

# INPLASY

## Protocol for a Systematic Review on the Use of Orodispersible Tablets in Paediatrics

INPLASY2025110022

doi: 10.37766/inplasy2025.11.0022

Received: 9 November 2025

Published: 9 November 2025

Farhaj, S; Ahmad, N; Hamid, O; Conway, BR; Ghori, MU.

**Corresponding author:**  
Muhammad Usman Ghori

m.ghori@hud.ac.uk

**Author Affiliation:**  
University of Huddersfield.

### ADMINISTRATIVE INFORMATION

**Support** - University of Huddersfield.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY2025110022

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 9 November 2025 and was last updated on 9 November 2025.

### INTRODUCTION

**Review question / Objective** Children are often underserved by oral medicines designed primarily for adults, leading to off-label use, extemporaneous manipulation of dosage forms and an increased risk of dosing inaccuracy. This systematic review aims to synthesise recent advances in paediatric orodispersible tablets (ODTs), focusing on how these formulations can better meet age-appropriate needs.

The objective is to identify, describe and compare experimental studies that report the development and evaluation of ODTs relevant to paediatric use, including those labelled as “fast dissolving”, “orally disintegrating”, “mouth-dissolving” or “rapid dissolving” tablets. Specifically, the review will examine (i) manufacturing technologies and process routes used to produce paediatric ODTs, (ii) selection and performance of disintegrants and co-processed excipients, (iii) taste-masking strategies and their impact on palatability, and (iv)

in-vitro disintegration and dissolution methods, including compendial and modified tests designed to better simulate the paediatric oral environment.

By collating and critically appraising these data, the review seeks to provide an evidence-based overview of the current state of paediatric ODT development and to identify gaps and priorities that will guide future research and translation into clinical practice. Children are often underserved by oral medicines designed for adults, leading to off-label use and workarounds that risk dosing inaccuracy. To synthesise recent advances in paediatric orodispersible tablets (ODTs), covering manufacturing technologies, disintegrant choices, taste-masking strategies and in-vitro disintegration methods.

**Rationale** Despite significant advances in drug-delivery science, most oral medicines on the market are still designed for adults rather than children. Paediatric patients differ from adults in swallowing ability, taste and texture preferences,

dosing needs and pharmacokinetics. In practice, this mismatch leads to off-label or unlicensed use of adult dosage forms, tablet splitting or crushing, and extemporaneous liquid preparations, all of which can compromise dose accuracy, stability and acceptability.

Liquid formulations are often considered first-line for children, but they are associated with challenges such as higher transport and storage costs, need for cold chain in some cases, limited shelf-life and reliance on potable water for reconstitution. Solid oral dosage forms are more stable and economical, yet conventional tablets and capsules are not suitable for many infants and younger children who have difficulty swallowing whole units.

Orodispersible tablets (ODTs) provide an attractive compromise: they are stable as solid dosage forms but rapidly disintegrate in the mouth to form a solution or suspension, reducing the need for chewing or concomitant water and improving swallowability and adherence. Regulatory agencies and organisations such as the EMA, FDA and WHO have highlighted the importance of child-appropriate oral formulations, and ODTs are increasingly recognised as a promising platform in this context.

Several narrative reviews have discussed orodispersible dosage forms, paediatric oral drug delivery and patent landscapes for child-friendly technologies. However, a focused, methodologically robust synthesis of experimental paediatric ODT formulations—covering manufacturing techniques, disintegrant strategies, taste-masking approaches and disintegration testing methods—remains limited.

This systematic review addresses that gap by applying PRISMA-based methods to identify and appraise experimental studies on paediatric-relevant ODTs published between 2015 and 2023. The findings will support formulators, clinicians and regulators in understanding current best practice, common pitfalls and priority areas for future development, ultimately contributing to more acceptable, safe and effective medicines for children.

**Condition being studied** The “condition” addressed in this review is the challenge of providing age-appropriate, acceptable and accurate oral drug delivery for paediatric patients using orodispersible tablets.

Many children have swallowing difficulties or dysphagia, and are unwilling or unable to take conventional tablets and capsules. At the same time, liquids may be impractical or unsuitable because of storage, stability, taste and dosing-accuracy issues. ODTs are intended to overcome

these barriers by rapidly disintegrating in the mouth, improving swallowability, palatability and adherence.

The review focuses on experimental evidence relating to paediatric-relevant ODTs, including formulation strategies designed to optimise disintegration time, taste-masking, dose flexibility and overall acceptability for children.

## METHODS

**Search strategy** The search strategy was developed in accordance with PRISMA guidelines and encompassed the stages of identification, screening, eligibility and inclusion. A systematic search of published research articles was conducted for the period January 2015 to March 2023.

An inclusive search was implemented across the following electronic databases: PubMed, EMBASE, MEDLINE, Scopus and Google Scholar. The core search string combined terms for orodispersible dosage forms and paediatric populations, for example:

“fast dissolving tablet” OR “orodispersible tablets” OR “orally disintegrating tablets” OR “mouth-dissolving tablets” OR “rapid dissolving” AND

“Paediatric” OR “Paediatrics” OR “Pediatric” OR “Pediatrics” OR “children”.

Titles and abstracts of all retrieved records were screened to remove clearly irrelevant articles. Full texts of potentially eligible studies were then assessed in detail against the predefined inclusion and exclusion criteria. Reference lists of included articles and relevant reviews were hand-searched to identify any additional studies missed by the database search. Where information was incomplete or unclear, attempts were made (where appropriate) to clarify study details from the published text.

The search will not be restricted by country of origin or healthcare setting but will be limited to articles published in English and within the specified time window.

**Participant or population** The population of interest is paediatric patients for whom orodispersible/orally disintegrating tablets are intended. Eligible studies include experimental formulation and evaluation work where: (1) the target or stated population is paediatric, or (2) the dosage form is explicitly described as suitable or designed for paediatric use.

**Intervention** Orodispersible tablets and closely related dosage forms (e.g., orally disintegrating, mouth-dissolving or fast-dissolving tablets) that

are developed, evaluated or proposed for paediatric use. Interventions include different manufacturing technologies (e.g., direct compression, freeze-drying, spray-drying, sublimation, nanoparticle-in-tablet systems, semi-solid extrusion/3D printing), disintegrant and excipient strategies, and taste-masking approaches used in paediatric-relevant ODTs.

**Comparator** Where applicable, comparators may include: conventional tablets or capsules, liquid or dispersible paediatric formulations, or alternative ODT formulations and commercial reference products. Studies without an explicit comparator will still be eligible if they report formulation development and performance outcomes (e.g., disintegration time, dissolution, mechanical strength, acceptability).

**Study designs to be included** Primary experimental studies reporting the formulation and/or performance evaluation of paediatric-relevant ODTs, including in-vitro, in-vivo and clinical/acceptability studies. Non-primary research (narrative reviews, editorials, viewpoints), conference abstracts without sufficient methodological detail, and studies on non-ODT dosage forms will be excluded.

**Eligibility criteria** Inclusion criteria: 1. Original experimental research articles. 2. Formulations described as orodispersible, orally disintegrating, mouth-dissolving, fast-dissolving or rapid-dissolving tablets. 3. Clear relevance to paediatric use (stated paediatric target population, paediatric doses or child-appropriate formats). 4. Studies reporting formulation composition and/or performance outcomes (e.g., disintegration time, dissolution, taste-masking, mechanical properties, acceptability). 5. Publications in English between January 2015 and March 2023. Exclusion criteria: 1. Studies focusing exclusively on adult populations with no paediatric-relevant context. 2. Dosage forms other than ODTs (e.g., capsules, conventional tablets, transdermal systems) unless the ODT is the main focus. 3. Reports limited to devices, packaging or manufacturing operations without formulation performance data. 4. Narrative reviews, perspectives, editorials and conference abstracts lacking sufficient methodological detail. 5. Studies outside the defined time window or not published in English.

**Information sources** Information sources will include:

1. Electronic databases: PubMed, EMBASE, MEDLINE, Scopus and Google Scholar.

2. Reference lists of included studies and relevant reviews, which will be hand-searched to identify additional records.

No limits will be placed on the country of origin or healthcare setting; however, only studies published in English within the specified time frame will be included. Grey literature and trial registries will not be systematically searched, given the focus on published experimental formulation studies.

**Main outcome(s)** Main outcomes will include:

1. Formulation and process characteristics of paediatric-relevant ODTs (e.g., manufacturing route, excipients/superdisintegrants, taste-masking approach).
2. Disintegration and dissolution performance, including compendial and modified in-vitro methods and reported disintegration times.
3. Key quality attributes such as hardness, friability, content uniformity and stability, where available.
4. Reported palatability and acceptability outcomes in paediatric or proxy populations.

**Additional outcome(s)**

Additional outcomes will include:

1. Temporal trends in paediatric ODT publications (e.g., number of studies per year).
  2. Geographic distribution of research activity.
  3. Mapping of active pharmaceutical ingredients to commercially available paediatric products, where such information is reported.
- Not applicable.

**Data management** The data will be organised using Microsoft Excel and stored using the OneDrive system on the University of Huddersfield's secure server.

**Quality assessment / Risk of bias analysis** Risk of bias for all eligible studies will be assessed using a previously published framework developed by the review team, which covers six key domains: (i) research rationale, (ii) description of methodology, (iii) characterisation and testing, (iv) description of results, and (v) discussion and conclusions. Two reviewers will independently apply this framework to each study, with disagreements resolved by discussion and, if needed, consultation with a third reviewer. Domain-level assessments will be summarised descriptively and graphically to characterise the overall quality and risk-of-bias profile of the evidence base.

**Strategy of data synthesis** Information was extracted from all eligible studies using a predefined template, which included details such as the type of formulation, aim, manufacturing

---

technique, excipients used, characterisation test and the overall findings of the study. The gathered data were then organised into a table format using Microsoft Word 2019.

curation; Writing - Original draft and Writing-Review and editing; Supervision; Project administration.  
Email: m.ghori@hud.ac.uk

### Subgroup analysis

Where data permit, subgroup or stratified narrative analyses will explore:

1. manufacturing route (e.g., direct compression vs freeze-drying vs 3D printing),
2. disintegrant type (natural, semi-synthetic, synthetic, co-processed),
3. use of taste-masking strategies, and
4. geographic region of study origin or target indication.

These analyses will remain descriptive and hypothesis-generating rather than inferential.

**Sensitivity analysis** No formal quantitative sensitivity analyses are planned because the review is based on heterogeneous experimental formulation studies and will use narrative synthesis rather than meta-analysis. Informally, the robustness of conclusions will be explored by considering the impact of excluding studies judged to be at higher risk of bias or with particularly sparse methodological reporting, and by highlighting where findings are supported by multiple, independent studies versus single reports.

**Language restriction** Studies published in English were selected.

**Country(ies) involved** United Kingdom.

**Keywords** Orally disintegrating tablets; Formulation development; Compression; Superdisintegrants; Disintegration.

### Contributions of each author

Author 1 - Samia Farhaj - Methodology; Validation; Data curation; Writing - Original draft and Writing-Review and editing.

Email: samia\_rafat13@yahoo.com

Author 2 - Noman Ahmad - Validation; Writing-Review and editing.

Email: noman.ahmad@hud.ac.uk

Author 3 - Omar Hamid - Validation; Writing-Review and editing.

Email: omar.hamid@hud.ac.uk

Author 4 - Barbara R. Conway - Conceptualisation; Methodology; Validation; Data curation; Writing - Original draft and Writing- Review and editing; Supervision.

Email: b.r.conway@hud.ac.uk

Author 5 - Muhammad Usman Ghori - Conceptualisation; Methodology; Validation; Data