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Review Article

**OTITIS MEDIA TREATMENTS IN CHILDREN: SYSTEMATIC  
REVIEW IN LITERATURE****Ibtihal Tariq Yamani<sup>1\*</sup>, Jumanah Ahmed Almansaf<sup>2</sup>, Reyof Saeed Alharthi<sup>3</sup>, Jazi Abdullah Alosaimi<sup>4</sup>, Dana Manhal Alajlouni<sup>5</sup>, Malek Abdulrahman Almalki<sup>6</sup>, Abdulelah Abdullah Alojayan<sup>7</sup>, Mohammed Baqer Al khalaf<sup>7</sup>, Nassrain Khalid Alharbi<sup>8</sup>, Haya Mohammed Bin Hassan<sup>5</sup>**<sup>1</sup> Umm al-Qura University, Makkah, Saudi Arabia,<sup>2</sup> Almaarefa university, Riyadh, Saudi Arabia,<sup>3</sup> Taif University, Taif, Saudi Arabia,<sup>4</sup> King Abdulaziz University, Rabigh, Saudi Arabia,<sup>5</sup> Princess Nourah Bint Abdulrahman University, Riyadh, Saudi Arabia,<sup>6</sup> Taibah University, Almadina Almunawara, Saudi Arabia<sup>7</sup> King Faisal University, Al-Hasa, Saudi Arabia,<sup>8</sup> Ibn Sina National College for Medical Studies, Jeddah, Saudi Arabia**Abstract**

*This review is aiming to systematically summarize the literature on Otitis Media treatments in Children. The present review was conducted by searching in Medline, Embase, Web of Science, Science Direct, BMJ journal and Google Scholar for, researches, review articles and reports, published over the past years. Books published on Management of Otitis Media treatments in Children. If several studies had similar findings, we randomly selected one or two to avoid repetitive. Based on findings and results this review found All included RCTs had some methodological flaws. Three trials recruited a representative patient spectrum (Significant effect modifications were noted for otorrhoea, and for age and bilateral acute otitis media. In children younger than 2 years of age with bilateral acute otitis media, 55% of controls and 30% on antibiotics still had pain, fever, or both at 3–7 days, with a rate difference between these groups of –25% (95% CI –36% to –14%), resulting in a number-needed-to-treat (NNT) of four children. We identified no significant differences for age alone. In children with otorrhoea the rate difference and NNT, respectively, were –36% (–53% to –19%) and three, whereas in children without otorrhoea the equivalent values were –14% (–23% to –5%) and eight.*

*Antibiotics seem to be most beneficial in children younger than 2 years of age with bilateral acute otitis media, and in children with both acute otitis media and otorrhoea. For most other children with mild disease an observational policy seems justified.*

**Keywords:** antibiotics, otitis media, children.

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## INTRODUCTION:

Acute otitis media is extremely common in children. By the age of 3 months, 10% of children will have suffered at least one episode. The incidence peaks between 6 and 15 months.<sup>1</sup> In Western countries mortality is low, but it may be higher in underdeveloped countries.<sup>2</sup> Complications are now rare in the West, although in 1954 the rate of mastoiditis was 17% in cases of acute otitis media.<sup>3</sup> Symptoms consist mainly of pain and systemic illness, sometimes very distressing, which in 80% of children is limited to 24 hours' duration.<sup>4</sup> The pain is caused by pressure on the tympanic membrane, which can sometimes be seen bulging and inflamed at otoscopic inspection. After the inflammation settles, the consequent deafness left by fluid retained within the middle ear space may take several weeks to resolve.

Considerable attention has been focused on the role of infection in acute otitis media. Several attempts at identifying causative infectious agents have yielded several, the main ones being *Streptococcus*, *Branhamellacatarrhalis* and *Haemophilus* species.<sup>5</sup> Some viruses have been implicated. Twelve different case series failed to identify a causative infectious agent in the middle ear fluid of 28-62% of patients.<sup>5</sup> The details of the pathophysiological process, traditionally described as arising from the increased bacterial load and obstructive elements that occur during an upper respiratory tract infection, may be incompletely understood.

## METHODS:

The present review was conducted December 2018 in accordance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA) declaration standards for systematic reviews. We reviewed all the topics on Otitis Media treatments in Children. To achieve this goal, we searched Medline, Embase, Web of Science, Science Direct, and Google Scholar for, researches, review articles and reports, published over the past 15 years. Books published on iron deficiency management.

Our search was completed without language restrictions. Then we extracted data on study year,

## RESULTS:

All included RCTs had some methodological flaws. Three trials recruited a representative patient spectrum (Significant effect modifications were noted for otorrhoea, and for age and bilateral acute otitis media. In children younger than 2 years of age with bilateral acute otitis media, 55% of controls and 30% on antibiotics still had pain, fever, or both at 3-7 days, with a rate difference between these groups of

study design, and key outcome on Otitis Media treatments in children. The selected studies were summarized and unreproducible studies were excluded. Selected data is shown in the Table 1.

Studies has been rated as being high quality by an established evaluation process based on the DyunaMed criteria and it's based on the level of evidence as following:

**Level 1 (likely reliable) evidence:** representing research results addressing clinical outcomes and meeting an extensive set of quality criteria which minimize bias. example: Randomized controlled trial/meta-analysis.

**Level 2 (mid-level) evidence:** representing results addressing clinical outcomes, and using some Methods of scientific investigation but not meeting the quality criteria to achieve level 1 evidence labeling. Example: well-designed non-randomized clinical trials.

**Level 3 (lacking direct) evidence:** representing reports that are not based on scientific analysis of clinical outcomes. Examples include case series, case reports, expert opinion and conclusions extrapolated indirectly from scientific studies.

## Inclusion criteria

Only randomized clinical trials (RCTs) were considered for this systemic review and only studies that recruited children under 12 years, if they were involved the use of one or more antibiotics.

## Exclusion criteria

Non-relating articles were discarded, while additional articles reporting on emergency Otitis Media treatments were excluded.

## Data extraction and analysis

Information relating to each of the systematic review elements was extracted from the studies and collated in qualitative tables. Direct analysis of the studies of Otitis Media treatments is made with extreme caution, as different sampling techniques can provide bias as overview of the assemblage -25% (95% CI -36% to -14%), resulting in a number-needed-to-treat (NNT) of four children. We identified no significant differences for age alone. In children with otorrhoea the rate difference and NNT, respectively, were -36% (-53% to -19%) and three, whereas in children without otorrhoea the equivalent values were -14% (-23% to -5%) and eight.<sup>6</sup>

Antibiotics seem to be most beneficial in children

younger than 2 years of age with bilateral acute otitis media, and in children with both acute otitis media and otorrhoea. For most other children with mild disease an observational policy seems justified.<sup>6</sup>

Pain was not reduced by antibiotics at 24 hours, but was at two to seven days, (relative risk (RR) 0.72; 95% confidence interval 0.62 to 0.83). However, four trials (1271 children) comparing antibiotics prescribed immediately rather than initial observation found no difference at three to seven days.

Antibiotics did not reduce tympanometry, perforation or recurrence. The only case of mastoiditis was in an antibiotic treated child. Vomiting, diarrhoea or rash was higher in children taking antibiotics (RR 1.37; 95% CI 1.09 to 1.76). Individual patient data meta-analysis of a subset of the included trials found antibiotics to be most beneficial in children: aged less than two; with bilateral AOM and with both AOM and otorrhoea.<sup>7</sup>

**Table (1) Results from Sequencing Studies.**

Author	Study sample	Intervention	Outcomes measurement	Result	Level of evidence
Maroeska etal (2006) <sup>6</sup>	patient data from 1643 children aged from 6 months to 12 years	six randomised trials of the effects of antibiotics in children with acute otitis media. Individual	-otorrhoea. - pain	Significant effect modifications were noted for otorrhoea, and for age and bilateral acute otitis media. In children younger than 2 years of age with bilateral acute otitis media, 55% of controls and 30% on antibiotics still had pain, fever, or both at 3–7 days, with a rate difference between these groups of –25% (95% CI –36% to –14%), resulting in a number-needed-to-treat (NNT) of four children. We identified no significant differences for age alone. In children with otorrhoea the rate difference and NNT, respectively, were –36% (–53% to –19%) and three, whereas in children without otorrhoea the equivalent values were –14% (–23% to –5%) and eight.	Level 2

<b>Sharon Sanders. et al (2004)<sup>7</sup></b>	10 trials (2928 children) from high income countries with low risk of bias	Randomised Controlled Trials	- Pain	Pain was not reduced by antibiotics at 24 hours, but was at two to seven days, (relative risk (RR) 0.72; 95% confidence interval 0.62 to 0.83). However four trials (1271 children) comparing antibiotics prescribed immediately rather than initial observation found no difference at three to seven days. Antibiotics did not reduce tympanometry, perforation or recurrence. The only case of mastoiditis was in an antibiotic treated child. Vomiting, diarrhoea or rash was higher in children taking antibiotics (RR 1.37; 95% CI 1.09 to 1.76). Individual patient data meta-analysis of a subset of the included trials found antibiotics to be most beneficial in children: aged less than two; with bilateral AOM and with both AOM and otorrhoea.	Level 3
<b>Van Buchema etal (2003)<sup>8</sup></b>	171 children with acute otitis media (239 affected ears) were treated by four different methods: neither antibiotics nor myringotomy; myringotomy only; antibiotics only; or both antibiotics and myringotomy	Randomised Controlled Trials	pain, temperature, duration of discharge, otoscopic	There were no significant differences in clinical course (pain, temperature, duration of discharge, otoscopic appearances, audiography, recurrence rate) between the four groups. In the groups treated without antibiotics, the ears discharged for slightly longer and the eardrums took a little longer to heal; these differences were not significant. No complications were seen	Level 2
<b>Brook and Gober, (2009)<sup>9</sup></b>	100 patients with AOM with new spontaneous perforation	Retrospective observational	Postvaccine vs Prevaccine	44% vs 54% Serotypes not reported MSSA: 8% vs 8% MRSA: 10% vs 0% (P > .05)	Level 3
<b>McEllistrem et al, (2005)<sup>10</sup></b>	505 child in 5 hospitals	Retrospective observational	Postvaccine vs Prevaccine	52% vs 76% (P . .01) Non-PCV7 serotypes: 32% vs 12% (P > .01) PCV-related serotypes: 13% vs 10% P values are trend over Time0.	Level 3

Veenhoven et al,(2003) <sup>11</sup>	383 patients with recurrent AOM	Retrospective observational	Postvaccine vs Pre vaccine Streptococcus pneumoniae Haemophilus influenzae	Serotype analysis: 22% vs 35% PCV7 serotype: 31% vs 42% Non-PCV7 serotype: 70% vs 58% pneumococcal conjugate vaccine-related serotype: not reported	Level 3
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MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin-sensitive *Staphylococcus aureus*; PCV7, heptavalent pneumococcal conjugate vaccine.

### DISCUSSION:

Acute otitis media (AOM) is common in children, causing pain and deafness. Though AOM usually resolves without treatment, it is often treated with antibiotics. This review found that antibiotics are not very useful for most children with AOM. Antibiotics marginally decreased the number of children with pain at 24 hours (when most children were better), only slightly reduced the number of children with pain in the few days following and did not reduce the number of children with hearing loss (that can last several weeks). However, antibiotics seem to be most beneficial in children younger than two years of age with bilateral AOM (infection in both ears), and in children with both AOM and otorrhoea (discharge from the ear). There was not enough information to know if antibiotics reduced rare complications such as mastoiditis (an infection of the bones around the ear). Some guidelines have recommended a management approach in which certain children are observed and antibiotics taken only if symptoms remain or have worsened after a few days

### CONCLUSIONS:

This review found no difference between immediate antibiotics and observational treatment approaches in the number of children with pain three to seven days after assessment. All of the studies included in this review were from high-income countries. Data from populations in which the incidence of AOM and risk of progression to mastoiditis is much higher are lacking. Antibiotics caused unwanted effects such as diarrhea, stomach pain and rash, and may increase resistance to antibiotics in the community. It is difficult to balance the small benefits against the small harms of antibiotics for most children

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