Psychometric properties of scales used for grading the severity of bronchial obstruction in pediatrics: A systematic review and meta-analysis

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Introduction. In pediatrics, identifying the severity of bronchial obstruction in an early manner is a decisive factor. Objective. To assess the psychometric properties of the scales for grading the severity of bronchial obstruction in pediatric patients. Population and Method. This was a systematic review of studies on the validity and reliability of scales for grading the severity of bronchial obstruction conducted in infants and children younger than 3 years old. The search was conducted in Medline, WoS, EMBASE, SciELO, and Google Scholar. The correlation coefficient corresponding to each article was included in a random effects model to establish the criterion validity and reliability using the weighted averages of coefficients as per the sample size. Results. A total of 9 articles were included, which accounted for 2699 children; 3 articles had an adequate or excellent methodological quality. Four articles established the concurrent criterion validity considering oxygen saturation, with a weighted correlation coefficient of -0.627 (95% confidence interval [CI]: -0.767 to -0.431, p 0.001); 2 articles established the convergent criterion validity, with a weighted correlation coefficient of 0.809 (95% CI: 0.721 to 0.871, $p < 0.001$); 6 articles established the inter-observer reliability, with a weighted correlation coefficient of 0.500 for kappa and 0.891 for the intraclass correlation coefficient. Conclusion. The assessment of psychometric properties to support the use of scales for grading the construct "severity of bronchial obstruction" showed a moderate to adequate criterion validity. The percentage of agreement among observers in terms of the studied measure (severity of bronchial obstruction) was adequate; however, weaknesses such as the article design should be taken into account since it may affect the internal validity of results.

Obstructive pulmonary diseases

Result reliability

Result reproducibility

Result validity

Scales

bronchus obstruction

clinical assessment

disease severity

Embase

Hospital of Wisconsin Respiratory Score

human

intrarater reliability

Kristjansson scale

Medline

meta analysis

outcome assessment

oxygen saturation

pediatrics

psychometry

Respiratory Distress Assessment Instrument

Respiratory distress scale

respiratory tract disease assessment

Review

systematic review

Tal score

Wang score

Article

disease severity assessment

rating scale

bronchiolitis

child

chronic obstructive lung disease

infant

preschool child

psychometry

severity of illness index

Bronchiolitis

Child

Child, Preschool

Humans

Infant

Lung Diseases, Obstructive

Psychometrics

Severity of Illness Index