilization for childhood pneumonia.

**Keywords:** Health literacy, Health service utilization, Respiratory tract infection.

Pneumonia contributes to about 15% of all deaths among children below 5 years of age in India and thus is a major public health problem for the country. Apart from enhancing health care infrastructure and personnel, research is also emerging regarding the care seeking behavior of families, which is a key towards formulating strategies for reducing pneumonia-related childhood morbidity and mortality [1,2]. Faith in supernatural causes, poor understanding of the disease and use of home remedies have led to delays in care seeking by families in India. In addition, poor recognition of danger signs/symptoms of pneumonia and seeking care from unqualified rural medical practitioners, have been shown to cause undue delay in care seeking by families in India [3-5]. Considering the recommendations by WHO and UNICEF [6] about the need to enhance capacities of families to seek prompt care in order to reduce mortality and morbidity from pneumonia, a deeper understanding of the socio-cultural influences that govern these behaviors and issues related to availability, accessibility and affordability of health systems are needed.

Using the Andersen and Newman framework [7] for health service utilization we examined factors influencing care-seeking behavior for childhood pneumonia in the community towards gaining insights into optimizing healthcare utilization. The framework is based on three characteristics, namely predisposing factors, enabling factors and need factors. Predisposing factors refers to culture, decision making abilities and knowledge and attitudes of individuals towards the health system. Enabling factors refers to the logistics of obtaining care. Need factors include perceived need by families- how people understand their illness -and evaluated need by health care providers - judgment about people's health status and need for medical care.

### METHODS

This paper is part of a larger study [8] carried out in three districts in the states of Tamil Nadu (TN), Madhya Pradesh (MP) and Uttar Pradesh (UP) from 2016-2017. While UP and MP were chosen because of high infant mortality rate (IMR), TN served as a comparator on account of its lower IMR. The selection of districts was made following consultations with

the state health authorities and after reviewing the prevailing IMR in these districts. Probable pneumonia was defined as the presence of fast breathing with or without chest indrawing, stridor/grunt in a child <5 years of age occurring over the preceding three months [9], with the mother serving as the respondent. Considering 'not sought care' in about 30% of population [4], taking a 5% absolute margin of error and a design effect of 2, a sample size of 740 children <5 years, per state (250 per district), with probable pneumonia was obtained. From the list of health sub-centers (HSCs) in a district, 30 per district were selected using population proportionate to size method. The list of eligible children in each HSC was obtained from the field health worker and a household survey was undertaken until the desired sample size of 8 children with probable pneumonia per HSC was achieved.

Mothers consenting for participations were administered a structured questionnaire to assess their care-seeking behavior. A sub-sample of these mothers was purposively selected to participate in semi-structured interviews to understand the cultural and familial influences that governed their care-seeking behaviors. We also conducted semi-structured interviews (SSIs) and focus group discussions (FGDs) with healthcare providers (HCPs), such as doctors from the private and public sector, community health workers (CHWs) and wherever possible with untrained care providers (UCPs). State and district level governmental permissions and ethics approval were obtained by each of the respective site investigators.

**Statistical analysis:** Statistical analyses of the quantitative data was done using SPSS software version 16.0 (SPSS Inc). Data on type and time of seeking care was recorded as frequencies and percentages. All qualitative data were audio recorded, transcribed verbatim into (Hindi for MP and UP, and Tamil for TN), translated into English and entered into NVIVO, a qualitative analysis software. A framework analytical approach [10] was applied which began with gaining familiarity with the data through repeated readings of the transcripts. Following a careful review of the data, themes were identified, quotes were sorted and placed under

appropriate thematic categories and final interpretations were made.

## RESULTS

Out of a total of 13,544 households, we identified 729, 752 and 713 children with symptoms of probable pneumonia from the states of MP, UP and TN, respectively. Forty mothers across the three states participated in the SSIs (12 from MP; 11 from UP and 17 from TN). Mothers, aged 20 to 35 years, included 10 non-literate women (4 from MP and 6 from UP). While majority were housewives, 7 were engaged in farming or casual labor (4-MP, 2-UP, 1-TN). Forty one HCPs from the three states participated, including 25 doctors from the government and 10 from the private sector. Six UCPs participated, none of whom were from TN. Thirteen FGDs were conducted with CHWs across the three states (MP-3; UP-5; TN-5).

**Health service utilization:** In MP, utilization of private allopathic care was highest at 74% with 12% seeking care from government health facilities (**Table I**). In UP, majority (71%) went to UCPs' with only 5% not seeking care for their child. Mothers in TN predominantly sought care from private allopathic doctors (75%). Utilization of government care was higher compared to the other two states at 19.6, but no mother reported going to a UCP. Data by district is presented in **Web Table I**. More than half the sample of mothers from each state (59%-MP, 70%-UP, 80%-TN) sought care for their child within 24 hours of symptom presentation (**Table II**). As compared to UP where 70% went to UCPs, in MP and TN, private allopathic care was the preferred choice (75% and 74%, respectively). Going to government health facilities was highest in TN at 18.9%. Data by districts is presented in **Web Table II**.

**Factors influencing health service utilization:** Cultural practices, either personal, or due to familial pressure, in TN, included exposing the child to incense fumes (*Sambrani*), feeding a concoction made from *Tulsi* (Basil), application of *Karpuravalli Thaillam* (oil extracted from a medicinal herb), seeking the blessings of priests and tying a sacred thread around the babies wrist or waist. However, these mothers

**Table I Care-Seeking for Childhood Pneumonia in Three States in India, 2016-2017**

State (no. with probable pneumonia)	Type of healthcare sought			No care sought
	Allopathic care		n=119	
	Government, n=282	Private, n=1203		
Madhya Pradesh (729) <sup>a</sup>	89 (12.2)	541 (74.2)	57 (7.8)	42 (5.8)
Uttar Pradesh (752) <sup>b</sup>	53 (7)	127 (6.9)	533 (70.9)	39 (5.2)
Tamil Nadu (713) <sup>c</sup>	140 (9.6)	535 (75.0)	0	38 (5.3)

Data provided as no. (%). Numbers in each district: <sup>a</sup>Bhopal-247, Panna-237, Satna-245; <sup>b</sup>Kanpur Nagar-254, -Shravasti-267, Faizabad-231; <sup>c</sup>Erode-149, Tirunelveli-314, Krishnagiri-250. UCP-Unqualified care provider.

**Table II Health Service Utilization: Sought Care Within 24 hours in Three States in India, 2016-2017**

State (no. with probable pneumonia)	Taken to health facility within 24h, n=1551	Allopathic care UCP, n=495		
		Government, n=199	Private, n=915	
Madhya Pradesh, (n=729)	428 (58.7)	57 (13.3)	357 (83.4)	10 (2.3)
Uttar Pradesh, (n=752)	530 (70.5)	30 (5.7)	99 (18.7)	395 (74.5)
Tamil Nadu, (n=713)	593 (83.2)	112 (18.9)	459 (77.4)	-

Data provided as no. (%). Row totals do not match as data was missing for 4, 6 and 22 children in MP, UP and TN, respectively. UCP - Unqualified care provider.

simultaneously sought care from qualified allopathic doctors. Beliefs in cultural and traditional practices were more prevalent in MP and UP, with mothers resorting to home remedies like use of mustard oil, *Ajwain* (carom seeds), *hing* (Asfoetida), *haldi* (Turmeric), for treating cough or cold. Oil massages using mustard oil and *barasingha* (a piece of deer horn that is finely ground) were believed to be effective in treatment of chest in-drawing *Jhaad phoonk* (a type of exorcism) was seen to protect the baby against the evil eye. These were usually the first steps taken by mothers when their child fell ill. If this failed, care was sought from a care provider.

**Decision making:** Mothers in TN reported having higher autonomy and decision-making capacity. They had the support of their in-laws and elders in the family who encouraged them to seek appropriate care for their child and would even accompany them to the hospital if required. Instances of joint decision making with the husband were also reported. On the other hand, decisions regarding care seeking in MP and UP were mostly made by family elders or husbands, with mothers usually acquiescing to such decisions. In nuclear families decisions were either made jointly by husband and wife or else only by the husband.

**Enabling factors:** The health system infrastructure in TN, both government and private allopathic sector, is well developed and fairly equitably distributed across the districts (**Web Table III**). Added to this, the presence of private care facilities provides rural folk with an alternative choice. In contrast, the numbers of primary health centers (PHCs) and community health centers (CHCs) in MP and UP are distinctly inadequate for their large populations. Besides Bhopal in MP and Faizabad in UP, the number of government hospitals are exceedingly low in these states. Private allopathic healthcare facilities are also few. The presence of UCPs was ubiquitous in these districts, although we do not have any reliable data on their numbers.

Our qualitative interviews with mothers revealed that in TN, both government and private care facilities were equally accessible. Preferences for private care were clearly evident with families switching between doctors depending on how well the child responded to treatment. Doctors in the private

sector were believed to be more effective, easily accessible and available till late in the evenings. They also administered injections, believed to bring about rapid cures. Further, doctors and paramedical staff in government hospitals were perceived as unfriendly providing unsatisfactory answers to queries unlike in the private sector. Despite this preference for doctors in the private sector, several mothers gave positive feedback regarding care provided in government hospitals. They described it as being affordable, accessible, of good quality and comparable to that of private facilities. Others spoke of the CHWs who made home visits and provided advice regarding the health of their child. Use of government health facilities for seeking care for children was more evident in TN as compared to the states of MP and UP.

In MP and UP, need for travelling long distances to access care in government health services, coupled with unavailability of doctors in these facilities, acted as major deterrents to care seeking. Connectivity was particularly poor in Shravasti (UP). Seeking care from the *jhola chaap* (UCP) was common in UP as compared to MP, where they were easily accessible, were cheaper than private doctors, made home visits and usually dispensed allopathic medicines. In MP, preferences for seeking care from private care providers dominated as mothers considered the money well-spent. However, we were unable to ascertain if these private care providers were qualified or unqualified. The belief that government facilities were lacking in cleanliness and competent doctors, involved long waiting time and had inadequate supply of drugs, added to the general negative opinion. Mothers in UP said that even the 24-hour government facilities did not have doctors, thereby defeating the purpose for which they were set up.

**Perceived need:** Regarding the 'need factor', we found that in TN mothers were unfamiliar with the term pneumonia and unaware of its cause or presenting symptoms. Although symptoms of fever, cough and cold were well understood, mothers rarely reported seeing cases of pneumonia. Only those who had sought care for treatment of pneumonia for their child or whose child had died following pneumonia had better awareness about the condition. In MP and UP, some mothers were reasonably aware of pneumonia and described

a range of symptoms. Others spoke of the importance of vaccination and cleanliness as protection against pneumonia, indicating satisfactory awareness about the disease. If the child's cold and cough was perceived to be very heavy, it was referred to as 'double pneumonia'. Some, while unfamiliar with the term, were nevertheless aware of symptoms like chest indrawing and appreciated the need to seek care for its treatment. Others subscribed to the traditional belief that children were at risk for contracting pneumonia if they had "*cold in their bodies*" as compared to "*heat*". Difficulties in recognizing severity of illness were also expressed.

*Evaluated need:* In TN, the HCPs stated that though awareness about pneumonia was poor in the community, the ability to recognize symptoms of respiratory distress in the child was adequate, which influenced timely and appropriate care seeking. They believed that there was not much delay in care seeking among families and as a back-up, families kept paracetamol syrup and nasal drops at home for use in case of such symptoms occurring. Doctors in the government sector appreciated the sustained health literacy efforts provided by CHWs during antenatal visits. They also credited government run school health programs for increasing health literacy among mothers. Although there was a trend of preferring private over government facilities, especially during an emergency for reasons of faster accessibility, for regular care, families would go to government facilities. According to the CHWs, negative beliefs about the poor quality of health care and long waiting time in the government hospitals influenced many to seek care from the private sector, even at great financial cost. Seeking care for their child from UCPs however, was not reported. In MP, care providers in the government sector, felt that awareness about pneumonia in the community was good perhaps due to its high prevalence. They felt that it was rare for families not to seek care however, the type of care sought was not always appropriate and often delayed due to use of home remedies and magico-religious practices. The CHWs said that many poor families chose to seek care from UCPs who were easily accessible, dispensed allopathic medicines and gave injections. Physicians, both public and private, agreed that there was a preference for private over government care because of the distances involved in accessing these facilities and because doctors in government hospitals were not always available. They also said that decision making concerning care-seeking for children remained with the elders of the household or with the woman's husband. The HCPs in UP felt that, awareness about pneumonia was poor and, care was sought only when symptoms became serious. Resorting to home remedies was usually the first step. The CHWs said that the easy availability of UCPs combined with the faith people had in them influenced people's preferences

for them. They also spoke of people's preferences for private care as against government care as it was believed to be better and more prompt. In addition, women's dependence on their husbands or elder members in their household to make decisions on care-seeking contributed to delays in care-seeking.

## DISCUSSION

Three key findings emerge from our study. Firstly, cultural beliefs, color attitudes and practices, which coupled with poor understanding of illness and their appropriate treatment seem to delay care seeking. Secondly, women, particularly in MP and UP have poor decision making capabilities contributing to delays in appropriate care seeking. Thirdly, inadequacies in the number and infrastructure of primary health-care facilities have created a negative impression regarding their effectiveness and quality in MP and UP resulting in their poor utilization. Although government health infrastructure and its utilization are better in TN, the preferred choice of care was still the private care provider.

Cultural beliefs regarding use of home remedies for child care in India are deeply venerated, have been practiced for generations and play an important role in the lives of most Indian families. Earlier studies [2,3,11], too have described their use in the management of symptoms of pneumonia. In our study this was evident in the states of MP and UP where home remedies and magico-religious practices were often the first and only steps adopted by mothers towards management of symptoms of probable pneumonia. In TN, resorting to home remedies was much less and usually done alongside of allopathic care. Early care-seeking practices in TN can be explained by better awareness promoted by effective educational messages provided by the government health facilities specifically the CHWs. Other studies [12] too have demonstrated the role of the lady health worker in bringing about better health literacy among mothers regarding newborn care. Adedokun, et al. [13] reported that increased exposure to mass media resulted in greater utilization of health care services. In addition to highlighting the value of seeking care within 24 hrs of symptom presentation, health messages need to be simple, easy to remember and must be constantly reiterated to ensure their better retention.

The findings from our study that mothers from MP and UP had little to no role in decision-making concerning care-seeking for their child has been corroborated by other studies [14,15]. A study from Nigeria [16] described two scenarios leading to negative consequences: when fathers had no role in child rearing mothers did not have support for their decision making and when mothers were restricted in movements and social interactions they did not seek timely and appropriate care. In contrast, mothers from TN, in our

### WHAT THIS STUDY ADDS?

- Strengthening government health infrastructure and its reach, improving health literacy targeting communities, families and mothers will optimize health care utilization.

study, had more autonomy in decision-making regarding child care and were better informed due to the information provided by the CHWs and other health personnel resulting in timely and appropriate allopathic care for their children. Health care from UCPs was not sought and home remedies if used, were always alongside allopathic care. These findings underscore the value of women's empowerment in the context of child care.

The presence of a good network of well equipped, functioning, and well-connected health care facilities in the government sector in TN has significantly contributed to their better utilization as well as towards a more positive attitude towards them unlike what was observed in MP and UP. Chandwani and Pandor [17] highlighted the lack of accountability among HCPs, and poor credibility of the public health facilities as reasons contributing to their poor utilization. Further, respondents from MP and UP had to contend with poor road connectivity to access government health facilities and frequently with non-availability of doctors and medicines which served as major deterrents to their use. The under-utilization of public sector health-services as observed in MP and UP, is well acknowledged in resource poor countries [18,19]. The private health sector on the other hand, has shown remarkable growth and utilization, attributable to its easy access, availability of adequate health personnel and medicines [20]. Given the high cost of care that the poor are forced to bear, a coordinated effort to strengthen government health systems in terms of both availability and accessibility of manpower and appropriate treatment will greatly improve health care utilization in this sector.

In terms of limitation, our study could perhaps have benefited from interviews with family members, who play a critical role in decision-making for seeking care

To conclude, government health facilities in UP and MP are under-utilized, a feature that could be addressed if infrastructure is strengthened and facilities made more accessible. With UCPs proliferating in these states, these would be critical steps to attract appropriate care seeking. Secondly, promoting health literacy using simple easy to follow messages among families including mothers will be another important strategy considering the key role family members play in decision making. These could help optimize care seeking for childhood pneumonia.

**Acknowledgements:** Dr Rema Devi for her valuable comments on the paper. Dr BR Desikachari for the continued advice and

support he provided throughout the study. Dr Manoj Kumar Das, Director Projects, The INCLEN Trust International, New Delhi for his technical inputs provided during the conduct of the study. We thank the Directorates of Public Health in the states of Madhya Pradesh, Uttar Pradesh and Tamil Nadu for enabling the conduct of the study in the selected government health facilities.

*Note:* Additional material related to this study is available with the online version at [www.indianpediatrics.net](http://www.indianpediatrics.net)

*Ethics approvals:* Institutional Human Ethics Committee, AIIMS, Bhopal; No. IHEC-LOP/2015/EF0022, dated September 21, 2015. King George's Medical University, KGMU; No. 7297/Ethics/R.Cell-15; dated September 19, 2015. Samarth Institutional Ethics Committee; No. IEC/003, dated April 18, 2015.

*Funding:* This work was supported by Bill and Melinda Gates Foundation through The INCLEN Trust International (Grant number: OPP1084307). The funding source had no contribution in study design, implementation, collection and interpretation of data and report writing. *Competing interests:* Non stated.

### REFERENCES

1. Geldsetzer P, Williams TC, Kirolos A, et al. The recognition of and care seeking behaviour for childhood illness in developing countries: a systematic review. *PLoS One*. 2014;9:e93427.
2. Minz A, Agarwal M, Singh JV, Singh VK. Care seeking for childhood pneumonia by rural and poor urban communities in Lucknow: A community-based cross-sectional study. *J Fam Med Prim Care*. 2017;6:211-7.
3. Aftab W, Shipton L, Rabbani F, et al. Exploring health care seeking knowledge, perceptions and practices for childhood diarrhea and pneumonia and their context in a rural Pakistani community. *BMC Health Serv Res*. 2018;27:18:44.
4. Mathew JL, Patwari AK, Gupta P, et al. Acute respiratory infection and pneumonia in India: A systematic review of literature for advocacy and action: UNICEF-PHFI series on newborn and child health, India. *Indian Pediatr*. 2011;48: 191-218.
5. Siswanto E, Bhuiyan SU, Chompikul J. Knowledge and perception of pneumonia Disease among mothers of children under five years attending Nakhon Pathom general hospital, Thailand [Internet]. 2007 Accessed August 24, 2018. Available from: <https://docplayer.net/81459193-Knowledge-and-perception-of-pneumonai-disease-among-mothers-of-children-under-five-years-attending-nakhon-pathom-general-hospital-thailand.html>
6. WHO | Global action plan for prevention and control of pneumonia [GAPP] [Internet]. WHO. 2013. Accessed August 31, 2018. Available from: [http://www.who.int/maternal\\_child\\_adolescent/documents/fch\\_cah\\_nch\\_09\\_04/en/](http://www.who.int/maternal_child_adolescent/documents/fch_cah_nch_09_04/en/)
7. Andersen R. Revisiting the behavioural model and access to medical care: Does it matter? *Hlth Soc Beh*. 1995;36:1-10.
8. Mohanraj R, Kumar S, Jayakumar S, et al. Where do mothers take their children for pneumonia care? Findings from three

- Indian states. PLoS One. 2019;14:e0214331.
9. Integrated management of neonatal and childhood illness [IMNCI] Modules 1 to 9. Ministry of Health & Family Welfare Government of India; 2009.
  10. Ritchie J, Lewis J. Qualitative research practice: a guide for social science students and researchers. Choice Rev Online [Internet]. 2003;41:41-1319-41-1319. Accessed August 30, 2018. Available from: <http://choicereviews.org/review/10.5860/CHOICE.41-1319>
  11. Ferdous F, Dil Farzana F, Ahmed S, et al. Mothers' perception and healthcare seeking behavior of pneumonia children in rural Bangladesh [Internet]. International Scholarly Research Notices. 2014. Accessed August 30, 2018. Available from: <https://www.hindawi.com/journals/isrn/2014/690315/>
  12. Bhutta ZA, Memon ZA, Soofi S, et al. Implementing community-based perinatal care: Results from a pilot study in rural Pakistan. Bull World Health Organ. 2008;86:452-9.
  13. Adedokun ST, Adekanmbi VT, Uthman OA, Lilford RJ. Contextual factors associated with health care service utilization for children with acute childhood illnesses in Nigeria. PLoS One. 2017;12:e0173578.
  14. Awasthi S, Nichter M, Verma T, et al. Revisiting community case management of childhood pneumonia: perceptions of caregivers and grass root health providers in Uttar Pradesh and Bihar, Northern India. PLoS One. 2015;10:e0123135.
  15. Abubakar, Amina, Baar, Anneloes Van, et al. Socio-cultural determinants of health-seeking behaviour on the Kenyan coast: A qualitative study [Internet]. Accessed on May 26, 2019. Available from: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0071998>
  16. Bedford KJA, Sharkey AB. Local barriers and solutions to improve care-seeking for childhood pneumonia, diarrhoea and malaria in Kenya, Nigeria and Niger: A qualitative study. PLoS One. 2014;9:e100038.
  17. Chandwani H, Pandor J. Healthcare-Seeking Behaviors of Mothers regarding their Children in a Tribal Community of Gujarat, India. Electron Physician. 2015;7:990-7.
  18. Shaikh BT, Hatcher J. Health seeking behaviour and health service utilization in Pakistan: challenging the policy makers. J Public Health Oxf Engl. 2005;27:49-54.
  19. Muro F, Meta J, Renju J, et al. "It is good to take her early to the doctor" - mothers' understanding of childhood pneumonia symptoms and health care seeking in Kilimanjaro region, Tanzania. BMC Int Health Hum Rights. 2017;17:27.
  20. Bhatia JC, Cleland J. Health-care seeking and expenditure by young Indian mothers in the public and private sectors. Health Policy Plan. 2001;16:55-61.

**Web Table I Health Service Utilization- Type of Care Sought by Districts in Three States in India, 2016-17.**

District	Cases of probable pneumonia	Allopathy		Unqualified care providers	Not sought care
		Government	Private		
Madhya Pradesh					
Bhopal	247	26 (10.5)	172 (69.6)	39 (15.8)	10 (4.0)
Panna	237	28 (11.8)	181 (76.4)	16 (6.8)	12 (5.1)
Satna	245	35 (14.3)	188 (76.7)	2 (0.8)	20 (8.2)
Uttar Pradesh					
Kanpur Nagar	254	19 (7.5)	69 (27.2)	160 (63.0)	6 (2.4)
Shrawasti	267	23 (8.6)	13 (4.9)	212 (79.4)	19 (7.1)
Faizabad	231	11 (4.8)	45 (19.5)	161 (69.7)	14 (6.1)
Tamil Nadu					
Erode	149	28 (18.8)	111 (74.5)	0	10 (6.7)
Tirunelveli	314	64 (20.4)	244 (77.7)	0	6 (1.9)
Krishnagiri	250	48 (19.2)	180 (72.0)	0	22 (8.8)

Values in no. (%).

**Web Table II Health Service Utilization- Sought Care Within 24 hours by Districts in Three States of India, 2016-17**

District/ State	Cases of probable pneumonia	Taken to health facility within 24 h	Allopathy		Unqualified care providers	Not sought care
			Government	Private		
Madhya Pradesh						
Bhopal	247	172 (69.6)	21 (12.2)	142 (82.6)	7 (4.1)	0
Panna	237	116 (48.9)	14 (12.1)	101 (87.1)	1 (0.9)	0
Satna	245	140 (57.1)	22 (15.7)	114 (81.4)	2 (1.4)	2 (1.4)
Uttar Pradesh						
Faizabad	231	175 (75.8)	7 (4.0)	36 (20.6)	128 (73.1)	4 (2.3)
Shravasti	267	169 (63.3)	14 (8.3)	7 (4.1)	148 [87.6]	0
Kanpur Nagar	254	186 (73.2)	9 (4.8)	56 (30.1)	119 [64.0]	2 (1.1)
Tamil Nadu						
Tirunelveli	314	262 (83.4)	55 (21.0)	205 (78.2)	0	2 (0.8)
Krishnagiri	250	234 (93.6)	46 (19.7)	168 (71.8)	0	20 (8.5)
Erode	149	97 (65.1)	11 (11.3)	86 (88.7)	0	0

Values in no. (%).

**Web Table III Health System Infrastructure in Study Districts in Three States of India, 2016-17**

<i>Districts</i>	<i>Population<sup>a</sup></i>	<i>PHC</i>	<i>CHC</i>	<i>Govt. hospitals</i>	<i>Private hospitals</i>
<i>Madhya Pradesh</i>					
Panna	1016520	14	6	1	13
Satna	2228935	44	8	11	22
Bhopal	2368145	9	3	41	100
<i>Uttar Pradesh</i>					
Faizabad	2470996	33	6	46	6
Kanpur Nagar	1794184	31	6	2	40
Shravasti	1117361	12	6	1	3
<i>Tamil Nadu</i>					
Krishnagiri	1879809	46	10	11	36
Tiruneveli	3322644	70	19	14	110
Erode	2251744	68	14	8	139

<sup>a</sup>as per Census of India, 2011. PHC: primary health center, CHC: community health center.



**Web Box I Selected Quotes from Focused Group Discussions of Mothers of Children With Pneumonia and Healthcare Providers***Predisposing Factors*

**Cultural beliefs** We don't follow any of the Siddha or Ayurvedic medicines. We take only what is given in the hospital. I don't believe in all that because I am scared that it might produce side effects or harmful effects. All those primitive methods are not followed nowadays. Everyone goes to the hospital for treatment... though we are uneducated, we know this (Krishnagiri –TN).

I gave oil massage for 8 days. In the village everybody said to get 'jhad phookh' done, the child would be cured. We went to 'maulna hakim'. he did 'jhad phookh' but the 'pasli chalna' (chest in-drawing) did not get better. Then we saw 'ki pasli bohat tez chal rahi hai' (fast breathing) and was not getting better so we took him to another doctor. (Shravasti-UP)

We believe exorcism helps...it helps in improving the health of the baby. We give dhuni to the baby where he is exposed to smoke from this burning wood. Recently when he fell sick, we took him to a healer who did jhaad phoonk where holy ash is blown over the baby. (Bhopal- MP)

*Decision-making*

They don't expect me to get permission from them. My husband has never accompanied me to the hospital. If my children fall sick, I take them.... They will scold me only if I fail to take the children to hospital. (Krishnagiri- TN).

My husband only takes all the decisions. Usually he [husband] decides about going to the doctor and I do not go against him or suggest otherwise because if something happens to the baby or she does not get relief then everyone will say you told this that's why she was not relieved (Faizabad- UP)

Mother in law takes decision regarding yasodha (child). Father in law is not there. If husband is available then he also takes. I also say my opinion (Satna- MP).

*Enabling factors*

If the baby doesn't recover then we take him to a private hospital. If we go to government hospital (GH) for treatment, baby is not recovering.... If we go for treatment of phlegm GH is good. But for fever, it is not good. Though we give medicine... they don't put injection. They give only tonic. No result in giving tonic. So we go to a private hospital (Erode-TN)

They take money in private but they do proper check-up. In government there is only one doctor or none. Keep standing in the queue such that the child gets serious. There should be good doctors and good medicines should be available. And if patients go then they should be properly heard and checked. (Satna- MP)

Here at the crossroads of our village there is a jholachaap, who else would be found here! This is close for us and where we have been benefited we will go there only (Shravasti-UP).

*Need factors*

Perceived need (community perspective):

If he has phlegm and runny nose, he will start to develop fever. At that time itself I will keep in mind that this should not escalate, I will be careful. My child also tends to become weak after the fever. So looking at all this I will take him to the government hospital immediately. (Tirenelveli-TN)

Usually when my child has cold, hot fomentation will be done, if not cured then a village doctor comes then we consult him. When he had panjar (chest in-drawing), I applied oil and did hot fomentation for 1-2 days. When it didn't get relieved then we took him to the doctor. Firstly we consulted here in the village to the 'jhola chhap doctor' (quack), and then took child to private doctor. (Shravasti-UP)

Whenever we feel something, we apply balm and give syrup which is kept at home so she gets better. If she doesn't get better with home remedy then we take her to the doctor. I don't go outside the house so how do I ask the ASHA or the ANM. I take her to the doctor only when it is serious. (Panna-MP)

Evaluated need (health care provider perspective):

Even when the baby has cold, they bring the baby. And when the baby is making Karrrrr sound. Even when there are no symptoms or signs also.... when they feel like there is some sound.... They bring the patient. (PHC MO, Krishnagiri-TN)

They do Jhaad phoonk, in the name of God. They do oil massage and keep them under the sun. R: They give home remedies like asafoetida, turmeric mixed in warm milk etc so that the child gets relief. R: Sometimes the child's condition deteriorates as they take the child to untrained doctors. First they worsen the condition and then they tell us that we have given many medicines but there is no relief. (FGD CHWs, Satna- MP)

When the child is unable to breathe, they come to us mostly in that condition. Yes they keep them at home only, they give the child oil massage at home, they go to the quacks and to magico-religious healers. If the fever is not high enough they don't consider it as fever.. (Private Doctor, Faizabad- UP)