Views regarding use of complementary therapies for acute respiratory infections: systematic review of qualitative studies

# Abstract

## Background

Unnecessary antibiotic prescribing and use are most common for uncomplicated acute respiratory infections (ARIs). Some Complementary and Alternative Medicine (CAM) treatments have evidence of effectiveness for symptom relief and could be used instead of antibiotics.

## Aim

To understand views of the general public and health professionals regarding use of CAM for uncomplicated ARIs.

## Design and Setting

Systematic review and thematic synthesis of qualitative studies.

## Method

We systematically searched MEDLINE, EMBASE, AMED, COREHOM, CINAHL, Dissertation and theses global and Web of Science Core Collection. We included studies which reported qualitative data on the use of CAM for uncomplicated ARIs where participants were either patients or parents of patients, health professionals or the general public. Analysis followed thematic synthesis.

## Results

Twenty-two studies were included from four high-income and ten low-and-middle income countries; almost all focussed on non-White populations. Nineteen concerned parents’ treatment of ARIs in their children. In all settings, treatment decisions were influenced by beliefs about the illness (cause, severity), beliefs about treatments (efficacy, safety), availability of treatments and of trustworthy advice. Participants mostly thought CAM is an acceptable option for treatment of mild ARIs but felt that they need trustworthy advice on which treatments to use and when.

## Conclusion

Treatment decisions depend on beliefs about the illness and treatments, availability of treatments and advice. CAM treatments appear to be acceptable to people from many different settings as a possible alternative to antibiotics for mild ARIs. There is a need for reliable, evidence-based advice on which treatments to use.

[248 words]

## Keywords

Respiratory Tract Infections; Complementary and Alternative Medicine; antibiotics; Qualitative research; Systematic review; Treatment decisions

# How this fits in

Complementary therapies may be useful in relieving symptoms of ARIs and helping to avoid antibiotic use. However, little is known about the views of patients, carers, health professionals and the general public on the use of CAM for ARIs. This systematic review shows that many patients are open to this idea, depending on their beliefs about the illness, CAM, and the availability of treatments and reliable advice. However, there is a relative lack of evidence from some ethnic backgrounds, including White populations and high population middle income countries such as China.

# Background

Reducing the use of antibiotics is a pressing international priority, because high levels of use are associated with high levels of antimicrobial resistance (AMR), both at the population level and at the individual level (1-3). In the UK, 74% of antibiotics for human use are prescribed in primary care (4). Although prescription of antibiotics is declining slowly, there is still much room for progress, particularly in the management of Acute Respiratory Infections (ARIs) (5). For example over 70% of children with tonsillitis and otitis media are still being prescribed antibiotics, compared to a recommended level of under 20% (6), although antibiotics have small or negligible symptomatic benefits for uncomplicated ARIs (7-10).

Several strategies have been studied for reducing use of antibiotics, including use of delayed prescriptions (11), analgesics and antipyretics (12). Delayed prescribing is endorsed by the NICE guidelines (13) but has not achieved widespread uptake. Steam inhalation has not been shown to be helpful whilst ibuprofen had no significant benefit and may cause harms (12). Other potential symptomatic treatments in adults (the expectorant guaifenesin, mucolytics and antihistamine-decongestant combinations) have not been shown to have consistent benefit in a recently updated Cochrane systematic review (14).

There is a need for additional strategies to provide symptomatic relief and reduce unnecessary antibiotic use for ARIs. Observational studies show that practices and hospitals using complementary and alternative medicines (CAM) have much lower antibiotic prescription rates compared to conventional practices (15, 16). Some evidence suggests that several herbal remedies may be effective in the management of respiratory infections (17-19), so there is the potential to use these in order to improve symptoms and reduce use of antibiotics. However it is not clear whether this strategy would be acceptable to patients or mainstream health professionals, or could be used more widely.

Understanding how people perceive the use of CAM for ARIs is an important step before any change can be expected. The aim of this study is to understand the views of patients, health professionals and the general public about using CAM instead of antibiotics for ARIs, through a systematic review of qualitative studies. To date, we believe there has been no attempt to systematically review this qualitative literature. The specific review questions are as follows:

1. What do patients, health professionals and the public think about the use of CAM for the treatment of ARIs?

2. What are the barriers and facilitators to the use of CAM for reducing the over-use of antibiotics for ARIs?

# Methods

The protocol for this review has been published on the PROSPERO database (reference CRD42017073745, available at: <http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017073745>

## Inclusion criteria

We sought studies which used qualitative methods of data collection, described qualitative analysis and presented qualitative data, either as stand-alone studies or as distinct parts of mixed-methods studies. We included studies reporting qualitative data on the use of CAM for ARIs, in which participants were either patients or the parents / caregivers of patients, health professionals or the general public. Search terms for ARIs included MeSH terms for cough, bronchitis, common cold, influenza, laryngitis, pharyngitis, pleurisy, rhinitis, sinusitis, supraglottitis, tracheitis and otitis media. Search terms for CAM included MeSH terms for complementary, alternative, traditional, herbal, Chinese and Ayurvedic medicine, naturopathy, homeopathy, aromatherapy, medicinal plants and phytotherapy (Supplementary Table 1). We excluded: studies on pneumonia and chronic respiratory tract infections; studies which did not describe qualitative methods or report qualitative findings; first person narratives and single case studies. There were no restrictions on language or year of publication.

## Search strategy

Six databases were searched: MEDLINE, EMBASE, Allied and Complementary Medicine Database (AMED), Dissertation and theses global, COREHOM, CINAHL and Web of Science Core Collection from inception to end of June 2019. A broad search strategy was developed (before conducting the search) using keywords for the electronic databases according to their specific subject headings or structure. For each database, search terms were adapted according to the search capabilities of that database. The full search strategy for Medline is given in Table S1. Reference lists of potentially relevant papers were reviewed to identify other potential papers not retrieved in the initial search. We also conducted forward citation searching using Google scholar. Lastly, known experts in the field and authors of included papers were contacted to identify any remaining studies, including any grey literature.

## Screening

The references underwent a two-stage process of screening using the inclusion and exclusion criteria. The titles and abstracts were each independently screened by at least two researchers (XYH, ED, NJ, SE, MW). The full text versions of studies were obtained if they appeared to be relevant or where it was unclear from the abstract whether they met the inclusion criteria. Full text versions were screened independently by at least two researchers (XYH, ED, NJ, MW). Disagreements were resolved via discussion, or by consulting a third reviewer.

## Quality appraisal

Two researchers independently assessed quality of the papers meeting the inclusion criteria using the Critical Appraisal Skills Programme (CASP) quality assessment tool for qualitative studies (20). Quality criteria were used to inform interpretation and confidence in findings rather than to exclude papers, in recognition that sometimes not all criteria are reported in published papers due to restrictions on word count.

## Analysis

Two researchers read and re-read studies to familiarise ourselves with the results and the original authors’ interpretations of their data. By searching the results and discussion sections of the first ten papers, we identified key descriptive themes inductively, regarding barriers and facilitators to the use of CAM and antibiotics for the treatment of ARIs. The texts of included papers were exported into NVivo, (QSR International Pty Ltd. Version 12, 2018) to facilitate coding and analysis. Texts from subsequent studies were coded into pre-existing themes, and new themes were created when deemed necessary. Descriptive themes were then developed into secondary “analytical themes” in discussion with the research team, aiming to go beyond the conclusions of the initial studies (21). These were organised into an over-arching model to explain patients’ decisions on which treatments to use, in particular whether to use antibiotics or alternative treatments for ARIs. The model was modified after discussion with the whole research team until a consensus was reached.

# Results

## Quantity and quality of included studies

Our search retrieved 1270 results (Figure 1). After screening for eligibility, 22 papers were included in the synthesis. Study characteristics are summarised in Table 1. Four were in Europe, four in America, seven in Africa, six in Asia and one in Australia. All three studies from the UK (22-24) and all three from the USA (25-27) included a majority of respondents from ethnic minorities. There were only two studies from low-income countries (Ethiopia (28), Uganda (29)) and the others were from middle income countries in Africa and South-East Asia. Almost all of the studies focussed on treatment-seeking by parents for their children’s illnesses; for many of these, the main aim was to understand why parents do not use antibiotics or seek care when their child has a potentially serious respiratory infection. There were only three papers which included use of CAM for ARIs in adults. One focussed on an Asian community in Glasgow (22), another studied the experiences of patients in Germany who had recently used herbal medicine (30) and the third asked primary care practitioners in India about their management of influenza-like illness (31). Twelve studies included health professionals, but none specifically asked patients or practitioners about their views on CAM as a possible intervention to reduce overuse of antibiotics for coughs, sore throats, ear infections, or other ARIs. However, in exploring the role of CAM in the management of ARIs, several papers contrasted participants’ accounts of CAM with their accounts of antibiotics. Over half of the papers were published before 2000.

INSERT TABLE 1 HERE

The detailed quality assessment of the included studies is reported in Supplementary Table 2. All studies clearly stated their aims, appropriately chose a qualitative design, and reported their findings clearly. The biggest gaps were in rigorous reporting of data analysis, and in including consideration of the relationship between the researcher and participants. Most of the older studies did not report ethical approval (but this was not a requirement at the time).

INSERT FIGURE 1 HERE

## Data synthesis and development of model

Many descriptive themes were identified regarding factors which encourage or discourage use of CAM for acute respiratory infections (Tables 2 and 3). These themes mostly mirror each other: the factors which encourage use of antibiotics discourage use of CAM, and vice-versa. Therefore it is possible to organise the themes into four higher order themes: beliefs about the illness, beliefs about the treatments, availability of treatments, and trusted advice.

INSERT TABLES 2 AND 3 HERE

## Over-arching explanatory model

The model in Figure 2 explains the decision-making process regarding which treatment to use for an ARI. The model has been derived mainly from studies of parents making treatment decisions about their children, but also seems to fit the data available for adult patients and health professionals and appears consistent across all the varied settings of the primary studies included in this study. Different people making a treatment decision in different settings may have very different beliefs about the illness and possible treatments, and the availability of treatments and reliable advice also varies, explaining why very different conclusions may be reached for a similar illness.

### Treatment decisions are influenced by beliefs about the cause and severity of the illness

Many studies from settings ranging from the UK to Uganda, Nigeria, Bangladesh and the Philippines described a common belief that ARIs are caused by “cold” and therefore must be treated with “warm” remedies such as ginger (22), a methyl salicylate chest rub (32), or by consulting a traditional healer (33, 34). In Leeds (UK), families who had not consulted a doctor for their child recently, believed that their children's colds were caused by viruses and would get better by themselves (23). In contrast, health practitioners in India believed that the illness may be caused by bacteria, leading them to prescribe antibiotics (31). Parents reported a variety of beliefs about how to judge severity of illness, some more accurate than others, which were the main factor determining whether they sought care from a health facility. In the USA, high fever and green sputum were perceived to be signs of severity (25). In Nigeria, South Africa, Bangladesh and the Philippines, lack of improvement with traditional treatment, persistent cough and fast breathing were perceived to be signs of severity, and reasons for seeking formal health care (33-36).

### Treatment decisions are influenced by beliefs about the efficacy and safety of treatments

Some participants in the study carried out amongst the Asian population in Glasgow believed that fennel decoction is effective for respiratory infections (22) and many parents in the study carried out in London believed honey to be effective for coughs and colds (24). Interestingly, parents in Uganda did not even have a word for “antibiotics” and did not seem to distinguish between them and other modern medicines such as paracetamol (29). In contrast, some parents in the USA believed that antibiotics would cure ARIs more rapidly:

*“When kids are screaming and you’re getting fevers, I wouldn’t feel comfortable for my doctors to tell me, ‘Let it play its course.’ I think I’d flip.”* mother, USA (25).

Health professionals in India (31) and Australia (37) reported that they encounter patients who demand antibiotics, which in turn leads them to prescribe in order to satisfy them.

*“Sometimes they are quite demanding for antibiotics. Then probably you’ve got less threshold … cos you’ve got to make them happy… you try and explain to them the pros and cons of antibiotics, but in the end, you just have to please them…”* GP, Australia (37)

Several studies found that people spoke about CAM as “natural” and safe (22, 24), but a few uncovered concerns about its safety, mainly amongst health professionals but also amongst a few members of the public (22, 33). Health professionals in London said they were concerned that honey can cause botulism in infants, and also that they could not identify ingredients of traditional medicines, and that some may be adulterated and/or may cause adverse effects (24). Some participants expressed concern about the safety of traditional remedies: Asians living in Glasgow (UK) felt that although herbal medicines were safe, those with metal ingredients are not (22); some mothers in the Philippines felt that massage is not safe for young babies (33). Four studies reported concerns about side-effects of antibiotics, but only two studies in the US and in the Philippines (25, 33) found that some parents were aware of the potential for resistance, which discouraged their use. The study in the Philippines was the only one in which parents expressed views that antibiotics are dangerous if used too frequently or for too long (33).

### Availability of reliable advice

Several studies found that parents expressed uncertainty about the illness or which treatments to use, in which case they tried to seek advice from trusted sources. The most commonly mentioned were health professionals, family and friends. Only one study mentioned the internet (24) although described it as less trustworthy than other sources. Lack of reliable advice was one barrier to patients using CAM because they were often uncertain which remedy to use (22).

### **Availability, cost and convenience**

Research participants said that items available in the home at low cost (such as ginger, lemon and honey) were often much easier to use (24, 33, 36). In many settings, antibiotics were described as difficult to access: participants in low and middle income countries said this was mainly because of geographical distance to health facilities and medicines being out of stock (33, 34). In the Philippines, traditional healers were also seen as more approachable:

*“Treatment and advice offered by manghihilot are more affordable to poor families, and they are regarded as more approachable and more familiar with the everyday life of the community.”* researchers’ interpretation, Philippines(33)

In high-income countries, participants described health professionals’ increasing reluctance to prescribe antibiotics:

*“When they [their children] were younger, they’d [doctors] prescribe it anytime. They [children] would pull [at their ear], and there was a little bit, and (snaps fingers) we got antibiotics. Over the years it’s becoming a lot more difficult to have it prescribed. [Doctors] want to make sure it has strep or it’s an actual ear infection or it’s something that they’re going to treat.”* Parent, USA, quoted in (25)

Health professionals in Australia implied that it was sometimes easier for them to prescribe antibiotics than to explain to patients why they don’t need them:

*“Time constraints, you know, force GPs to dish them out.”* GP, Australia(37)

# Discussion

## Summary of main findings

In many settings, patients seem open to the idea of using CAM for the treatment of ARIs. However, the decision is based on the interaction of three main groups of factors: beliefs about the illness, beliefs about different treatments, and availability of these treatments. When people are uncertain about the illness or the treatment, they seek advice from a trusted source, which may include family, friends, health professionals or the internet. Most of the studies focussed on parents’ decisions about treatment of their children’s ARIs, and twelve also interviewed health professionals about their views. In spite of this, the themes were remarkably consistent across a wide range of settings and enabled us to develop an explanatory model (Figure 2), which we hypothesise is more widely generalisable. All the themes identified in the included studies fit into this model, which explains the decision-making process about which treatment to use for an ARI. We did not find many qualitative studies on the views of patients, health professionals and the public on the use of complementary therapies for treatment of ARIs. Notably, we found no studies in some countries consuming large quantities of antibiotics (China, Brazil, Russia). We found only three studies about adults and only five including White populations, who are often over-represented in other studies.

## Strengths and limitations

This review used a comprehensive search strategy and two authors independently screened all the titles and abstracts as well as the selected full texts, and the data was independently analysed by three researchers, before agreeing a common framework. The main limitation is that we did not search databases in the Chinese language or other non-European languages, which may have contained other useful studies. Another limitation of the underlying literature is that many of the studies were conducted before the year 2000, and only four of the papers reported research conducted since 2010 (25, 31, 37, 38). The situation today may be different from what was reported in the older papers. For example in South Africa, use of traditional medicine amongst TB patients greatly declined from 2003 to 2011 (39), while global use of antibiotics increased by 35% between 2000 and 2010, especially in Brazil, Russia, India, China and South Africa (40).

## Comparison with existing literature

Although our search focussed on the use of CAM for ARIs, many included studies also covered views on antibiotics. Most qualitative studies on decision-making for acute childhood infections focus on whether or not to prescribe or take antibiotics (41). Our review confirms findings from previous research that beliefs about the safety and efficacy of antibiotics motivate people to use them for treating ARIs (42). Our review also confirms the prediction of the Health Belief Model (43) that a behaviour will be determined by beliefs about the benefits and costs of a health action, as well as the perceived severity of the illness - this seems to apply equally to the decision whether to take complementary or conventional medicine. One qualitative study on parents’ decisions whether to consult for children’s ARIs in the UK highlighted similar findings to ours: the important factors were perceived threat to the child (severity of illness and susceptibility of the child), uncertainty about home management, and seeking information from a range of sources (44).

In line with other research showing that few parents believe antibiotic resistance is relevant to them (45, 46), only one of the studies identified that some parents were concerned about antibiotic resistance (25). Other studies have also found that health professionals are more likely to prescribe antibiotics when they do not have time to explain to patients why they don’t need them (47, 48).

## Implications for practice and research

Most studies found that patients commonly use herbal remedies for ARIs and are open to this as a management option, but several studies highlighted concerns about the lack of reliable advice on which complementary therapies to use. Although home remedies are often viewed as cheap and accessible self-care options (49), other CAM treatments may not be easily available and are often more expensive than a prescription for antibiotics. If CAM is to form part of a strategy to reduce over-use of antibiotics, reliable advice on which remedies to use, and how to obtain or prepare and use them, is needed both for patients and for health professionals.

While high-income countries are focussing on preventing the spread of antibiotic resistance, low income countries are still struggling to reduce deaths from pneumonia (50). In 2017, over 800 000 children died under the age of 5 years from acute lower respiratory infections (51). There has been more of a tendency to use herbal remedies because of the belief that ARIs are caused by cold, and that diet and herbal remedies can treat this (29, 32-35, 52), as well as the perception that herbal remedies are “natural”, safe, and easily available at low cost (33, 36, 38). Parents often do not have the knowledge to recognise signs of severe illness (29, 35, 50). Antibiotics have been more difficult and costly to access and are sometimes unavailable even in health facilities (33, 53). Recent efforts have attempted to overcome these problems, for example by training community health volunteers to detect and treat respiratory infections with antibiotics (34). However, there is a risk that people increase their use of antibiotics for every respiratory illness and stop using CAM treatments they may previously have used. This review suggests that treatment-seeking decisions could be improved by providing reliable advice to parents on how to judge the severity of their child’s illness, when it is fine to treat them at home, and when they need to seek treatment from a health facility. It also suggests that allopathic primary health care providers (including nurses and community volunteers) also need reliable advice on which herbal remedies to recommend for cases which do not require antibiotics.

Further research is clearly needed to test these hypotheses and ideas. We found no studies in some of the most populous middle-income countries with high antibiotic consumption (Brazil, Russia and China). There have been very few qualitative studies in the White populations of the UK, Europe, US, Australia or other high-income countries, whose attitude to CAM may differ from that of other ethnic groups (which were the major focus of most studies found for this review). There have been almost no studies of the treatment decisions made by adults for their own respiratory infections in any setting; they may use a different decision-making process for themselves than they do for their children.

Information from qualitative studies will help to inform the development of possible interventions which can then be tested for their impact on appropriate use of antibiotics and alternatives. The COM-B (Capability, Opportunity, Motivation) model of behaviour change (54) summarises the vast majority of behaviour change theories and is a very useful tool for planning and designing interventions. It categorises reasons for behaviours into capability, opportunity and motivation. Our proposed model maps on to the COM-B behaviour change wheel as shown in Table 4. This helps us to hypothesise which intervention(s) may be most effective at increasing appropriate use of treatments for ARIs, depending on the most important factors in different communities and countries. In most settings, the areas most amenable to intervention would be increasing psychological capability to use alternatives to antibiotics (improving understanding of antibiotic resistance), improving physical availability of alternatives, and providing reflective motivation through trusted advice on the most effective treatments. Some resources already exist and more are being developed to help parents judge the cause and severity of ARIs, particularly in children (55, 56); it would be important to evaluate their effectiveness. However there are few if any trusted sources of advice on safe and effective complementary therapies for the treatment of ARIs, either for patients or for health professionals. Such advice, based on sound evidence, should be integrated into other resources, and its impact on treatment-making decisions should be evaluated.

INSERT TABLE 4 HERE

# Conclusions

The studies included in this review led us to present a model to explain decisions taken by patients, and by parents about treatments for their children’s respiratory infections. The three main factors influencing the decision are beliefs about the illness (causes and severity), beliefs about treatments (safety and efficacy) and the availability of the treatments. Understanding the relative contributions of each of these factors in a particular setting would inform the design of customised interventions to improve the appropriate use of antibiotics. In many settings, complementary therapies may be an acceptable alternative, provided that reliable advice is available on which therapies to use.

# Ethical approval

Not applicable

# [Competing interests](http://bjgp.org/authors/bjgp-ethical-guidelines)

The authors have declared no competing interests.

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# Figure 1: PRISMA flowchart

**Screening**

**Identification**

Records after duplicates removed
(n = 1270)

Records excluded
(n =1176)

Records identified through database searching
(n =1693)

Titles and abstracts screened
(n =1270)

**Eligibility**

Full-text articles excluded, with reasons
(n =72)

* Lack of qualitative data on acute respiratory infections (58)
* Pneumonia (4)
* Chronic RTI (1)
* No CAM involvement (9)

Full-text articles assessed for eligibility
(n =94)

**Included**

Studies included in thematic synthesis
(n = 22)

Additional records identified through other sources
(n =274)

# Figure 2: Over-arching explanatory model

****

# Table 1: Characteristics of included studies

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Dates interviews were conducted** | **Country (location)** | **Source of recruitment** | **Sample size** | **Participant characteristics** | **Respiratory Tract Infection/ Symptoms (other infections)** | **Data collection (and analytical method where stated)** | **Aims** |
| **Bhopal (1986)**  | NS | UK (Glasgow) | One general practice in Glasgow in which >10% of patients were Asian. | 65 patients | 30 men and 35 women, all Asian, 59 of whom had been born outside the UK. Age range 19-70 years.  | Common cold/ cough/ fever/ earache | Individual interviews based on semi-structured questionnaire, open questions. | To examine the application of traditional health beliefs and remedies and relate this to the health care provided by the health services in Asian community in UK. |
| **Clarke (1989)** | 1987 | UK (inner-city Leeds) | 3 general practices  | 159 parents | Parents of children aged 2-11 years; white, Asian, and Afro-Carribean50% had seen a GP in the last 2 weeks, 50% had not seen a GP for at least 4 months | children’s respiratory and febrile illnesses | Individual interviews | To understand how parents from different ethnic groups manage their children’s respiratory and febrile illnesses |
| **Kumar et al. (2010)** | 2007-8 | UK (London Boroughs of Brent and Harrow) | Purposive recruitment of parents (with at least one child under 16) from: Ethnic minority support groups,cultural associations, refugee groups, baby clinics, mother andtoddler groups, baby massage classes, nurseries, schools,churches/temples, and parenting websites  | 92 parents (11 focus groups)30 primary health care professionals (GPs, health visitors, midwives and nurses) from a range of GP practices in locations with diverse ethnic and socio-demographic distributions | 67% mothers35% Asian, 35% White, 12% Black. 32% born in the UK | Upper respiratory tract symptoms, colds/ cough in children | 11 Focus groups with parents30 interviews with health professionals(framework approach) | To discusses parents’ and primary healthcare practitioners’ perceptions of the safety of honey for children. |
| **Joos et al (2012)** | 2008 | Germany (Heidelberg) | Newspaper advertisements and website,  | 18 patients | age > 18 yrs; used herbal medicine for upper respiratory tract infection in the previous three months | Upper respiratory tract infection | Individual interviews(qualitative content analysis) | To explore the perspectives and experiences of patients using herbal medicine (HM) in a primary care context, focussing on central patient attitudes and motives for using HM, the methods and needs for information and communication and the role of the costs in choices made. |
| **Biezen et al (2017)** | 2014 | Australia (metropolitan Melboure) | General practices | 30 primary care providers (PCPs) | 20 GPs, 5 pharmacists, 2 practice nurses (PNs), 3 maternal and child health nurses (MCHNs) | Respiratory tract infections in young children | Individual interviews(thematic analysis) | To explore the views, attitude and practices of PCPs such as GPs,PNs, MCHNs and pharmacists in the management of RTIs inyoung children. |
| **Finkelstein et al. (2014)** | 2011 | USA (Massachusetts) | Waiting rooms of 4 paediatric practices  | 31 Parents | 27 mothers and 4 fathers of children ≤ 6 years old, aged 20-43, from mixed ethnic groups (14 Black, 13 White, 2 Asian) and mixed levels of education  | Respiratory illness in children | Focus groups (content analysis; immersion/crystallization method) | To explore care seeking and use of home remedies for common infections, knowledge and attitudes regarding antibiotic use, and issues of trust in medical providers. |
| **Mikhail (1994)** | NS | USA (rural central California) | A community clinic  | 100 women | Of Hispanic origin; 81% born in Mexico; age 16-48; with at least one child aged <5 years | Children’s health problems – including cough | Individual semi-structured interviews | To identify and describe initial sources of advice and help for childhood illnesses, and practices for the management of these illnesses |
| **Yearwood (2007)** | NS | USA | A community centre and a nursing school | 7 women from community centre and 5 nursing students | Women of Caribbean origin (Jamaica, Haiti, St. Kitts, Trinidad, and Guyana)Mothers or caretakers of children aged 4 months – 16 years | Childhood illnesses including ARIs | Focus group discussions(qualitative content analysis) | To obtain fundamental data about the child health care decision making and practices of immigrant women from the English-speaking Caribbean region and to describe their experience with the U.S. health care system |
| **Martínez et al (1997)** | NS | Mexico | 6 rural communities | 6 health care assistants36 mothers | One health care assistant per community6 mothers per community, with children under 5, or with experience of managing ARIs in their children | ARIs in children | Individual interviews | To describe common practices for management of ARIs, terms used to describe ARIs, and symptoms and signs of ARIs recognised by mothers. |
| **Teixidor-Toneu et al (2017)** | 2015 | Morocco (city of Marrakech and 6 rural communes in the N’Fiss valley in the High Atlas mountains) | Random selection of mothers in villagesHealers identified by mothers and social networksRural health centresMarket places | 33 mothers27 healers / herbalists5 public health professionals | Rural: 33 mothers, 13 healers, 10 herbalists, 5 public health professionals Urban: 4 healers | Childhood illnesses (including tonsillitis, ear infections) | Individual interviews, direct observation of 12 healing sessions | To understand the selection of traditional medicinal plants used by folk healing specialists, popular explanatory models and care-seeking behaviour |
| **Muhe et al (1994)** | NS | Ethiopia (Butakira district) | Peasant Associations and Urban Dweller Associations | 15 mothers | 5 from a Christian peasants’ association, 5 from a Muslim peasants’ association, 5 from Butajira town. | ARI in children under 5 years of age | Individual interviews | To understand mothers' perceptions of illness andpractices in care of their children |
| **Oyejide & Oke (1995)**  | NS | Nigeria (4 local government areas: Akko in Bauchi Sate, Oyun in Kwara State, Calabar in Cross River State, Owo in Ondo State) | Residents approached by key informants in villages | 104 focus groups:52 groups of mothers, 30 groups of fathers, 22 groups of grandmothers | Caretakers of children under 5 years  | Childhood ARI, cough, Whooping cough, measles, pneumonia, throat infection and ear infection | Focus group discussions, informal unstructured interviews, participant observation | To collect information on socio-cultural and behavioural factors associated with transmission and management of ARI (perceived causes of infection and home remedies used for treatment), to plan a National Control Programme targeted at reducing ARI |
| **Iyun & Tomson (1996)** | 1990 | Nigeria (2 LGAs in Oyo state) | Households in 2 towns and two villages | 40 mothers of children under 5 (in-depth interviews)60 mothers of children under 5 (in 10 focus group discussions) | Age 25-29, 30% illiterate, mainly traders, Yoruba ethnicity.  | Childhood ARI, Cough, cold, catarrh. Fever  | In-depth interviews and focus groups  | To identify the treatment methods for ARI at the household level in order to understand the nature of the healing traditions adopted by rural communities in South-western Nigeria and to illustrate how modern medications often meet indigenous perspectives on causes of ARI and therefore affect health-seeking behaviour. |
| **Hildenwall et al (2008)** | NS | Uganda (Iganga / Mayuge Demographic Surveillance site) | Rural Health units and villages | 8 health workers8 traditional healers5 groups of mothers (number not specified) | 2 groups of younger mothers (age 15-25)3 groups of mothers aged >25 | Childhood fever, cough and difﬁcult/fast breathing | In-depth interviews with health workers and traditional healers.Focus group discussions with mothers(latent thematic content analysis) | To elucidate local illness concepts involving childhood fever, cough and difﬁcult/fast breathing and how these concepts inﬂuence management of children with potential pneumonia. |
| **Kauchali et al (2009)** | NS | South Africa (Hlabisa district, rural Kwazulu-Natal) | Communities selected mothers regarded as knowledgeable in childhoodillnesses because of their age and/or parity | 21 mothers  | Age 22–64 with a median parity of 3 (range: 2–8). Zulu. | ARI in children | In-depth interviews about videos of children with different degrees or respiratory illness (15 mothers) and focus group (6 mothers) | To identify ARI-related vocabulary and concepts ofmothers; to assess whether mothers recognize signs of respiratory distress, their interpretation of these signs, and whether they take appropriate action. |
| **Friend du Preez et al (2013)** | 2004 | South Africa (Johannesburg and Soweto) | “birth to 20” study cohort; paediatricdispensary queue at a public hospital | 5 caregivers (+5 focus groups – numbers not specified), 6 providers of traditional healthcare6 providers of Western health care | - black caregivers of children under 6 years- Providers of traditional healthcare- nurses and a pharmacist | Childhood illnesses (including cough) | In-depth interviews (17) and focus groups (5 – all with caregivers) | To understand family choices about treatment ofchildhood illness |
| **Chand & Bhattacharyya 1993** | 1989 | India (Marathwada region of Maharashtra) | 3 rural villages  | 79 mothers / grandmothers6 community health workers3 traditional birth attendants | Mothers or grandmothers of children under three years.  | Childhood ARIs | in-depth interviews, case histories, focus groups and observation | To understand the processes by which household members recognize and label respiratory illness and to understand how decisions for the treatment of ARI are made. |
| **Ahankari et al, 2017** | 2014 | India (Solapur, Maharashtra) | Urban Primary Care centres settings  | Primary care practitioners: 16 allopathic (mostly private, only 1 working in the public sector) and 4 complementary | 11 GPs, 3 paediatricians, 1 anaesthetist, 1 obstetrician, 3 Ayurvedic practitioners, 1 homeopath | Influenza-like illness (ILI) | Semi-structured interviews(thematic analysis) | To understand the role of clinical judgement, cognitive elements and socioculturalfactors influencing clinical reasoning in relation to influenza-like illness |
| **Kresno et al (1993)** | 1991 | Indonesia (Rural subdistrict of Gabuswetan, West Java) | Health centres; Cluster sampling of mothers in villages | 102 mothers of children under 519 health care providers6 traditional healers2 men from the community | Mothers from the area who had children under age 5 years;mothers seeking care for a child under 5 years of age who was currently sick with an ARI;both biomedically trained and traditional health care providers | Childhood ARIs | Structured and open-ended interviews | To provide information on local perceptions, terminology, home care, and health care-seeking behaviours that would inform the design of a prospective study of risk factors for severe morbidity and mortality from ARI  |
| **Simon et al. (1996)**  | 1993 | Philippines (Tagbilaran City, Bohol) | Paediatric outpatient clinic of the major government hospital  | 65 Mothers, 12 grandmothers45 healthcare providers  | Caretakers presenting with sick children (< 5 years) Mean 8 years of formal education | ARI, Cough in children | In-depth interview, case studies, review of hospital medical records and observations | To assess caretakers' actions when children are sick with cough, and to describe home management, health-seeking behaviour, and attitudes and practices with regard to the administration of pharmaceuticals. |
| **Stewart et al, 1994** | NS | Bangladesh (Matlab - rural area of Chandpur District) | Health Centre and homes | 20 mothers of children under 5 with pneumonia12 focus groups (number of participants not specified) | 10 mothers who had come to hospital after referral10 mothers who had stayed at home2 FGDs with each of the following groups: young mothers, older mothers, grandmothers, traditional birth attendants, traditional spiritual healers, and community health workers | Symptoms of pneumonia in a small child | Case history interviews and focus group discussions | To describe community perceptions of signs and symptoms of ARI, case management behaviour, and constraints to service utilization. |
| **Rashid et al.(2001)**  | 1998-1999 | Bangladesh (Rural areas within districts of Mymensingh, Bogra and Dinajpur) | Random selection | 63 rural mothers (individual interviews)51 mothers (focus groups)23 health volunteers5 BRAC ARI programme staff  | In focus groups, 31 mothers were aged 16-26 and 20 were aged 26-40.  | Pneumonia and ARI in children | In-depth interviews and focus groups | To explore mothers' knowledge of ARI and their home care practices and behaviour; to examine health volunteers' knowledge of ARI and to explore health volunteers' perceptions of the programme as well as of the rural communities they serve. |

Abbreviations:

NS = Not Stated

BRAC ARI Programme = Bangladesh Rural Advancement Committee Acute Respiratory Infections programme

# Table 2: Factors encouraging and discouraging use of antibiotics for ARIs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Higher Order Theme** | **Themes – favouring use of antibiotics** | **Example quotes** | **Themes - discouraging use of antibiotics** | **Example quotes** |
| Beliefs about the illness | Belief that the illness is severe | “*I come in knowing he has the bronchitis or the pneumonia, and they won’t want to do the x-ray or give him an antibiotic; they’ll just say “Keep giving the albuterol”. And, I’ll insist on getting the x-ray . . . and we get the pneumonia*.” Parent, USA (25) | Belief that the illness is mild | “*If the respiratory illness was perceived to be mild, i.e. when the child was thought to have been affected by cold, mothers resorted to home remedies and care from an indigenous healer (kabiraj)*.” Researchers, Bangladesh (34) |
| Belief that the illness is caused by “germs” | “*They examined the child and said that the lungs have phlegm and they gave me Amoxycillin because it can kill germs*.” Mother, The Philippines (33) | Belief that the illness had other causes, such as cold or supernatural causes | “*If her mucus is clear, the doctor isn’t going to think it’s a problem and if it’s not green, they shouldn’t be giving an antibiotic*.” Caribbean woman, USA (27)“*If, however, the infant was thought to be suffering from an `evil wind carrying disease', mothers were most likely to take their children to a kabiraj or a religious healer*.” Researchers, Bangladesh (34) |
| Beliefs about treatments | Belief that antibiotics are effective | “*It is this success with treatments or providers which may make caregivers more likely to use them again - because you ﬁnd that she was given like for instance amoxicillin*” – Nurse, South Africa (53) | Concerns about resistance | “*I personally have that fear, that if I’m ever giving my child antibiotics that he’s going to build up some kind of resistance to it, and when he really needs it, it’s not going to do anything for him*.” Parent, USA (25) |
| Experience of side-effects | “*I was prescribed so many antibiotics that I developed an allergic reaction to penicillin* [sic]. *Now, those agents are extremely harmful, actually, I am left with an infection of the intestines every time*.” Patient, Germany (30) |
| Desire to avoid antibiotics | “*Well to me it’s about the question antibiotics [sic] or no antibiotics. And that’s actually my motivation there to get around the antibiotics [...] well, since I have been taking that early on I have, if I remember correctly, not taken any more antiobiotics [sic]. And before, I did that on a regular basis*.” Patient, Germany (30) |
| Availability, cost and convenience | Availability of antibiotics | “*Most mothers were relieved to be able to get antibiotics quickly and cheaply from the volunteers*.” Researchers, Bangladesh (34) | Lack of availability | “*Those who went to a health center received free advice and could receive free medicines if available, but this was uncommon at the time of this study, and only two mothers who had presented to rural health centers had received antibiotic drugs (cotrimoxazole and amoxycillin). Due to a drastic reduction in the availability and irregular supplies of medicines, midwives increasingly advised caretakers to use herbal remedies*” Researchers, The Philippines (33) |
| Low cost of antibiotics | “*They [mothers] felt that the 5 taka (US$0.09) charged by BRAC workers was a small sum of money, and the payment system to be quite flexible*.” Researchers, Bangladesh (34) | High cost | “*antibiotics were seldom used for self-treatment because they were too expensive to buy*” Researchers, The Philippines (33) |
| High cost of reconsultation | “*They did give me one [antibiotic for otitis] here because I made it a point where if I have to come back, it’s another $20*.” Parent, USA (25) |
| Time pressures | *“Time constraints, you know, force GPs to dish them out.”* GP, Australia *(37)* |
| Trusted advice | Trusted advice / prescription  | “*Parents in earlier focus groups, like today, expressed trust in their clinicians to decide when antibiotics were needed*” Researchers, USA (25) | Mistrust of modern medicine and lack of advice | “*I have been reading a lot of articles lately that were critical towards the current practice in medicine [...] there’s such an overstated belief in progress. And if people resort to herbal medicine they say “We don’t even want modern medicine, we want the time-tested.*” Patient, Germany (30)“*I’ve noticed many doctors being very self- opinionated. They will say ‘I am prescribing this to you and you don’t have a say in it’. And when I inquire ‘But what kind of side eﬀects does this have, which alternatives are there?’. It’s like that [...] they don’t like that at all, to be questioned*.” Patient, Germany (30) |

# Table 3: Factors encouraging and discouraging use of complementary therapies for ARIs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Higher order theme** | **Themes – favouring use of CAM** | **Example quote** | **Themes - discouraging use of CAM** | **Example quote** |
| Beliefs about the illness | Belief that the illness is mild | “*for minor coughs and colds honey and lemon ease the cough*” Mother, UK (24) | Belief that the illness is severe | “*Drugs were considered expensive but necessary if the child's condition did not improve with herbal remedies*.” Researchers, The Philippines (33) |
| Belief that the illness is caused by cold | “*The folk etiology is that ARI is caused by exposure to cold and that therefore "warm' medications that will promote warming and soothing effects can be used to 'expel' the "cold" from the chest of the children and are the treatment of choice.”* Researchers, Nigeria (32) | *“Even one of the Ayurvedic practitioners prescribed antibiotics in more severely ill patients if symptoms failed to resolve.”*Researchers, India (31) |
| Beliefs about treatments | Belief that CAM can treat the cause of the illness | “*It was frequently argued that Asian medicines get to the root of the problem while Western medicines merely suppress symptoms*.” Researcher, UK (22)“*So you don’t just ﬁght an illness, but treat the* *whole person as such. I have studied the topic quite thoroughly*.” Patient, Germany (30) | Belief that CAM is ineffective | “*Asian remedies work too slowly; Asian remedies are inactive in the British climate; Asian remedies simply do not work*.” Researcher, UK (22) |
| Belief that CAM is safe and natural | “*they do say natural medicines are probably better for them*” (Asian mother, UK) (24)“*They don’t meddle around with your system quite like chemical drugs and knowledge about them has been around for a long time*” Patient, Germany (30)“*I think their eﬀects are gentler, that they are - that they don’t have as many side eﬀects, that you may get a longer-lasting eﬀect if you are taking them on a regular basis*.” Patient, Germany (30) | Concerns about safety of CAM | “*By far the most common concern in all practitioner groups was being unable to identify ingredients of TCA and potential intentional adulteration. Cited adverse effects included: liver dysfunction/failure from herbal medicine and vitamin A*..” Researchers, UK (24)“*I do know that [name of a herbal preparation]* *is highly problematic for pregnant women because there is some kind of active ingredient in there which is just problematic. I just think in this respect I would not think of this as any safer than the meds of conventional medicine*.” Patient, Germany (30) |
| Concern that CAM is illegal | “*Asian remedies may be against the law*” Researcher, UK (22) |
| Availability, cost and convenience | Availability of CAM | “*these remedies, particularly those which are culinary ingredients, are readily available in the home or local food stores*.” Researcher, UK (22) | Lack of availability | “*there is a lack of fresh ingredients to prepare effective remedies*” Researcher, UK (22) |
| Low cost of CAM | “*The reasons for using home remedies included the fact that they were much cheaper than modern medicine*” Researchers, Nigeria (36) | High cost of CAM practitioners and products | “*I would do that [visit the alternative practitioner] if I could aﬀord it [...] policy is always aiming at the patient paying for these things himself [...] but it’s just a question of cost [...] I don’t have a lot of money and healthy food is important, too. I mean I can’t spend money on the alternative practitioner if I don’t have money to pay for my food*.” Patient, Germany (30) |
| Easy to prepare | “*Dry ginger tea with aniseed is good for bad colds. It’s easy to do because we have it all at home*.” Sikh mother, UK (23) | Inconvenient to prepare | “*Asian remedies are inconvenient to prepare for the busy person*.” Researcher, UK (22) |
| Trusted advice on CAM | Trusted advice from health workers | “*Midwives working from health centers also encouraged and educated young mothers to treat their children with herbs for symptomatic relief of minor illness, according to Philippines National ARI Control Program (CARI) guidelines*.” Researchers, The Philippines (33)“*This herbal drug and the homeopathic one for your throat was recommended to me by an ENT specialist ... and since I have been taking it I have neither had tonsillitis nor bronchitis, which I had had regularly [sic] before and that was with antibiotics*…” Patient, Germany (30) | Lack of trustworthy advice | “*reliable advice is difficult to obtain*” (22)“*It is pretty diﬃcult with herbal medicine because there is so little about the side eﬀects in the patient information leaﬂet. Sometimes, I can’t imagine there being so little side eﬀects if it’s a herbal drug*.” Patient, Germany (30) |
| Relatives’ advice | “*Is from your parents, grandparents, because their views have been passed down and you know you can trust it*” Iranian mother, UK (24)“*Well, my mother didn’t send us to the doctor right away then or fed us antibiotics, rather she tried herself, you know, with home remedies*.” Patient, Germany (30) | Health volunteers’ advice | “*Elders also said to eat fruits but to avoid vegetables. The BRAC health volunteers help us now. What happened before ± let's forget it*.” Mother, Bangladesh (34) |
| Views of the wider community | “*Maybe if you studied it and lived in an environment where everyone has an idea, that this symptom could be remedied with this tea, and so forth, then it simply ampliﬁes, I think, over the course of time*.” Patient, Germany (30)“*If I knew that only uneducated people … believed in natural healing then I wouldn’t take it as seriously*…” Patient, Germany (30) |
| Decision on treatment | Desire for autonomy | “*Sometimes it doesn’t work any other way, but essentially, you can take many matters into your own hands. Maybe that’s one of those instances where you have to think for yourself and not have yourself get back on your feet with meds*.” Patient, Germany (30) |  |  |

# Table 4: Mapping the decision-making model on to the COM-B (Capability, Opportunity, Motivation) model of behaviour change

|  |  |  |
| --- | --- | --- |
| COM-B domain | Treatment Decision Model | Examples  |
| Capability | Physical | Ability to access health care facility | It is difficult for some patients to access a health facility in Bangladesh (34) |
| Psycho-logical | Knowledge about illnesses and treatments | Some parents in USA know about antibiotic resistance (25) |
| Opportunity | Physical | Availability, cost and convenience of treatments | Herbal remedies and honey are easily available at home (22-24)Antibiotics are easily available from health volunteers in Bangladesh (34) or from shops in the Philippines, without prescription (33) |
| Social | “Permission” to consult a health worker  |  “*When my mother-in-law was alive I could not go to any of the doctors but now she is no longer alive and I can get care from a doctor.*”Woman, Bangladesh(34)*“The grandmothers tend to make most of the decisions about child care although the child's mother is usually blamed when the child becomes ill… Initially, the maternal grandmother was reluctant to diagnose a serious illness since it would be considered her daughter's fault.”* Researcher, India (57) |
| Motivation | Automatic  | Use of treatments which have previously been used with success for similar illnesses;Automatic use of home remedies as the first treatment for any illness | “*these things have been used for generations you know, it was used for me, it was, I’m using it for my child, we’ll be ﬁne... These are kind of a standard protocol*” Indian mother, UK (24)“the common tendency [is] to "diagnose" a child's illness by his or her response to a relatively constant sequence of treatment regimes. For example, almost all initially treat Acute Respiratory Infection-like symptoms with home remedies and dietary measures”. Researchers, Bangladesh (58) |
| Reflective | Uncertainty about the illness or treatments leads people to seek advice from a trusted source to help them make a decision. | *“For coughing, a large proportion of caregivers would not know what to do and would take their child to a health care provider as a ﬁrst course of action*” Researchers, South Africa (53) |