Olfactory sensory and perceptual evaluation in newborn infants: a systematic review
Rosana Tristão, Lucas Lauand, Kassandra Falcão, Luiz Brant, Geraldo Fernandes, Karina Costa, Jan Spilski, Thomas Lachmann

To enable PROSPERO to focus on COVID-19 registrations during the 2020 pandemic, this registration record was automatically published exactly as submitted. The PROSPERO team has not checked eligibility.

Citation

Review question
How to evaluate the olfactory system reaction in newborn infants? A systematic review of methods of investigation of the olfactory system function in infants. We aim to answer if there is any existent evaluation tool for smell function able to be applicable in clinical context, for instance in newborn infants infected by SARS-COV-2 (Covid).

Searches
Articles with full text published in the electronic bibliographic databases: PubMed, Web of Science, The Cochrane Library, MEDLINE, LILACS, Scopus, EBSCOhost, and PsycArticles will be studied. The searches were conducted from September 21th to October 1th and will be re-run just before the final analyses to retrieve further studies for inclusion. There will be included articles in English, French, Spanish, Portuguese. Studies until the date the searches were run were sought, with no publication period restriction.

Database search will involve the keywords: neonate, newborn, infant, fetus, foetus, evaluation, assessment, test, smell, psychophysical method, olfaction, olfactory, nasal sensor, odour, odorant, nasal chemosensory, olfactory bulb.

Types of study to be included
Inclusion criteria: Peer-reviewed studies published in English, French, Spanish and Portuguese, involving human participants under 28 days old, presenting evaluation methods of the olfactory system, with no publication period limitation.

Exclusion criteria: Abstracts (e.g., from conferences), theses, monographs, dissertations, research conducted with animals or human adults, studies that did not present the methodology, conclusions or results of the investigation, studies that did not present clearly the method of olfaction evaluation, studies presenting the effects of olfaction in pain or feeding habits.

Condition or domain being studied
Olfactory system development

Participants/population
Inclusion: Neonates (under 29 days old)

Exclusion: humans over 28 days old

Intervention(s), exposure(s)
The evaluation of olfactory system reactions to environmental stimuli in infants is defined in terms of methodological as theoretical approaches of experimental and clinical assessment tools. These
approaches are mainly based on psychophysical area of study and can be
based on both, behavioral and physiological methods. Examples can be found
in studies describing early abilities of newborn babies for behaviors or
heart rate variability showing memory of maternal food preferences or mother’s
breast milk, and also from studies that analyses chemosensation in fetus,
showing skills as early as first gestation trimester advance,
revealing high sensibility for detection and discrimination to different odors.

Comparator(s)/control
Not applicable.

Main outcome(s)
Establishing the validated smell evaluation tools feasible to be applied in odor studies, presenting the limits and facilitations for the assessment of the olfactory system responses in newborn infants.

* Measures of effect
Not applicable.

Additional outcome(s)
Not applicable.

* Measures of effect
Not applicable.

Data extraction (selection and coding)
Titles and abstracts of studies retrieved using the search strategy and those from additional sources will be screened independently by three review authors to identify studies that potentially meet the inclusion or exclusion criteria outlined above. The studies selected by at least one of the reviewers will advance for full text analysis. The full text of these potentially eligible studies will be retrieved and independently assessed for eligibility by two review team members. Any disagreement between them over the eligibility of particular studies will be resolved through discussion with a third reviewer.

A standardized, pre-piloted form will be used to extract data from the included studies for assessment of risk of bias and evidence synthesis. The following data will be extracted from the full text of studies: study population; study setting; details of the stimuli presentation; study methodology; outcomes. Two review authors will extract data independently, discrepancies will be identified and resolved through discussion (with a third author where necessary). Missing data will be requested from study authors, if necessary. Mendeley and Excel will be used to track the review of all articles, and all extracted data from each study will be saved in an Excel spreadsheet.

Risk of bias (quality) assessment
Risk of bias will be assessed by Cochrane Collaboration’s Risk of Bias Assessment tool. Two independent reviewers will evaluate the quality of published studies using this tool. Any discrepancy will be settled with the help of a third reviewer.

Strategy for data synthesis
A formal narrative synthesis of data will be conducted by a comparative analysis of the studies. Interpretation of results will involve summarizing the main findings and relating them to the previously published data in Psychophysical and Neurological Science, describing the implications of the results, explaining possible physiological mechanisms involved, commenting on similarities and differences across the different methodological procedures, discussing limitations and strengths, noting possible sources of bias, imprecision, or controversies, suggesting future research directions, and noting the clinical significance of the
review on patient care.

**Analysis of subgroups or subsets**
This is a qualitative synthesis and while subgroup analyses may be undertaken, it is not possible to specify the groups in advance.

**Contact details for further information**
Rosana Tristão
rmtt@unb.br

**Organisational affiliation of the review**
University of Brasilia, Brasilia, Brazil
http://fm.unb.br/

**Review team members and their organisational affiliations**
Professor Rosana Tristão. University of Brasilia, Brasilia, Brazil
Mr Lucas Lauand. Faculty of Medicine, Area of Medicine of Child and Adolescent, University of Brasilia
Ms Kassandra Falcão. Faculty of Medicine, Area of Medicine of Child and Adolescent, University of Brasilia
Mr Luiz Brant. Faculty of Medicine, Area of Medicine of Child and Adolescent, University of Brasilia
Assistant/Associate Professor Geraldo Fernandes. Faculty of Medicine, Area of Medicine of Child and Adolescent, University of Brasilia
Professor Karina Costa. Faculty of Medicine, Area of Medicine of Child and Adolescent, University of Brasilia
Professor Jan Spilski. Center for Cognitive Science, University of Kaiserslautern
Professor Thomas Lachmann. Center for Cognitive Science, University of Kaiserslautern

**Type and method of review**
Systematic review

**Anticipated or actual start date**
08 September 2020

**Anticipated completion date**
20 January 2021

**Funding sources/sponsors**
None to declare.

**Conflicts of interest**
The other authors declare that they have no known conflicts of interest.

None known

**Language**
English

**Country**
Brazil, Germany

**Stage of review**
Review Ongoing

**Subject index terms status**
Subject indexing assigned by CRD

**Subject index terms**
MeSH headings have not been applied to this record

**Date of registration in PROSPERO**
20 December 2020

**Date of first submission**
19 November 2020

Details of any existing review of the same topic by the same authors
Not applicable

Stage of review at time of this submission

<table>
<thead>
<tr>
<th>Stage</th>
<th>Started</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary searches</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Piloting of the study selection process</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Formal screening of search results against eligibility criteria</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Data extraction</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Risk of bias (quality) assessment</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Data analysis</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.

The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

Versions
20 December 2020

This information has been provided by the named contact for this review. CRD has accepted this information in good faith and registered the review in PROSPERO. The registrant confirms that the information supplied for this submission is accurate and complete. CRD bears no responsibility or liability for the content of this registration record, any associated files or external websites.