Revista
Torreón Universitario
www.faremcarazo.unan.edu.ni / ISSN 2410-5708 / e-ISSN 2313-7215
Year 11 | No. 31 | June - September 2022

Centor's criteria modified by MacIsaac and their diagnostic and therapeutic efficacy in acute pharyngotonsillitis in children, Systematic review

Fernanda Pineda Gea
General Practitioner and Hearing Aid Practitioner
Teaching at Redemptoris Mater Catholic University, Nicaragua
https://orcid.org/0000-0003-0927-3585
ferpgea@gmail.com

Virginia Lucia López Fitoria
Graduate student, Faculty of Medicine,
Redemptoris Mater Catholic University, Nicaragua
https://orcid.org/0000-0003-4248-5790

Haydalina Bermúdez
General Practitioner
Redemptoris Mater Catholic University, Nicaragua

José Joaquín Castillo
General Practitioner
Redemptoris Mater Catholic University, Nicaragua

Submitted on January 14, 2022 / Accepted on April 19, 2022
https://doi.org/10.5377/rtu.v11i31.14227

Keywords: Tonsillitis, pharyngitis, diagnosis, Centor criteria modified by MacIsaac, a systematic review

ABSTRACT

Introduction and objective: Acute pharyngotonsillitis of bacterial etiology requires antibiotic treatment, the Centor criteria modified by McIsaac are a useful clinical prediction tool to identify patients with bacterial pharyngotonsillitis whose etiology is caused by Group A Streptococcus β-Hemolyticus. The objective of this review was to synthesize the available and accessible medical evidence on the therapeutic efficacy of the Centor criteria modified by MacIsaac and used for the diagnosis and initiation of antibiotic treatment in acute pharyngotonsillitis in children.

Methodological design: A systematic review was carried out in the MEDILINE database through the PUBMED meta-search engine, using the following thesauri in the search strategy "preschoolers" AND "Diagnosis" AND "Pharyngitis" OR "tonsillitis". Scientific articles published between 2005-and 2020, without language restriction, with a cross-sectional, cohort, and analytical methodological design were used as inclusion criteria. The following exclusion criteria were used: duplicate studies published outside the study and search period, studies with poor methodological quality after applying the STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) tool.

Results: Nine articles were included, which complied with more than ten items contained in the STROBE tool. The evidence included in two studies mentions the importance of using these criteria as a filter to differentiate patients with bacterial pharyngotonsillitis from viral pharyngotonsillitis, emphasizing their usefulness to support antibiotic prescription in patients. Five articles mention that they should be used in a complementary manner with paraclinical tests to confirm the accurate diagnosis of streptococcal infection. Two investigations showed that anamnesis and examination are important for diagnosis, but not sufficient, evidencing that pediatric patients who met three or more criteria have approximately twice the risk of streptococcal infection.

Conclusions: The likelihood of having a streptococcal infection increases as the Centor criteria as modified by MacIsaac are met so the clinician should record a thorough oropharyngeal examination in the record to assess the presence or absence of these criteria, which should be supplemented by paraclinical tests for an accurate diagnosis.

INTRODUCTION: STATUS OF THE SUBJECT

Acute pharyngotonsillitis of bacterial etiology requires antibiotic treatment, the Centor criteria modified by McIsaac are a useful clinical tool to identify patients with bacterial pharyngotonsillitis whose etiology is caused by Group A Streptococcus *β*-Hemolyticus. In Nicaragua in health care units, the diagnosis of pharyngotonsillitis is common in clinical practice,

which is why the clinical question arises: are the Centor criteria modified by McIsaac useful for the diagnosis, and initiation of antibiotic treatment in acute pharyngotonsillitis in children?

From the following question the PICO variables that will govern the course of this review are broken down:

P Population: children with acute pharyngotonsillitis.

I Intervention: Application of McIsaac's modified Centor clinical criteria for diagnosis and initiation of antibiotic treatment.

C Comparison: We did not choose to establish a comparison group.

O Results: Therapeutic efficacy.

MATERIAL AND METHODS:

Type of study.

The present investigation has a qualitative type approach being its design a prognostic type systematic review.

Eligibility criteria:

Inclusion criteria.

1. Scientific articles that address the clinical usefulness of the Centor criteria modified by McIsaac for the diagnosis of acute pharyngotonsillitis in children.
2. Scientific articles with descriptive, cross-sectional methodological design (Cohort, case-control).
3. Scientific articles with good methodological quality according to compliance with items contained in the STROBE tool.
4. Gray literature (graduate and postgraduate theses available on the web).
5. Scientific articles published in Spanish and English.

Exclusion criteria

1. Scientific articles that, when critically evaluated, did not meet ten or less of the items contained in the STROBE tool.
2. Duplicate studies without access to download a pdf file.
3. Studies published outside the study period and study and search period.

Sources of information: Primary scientific articles included in this research.

Information search technique

The procedure to access the scientific evidence included in this review was through the use of manual searches using the Google Scholar search engine, identifying the repositories and the database with free online access described below:

Database: MEDLINE through the PubMed search engine: Link https://pubmed.ncbi.nlm.nih.gov/

Repositories:

Universidad Santiago de Guayaquil: http://repositorio.ucsg.edu.ec/

University of Cuenca: https://dspace.ucuenca.edu.ec/

Steps for the execution of the bibliographic search strategy

Step 1 Identification of search terms (thesauri):

Use of the Google meta-search engine, we proceeded to identify the web page of the DeSC (Descriptors in Health Sciences) LINK: http://decs.bvs.br/E/homepagee.htm, where the PICO variables were typed to identify the thesauri (controlled language or search terms) that were subsequently used in the bibliographic search process, taking into account the above, the option "Consult the DeSC" was selected and we proceeded to search for the thesauri.

Step 2 Checking similarities of DeSC descriptors with MeSH descriptors

The search for evidence was carried out in two tools (databases and repositories) whose publication language is English and Spanish, which is why the similarity and discrepancy between the DeSC and MeSH descriptors were checked, and for this purpose, the MEDLINE database was accessed: Link: https://www.ncbi.nlm.nih.gov/mesh/.

After having corroborated the similarities between both descriptors, verifying the number or unique identifier, the search terms used in this review were defined, for which the comparative table shown below demonstrates this procedure:

Variables PICO	Number of a unique identifier	DeSH descriptor results	MeSH descriptor results
Child	D002675	"Preschool"	"Child, Preschool"
Diagnostic	D003933	"Diagnostic"	"Diagnostic"
	D010612 D014069	"Pharyngitis "Tonsillitis"	"Pharyngitis" "Tonsillitis"
Therapeutic efficacy	D016896	"Treatment Outcome"	"Treatment Outcome"

Step 3 Search string construction and definition

Search string construction: Use of Boolean operators

The logical or Boolean operator (AND) was used as follows in our search strategy "Child, Preschool" AND "Diagnostic" AND "Tonsillitis".

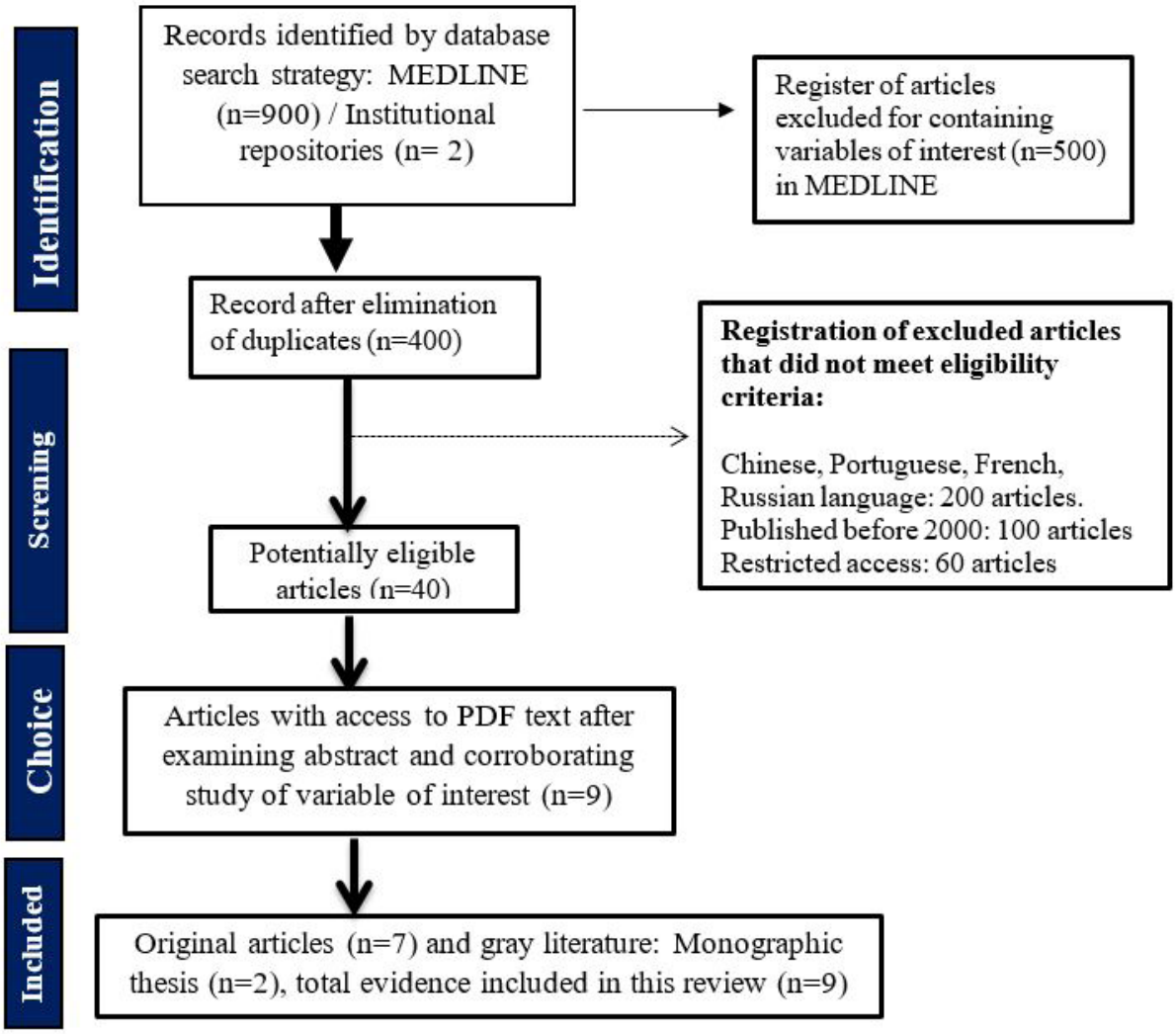
Step 4 Application of search strategies

The specific MeSH descriptors identified for the search of scientific articles in the MEDLINE database related to the topic under study were first typed into the PubMed search engine independently for each of the MeSH terms and then search strings were performed using Boolean operators. The DeSH terms identified for the search in the institutional repositories were used in the same way as described above.

Bibliographic search period

Study period: last 21 years (2000-2021).

Search date: May 15, 2021 - June 30, 2021.



PRISMA flowchart

Process of selection and exclusion of studies included in this systematic review.

Source: Adapted from the guide of methodological aspects to be evaluated in a systematic review provided by the Catholic University Redemptoris Mater, UNICA (2021).

Bibliographic review method

After the initial search (in the chosen database) and subsequent purging of duplicate references or those that did not contain the variable of interest, the final number of references was identified for the second phase of the review, which consisted of screening the content of the articles by reading the titles and abstracts of the articles and eliminating those articles that were not relevant to the objective of the review.

The methodological quality criteria of each article included were evaluated following the guidelines of the STROBE statement (2009). Each article was evaluated critically and intensively according to pre-established methodological quality parameters and those articles in which ten

or more of the items contained in the STROBE (2009) tool were identified were selected, it should be added that for each item identified within the articles a point was assigned, if any characteristic described in the tool has not identified a point was subtracted, at the end the items were added and subtracted to obtain an overall score. Also, the quality of evidence was established for each article using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) method taking as a reference the type of study included in this review.

Data extraction process: Data analysis.

The analysis technique for this systematic review was through the preparation of summary tables, where the most relevant information of each of the articles taken as a sample was consigned, for this purpose, it was evaluated one by one comparing various characteristics or distinctive points among the articles. The design of this summary table of findings was taken from the methodological guide for systematic reviews proposed by the Catholic University Redemptoris Mater (2021) and the guidelines mentioned in the PRISMA statement (2015).

Control of bias among studies.

Publication bias.

We included scientific articles that reflected both positive and negative results.

To minimize selection bias among the included articles.

We excluded those studies that did not meet the eligibility criteria and in the selection phase, the investigators read the abstracts and titles of eligible articles on three occasions in order to identify those that resembled our objective.

RESULTS AND DISCUSSION: SUMMARY OF EVIDENCE:

The complete characteristics of the nine included studies are detailed in Table 1 and 2.

Table 1

Publication data

(ID)	Authors	Year of publicaction	Publication title	Country of publication	Language of publication	Published in
1	Tintín et al	2013	Validation of the modified Centor scale for clinical diagnosis of acute streptococcal pharyngotonsillitis in patients aged 5 to 19 years. Health center no 1, 2013	Cuenca, Spain	Spanish-English	University of Cuenca Repository: https://dspace.ucuenca.edu.ec/bitstream/123456789/4985/1/MED217.pdf
2	Fornes et al	2019	Utility of clinical criteria for the proper diagnosis of pharyngotonsillitis in pediatric emergency care	Valencia, Spain	Spanish-English	Rev Esp Public Health. 2019; Vol. 93: November 20 e1-11.
3	Cifuentes y Jaramillo	2020	Diagnostic accuracy of Centor criteria in pharyngotonsillitis applied in children >4 years seen in the pediatric service of the General Hospital Less Milagro Dr. Federico Bolaños Moreira in the period May 2019-February 2020.	Guayaquil, Ecuador	Spanish	Santiago de Guyaquil Catholic University Repository: http://repositorio.ucsg.edu.ec/bitstream/3317/14901/1/T-UCSG-PRE-MED-946.pdf

(ID)	Authors	Year of publicaction	Publication title	Country of publication	Language of publication	Published in
4	Barbosa et al.	2014	Diagnosis of streptococcal pharyngotonsillitis in children and adolescents: clinical picture limitations	Brazil	English	Paulista Journal of Pediatrics, 32(4), 285–291.
5	Roggen et al.	2013	Centor criteria in children in a paediatric emergency department: for what it is worth	Belgium	English	BMJ open, 3(4), e002712.
6	Mazur et al.	2014	Empirical validation of Polish guidelines for the management of acute streptococcal pharyngitis in children	Lublin, Poland	English	International journal of pediatric otorhinolaryngology, 78(1), 102–106.
7	Nishiyama et al.	2018	Clinical features predicting group A streptococcal pharyngitis in a Japanese paediatric primary emergency medical centre	Japan	English	The Journal of international medical research, 46(5), 1791–1800.
8	Fine et al.	2012	Large-scale validation of the Centor and McIsaac scores to predict group A streptococcal pharyngitis	Boston, USA	English	Archives of internal medicine, 172(11), 847–852.

(ID)	Authors	Year of publicaction	Publication title	Country of publication	Language of publication	Published in
9	Brennan et al	2018	Adherence to guidelines for testing and treatment of children with pharyngitis: a retrospective study	Boston, USA	English	BMC Pediatr 18, 43 (2018).

Table 2. Contents of the publication

(ID)	Research design	Period, sample	Variables studied	Main results	Research findings	Methodological Quality	Quality of evidence (GRADE)
1	Transversal Validation of diagnostic test	July-September 2013 280 patients	Age Sex Sensitivity Specificity	Age: 42.5% (n=199) 5-9 years old (p=0.037) Sex: Female 54.6% (n=153) Sensitivity of the Modified Centor scale: 91.1% [CI 95% de 0,86– 0,97] Specificity: 97,7% [CI 95% de 0.96 – 1]	The modified Centor scale discriminates patients with streptococcal pharyngotonsillitis with high sensitivity and specificity compared to culture.	STROBE 22 points	Moderate

(ID)	Research design	Period, sample	Variables studied	Main results	Research findings	Methodological Quality	Quality of evidence (GRADE)
2	Cross-sectional, Analytical	Year 2016 3,771 patients	Age Gender Centor Criteria Specificity Sensitivity Paraclinical Test	Age: 60.3% (n=2273) older than or equal to 3 years. Sex: male 51.82% (n=1954). Centor criteria: Age> than 3 years: 97.4%. (n=112) Fever: 75.7% (n=87) (n=87) Adenopathy: 21.7% (n=25) (n=25) Tonsillar exudate: 53% (n=61) (n=61) Predictive analysis of McIsaac criteria yielded a sensitivity of 48.3%, specificity of 53.3%. Paraclinical test: Rapid Detection Test (RDT) in 58.1% (n=330) and positive in 41.9% (n=238). At least 3 criteria were met by 48.3% (n=115) of those with RDT+, of which the most frequent were age older than 3 years (97.4%); and 46.7% (n=154) of those with RDD- met them, where the most frequent was the absence of cold (91.6%).	The anamnesis and examination examination are important for the diagnosis of bacterial AAD but not sufficient, since clinical diagnosis without complementary tests has an error rate tests has an error rate of up to 25-50%. Diagnosis should therefore be based clinical criteria and objective tests to detect the microorganism	STROBE 21 Points Items not met: Do not specify sample size in the material and methods section.	Low

(ID)	Research design	Period, sample	Variables studied	Main results	Research findings	Methodological Quality	Quality of evidence (GRADE)
3	Observational, Analytical Retrospective	May 2019-February 2020 379 patients	Age Sex Sensitivity Specificity Paraclinical test	Average age:7.38 years Sex: 56.7% male Sensitivity: 99.72%. Specificity: 81.82%. Paraclinical test: Pharyngeal exudate	The Centor criteria modified by Mac Issac prove to be a rapid diagnostic tool for acute pharyngotonsillitis of Bactrian origin as it allows grouping of patients based on those who require immediate antibiotics and those who do not.	STROBE 22 POINTS	Moderate

(ID)	Research design	Period, sample	Variables studied	Main results	Research findings	Methodological Quality	Quality of evidence (GRADE)
4	Analytical Cross-sectional	78 patients	Centor Criteria Sensitivity Specificity Paraclinical test	Centor criteria Absence of coryza (OR = 1.80; p = 0.040) absence of conjunctivitis (OR = 2.47; p = 0.029) pharyngeal erythema (OR = 3.99; p = 0.006) pharyngeal exudate (OR = 2.02; p = 0.011) tonsillar swelling (OR = 2.60; p = 0.007) were significantly associated with strep throat tonsillitis. The highest clinical score is characterized by coryza. Absence, pharyngeal exudate, and pharyngeal erythema had a sensitivity of 45.6%, and 74.5% specificity. Paraclinical test: Pharyngeal exudate and latex particle agglutination test. (LPAT).	The clinical presentation should not be used to confirm streptococcal pharyngotonsillitis because its performance as a diagnostic test is low. Therefore, there is a need to improve the availability of diagnostic tests such as LPAT	STROBE 21 POINTS Items not met: Do not specify within the methods heading the period of study.	Moderate

(ID)	Research design	Period, sample	Variables studied	Main results	Research findings	Methodological Quality	Quality of evidence (GRADE)
5	Retrospective Cohort	2008 a 2010 441 patients	Overall prevalence Age Sex	Prevalence: 32%. Mean age: 5 years Sex: male (n=230) None of the individual symptoms or a Centor score ≥3 appeared to be effective in ruling out beta-hemolytic streptococcal infection. The pooled likelihood ratio for Centor criteria ≥3 was 0.67 [CI95% 0,50-0,90] for preschool children and 1.37 [CI95% 1,04-1,79] for older children.	Our results confirm the ineffectiveness of the Centor criteria as a predictor of the presence or absence of GABHS in a pharyngeal swab culture in children aged 2 to 15 years.	STROBE 22 POINTS	Moderate
6	Retrospective Cohort	November 2011 - May 2012 90 patients	Age Sex Sensitivity Specificity	Age: 6.6 years Sex: Male (n=52) The MacIsaac modified Centor criteria score 4 was specific and sensitive in 48.05% [CI95%: 36,5-59,7%]. The sensitivity, specificity, and diagnostic accuracy of RADT were 100%, 96%, and 98%, respectively.	Empirical antibiotic therapy in children with MCS score 4 (Centor modified by McIsaac) will result in significant overtreatment of those with non-streptococcal pharyngitis.	STROBE 22 points	Moderate

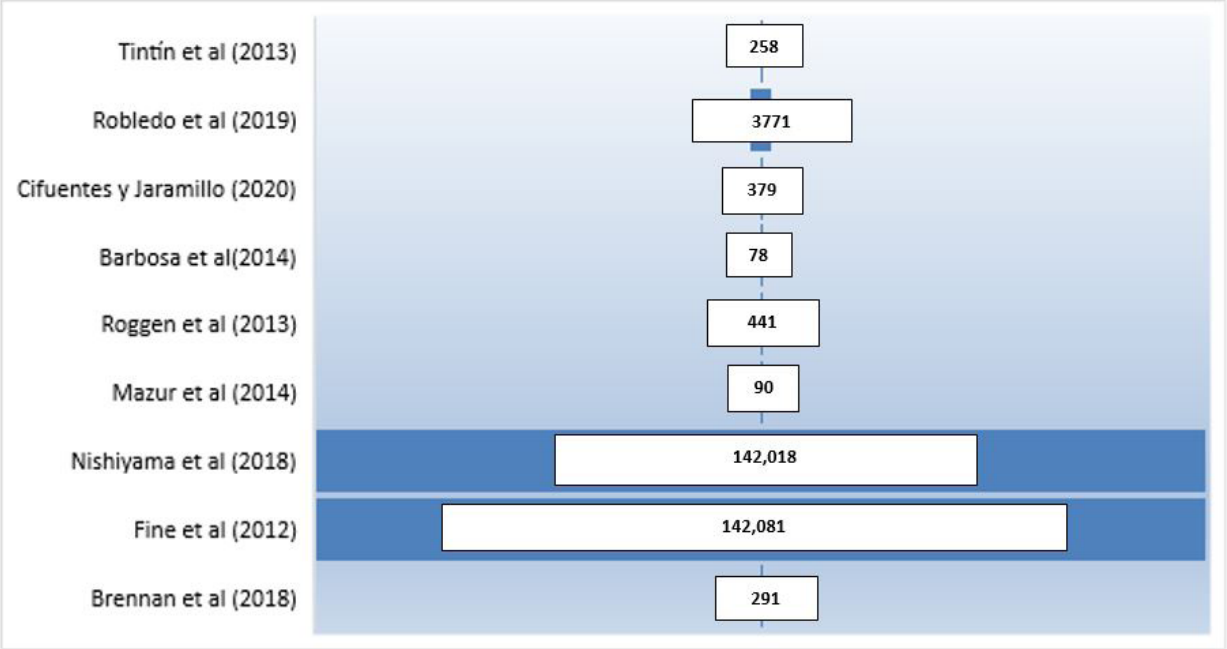
(ID)	Research design	Period, sample	Variables studied	Main results	Research findings	Methodological Quality	Quality of evidence (GRADE)
7	Retrospective Cohort	December 2010 - July 2015 142,018 patients	Prevalence rate	The prevalence rate for positive streptococcal pharyngoamigadalitis in the cohort was 32.5% (319/981) The prevalence rate for positive streptococcal pharyngoamigadalitis was 31.6% (12/36) in individuals with a McIsaac score of one point, 26.7% (58/218) with a score of two points, 30.8% (123/400) with a score of three points, and 38.5% (126/327) with a score of four or five points; these differences were significantly different between scores (p = 0.024). A McIsaac score of 4 or 5 significantly predicted group A beta-hemolytic streptococcus infection positivity, but the positive likelihood ratio was low at 1.30 [CI95%:1,09–1,55].	A score of 4 or more on the Centor criteria modified by McIsaac indicates signs important for predicting Group A beta-hemolytic streptococcus infection in many patients with pharyngitis but cannot be used alone to diagnose beta-hemolytic streptococcal pharyngotonsillitis.	STROBE 22 POINTS	Moderate

(ID)	Research design	Period, sample	Variables studied	Main results	Research findings	Methodological Quality	Quality of evidence (GRADE)
8	Retrospective Cohort	September 1, 2006, through December 1, 2008 142,081 patients	Sex Risk of group A beta-hemolytic streptococcus infection according to the presence of Centor criteria	The predominant sex in both cohorts was male. Patients younger than 15 years: 23% [CI95%22%-23%] tested positive for group A streptococcal pharyngotonsillitis infection, including 7% [CI95%,7%-8%] of those with a Centor score of Zero,12% [CI95%, 11% -12%] of those with a Centor score of one 21% [CI95%, 21% -22%] of those with a Centor score of 2, 38% [CI95%, 38% -39%] of those with a Centor score of three; and 57% [CI95%, 56% -58%] of those with a Centor score of four. For patients aged 3 years or older, 27% [CI95%, 27% -27%] tested positive for group A streptococcal pharyngotonsillitis infection, including 8% [CI95%, 8% -9%] of those who tested positive with a McIsaac score of 0.14% [CI95%, 13% -14%] of those with a McIsaac score of one, 23% [CI95%, 23% -23%] of those with a McIsaac score of two, 37% [CI95%, 37% -37%] of those with a McIsaac score of three and 55% [CI95%, 55% -56%] of those with a McIsaac score of four.	The usefulness of the Centor criteria modified by MacIsaac to establish the probability of pharyngotonsillitis due to beta-hemolytic streptococcus infection is validated.	STROBE 22 POINTS	Moderate

(ID)	Research design	Period, sample	Variables studied	Main results	Research findings	Methodological Quality	Quality of evidence (GRADE)
9	Retrospective Cohort	Agosto 2011 - Julio 2012 291 pacientes	Age Sex Sensitivity Specificity Centor Criteria	Average age: 8 years old Sex: female Susceptibility: 55%. Specificity 55%. The 87(30%) had all five components of the McIsaac score documented. There was sufficient data to classify the score as <2 or ≥2 in 234(80%); among these, 96% indicated testing rapid streptococcal testing and/or a throat culture in an outpatient setting.	Most tests for group A strep pharyngotonsillitis infection in children with pharyngitis are indicated, although clinicians do not regularly document all elements of a validated pharyngitis scoring tool	STROBE 22 POINTS	Moderate

A total of 900 articles were identified after applying the search strategy in the MEDLINE database using the PUBMED meta-search engine and two monographic theses (gray literature); scientific evidence that did not meet the eligibility criteria or did not contain the variable of interest was excluded, This left 40 potentially eligible articles which, after being subjected to a critical reading of their content, nine articles were selected to form part of this review (see PRISMA diagram). It is worth mentioning that in the nine articles included in this review, more than ten items described in the STROBE(2009) tool were identified, which shows that they have good methodological quality and their writing follows international guidelines for scientific publication.

Regarding the place where the included evidence was published, two were published in the United States of America and Spain, followed by one article published in Ecuador, Brazil, Poland, Belgium, and Japan, respectively.



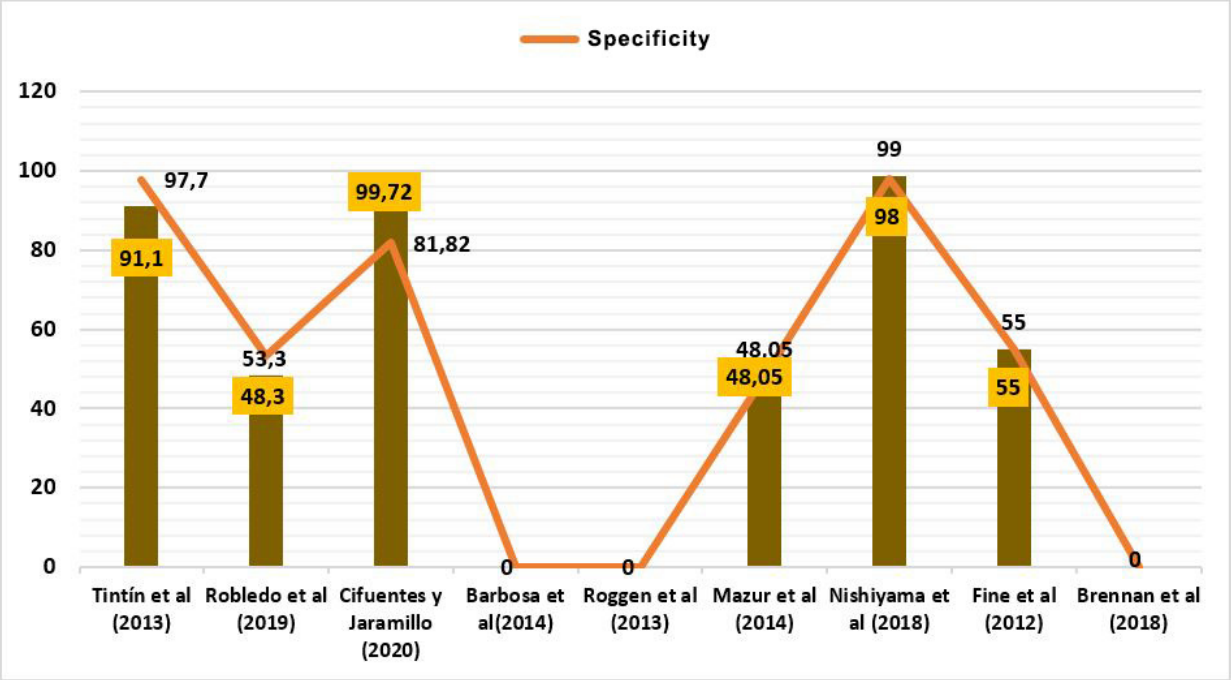
Graph 1

Distribution of the sample size reported in the included articles.

Source: information extracted from the scientific articles included in this review and synthesized in the summary tables of findings 1 and 2.

As shown in the tree diagram (Figure 1), the cohorts that included the largest number of participants were those conducted by Noshiyama et al. (2018) and Fine et al. (2012) followed by Fornes et al. (2019), when comparing the results validating the use of the Centor criteria modified by MacIsaac, it was observed that Fine et al. (2012) and Robledo et al. (2019) reported the use of these criteria for the diagnosis of acute pharyngotonsillitis as predictors of Group A beta-hemolytic streptococcus infection; however, both investigations emphasized the importance of using these criteria as a filter to differentiate patients with pharyngotonsillitis of bacterial etiology from viral etiology, emphasizing that these criteria are of clinical utility to support antibiotic prescription in patients and should therefore be detailed in the medical consultation in the clinical record.

According to the distribution of age averages calculated and reported in the research conducted by Fornes et al. (2019), Cifuentes and Jaramillo (2020), Mazur et al. (2014), Roggen et al. (2013), and Brennan et al. (2018), pediatric patients affected by acute pharyngotonsillitis of bacterial etiology predominate in an age range of 3 to 8 years and boys are more affected than girls (only two of the six articles identified prevalence in girls over boys) this study provides valuable information showing that cases are concentrated in the first years of life, especially at school age which allows us to emphasize prevention measures in this age group.



Graph 2

Sensitivity and specificity of the Centor Criteria modified by MacIsaac.

Source: information extracted from the scientific articles included in this review and synthesized in finding summary tables 1 and 2.

Regarding the sensitivity and specificity of the Centor Criteria modified by MacIsacc (Figure 2), it was shown that of the nine articles included, only three did not evaluate the sensitivity and specificity of the Centor criteria for the diagnosis of pharyngotonsillitis of bacterial etiology. Following the results provided in the included investigations, it was observed that the sensitivity, i.e. the probability of correctly classifying a sick individual using the Centor criteria modified by MacIsaac, is above 40% probability.

The above supports the opinion of researchers Tintin et al. (2013), Fornes et al. (2019), Cifuentes and Jaramillo (2020), Mazur et al. (2014), Nishiyama et al. (2018), Fine et al. (2012) which emphasize the statement that these criteria should be used in a complementary manner with paraclinical tests to confirm the diagnosis associated with streptococcal infection. However, they emphasize that the usefulness of these criteria allows the clinician to identify and support the empirical prescription of antibiotic treatment, so they suggest that these criteria should be identified and recorded during the consultation, to establish the risk of streptococcal infection according to the criteria identified in patients, As observed in this review (Figure 2), these criteria are highly specific to detect patients with pharyngotonsillitis of bacterial etiology and therefore become a useful tool to classify patients who require antibiotic treatment or not, because as it is widespread in the literature and evidence in clinical practice, in children under two years of age

is more frequent the infection of the pharynx by viral agents and in children older than three years is more frequent the infection of the palatine tonsils and pharynx by bacterial agents.

Another important point to address is that despite the sensitivity and specificity of these criteria as mentioned above, most researchers agree that they should be complemented with other paraclinical tests for an accurate diagnosis. As shown in Table 2, most authors except for Nishiyama et al. (2018) and Fine et al. (2012), studied the efficacy of the Centor criteria modified by MacIsaac for the diagnosis of acute streptococcal pharyngotonsillitis by comparing them with other paraclinical tests such as Rapid Detection Test (RDT), pharyngeal exudate culture and latex particle agglutination test.

Evidently, the research carried out by the authors mentioned above, demonstrated the superiority of these paraclinical tests for the confirmatory diagnosis of streptococcal infection in fact they emphasize that anamnesis and examination are important for the diagnosis of acute bacterial pharyngotonsillitis but not sufficient, since clinical diagnosis without complementary tests has an error rate of more than 50- 60% approximately.

Roggen et al. (2013) and Nishiyama et al. (2018) determined the prevalence of pharyngotonsillitis of bacterial etiology. Both investigations with an interval of more than five years showed that the prevalence of this clinical entity ranges between 32-32.5%, demonstrating that pharyngotonsillitis in its great majority is of viral etiology so that not all cases that come to the medical office should be treated with outpatient antibiotic therapy.

Regarding the detailed description of the Centor criteria modified by MacIsaac in the included articles (See table 2), it was evidenced that two of the nine articles, described the prevalence (Fornes et al ,2019) and calculated the risk (Barbosa et al., 2014) according to the separate presence of each criterion. Barbosa et al. (2014) established that the risk of having group A beta-hemolytic streptococcus infection was twice as high in those patients who had tonsillar swelling and did not have conjunctivitis. It also established that presenting pharyngeal erythema increased the risk up to three times more compared to those who did not present this criterion.

On the other hand, Roggen et al. (2013) identified that pediatric patients who met three or more criteria had approximately twice the risk [1.37: 95%CI 1.04-1.79] of streptococcal infection. In this regard, Nishiyama et al. (2018) established that those patients who met four or five criteria had twice the risk [1.30: 95%CI 1.09-1.55] compared to those patients who did not. The above findings demonstrate that the likelihood of having a streptococcal infection increases as the Centor criteria modified by MacIsaac are met, so the clinician should perform a thorough oropharyngeal examination to assess the presence or absence of these criteria, which, according to the scientific evidence included, are very useful in clinical practice.

CONCLUSIONS

The scientific literature reviewed is reliable since it has good methodological quality. It was identified that the most frequently described Centor criteria modified by McIsaac are adenopathy and tonsillar erythema, showing that these criteria are useful for the diagnosis and initiation of antibiotic treatment in acute pharyngotonsillitis, since they allow predicting the probability of having a streptococcal infection, which increases as the Centor criteria modified by MacIsaac are met, so the clinician should record in the file an exhaustive oropharyngeal examination to evaluate the presence or absence of these criteria, which should be complemented with paraclinical tests for an accurate diagnosis since they are not 100% specific for the confirmatory diagnosis, it was identified that the higher the score or presence of these criteria the higher the risk of infection by group A beta-hemolytic streptococcus.

THANKS

The authors would like to thank the faculty of the diploma course in research methodology with emphasis on data analysis for providing the tools to successfully carry out this research.

DECLARATION OF INTERESTS

Conflict of interest

The authors have declared no conflict of interest.

Source of funding:

None.

Ethical approval

Ethical approval was not required since this is a secondary analysis of data derived from published primary studies. It is worth mentioning that this article originated from the research carried out by Haydalina Bermúdez and José Joaquín Castillo and tutored by Dr. Fernanda Pineda Gea with the aim of obtaining the Degree of Doctor of Medicine and Surgery awarded by the Catholic University Redemptoris Mater.

CONTRIBUTION OF THE AUTHORS

Fernanda Pineda-Gea: development of protocol and research report, evaluation of the quality of data extraction, searches, identification of studies, data extraction and preparation of the first and last version of the manuscript for review.

Virginia Lucia López-Fitoria preparation of the first version of the article and preparation of the manuscript for review.

Haydalina Bermúdez and José Joaquín Castillo: development of protocol and research report, data extraction, searches, identification of studies.

All authors have reviewed and approved the final version of the text.

BIBLIOGRAPHY

Brennan-Krohn, T., Ozonoff, A. y Sandora, TJ (2018) Adherencia a las pautas para las pruebas y el tratamiento de niños con faringitis: un estudio retrospectivo. BMC Pediatr 18, 43 (2018). https://doi.org/10.1186/s12887-018-0988-z

Barbosa Júnior, Aurelino Rocha; Oliveira, Cláudia Di Lorenzo; Fontes, Maria Jussara Fernandes; Lasmar, Laura Maria de Lima Bezário Facury; Camargos, Paulo Augusto Moreira (2014). Diagnosis of streptococcal pharyngotonsillitis in children and adolescents: clinical picture limitations. Revista Paulista de Pediatría, 32(4), 285–291. https://doi.org/10.1590/S0103-05822014000400002

Cifuentes Altamirano J.A y Jaramillo Villamar J.H (2020). Precisión diagnóstica de los criterios de Centor en faringoamigdalitis aplicados en niños >4 años atendidos en el servicio de pediatría del Hospital General Less Milagro Dr. Federico Bolaños Moreira en el período mayo 2019-febrero 2020. Tesis para optar al título de médico. Repositorio de la universidad católica Santiago de Guyaquil: http://repositorio.ucsg.edu.ec/bitstream/3317/14901/1/T-UCSG-PRE-MED-946.pdf

Fine, A. M., Nizet, V.,y Mandl, K. D. (2012). Large-scale validation of the Centor and McIsaac scores to predict group A streptococcal pharyngitis. Archives of internal medicine, 172(11), 847–852. https://doi.org/10.1001/archinternmed.2012.950

Fornes Vivas, Rosa, Robledo Díaz, Luis, Carvajal Roca, Eva, Navarro Juanes, Agustín y Pérez Feito, Carlos. (2019). Utilidad de los criterios clínicos para el adecuado diagnóstico de la faringoamigdalitis en la urgencia pediátrica. Revista Española de Salud Pública, 93 e201911061. http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1135-57272019000100029&lng=es&tlng=es.

Guía de Universidad Católica Redemptoris Mater (UNICA) Aspectos metodológicos a tomar en cuenta en la elaboración, redacción y evaluación de la calidad metodología de una revisión sistemática (2021) 2 Ed.

Mazur, Elżbieta; Bochyńska, Ewa; Juda, Marek; Kozioł-Montewka, Maria (2014). Empirical validation of Polish guidelines for the management of acute streptococcal pharyngitis in children. International Journal of Pediatric Otorhinolaryngology, 78(1), 102–106. https://doi.org/10.1016/j.ijporl.2013.10.064

Nishiyama, M., Morioka, I., Taniguchi-Ikeda, M., Mori, T., Tomioka, K., Nakanishi, K., Iijima, K. (2018). Características clínicas que predicen faringitis por estreptococo del grupo A en un centro médico de urgencias primarias pediátricas de Japón. Revista de Investigación Médica Internacional, 46 (5), 1791-1800. https://doi.org/10.1177/0300060517752954

STROBE. (2009). Herramienta de verificación STROBE. Consultado el 20 de agosto de 2020, de https://www.strobe-statement.org/index.php?id=available-checklists

PRISMA (2015). Herramienta de verificación PRISMA. Consultado el 07 de agosto de 2020, de https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/2046-4053-4-1/tables/3

Roggen, I.; van Berlaer, G.; Gordts, F.; Pierard, D.; Hubloue, I. (2013). Centor criteria in children in a paediatric emergency department: for what it is worth. BMJ Open, 3(4), e002712–e002712. doi:10.1136/bmjopen-2013-002712

Tintin singueza, MS; Tito Moreno, MV; Urguiles Figeroa, MF (2013) Validación de la escala de Centor modificada para el diagnóstico clínico de faringoamigdalitis aguda estreptocócica en pacientes de 5 a 19 años de edad. Centro de salud no 1, 2013.Tesis para optar al título de médico. Repositorio universidad de Cuenca: https://dspace.ucuenca.edu.ec/bitstream/123456789/4985/1/MED217.pdf |