

FACTORS INFLUENCING HEALTHCARE UTILIZATION AMONG CHILDREN WITH PNEUMONIA IN MUNTINLUPA CITY, THE PHILIPPINES

Soon Ae Kim¹, Maria Rosario Z Capeding² and Paul E Kilgore^{1,3}

¹Division of Translational Research, International Vaccine Institute, Seoul, Republic of Korea; ²Research Institute for Tropical Medicine, Muntinlupa City, Philippines; ³Department of Pharmacy Practice, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University, Detroit, USA

Abstract. We evaluated the factors influencing healthcare utilization among children aged <5 years with pneumonia symptoms in Muntinlupa City, the Philippines. We interviewed 1,330 caregivers from 190 households per district in seven districts from March to April, 2009 using a standardized questionnaire to obtain information about demographic characteristics, access to healthcare facilities, and potential barriers to healthcare utilization. The mean age of the children was 32 months; 54.7% were boys. Seventy-four point three percents ($n=972$) of caregivers stated when their child had pneumonia symptoms they brought them to a government health center, 14.1% ($n=184$) went to a private clinic, 8.0% ($n=104$) went to a hospital, 3% ($n=40$) were treated at home and 0.5% ($n=7$) received traditional medicine from a local healer. Caregivers required an average of 12 minutes to reach a healthcare facility. Reasons given by caregivers for their choice of healthcare facility were low cost (47.5%), availability and accessibility to transportation (29.6%) and perceived good quality of care (16.5%). In conclusion, nearly three quarters of caregivers interviewed brought their child with pneumonia symptoms to a government health center for treatment. Cost was the main factor influencing choice, followed by transportation availability and quality of care.

Keywords: healthcare utilization, pneumonia, surveillance, Phillipines

INTRODUCTION

Pneumonia is a major cause of childhood morbidity and mortality, particularly in developing countries (UNICEF/WHO, 2006). Many studies have been conducted using population-based or hospital-based

surveillance to estimate the disease burden of pneumonia (Bamba *et al*, 2006; Gupta *et al*, 2007; Chamany *et al*, 2008; Naheed *et al*, 2009; Kim *et al*, 2011; Andrade *et al*, 2012; Arguedas *et al*, 2012; Benavides *et al*, 2012; Capeding *et al*, 2013). However, globally there is substantial variability in access to hospital treatment of childhood respiratory diseases including pneumonia at national and regional levels and within the healthcare systems (Luque *et al*, 2008; Gombojav *et al*, 2009; Wang and Lin, 2009; Dongre *et al*, 2010;

Correspondence: Soon Ae Kim, International Vaccine Institute, SNU Research Park, Nakseongdae-Dong, Kwanak-Gu, Seoul, South Korea, 151-919.

Tel: +82 2 872 2801; Fax: +82 2 881 1164

E-mail: sakimhaji@gmail.com

Nonvignon *et al*, 2010). Some studies have found the choice of caregivers or parents of children with pneumonia to seek healthcare facilities depends on accessibility of diagnostic capacity, including radiographic facilities, maternal education level, maternal perceptions and attitudes about symptoms and severity, socioeconomic status, health-related cultural practices and availability of transportation (Tan *et al*, 2006; Kallander *et al*, 2008; Deshmukh *et al*, 2009; Gombojav *et al*, 2009; Jordan *et al*, 2009; Srivastava *et al*, 2009; Sakisaka *et al*, 2010).

We evaluated factors influencing choice of healthcare institution to bring their children with pneumonia symptoms in Muntinlupa City, the Philippines.

MATERIALS AND METHODS

Study area

This study was conducted at the Research Institute for Tropical Medicine (RITM) and a defined study area around the RITM. The RITM is a tertiary-care referral hospital in Muntinlupa City, one of the municipalities of Metro Manila, the Philippines (Fig 1). Muntinlupa City has nine districts, each with one or two government health centers, including an outpatient clinic. Eight government health centers in 7 districts (Alabang, Ayala, Bayanan, Cupang, Pobalcion, Putatan, Tunasan) of Muntinlupa City were included in the study. The study subjects consisted of children aged <5 years with

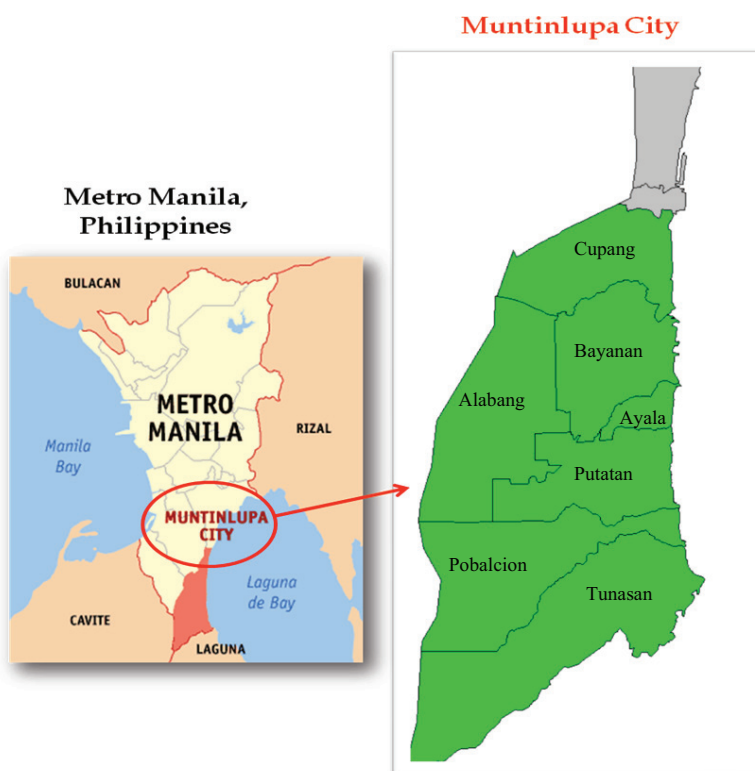


Fig 1—Study districts in Muntinlupa City, the Philippines.

pneumonia symptoms. This study was approved by the ethics committee of the Institutional Review Board at the RITM and the International Vaccine Institute.

Survey

A questionnaire was prepared in English, translated into Tagalog and reverse-translated into English to verify accuracy. The questionnaire was organized into 3 sections: general demographics about the household, parents or caregivers and children; healthcare utilization patterns for children with pneumonia symptoms; and information about medication use and vaccination against pneumococcal disease. Healthcare workers at the village level participated in interviews and data

collection. We conducted a pilot survey of a convenience sampling of 50 households among two districts in the study area and amended the questionnaire based on this survey.

One hundred ninety households from each district were chosen using clustered sampling. Written informed consent was obtained from each respondent prior to participation. The survey was conducted from March to April, 2009. Among households with more than one child aged <5 years, respondents were asked which child most recently suffered from fever and/or difficulty breathing.

Data analysis

Data were entered in duplicate by two different staff and consistency checks were performed. Descriptive statistical analysis was done using STATA® (version 9.0, Stata Corp, College Station, TX). Respondents were classified as mother, father, grandparent, relative or other. Household monthly income was stratified based on a median of 6,000 Philippine pesos (USD 150). Categorical comparisons were performed with a chi-square test or Fisher's exact test where appropriate. Significance was set at a $p < 0.05$.

RESULTS

General characteristics

We interviewed 1,330 respondents (190 from each of the 7 study districts). Respondents were mothers (82.5%; $n=1,097$), grandparents (9.2%; $n=122$), fathers (5.7%), relatives (2.3%) and others (0.4%) (Table 1). The mean age of the respondents was 33.0 years (± 9.3). The mean age of responding mothers was 30.7 years (± 6.5). Sixty-three percent had a primary school level education, 27.8% had a secondary school education and 10% had no

education. The average monthly income was 7,080 pesos (median, 6,000 pesos). Thirteen point five percent of responding fathers were unemployed and 78.5% of responding mothers were unemployed. Thirty-five point three percent of respondents were single mothers. There were an average of 1.4 bedrooms and 2.2 children per household; 68.2% of the households had one bedroom. The mean number of family members per household was 5.5 persons, which suggests easy spread of infectious pathogens in crowding conditions. Fifty-eight percent of households surveyed had at least one smoker in the family. The mean length of time living in Metro Manila was 16.4 years; however, 60% of respondents considered their hometown as different than Metro Manila.

Health care utilization

Ninety-eight point three percent of respondents ($n=1,308$) reported a child aged <5 years had suffered from pneumonia symptoms recently (Table 1). The mean age of those children was 32.6 (± 16.5) months. Fifty-five percent of children with pneumonia symptoms were males and 45.3% were females. Nine point three percent ($n=122$) of respondents reported a child with a history of respiratory disease; the most common diagnosis was asthma. The choices for a healthcare facility were a government health center (74.3%), a private clinic (14.1%), a hospital (8.0%), home care (3.1%) and a traditional healer (0.5%) (Table 2). The most important reasons for choosing a healthcare facility were low cost (47.5%), accessibility to transportation (29.6%), and perceived good quality of care (16.5%). Payment schemes of caring for the child were no charge at the government health center (67.7%), self-payment (26.3%), private insurance (2.1%)

Table 1
 Characteristics of study respondents.

Variables	Number (%)	Variables	Number (%)
Age of respondent (years)		Gender of child with pneumonia symptoms	
≤20	43 (3.2)	Male	715 (54.7)
21-30	595 (44.7)	Female	593 (45.3)
31-40	459 (34.5)	Age of child (month) with pneumonia symptoms	
41-50	140 (10.5)	28 days to <6 months	107 (8.2)
>50	93 (7.0)	6 months to <12 months	149 (11.4)
Respondent's relationship to child with pneumonia symptoms		12 months to <24 months	334 (25.6)
Mother	1,097 (82.5)	24 months to <36 months	281 (21.5)
Father	76 (5.7)	36 months to <60 months	434 (33.3)
Grandparent	122 (9.2)	Chronic health problem	
Relative	30 (2.3)	Yes	122 (9.3)
Other	5 (0.4)	No	1,186 (90.7)
Maternal education level		Healthcare facility sought for care of child with pneumonia symptoms	
No education	3 (0.2)	Hospital	104 (8.0)
Primary school	126 (9.5)	Private clinic	184 (14.1)
Secondary school	831 (62.5)	Government health center	972 (74.3)
Higher	370 (27.8)	Pharmacy	1 (0.1)
Household monthly income		Traditional healer	7 (0.5)
≤6,000 pesos	577 (43.4)	Home care	40 (3.1)
>6,000 pesos	753 (56.6)	Transportation	
Parental occupational status		Bus	5 (0.4)
Father		Jeepney	266 (21.0)
Employed	1,150 (86.5)	Pedicab	421 (33.3)
Unemployed	180 (13.5)	Taxi	4 (0.3)
Mother		Walking	517 (40.8)
Employed	286 (21.5)	Trolley	24 (1.9)
Unemployed	1,044 (78.5)	Other	29 (2.3)
Marital status		Reason for choosing health care facility	
Married	821 (61.7)	Good quality	216 (16.5)
Annulled	2 (0.2)	Convenient to get to	387 (29.6)
Separated	34 (2.6)	Low cost	621 (47.5)
Deceased	3 (0.2)	Other	84 (6.4)
Single	470 (35.3)	Payment scheme	
Home		Philippines health insurance	22 (1.7)
Metro Manila	541 (40.7)	Private insurance	27 (2.1)
Other town in Luzon	380 (28.6)	Self-pay	344 (26.3)
Visayas	296 (22.3)	Free government health center	885 (67.7)
Mindanao	113 (8.5)	Other	30 (2.3)

Table 2
Specific factors by type of healthcare facility.

	Governmental health center (N=972) n (%)	Other healthcare facility (N=358) n (%)	p-value
Maternal education level			NS
≤Primary school	697 (71.7)	260 (72.6)	
≥Secondary school	275 (28.3)	98 (27.4)	
Monthly income			0.018
≤6,000 pesos	439 (45.2)	138 (38.5)	
>6,000 pesos	533 (54.8)	220 (61.5)	
Age of respondent (years)			NS
≤20	33 (3.4)	10 (2.8)	
21-30	429 (44.1)	166 (46.4)	
31-40	333 (34.3)	126 (35.2)	
41-50	103 (10.6)	37 (10.3)	
>50	74 (7.6)	19 (5.3)	
Age of child (month) with pneumonia symptoms			NS
28 days to <6 months	79 (8.1)	28 (7.8)	
6 months to <12 months	116 (11.9)	33 (9.2)	
12 months to <24 months	246 (25.3)	88 (24.6)	
24 months to <36 months	208 (21.4)	73 (20.4)	
36 months to <60 months	320 (32.9)	114 (31.8)	

NS, not significant.

and Philippine health insurance (1.7%). Of the respondents surveyed, 3.8% had medical insurance.

The modes of transportation to healthcare facility were on foot (40.8%), pedicab (33.3%), jeepney (21.0%) and trolley (1.9%). The time to reach the healthcare facility was on average 12 minutes, regardless of the mode of transportation. Eight percent of respondents ($n=104$) took more than 30 minutes to reach a healthcare facility.

Since the majority of respondents attended a government health center, we grouped the types of facilities into either a government health center or other health care facilities and then evaluated differences between these two groups. Variables considered in comparing those

two types of health care facilities were maternal education level, monthly income, respondent's age group and child's age group (Table 2). Those with a lower family income were more likely to use a government health center ($p=0.018$).

Self-medication

Forty-three percent bought medications without a prescription for self treatment; of these, 2.1% stated they always self treated their children with pneumonia symptoms (Table 3). The methods used when choosing a drug were: choosing a brand previously prescribed by a doctor (87%) and choosing a brand suggested by a pharmacist, by family or a friend (10%). Major reasons for self-medication were to save time (75%), and save money (25%). Sixty-two percent knew the name of the

Table 3
Treatment information and history of pneumococcal vaccination for children with pneumonia symptoms.

Variable	Number (%)
Treatment without prescription (N=1,313)	
Always	27 (2.1)
Frequently	47 (3.6)
Sometimes	246 (18.7)
Rarely	243 (18.5)
Never	750 (57.1)
Factor's influencing drug choice (N=563)	
Previous doctor's prescription	490 (87.0)
Pharmacist's advice	12 (2.1)
Family/friend's advice	44 (7.8)
Advertisement	16 (2.8)
Drug label (bottle/box)	1 (0.2)
Reason for purchasing at pharmacy (N=563)	
Save money	142 (25.2)
Save time	419 (74.4)
Impolite health center staff	1 (0.2)
Others	1 (0.2)
Antibiotics (N=1,311)	
Yes	827 (63.1)
No	484 (36.9)
Name of antibiotics (N=827)	
Amoxicillin or its derivatives	526 (39.5)
Trimethoprim-sulfamethoxazole	82 (6.2)
Cephalosporin	184 (13.8)
Others	35 (2.6)
Antibiotic dose (N=1,311)	
Know	731 (55.7)
Do not know	581 (44.3)
Aware of pneumococcal vaccine (N=1,330)	
Yes	91 (6.8)
No	1,239 (93.2)
Pneumococcal vaccination history (N=1,328)	
Yes	5 (0.4)
No	1,323 (99.6)

antibiotic used; of these, 44.3% did not know the dosage or duration of the medicine. Forty percent of respondents bought either amoxicillin or one of its derivatives for self treatment. Ninety-two percent had

no knowledge of vaccines against pneumococcal disease, though pneumococcal vaccine was only available on the private market (Table 3).

DISCUSSION

In the Philippines, there is limited information about healthcare-seeking behaviors among parents/guardians with children who have pneumonia symptoms (Nichter, 1994). Understanding factors influencing healthcare utilization can assist public health policy makers to develop programs to reduce health care inequity. Community based surveillance should understand local healthcare-seeking behavior for diseases of interest to estimate disease burden; for example, a community survey of healthcare utilization could estimate the accurate incidence of pneumonia (Chamany *et al*, 2008; Jordan *et al*, 2009). We found 74.3% of caregivers sought healthcare at a government health center because it was affordable and easily accessible. This could define barriers to healthcare facility access. A similar study in Ecuador showed lack of money for medicines (32%), transportation costs (21%) and restricted health center operating hours (14%) affected access to healthcare (Luque *et al*, 2008). In Uganda, children arrived at a hospital after a median of 7 days from the onset of symptoms because of financial constraints (Källander *et al*, 2008; Hildenwall *et al*, 2009). Other reasons for failure to seek healthcare include failure to recognize the severity of the child's condition, distance to the health care facility, accessibility to transportation, lost work and rural location of home (Zaman *et al*, 1997; Gombojav *et al*, 2009). Some studies have recommended guidelines for seeking healthcare in a timely manner, since childhood

pneumonia may progress rapidly and can be fatal (Deb, 1998; Irimu *et al*, 2008; Kraft *et al*, 2009; King *et al*, 2010). It is important to educate the population through media and other methods via public health programs (Solberg *et al*, 2000; Gözümler and Unsal, 2004).

Thirty-five percent of respondents in our survey were single mothers, which could lead to healthcare access inequity. Factors influencing healthcare inequity needs to be studied further in this population. Another factor is important when considering public health policy; 60% of respondents stated there was a smoker in their house. Smoking and exposure to secondhand smoke are risk factors for pneumonia (Suzuki *et al*, 2009; Ramesh Bhat *et al*, 2012; Barsam *et al*, 2013; Spangler *et al*, 2014). Public health authorities need to focus on reducing smoking to decrease exposure to secondhand smoke.

Self-medication with antibiotics can lead to increasing resistance to antibiotics and may also lead to improper use or over-dosage of medicines (McKee *et al*, 1999; Kristiansson *et al*, 2008). Forty-three percent of respondents purchased antibiotics without a doctor's prescription before seeking healthcare.

Our study had limitations. First, retrospective studies are prone to recall bias. To minimize this bias, a prospective study is necessary. Second, this study was conducted in an urban area and cannot be applied to other populations. Studies in suburban and rural areas need to be conducted to better understand the overall picture in the Philippines.

In conclusion, most respondents stated they could not afford to pay expenses at a private clinic or hospital in this study. The results of this study can be used to inform government policy makers

regarding public health: a) there is a need to expand healthcare services at government health centers as a key primary care service; b) there is a need for education programs about pneumonia for the public, including when to see a physician and the risks of self-medication.

ACKNOWLEDGEMENTS

We thank all the field workers who conducted the household surveys, the study coordinator, Hasia Virginia Ramiso, the study nurses (Beatriz Macamay Alabang, Jessamae Acebuche Ayala, Abegail Latorre Bayanan Main, Anthony Latorre Cupang, Anamae Obcena Poblacion, Rian Martin Putatan, Kristine Abalos Tunasan), the Barangay health workers (Digna Regala Alabang, Cely Bunyi Ayala, Amelita Marabut Bayanan Main, Rose Santos Cupang, Susie Violante Poblacion, Consorcia Firme Putatan, Evelyn Buyante Tunasan), the health center physicians (Dr Rowena Tan Alabang, Dr Ma Theresa Tuliao Ayala, Dr Leilani Munsayac Bayanan Main, Dr Neal Argana Cupang, Dr Lydia Uñalivia Poblacion, Dr Victoria Victorio Putatan, Dr Cleofe Arciaga Tunasan); our secretary (Cinderella Pantino) and driver (Hubert Zeta) may have limited applicability and advocacy division at the IVI for the manuscript review. The results of this study were presented at the 26th International Pediatric Association meeting, August 2-9, 2010, Johannesburg, South Africa.

This study was supported financially by the International Vaccine Institute from the governments of South Korea and Sweden and by Pfizer, Inc.

REFERENCES

- Andrade AL, Oliveira R, Vieira MA, *et al*. Population-based surveillance for invasive pneumococcal disease and pneumonia in

- infants and young children in Goiania, Brazil. *Vaccine* 2012; 30: 1901-9.
- Arguedas A, Abdelnour A, Soley C, *et al.* Prospective epidemiologic surveillance of invasive pneumococcal disease and pneumonia in children in San Jose, Costa Rica. *Vaccine* 2012; 30: 2342-8.
- Bamba M, Jozaki K, Sugaya N, *et al.* Prospective surveillance for atypical pathogens in children with community-acquired pneumonia in Japan. *J Infect Chemother* 2006; 12: 36-41.
- Barsam FJ, Borges GS, Severino AB, *et al.* Factors associated with community-acquired pneumonia in hospitalised children and adolescents aged 6 months to 13 years old. *Eur J Pediatr* 2013; 172: 493-9.
- Benavides JA, Ovalle OO, Salvador GR, *et al.* Population-based surveillance for invasive pneumococcal disease and pneumonia in infants and young children in Bogota, Colombia. *Vaccine* 2012; 30: 5886-92.
- Capeding MR, Santos J BL, Kilgore PE, *et al.* Prospective surveillance study of invasive pneumococcal disease among urban children in the Philippines. *Pediatr Infect Dis J* 2013; 32: e383-9.
- Chamany S, Burapat C, Wannachaiwong Y, *et al.* Assessing the sensitivity of surveillance for pneumonia in rural Thailand. *Southeast Asian J Trop Med Public Health* 2008; 39: 549-56.
- Deb SK. Acute respiratory disease survey in Tripura in case of children below five years of age. *J Indian Med Assoc* 1998; 96: 111-6.
- Deshmukh PR, Dongre AR, Sinha N, *et al.* Acute childhood morbidities in rural Wardha: some epidemiological correlates and health care seeking. *Indian J Med Sci* 2009; 63: 345-54.
- Dongre AR, Deshmukh PR, Garg BS. Health expenditure and care seeking on acute child morbidities in peri-urban Wardha: a prospective study. *Indian J Pediatr* 2010; 77: 503-7.
- Gombojav N, Manaseki-Holland S, Pollock J, *et al.* The effects of social variables on symptom recognition and medical care seeking behaviour for acute respiratory infections in infants in urban Mongolia. *Arch Dis Child* 2009; 94: 849-54.
- Gözüm S, Unsal A. Use of herbal therapies by older, community-dwelling women. *J Adv Nurs* 2004; 46: 171-8.
- Gupta N, Jain SK; Ratnesh, *et al.* An evaluation of diarrheal diseases and acute respiratory infections control programmes in a Delhi slum. *Indian J Pediatr* 2007; 74: 471-6.
- Gupta M, Kumar R, Deb AK, *et al.* Multi-center surveillance for pneumonia & meningitis among children (<2 yr) for Hib vaccine probe trial preparation in India. *Indian J Med Res* 2010; 131: 649-58.
- Hildenwall H, Nantanda R, Tumwine JK, *et al.* Care-seeking in the development of severe community acquired pneumonia in Ugandan children. *Ann Trop Paediatr* 2009; 29: 281-9.
- Irimu G, Nduati RW, Wafula E, *et al.* Community understanding of pneumonia in Kenya. *Afr Health Sci* 2008; 8: 103-7.
- Jordan HT, Prapasiri P, Areerat P, *et al.* A comparison of population-based pneumonia surveillance and health-seeking behavior in two provinces in rural Thailand. *Int J Infect Dis* 2009; 13: 355-61.
- Källander K, Hildenwall H, Waiswa P, *et al.* Delayed care seeking for fatal pneumonia in children aged under five years in Uganda: a case-series study. *Bull World Health Organ* 2008; 86: 332-8.
- Kim SA, Kilgore PE, Lee SY, *et al.* Trends in pneumonia and influenza-associated hospitalizations in South Korea, 2002-2005. *J Health Popul Nutr* 2011; 29: 574-82.
- King R, Mann V, Boone PD. Knowledge and reported practices of men and women on maternal and child health in rural Guinea Bissau: a cross sectional survey. *BMC Public Health* 2010; 8: 319.
- Kraft AD, Quimbo SA, Solon O, *et al.* The health and cost impact of care delay and the experimental impact of insurance on reduc-

- ing delays. *J Pediatr* 2009; 155: 281-5. e1.
- Kristiansson C, Reilly M, Gotuzzo E, *et al.* Antibiotic use and health-seeking behaviour in an underprivileged area of Peru. *Trop Med Int Health* 2008; 13: 434-41.
- Luque JS, Whiteford LM, Tobin GA. Maternal recognition and health care-seeking behavior for acute respiratory infection in children in a rural Ecuadorian county. *Matern Child Health J* 2008; 12: 287-97.
- McKee MD, Mills L, Mainous AG 3rd. Antibiotic use for the treatment of upper respiratory infections in a diverse community. *J Fam Pract* 1999; 48: 993-6.
- Naheed A, Saha SK, Breiman RF, *et al.* Multihospital surveillance of pneumonia burden among children aged <5 years hospitalized for pneumonia in Bangladesh. *Clin Infect Dis* 2009; 48 (suppl 2): S82-9.
- Nichter M. Acute respiratory illness: popular health culture and mother's knowledge in the Philippines. *Med Anthropol* 1994; 15: 353-75.
- Nonvignon J, Aikins MK, Chinbuah MA, *et al.* Treatment choices for fevers in children under-five years in a rural Ghanaian district. *Malar J* 2010; 28: 188.
- Ramesh Bhat Y, Manjunath N, Sanjay D, *et al.* Association of indoor air pollution with acute lower respiratory tract infections in children under 5 years of age. *Paediatr Int Child Health* 2012; 32: 132-5.
- Sakisaka K, Jimba M, Hanada K. Changing poor mothers' care-seeking behaviors in response to childhood illness: findings from a cross-sectional study in Granada, Nicaragua. *BMC Int Health Hum Rights* 2010; 10: 10.
- Solberg LI, Braun BL, Fowles JB, *et al.* Care-seeking behavior for upper respiratory infections. *J Fam Pract* 2000; 49: 915-20.
- Spangler J, Csákányi, Rogers T, Katona G. Parental ease in asking others not to smoke and respiratory symptoms and illness among children. *Int J Environ Res Public Health* 2014; 11: 1747-55.
- Srivastava NM, Awasthi S, Agarwal GG. Care-seeking behavior and out-of-pocket expenditure for sick newborns among urban poor in Lucknow, northern India: a prospective follow-up study. *BMC Health Serv Res* 2009; 9: 61.
- Suzuki M, Thiem VD, Yanai H, *et al.* Association of environmental tobacco smoking exposure with an increased risk of hospital admissions for pneumonia in children under 5 years of age in Vietnam. *Thorax* 2009; 64: 484-9.
- Tan YS, Hong CY, Chong PN, *et al.* Knowledge that upper respiratory tract infection resolves on its own is associated with more appropriate health-seeking behaviour and antibiotic cognition. *Singapore Med J* 2006; 47: 518-24.
- The United Nations Children's Fund (UNICEF)/World Health Organization (WHO). Pneumonia: the forgotten killer of children. New York: UNICEF/WHO, 2006.
- Wang MJ, Lin SP. Study on doctor shopping behavior: insight from patients with upper respiratory tract infection in Taiwan. *Health Policy* 2010; 94: 61-7.
- Zaman K, Zeitlyn S, Chakraborty J, de Francisco A, Yunus M. Acute lower respiratory infections in rural Bangladeshi children: patterns of treatment and identification of barriers. *Southeast Asian J Trop Med Public Health* 1997; 28: 99-106.