Developing Orodispersible Films for Paediatric Antiemetics

Combining laboratory research and patient insights to improve anti sickness medicines for children

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Background

Introduction

- Chemotherapy induced nausea and vomiting (CINV) affects up to 80% of patients on chemotherapy
- Current anti sickness medicines: syrups, tablets, injections
- Problems: bad taste, swallowing difficulties, needle anxiety

- **CINV:** Affects up to 80% of children on chemotherapy. Causes distress, appetite loss, dehydration, and poor compliance.
- **Current treatments:** Tablets (hard to swallow), syrups (bitter taste, large volumes), infusions (effective but invasive).
- **ODFs:** Thin films placed on the tongue that dissolve within seconds. No swallowing, no water. Useful for rapid relief when children feel sick.

Laboratory Research

Orodispersible Films are created using electrospinning.

Electrospinning

- A drug-polymer solution is pushed through a needle with high voltage
- Liquid is stretched into ultra fine fibres, thinner than a hair
- Fibres collect on a flat surface, forming a thin film
- Produces large surface area → rapid drug dissolution
- Ensures drug is evenly distributed in the film

Characterised with:

- **TGA:** measured thermal stability and moisture loss.
- **DSC:** identified melting points, phase changes, and compatibility.
- **PXRD:** determined crystalline vs amorphous drug forms and checked purity.
- **SEM:** imaged surface morphology and fibre structure.
- **UV-Vis:** measured drug content and release profiles.

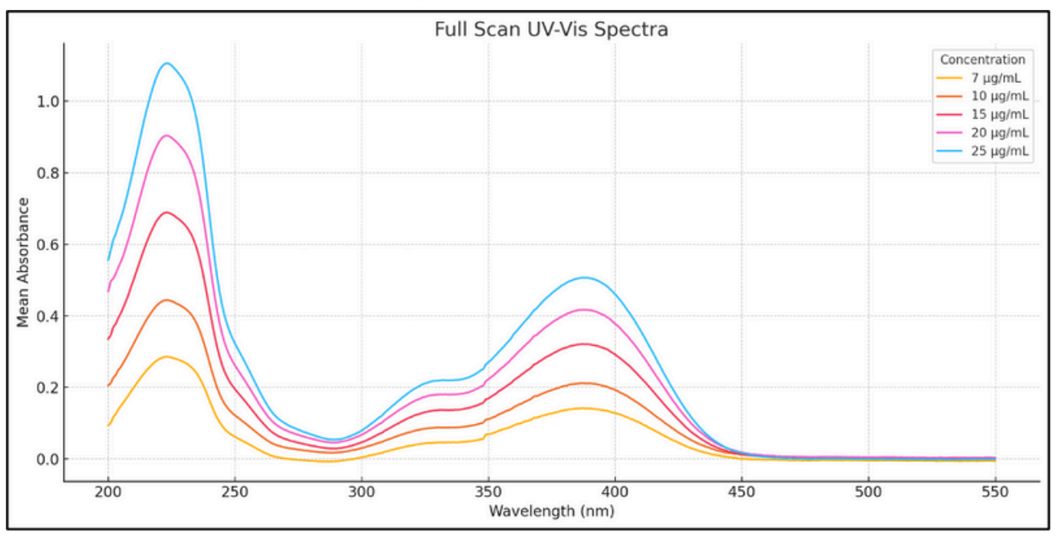

Figure 1. UV-Vis calibration curve for ondansetron.

Survey Method

- Survey adapted from previous Laidlaw Scholar (Diya Asawa, 2024).
- Conducted with 19 families at GOSH oncology/haematology department.
- Explored: severity, frequency, timing, and duration of CINV; coping strategies; treatment experiences; and preferences for dosage forms.
- Families asked to rank formulations: tablets, crushed tablets, dispersible tablets, liquids, infusions, and ODFs.

Findings and Results

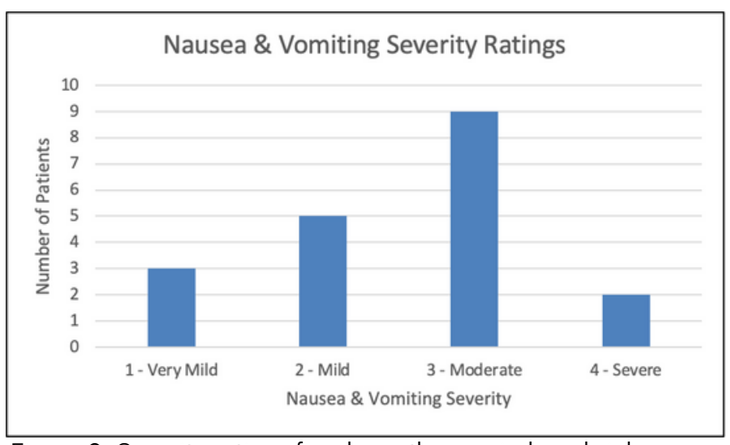

Figure 2. Severity ratings for chemotherapy induced sickness on a 1 to 5 scale. Most families selected mild or moderate, with a notable group reporting severe episodes.

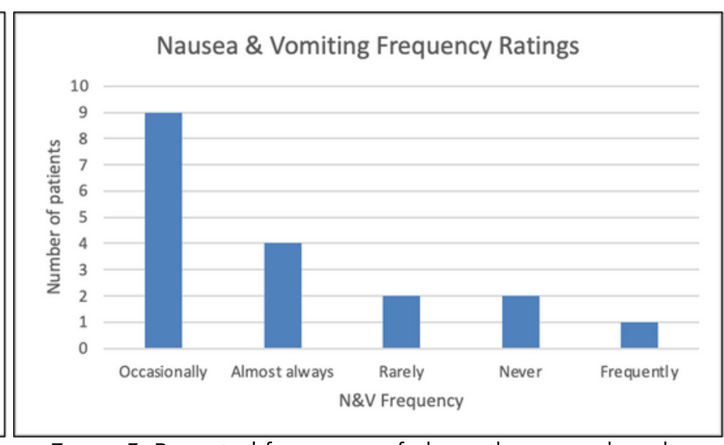

Figure 3. Reported frequency of chemotherapy induced sickness. Most families indicated frequent or very frequent episodes, with some describing symptoms as almost always present during treatment cycles.

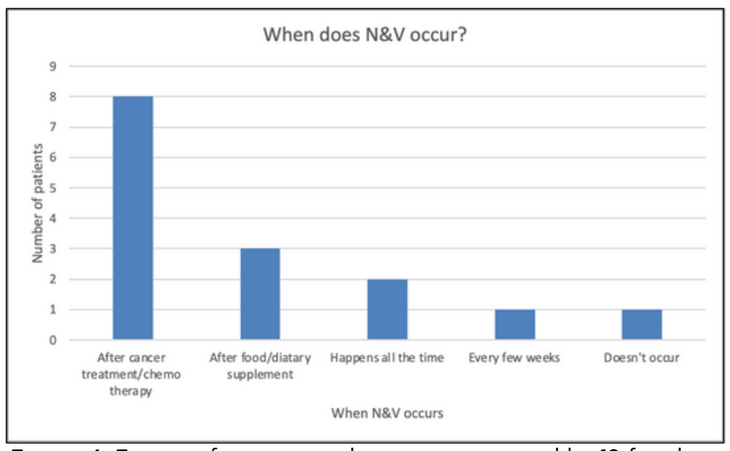

Figure 4. Timing of nausea and vomiting reported by 19 families. The majority of episodes occurred after chemotherapy treatment, with smaller numbers linked to food, persistent sickness, or occasional episodes.

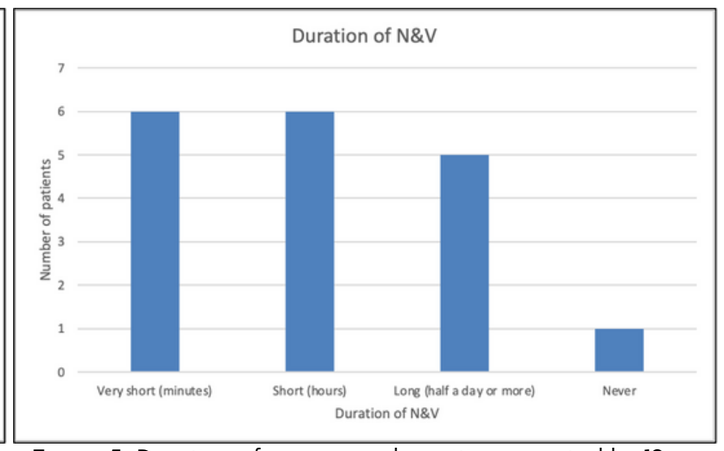

Figure 5. Duration of nausea and vomiting reported by 19 families. Most episodes lasted minutes to hours, though some persisted for half a day or longer.

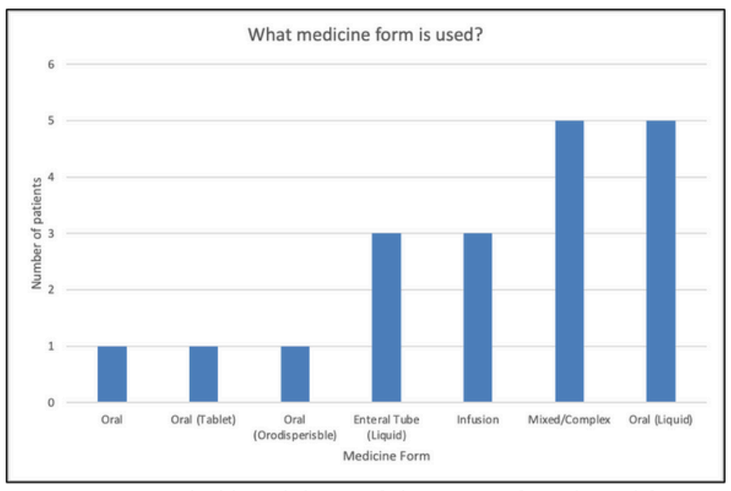

Figure 6. Detailed breakdown of the types of medicinal forms reported by 19 families, including oral liquids, tablets, orodispersible tablets, enteral tube delivery, infusions, and mixed regimens.

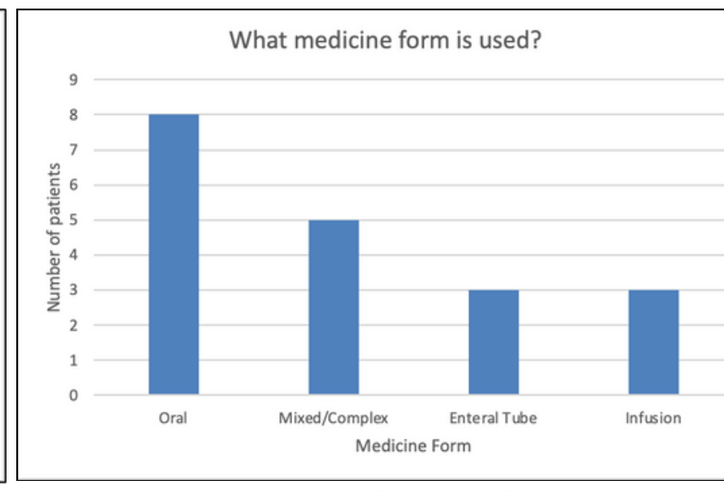

Figure 7. Grouped categories of medicinal forms reported by 19 families. Oral administration was most common, though many families relied on mixed regimens or non oral routes such as enteral tube and infusion.

Analysis and Discussion

- **Patient voices and lab data align:** Families said taste, swallowing, and ease of use were the biggest problems. Lab work showed that ODFs can be designed to dissolve quickly, distribute drug evenly, and potentially mask unpleasant tastes.
- **Why ODFs matter:** Families ranked ODFs as highly acceptable if taste is improved. Laboratory findings support their feasibility as a child friendly dosage form for anti sickness treatment.
- **Biggest gap revealed:** Current formulations add stress to treatment. Families often described medicines as another battle on top of chemotherapy. This highlights the urgent need for alternatives that children will willingly take.
- **Science with empathy:** Analytical techniques such as TGA, DSC, PXRD, SEM, and UV-Vis gave me the technical understanding of how films behave. The questionnaire reminded me that those behaviours matter only if the medicine is easy and comforting for the patient.
- **Personal reflection:** This project showed me that the best pharmaceutical research happens at the intersection of rigour and compassion. Working with families alongside lab data helped me see how research can translate into real improvements for children going through cancer treatment.

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