The Effect of Otitis Media on the Development of Speech and Language

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ABSTRACT

Background: Children frequently contract otitis media (OM), which could impede their ability to learn languages. There are numerous individual reports that have been uncovered in the literature that show an inverse relationship between OM and language learning. So, in order to incorporate information about how OM affects early children's language acquisition, a systematic review has been carried out.

Methods: Numerous electronic bibliographical databases, including PubMed, Embase, and ERIC, were searched. All observational studies and one randomized clinical trial published between 2000 and 2022 were included in the report depending on the inclusion criteria. Eleven papers were reviewed after screening and evaluating the abstracts, and information was taken on crucial factors including nation, sample sizes, designs of the studies, length of follow-up period, and key outcomes.

Results: Generally, the systematic review's results were contradictory. The majority of the research, though, found a conflicting or inversely association between OM and many aspects of young child's language improvement. In overall, the investigations that were included showed that OM is inversely correlated with language learning and can have an impact on several linguistic categories, including receptively and expressive language. Nevertheless, there were also a few negative results from very few researches.

Conclusion: OM is typically not severe and thus it can be disregarded. However, it has a negative impact on language learning. Therapists and doctors must be cautious when interacting with a child who has OM to avoid negative consequences on language acquisition.

Keywords: Otitis media; language development; Children; Systematic review.

INTRODUCTION

Children frequently contract the infection known as otitis media (OM), which is characterized by redness and inflammation of the middle ears (Homøe et al., 2020). Due to the fact that this illness does not necessarily result in significant manifestations in youngsters, it may go unnoticed (Brennan-Jones, et al., 2020). Overpopulation, substandard housing conditions, passive smoking, undernourishment, and restricted access to high-quality medical services are a few common triggers for OM (Fordington & Brown, 2020). As a consequence, OM may have negative impacts, including hearing loss and impacts on language learning (DeLacy, et al, 2020). For example, hearing loss that develops earlier in life might have had a persistent, irreversible chain of events that affects the children's language and social interactions (Sagr & Sagr, 2021). There is proof that by the time they turned ten, 90% of children had experienced at least one event. Additionally, 30 to 40% of kids experience recurrent attacks (Lee et al., 2020). Investigations on the age-specific incidence of OM have discovered a bimodal arc relating age and frequency of OM, revealing one conspicuous zenith before 2 years of age and a much smaller pinnacle at 5 to 7 years of age, the latter apogee coinciding with enrollment into primary education (Liu et al., 2020).

Research investigations have mainly focused on determining the detrimental impact of hearing issues brought on by OM on the prevalence of communication issues and educational achievement. However, other factors including persistent ear drainage, discomfort, and balance problems as well as sleeplessness and frequent doctor visits make life difficult (Brennan-Jones, et al., 2020). Additionally, there is proof that OM-related hearing loss variations may alter auditory perception and obstruct languages and communication acquisition. Therefore, when developing treatment and rehabilitation programs for the OM (Leach et al., 2021), emphasis should also be placed on enhancing speech and language. Therefore, there is a need for data proving how OM can result in issues with language learning and the amount to which language acquisition is impacted by OM before any strategies to control OM timely are made. In order to summarize the results of the effect of OM on early children's language learning, a systematic review was conducted. These results will assist physicians and ear, nose, and throat (ENT) and audiologist experts to evaluate and identify children for OM earlier so that the problem can be treated quickly and prevent the emergence of unfavorable hearing and speech-related consequences.

METHODS

A systematic study was conducted to assess, summarize, and consolidate the available data on the results addressing the impact of OM on young children's language learning. To conduct this systematic review, PRISMA guidelines was utilized to be adhered to (Page et al., 2021).

Elegibility Criteria

To address the questions of this study, a research project had to analyze the impact of OM on language acquisition and development (in any or all dimensions). There were included studies released in English from 2000 to 2022 in various parts of the world. Furthermore, only investigations that were quantitative were included. Papers that offered comments, critiqued earlier scientific findings, or contained editorials were not included. Publications with full texts but without qualitative components were also removed.

Information Sources

In 2022, a thorough examination of published articles had been conducted. Resources including

ERIC, Embase, and PubMed were all looked through. Along with online databases, all sources of relevant publications were taken into consideration in the searching process.

Search Strategy and Selection Process

Two reviewers conducted an independent search and screened the findings for possibly pertinent research before retrieving the full-text publications. The progress of either receptive or expressive languages after otitis media served as the study's main objective. Without regard to the year of publishing, location, or other social economic factors, the research methods were pre-piloted.

A combination of full texts have been discovered and Medical Subject Heading (MeSH) terms have been used. Depending on the types of demographic, intervention, result, and contexts, keywords were grouped into three main groupings. "Otitis media," "chronic otitis media," and "acute otitis media" were the most frequently used searching words in abstracts and headings.

Data Collection Process

Each study was examined after being loaded into the reference manager program (EndnoteTM file), and titles were checked for duplication as well. Since the abstracts did not specifically address the study's goal, they were not evaluated for additional examination. Subsequently, the remaining pertinent articles have been received and read in their entirety. The papers that satisfied the requirements were then abstracted and summarized using a standardized proforma.

Papers that were outside the purview of this evaluation have been eliminated after removing duplicates and reviewing the titles and abstracts in accordance with the inclusion criteria. In addition, the remaining investigations' bibliographies were checked and validated to make sure no important studies were left out. The reviewers separately searched the publications, and their conclusions and summaries were compared in order to spot any discrepancies and address them appropriately.

A uniform data collection form was filled out by independent reviewers for the qualifying published studies. Before beginning the data extraction method, the evaluator pilot verified the data gathering sheet and reviewed the data extraction tables to confirm that they included the crucial outcomes of the selected studies. Additionally, to describe the components of the data extraction proforma, recent research publications on the subject at hand were studied. Any disagreements between the two reviewers were resolved through mutual consent.

Data Items

The author, references, year of publishing, type of research design, size of population, average age with age range, length of follow-up, key research findings, and study conclusions were included in the summarized dataset.

Study Risk of Bias Assessment

The Downs and Black 27-item checklist for the methodological quality analysis of randomized as well as non-randomized publications was used to determine the risk of bias for the publications that were included (Downs & Black, 1998). An adequate recruiting process, responses rates, sampling representativeness of the overall population, objectives and reliable clinical outcomes, use of a calculations, adequate use of statistical techniques, and evidence of bias within the investigations were the main items on the checklist. One element was graded on a three - points scales (yes=2, partial=1, as well as no=0), and the remaining 26 elements were assessed either with yes (=1) or no/unable to identify (=0). Values vary from 0 to 28, and better

results indicate that the report's methodology was more sound. For the purpose of classifying publications by quality, the alternative cut points have indeed been proposed: Good (20-25), Excellent (26-28), Fair (15-19), Poor (≤14) (Hooper, et al, 2008). This Downs and Black tool has been found to have acceptable psychological qualities, including consistency reliability, test-retest reliability, inter-rater reliability, and criterion - related validity, in several studies. (Downs & Black, 1998). The list is one of the five largest quality rating scales recommended for use in systematic reviews (Deeks et al., 2003). Couples of reviewers separately performed the checklist, and any discrepancies were settled through talks. The findings of the risk of bias assessments have been used for descriptive reasons in order to examine the overall calibre of the including research and to produce a transparent manner of suggestion for the designs and conducts of additional investigations.

Effect Measures

The primary outcome measure was the effect of OM on the degree of early children's language acquisition. Additional outcome measures included the following: probable adverse effects, overall development, speech and language development, and quality of life (for example, atrophy of the tympanic membrane, tympanosclerosis, cholesteatoma, infections, perforation, and discharges).

Synthesis Methods

The included investigations' heterogeneity prevented statistical data pooling. Alternatively, to facilitate comprehension, findings have been narratively evaluated, divided into AOM and chronic/other OM, and arranged by location and country.

Certainty Assessment

The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach was used to evaluate the quality of the evidence. The GRADE test scores were as follows: a) 'Excellent quality: (very confident to the estimated effect). The genuine impact is very similar to the performance and evaluation, (b) Moderate quality: (moderately confident to the estimated effect). The real impact is probably like the estimates, although it is possible that it is much distinct, and (c) Low quality: (Limited confidence to the estimated effect). The genuine effects could vary markedly from the best possible knowledge, and (d) Very low quality: (very little confidence to the estimated effect). The genuine effects will probably different significantly from the effect estimate.

Identification and Inclusion of Publications

A number of 5260 publications were found after searching were done in the Cochrane Database of systematic reviews, Medline, Embase, and PubMed databases. 2750 articles and journals were left after duplication were eliminated. 1243 inconsequential publications were eliminated after the titles and abstracts were reviewed. For eligibility, sixteen full-text papers were evaluated. Ultimately, the current systematic review comprised eleven observational studies. In Figure. 1, the selecting process's specifics are displayed.

RESULTS

Features of the Study

Seven prospective studies were assessed (Baptista, 2019), (Bell, et al, 2016), (Badran, et al, 2013), (Zumach, et al, 2010), (Vernon-Feagans, et al, 2002), (Paradise et al., 2000), (Shriberg, et al, 2000), two Case-Control-Matched Trials (Uclés, et al, 2012),

(Winskel, 2006), single Longitudinal pregnancy cohort (Brennan-Jones, et al., 2020) and one RCT in this paper that is integrated into a cohort (Rovers et al., 2000). The included investigations, which covered 60.984 respondents aged between two months and ten years, were carried out between 2000 and 2022 in nine different countries (Australia, Portugal, Western Australia, Jeddah, Saudi Arabia, Spain, Sydney, the Netherlands, and the United States). The number of study respondents enrolled in each of the included researched papers' samples ranged from 9 to 22890, with a fairly wide variety of people. As was to be anticipated, the research examined kids between the ages of 2 months and 10 years old. These kids completed a variety of language developmental exams with a wide range of follow-up, often for 3–4 years. Table 1 displays all of the included investigations' specific details.

Methodological Effectiveness

Figure two displays the distributions of methodological quality grades depending on the Downs and Black checklist. The arrangement of the scores was symmetrical (M = 15.4, median = 16).

The Impact of OM on young children´s level of Languages Development

Brenan et al. 2020.'s analysis, which tracked kids for four years in a prospective study, discovered conflicting results on the link involving otitis media and languages improvement, which was reliant upon several elements for language acquisition (Brennan, et al., 2020). The researchers discovered that children with bilaterally otitis media saw significantly less receptive vocabulary development at the age of ten (β = -3.17 [-6.04, -0.31], p-value =.030), but not the combined unilaterally or bilaterally otitis media cohort (β = -1.83 [-4.04, 0.39], p-value =.106) (Brennan, et al., 2020). According to the investigators' findings, kids with otitis media had average developmental language ratings between the ages of six and ten that fell within the norm.

Different research from Portugal's Baptista in 2019 discovered a bad correlation between OM and language developments. Children with OM throughout the first year of life demonstrated an impairment in language developments, according to researchers (Baptista, 2019).

Potentially Adverse Effects

A 2019 investigation by Baptista in Portugal discovered no hearing impairment was seen in the control arm, but kids with otitis media, despite the age at which they first had the condition, had a modest and intermittent damage of hearing (Baptista, 2019). Earlier Otitis media episodes, according to the researchers, have a negative effect on language progress and must be promptly recognized to avoid negative effects (Baptista, 2019).

Similar to this, Bell et al. (2016) did a prospective cohort research in Australia in 2016 to determine if OM affected overall improvement, particularly linguistic features (Bell et al., 2016). Researchers discovered that children with prolonged otitis media had a higher likelihood of being labelled as developmentally sensitive on all dimensions compared to children without a persisting OM (20%–35% greater risk) (Bell et al., 2016).

In the United States, Shriberg et al. (2000) carried out a prospective research (Shriberg et al., 2000). The researchers noted that results connected to the language at a reduced rate at the age of three years were significantly correlated with degrees of hearing at twelve to eighteen months and delays in speaking. The likelihood of a speech impairment at age three, whether subclinical or clinical, was two percent for children with average hearing ranges between 12 and 18 months of 20 dB and 33percent for those

with average hearing rates between 18 and +20 dB (Shriberg et al., 2000)

General Development

Uclés et al. 2012, carried out a matched case-control research in Spain and discovered that linguistics assessments showed significant differences in scoring between patients of OM and control group (phonetics, phonetics, and syntaxes) (Uclés et al., 2012). But in the same research, there have been no variations in the meanings between the subjects and the control group (Uclés et al., 2012). These results emphasize the negative effects of prolonged OM of the right ear and show that it largely impairs phonetics and phonetic encoding of sounds, which may have implications for the preventative treatments of those children who are at risks (Uclés et al., 2012). Additional prospective research conducted by Zumach et al in Netherlands (Zumach et al., 2010). The authors noted that a statistically significant relationship was discovered among early childhood OM-related auditory and issues with speech at 27 months when they examined the relationship between these two (Zumach et al., 2010). A strong link across language grades at 27 months and Seven years old was also found. On the other hand, there was a strong association among earlier life OM and its auditory and linguistic abilities at elementary school ages (Zumach et al., 2010). Otitis media in the earlier years of life had no impact on language output or interpretation levels (Zumach et al., 2010).

The findings of this study primarily suggest that long-term consequences of early-life OM and the accompanying loss of hearing may not be relevant for overall comprehension of verbal and productive abilities (Zumach et al., 2010).

Evolution of Language and Speech

In Sydney, Australia, Winskel et al. (2006) carried out a matched case-control research. Once compared to children without OM, researchers noted a normal tendency for children with OM to achieve lower scorings on reading, rhyming and non-word readings, semantics skills of expressive vocabulary, phonetic comprehension abilities of alliteration, and word meanings (Winskel, 2006). These findings highlight the potential negative effects that otitis media may have on a child's future literacy and language progress (Winskel, 2006). A further investigation by Vernon-Feagans et al. (2002) in the United States discovered a negative correlation between language developments and otitis media. More particularly, researchers found that compared to the other three groupings of children, children with chronic otitis media and receiving poor care vocalised half as many and more diversified phrases whilst reading books, reacted to abstracts questions less effectively, and were judged to be using language more poorly by their teachers (Vernon-Feagans et al., 2002).

In the United States, Paradise et al. (2000) carried out a similar prospective research. The use of MEE during the preceding intervals did not appear to significantly affect children's performance on tests of impulsively expressive language, speech sounds generation, or other measurable cognitive qualities, according to the investigators. In contrast, scorings on all measures were consistently highest among children from low socioeconomic position and weakest among those from the weakest socioeconomic status (Paradise et al., 2000).

In the Eastern Netherlands, Rovers et al. (2000) did additional investigation. Following adjusting for the maternal educational level, the child's IQ, and initial variations, no discernible distinctions in expressing or comprehensive language between the two groups were found (Rovers et al., 2000). Ventilating tubes

did not significantly affect the linguistic improvement of OM kids (Rovers et al., 2000).

The children whose effusion did not persist throughout the follow-up showed a greater increase in their thorough language than did the children whose effusion persisted the entire time. The evolution of the expressing part of language did not differ in any way.

Quality of Life

To evaluate the impact of OM on language acquisition, Badran et al. (2013) monitored kids for four years in a prospective case series in Saudi Arabia. Researchers discovered that children's recurrent ears infections were a major factor in the improvement of linguistic deficits (Badran et al., 2013). Kids who had middle ear infections that persisted showed significant delays in language acquisition. Compared to research participants who had a background of recurrent middle ear infections, the mean age of all language skills (receptively, expressively, and overall language) was higher and better among children without a background of recurrent infections of the middle ears (Badran et al., 2013).

DISCUSSION

The question of whether a background of OM during the formative years of childhood causes speaking impairments and challenges with language developments continues to be a subject of heated debate. This systematic review was conducted to address the question of how OM affects language improvement causally. The fundamental goal of this study was to determine what was visible from the information of existing researches in order to draw conclusions about what was not seen, namely the causal impact of OM on language development. To answer the relevant research questions, the outcomes of the eleven eligible articles were combined and examined. Without the current indicated hypotheses and theories on how OM affects language development, the review's outcomes were generally considered acceptable consistent. More precisely, the majority of researches endorsed the idea that there is a negative link between OM and language acquisition, with the exception of a few articles that had mixed results.

The current results are in line with comparable research published by Roberts et al. (2012), approximately two decades ago, when researchers showed a variety of impacts between OM and child language developments, from no relationship to a very low connection (Casby, 2001). The similarity between the present systematic review and the meta-analysis as out by Roberts et al. 2012 was marginally less than anticipated (Casby, 2001). It's possible that this is the case since articles included in the meta-analysis did not account for the links between OM and language learning. This explanation for the decreased connection, therefore, may not be credible given the positively confounding brought on by the shared determinants of OM and language improvement. By further diminishing the connection, controlling for such positive confounding will have given estimates approaching the null. Controlling for positive variables had further debunked the theory and the idea that OM influences language improvement. The hypothesis would have been strengthened, however, if it were supposed that the non-exchangeability between the group of kids with and without OM is caused by adverse variables. The results of the meta-analysis performed by Roberts et al. 2012 were supported by further systematic reviews that were carried out 20 years earlier (Casby, 2001; Shekelle et al., 2002).

Some mediational processes triggered by hearing problems may provide the causal explanations for the impact of OM on language development. The information from the research, which shows that OM causes mild to moderate hearing difficulties, significantly supports this (Roberts et al., 2002). It is possible to hypothesis that these hearing issues also compromise with the language process, which prevents the youngster from precisely and efficiently encoding the data (Roberts et al., 2002). In the event of repeated OM and related loss of hearing during the creative period of language and learning, this significantly impairs the children's capacity to learn vocabularies or grammars. Even though the potential method by which OM influences language progress has been partially studied in the research for evaluating OM's construct validity, further research into effects modifications are still required. The association between OM and language progress may be totally mediated by hearing loss, or it could be partially mediated by the reactivity of the child caring setting. Investigators must investigate the construct validity of the components of OM that influence language acquisitions in the former case, whereas in the latter, the external validity will be evaluated to determine how the impact of OM is altered by various causal partners in various situations.

STRENGTHS AND LIMITATIONS

The results on the impact of OM on language acquisition and progress in newborns and young kids have been supported by this research. Strong evidence from observational studies and randomized controlled trials, which are regarded as the best and golden level in the hierarchy of research methods, strengthens the systematic review. Additionally, we discovered a variety of international research that gave us hope that the results may be applied in different contexts. Nevertheless, exercise caution must be because the frequency of causal partners can differ from setting to setting and has an impact on the estimate's magnitude. Since the majority of the included investigations evaluated the same results, a significant consistency had been discovered in the principal outcomes for those articles. Nevertheless, the investigations' follow-up periods differed, with some lasting longer than 4 years. The failure of the eligible articles to quantify and control all the underlying determinants of exposures and outcomes, which could have led to an overestimation of the impact of OM on language progress in the individual researches, was among their main shortcomings. Given the limitations of observational studies, it is necessary to make assumptions regarding the absence of unquantified confounding and modeling misspecification when determining the causal impact of the OM on language progress. Secondly, bias could be introduced into the individual research because to non-exchangeability brought on by selection bias or measuring error in either OM or language acquisition using various scales or assessments. For instance, losses to follow-up poses a serious danger to internal consistency in observational researches, and if assumed that those who were lost to follow-up were more sensitized and more likely to develop the outcomes, this selection bias could have led to an underestimating of the effects. As a result, it is important to read the results of studies that qualify carefully in light of these warnings.

CONCLUSION

In this systematic study, mixed to favorable data were discovered on the impact of OM on young children's language progress. In overall, the research that were included showed that OM is negatively correlated with language learning and can have an

impact on several language categories, including receptive and expressive language. Nevertheless, there were also a few contradictory results from extremely few research. OM is typically not severe and thus it can be disregarded. However, it has a negative impact on language learning. Therapists and doctors must be cautious when interacting with a child who has OM to avoid negative consequences on language acquisition. Given how OM affects different language domains, one must use caution when interacting with children. Furthermore, it is necessary to establish some community-based screening programs for kids that could check them for OM because not all kids visit clinics for a variety of reasons, including absence of availability to care, lack of complaints, or low level of awareness. Hence, early screening of children in the communities is necessary to stop the adverse effects of OM on language progress.

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ANNEXE. Figures and Tables

Figure 1. PRISMA chart of the included studies.

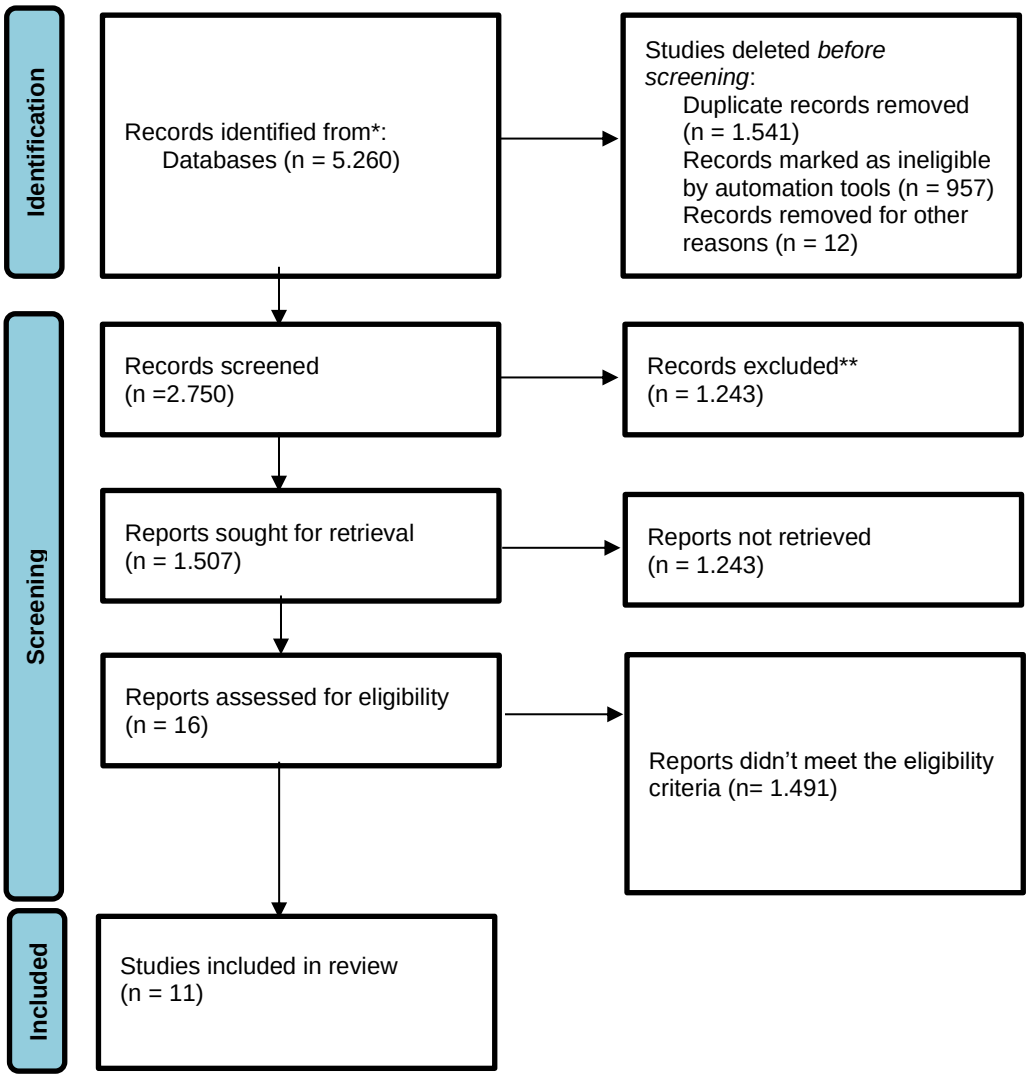

Table 1. General characteristics of the included studies.

Author	Study location	Research Design	Sample size	Age	Follow up and evaluation	Major results	Conclusion
(Brennan, et al., 2020)	Australia	Longitudinal pregnancy cohort	1344	Six years	Four years	Languages abilities and bilateral otitis media were not significantly correlated at age six (β = 0.56 [3.78, 2.66], P-value =.732). Children with bilaterally otitis media at age six showed a significant decline in the level of receptive vocabulary development at age 10 (PPVT-R) (β = -3.17 [-6.04, -0.31], P-value =.030), but not the combined cohort with unilaterally or bilaterally otitis media (β =- 1.83 [-4.04, 0.39], P-value =.106).	At ages six and ten, languages developmental ratings for kids with otitis media were on average within the normally limits. However, after accounting for a variety of socio-demographic factors, there was a small but statistically significant reduction in the incidence of receptive vocabulary acquisition in children who seemed to have bilaterally otitis media at age 6.
(Baptista, 2019)	Portugal	Prospective case series	9	Four to seven years		The linguistic progress of infants who had Otitis media during the first year of life was impaired. Children who had Otitis media three years later are comparable to the control group. The one and only category unaffected by Otitis media in infants in the first year of life was lexical competence. No hearing impairment was shown in the control group, but children with otitis media, despite the age at which they first had the condition, had a slight and intermittent deafness.	Early Otitis media occurrences have a significant impact on language progress, hence early diagnosis is necessary to avoid the harmful effects..

(Bell et al., 2016)	Western Australia	Prospective cohort study	22890	M=5.5 years old, SD=0.29	Three variant evaluation	Compared to children without a chronic otitis media, children with a chronic otitis media seemed to have a 20–35% higher risk of becoming labelled as developmentally sensitive on the social, emotional, language, cognitively, and physically dimensions. Children with numerous chronic illness classifications did not have a higher risk than those with a single diagnosis (all P-values >.05. There is no proof that disease-specific effects justify the risk..	Regardless of the overall circumstances, chronic otitis media in young children increases the likelihood of diminished schools motivation. These effects were observed for medical disorders such as chronic otitis media, which are not often thought to be detrimental to student achievement.
(Badran et al., 2013)	Jeddah, Saudi Arabia	Prospective case series	30	Four to ten years	Four to five years	Children's recurrent ear infections were a major factor in the impairments in language acquisition. Comparing study subjects with and without a background of recurrent middle ear infections, it was shown that children without this history had higher averages for receptive, expressive, and overall languages ages.	Significant delays in languages developments in kids with middle ear infections that don't go away.
(Uclés et al., 2012)	Spain	Matched case control study	35	Three to seven years	Four years	Language tests showed significant differences in phonetical, phonological, and syntactic performance between otitis media patients and controls. Nevertheless, semantic distinctions were not discovered..	These results highlight the causal role of chronic otitis media of the right ear and demonstrate that it primarily impairs phonetical and phonological encoding of voices that may have implications for preventative treatment of those children at danger..
(Winskel, 2006)	Sydney Australia	Matched case control study	43 experime	Six to eight	Not reported	A significant statistically link was discovered while analyzing the	The current findings of the research generally imply that

			ntal and 43 control	years old		relationship between early childhood otitis media associated auditory and languages impairments at 27 months. A strong link between language performance at 27 months and 7 years old was also found. On the other hand, there was a strong association between early-life otitis media and its auditory and linguistic abilities at elementary school. Otitis media in the early years of life had no impact on language output or understanding levels.	the long-term impacts of childhood otitis media and the accompanying hearing loss may not be relevant for overall languages comprehension and creative abilities.
(Zumach et al., 2010)	Netherlands	prospective study	65	Rang (6.6 - 7.10 years	Three monthly visits in the first two years of life	Children with a background of otitis media typically scores lower on phonological knowledge skills like alliterations, rhymes, and non-word reading, as well as semantics abilities like expressive vocabulary, word meanings, and reading, than children without a background of otitis media.	These findings highlight the potential difficulties that otitis media may provide for school-age children's later languages and literacy developments.
(Vernon-Feagans et al., 2002)	United states	prospective study	41	One year	Not reported	Children with chronic otitis media who received poorer care talked half as much and a wider variety of terms while reading the books, answered fewer abstraction questions correctly, and received lower ratings from their instructors for their languages usage than the other Three population of kids.	Languages developments an d otitis media have been proven to be incompatible.
(Paradise et al., 2000)	United states	prospective study	6350	Two months	Four years	There were no significant associations between exposure to MEE throughout antecedent times and child's performance on tests of spontaneously expressive languages, speech sounds productions, or other	The findings show that in some population of kids, persistent early-life MEE typically findings in subsequent minor, restricted deficits in

						assessed cognitive abilities in the sample group as a whole or in any subcategory. In contrast, ratings on all metrics were consistently highest among children from low socioeconomic position and lowest among those from the weakest socioeconomic status.	receptively languages and verbal elements of cognition.
(Rovers et al., 2000)	Eastern Netherlands	Randomized controlled trial embedded in a cohort	30,099	Nine months	Three years	After adjusting for maternal educational level, child's IQ, and basal variations, no distinctions in expressively or comprehensively languages betwee n the two groups could be detected. Almost as much as the kids who had continuous effusions through the whole follow-up, the comprehensively languages of the kids who were effusion-free throughout the follow-up showed improvements. No variations in the developments of expressive languages were discovered.	In children with otitis media, ventilating tubing had no discernible impact on languages progress.
(Shriberg et al., 2000)	United states	prospective study	70	Range (12 - 18 months)	One year	Speaking delays and poor languages performance at the age of three were significantly correlated with hearing scores at 12 to 18 months. For children with 20 dB average hearing scores at 12 to 18 months, the likelihood of a subclinical or clinical speaking delay at age three was 2%.	Languages proficiency at age three significantly moderated the significant effects of hearing scores at twelve to eighteen months on speaking quality at three years.

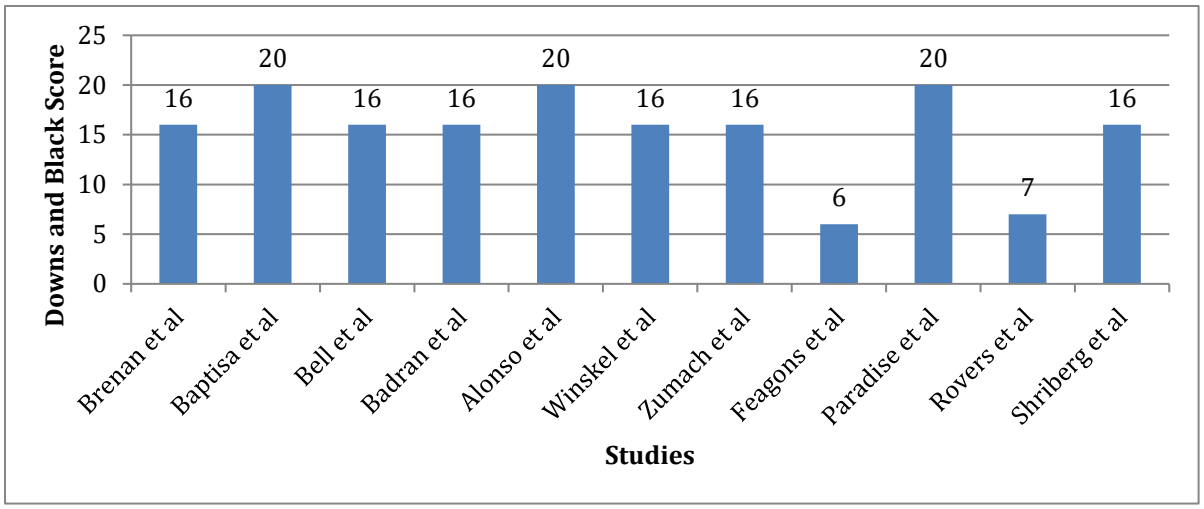

Figure 1 . Variation of the methodological quality rating depending on the Downs and Black checklist. Acceptable scoring scope: 0-28.