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Implementing a medication lubricant for pill dysphagia on an acute care ward using Plan-Do-Study-Act cycles

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ABSTRACT

Background Pill dysphagia, the difficulty in swallowing solid oral medications, is a common problem that can affect medication adherence and increase pill modifications. Current practices of crushing medications or using food vehicles have limitations and potential risks. This report describes the implementation of a medication lubricant, Gloup, for pill dysphagia on an acute care ward using Plan-Do-Study-Act cycles.

Objective The objective of this project was to evaluate the implementation of Gloup in the acute care ward setting and assess its acceptability and uptake by patients and ward nurses during medication administration.

Methods The project involved chart audits of medication administration records, collection of patient feedback, and staff feedback through meetings. Patient characteristics and medication administration practices were documented. The implementation process included education and training sessions for staff, development of a medication chart sticker for evaluation data collection and small-scale testing of Gloup with patients before ward-level implementation.

Results The implementation of Gloup on the acute care ward showed high uptake and acceptability. The majority of patients using Gloup had crushed medications, and the use of Gloup varied based on patient needs.

Conclusion The implementation of Gloup as a medication lubricant for pill dysphagia on an acute care ward was successful and well received by patients and staff. The use of Gloup appeared to improve medication administration practices and reduce the need for crushing medications or using food vehicles. This project highlights the importance of addressing pill dysphagia in acute care settings and provides insights for other wards considering similar interventions.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Safe and effective solutions for pill dysphagia in the acute care setting are needed to improve patient experience and reduce inappropriate medication modifications.

WHAT THIS STUDY ADDS

⇒ Plan-Do-Study-Act cycles supported the uptake of a nurse-initiated medication lubricant (Gloup) on an acute care ward to address pill dysphagia and provide a safer alternative to crushing medications or using food vehicles.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The introduction of a medication lubricant for pill dysphagia is scalable and spreadable across acute health services.

PROBLEM

Pill dysphagia refers to the difficulty of swallowing solid oral medications, including tablets and capsules.[1] It can lead to fears of choking or aspirating, as well as a sensation of pills getting stuck in the throat or chest.[1] Medication adherence may be affected, and patients and hospital staff often resort to crushing pills or using food vehicles to assist with administration. Modifying medication such as crushing, dissolving or opening capsules can reduce drug effectiveness, but also constitutes a medication error when the method of administration deviates from the original prescription.[2] Pill dysphagia is not only prevalent among individuals diagnosed with dysphagia, but also affects a significant proportion of the general population.[3]

In our local clinical experience at a metropolitan tertiary hospital's orthogeriatric ward, we observed that pill dysphagia was a common reason for crushing medications. Patients with neck of femur fractures often faced high pill burdens and had complex care needs due to a high incidence of dementia and delirium. Concerns were raised by nursing staff and students regarding the safety of routinely crushing medications and the impact of food vehicles on medication bioavailability. Commonly, nursing staff used yoghurt, custard and purees as administration aids, leading to unnecessary food waste (eg, using only a small portion of a tub of custard).

In exploring alternative practices, we discovered Gloup® (Rushwood, The Netherlands), a medication lubricant gel, as a potential solution. Initiated as a nurse-led practice change to enhance patient experience and medication administration, this improvement project aimed to evaluate the implementation

of Gloup in the acute ward context for patients experiencing difficulty swallowing medications. Our goal was to share the lessons learnt with other acute care wards. We estimated that approximately 30% of patient admissions would benefit from Gloup for pill dysphagia with whole or crushed medications. Specifically, we sought to assess the acceptability and uptake of Gloup by both patients and ward nurses during medication administration.

Background

Limited published research exists regarding the implementation of a medication lubricant to address pill dysphagia in the acute hospital setting. However, hospitalised patients are at higher risk of pill dysphagia and medication modification due to acute illness, multimorbidity, mental status changes such as delirium or sedation after surgery, and rapid patient turnover. These factors, combined with staff knowledge gaps, time pressures and poor communication, contribute to medication errors and inappropriate tablet crushing.[4]

Modifying medications outside manufacturer guidelines increases the risk of adverse effects and may affect the therapeutic window of certain drugs.[5] It is a common practice for nursing home residents,[6] commonly admitted to the orthogeriatric ward in this project. The *Don't Rush to Crush* handbook by the Society of Hospital Pharmacists Australia was developed to reduce medication errors in individuals with swallowing difficulties.[7]

Food vehicles are frequently used to manage pill dysphagia, including whole tablets or as mixing aids for crushed medications. Commonly reported food vehicles include custard, yoghurt, jam, honey, pureed food and thickened fluids.[8] Thickened fluids may also be prescribed by a speech pathologist for a person with diagnosed dysphagia. However, the absorption of medication and bioavailability can be significantly altered when administered with food vehicles or thickened fluids and is an ongoing area of research.[9]

Medication lubricants, such as Gloup, have been designed to aid individuals with pill dysphagia in swallowing medications effectively. Gloup is a medication lubricant gel that breaks down in the stomach, having minimal or no impact on medication absorption.[10] It is compliant with the International Dysphagia Diet Standardisation Initiative (IDDSI) levels and has no known drug interactions.[11] The IDDSI framework provides a common terminology (a continuum of 8 levels, 0–7) to describe food textures and drink thickness (see online supplemental figure 1). Gloup is classified as a Class I medical device and consists of food grade ingredients. It does not need to be prescribed.

The characteristics and effectiveness of Gloup for pill dysphagia are well established.[12] Fluoroscopy studies have demonstrated its superiority over water and other food vehicles in terms of tablet transit time.[13] Gloup Original, classified as IDDSI level 4, showed only a moderate delay in transit time compared with water and minimal post-swallow residue.[12] Comparative evaluations of medication lubricants in Australia found Gloup to be the most stable and medically graded option available.[11] Gloup has also been successfully mixed with a large number of liquid medications while still maintaining its IDDSI characteristics.[14]

Gloup has been widely implemented in approximately half of Australia's aged care facilities and has received positive acceptance from aged care staff.[15] Although Gloup has been available in Australia since 2014, there is no medication lubricant widely available for use in the acute care context. We wanted to address this practice gap and evaluate the acceptability and adoption of nurse-initiated medication lubricant for pill dysphagia on an acute hospital ward.

Measurement

Chart audits

To assess the adoption of Gloup and crushing practices on the ward, chart audits were conducted on the medication administration record (MAR) and medical record of admitted patients with pill dysphagia over a 5-month implementation period. Nurses were asked to document the use of Gloup and crushed medications each shift on an evaluation sticker placed in the bedside MAR. We determined whether crushing was recommended by speech pathology/medical staff or was initiated by nurses. The MAR was also reviewed for any withheld, refused, or missed medications. Additionally, the use of thickened fluids and diet modifications were documented. Patient characteristics such as age, gender, reason for admission, residency in aged care and presence of dementia or delirium were described in the sample.

Patient feedback

Patients who did not have a diagnosis of moderate to severe dementia or acute delirium were invited to provide feedback on their experience with Gloup. Verbal consent was obtained, and patients were asked to rate their agreement on five simple statements (such as 'I like the taste of Gloup' or 'I have less fear of choking on tablets') on a Likert-scale of *strongly agree* to *strongly disagree*.

Staff feedback

Staff feedback was collected during ward meetings through the implementation process (during Plan-Do-Study-Act (PDSA) cycles) to gather their input on the changed practice and the feasibility of using Gloup. Two ward-level feedback meetings were facilitated at the end of the project to explore benefits, challenges and any unintended consequences.

Ward resourcing

To understand the impact of the project on ward resource use, a simple comparison was made between the amount of food typically ordered by the ward for medication administration (eg, yoghurt or custard tubs) before and after the implementation of Gloup.

Design

The use of a PDSA design[16] was justified for this project as it provided a structured and iterative approach to test and implement the medication lubricant intervention, allowing for continuous evaluation and improvement based on real-time data and feedback from patients and staff.

PDSA cycle 1: developing the change

The design stage marked the first PDSA cycle of the project, which began in April 2022 and was finalised in October 2022 after obtaining hospital ethical approval as a quality improvement project (Ref. No.: EX/2022/MNHB/87637). Although this was a nurse-initiated practice change, it was essential to take time to collaboratively engage with the multidisciplinary team. A quality improvement team comprising nurses, pharmacists, speech pathologists and medical officers was established.

Individual meetings were conducted with each team member to gather input and address concerns. We then took a draft proposal to a ward-level presentation that facilitated further feedback and concerns, including aspiration risk and Gloup ingredients. Addressing these questions required returning to the literature, seeking answers from the manufacturer, and connecting with other researchers with experience with Gloup.

The team also discussed the process of screening for pill dysphagia and reached a consensus that Gloup could be initiated by nursing judgement, primarily through bedside observation during medication rounds. The ward was in the process of implementing a routine nursing dysphagia screening tool (a locally developed tool for speech therapy referrals for patients at risk of dysphagia) that could also aid in identifying patients who might benefit from Gloup. We anticipated barriers to using a structured patient-reported tool such as the PILL-5[1] (a 5-item patient-reported outcome measure for pill dysphagia), given the high proportion of dementia and delirium. However, any patient or family reported pill dysphagia would also prompt a trial of Gloup.

The final protocol involved registered nurses screening for patients who might benefit from Gloup using the methods above, independently initiating Gloup at the bedside during medication administration, and documenting its use in the MAR.

Gloup comes in four different flavours and two different thicknesses: orange, strawberry/banana, raspberry low sugar (IDDSI level 3) and vanilla forte (IDDSI level 4). Level 3, with a custard consistency, was recommended for majority of patients, and raspberry low sugar (to reduce impact on blood glucose) was selected as the standard flavour. Vanilla forte bottles were also made available for patients on extremely thickened fluids (level 4).

Before testing and implementation on the ward, short education and practise sessions were facilitated with staff, and electronic resources shared. Ward staff nominated as Gloup ambassadors or change champions on the ward. The project lead, a registered nurse on the ward, dedicated 1 day a week to facilitate the project, funded by a nursing research internship.

Patients and the public were not explicitly involved in the design, conduct, reporting, or dissemination plans for this project.

Strategy

PDSA cycle 2: testing a medication chart sticker and audit for data collection

To address the lack of consistent medication crushing records, we developed and evaluated a sticker entry in the MAR to collect ward Gloup and crushing practices (see online supplemental figure 2). We tested the chart audit process in November and December 2022. We trialled including the sticker in all MAR admission packs and ward pharmacists also ensured they were entered in new records. Initially, documentation was low, and feedback from the ward indicated that coloured/highlighted Gloup stickers would draw attention to the change.

As the use of highlighted stickers increased, pharmacists also started using them as a communication tool by adding written notes about crushing or medication safety. Nurses appreciated the clear documentation of Gloup and crushing practices from shift to shift. Although our focus was on testing evaluation methods, we recognised that the outcomes of this cycle could have prompted PDSA cycles to improve team communication regarding medication crushing/modification.

PDSA cycle 3: small-scale testing

In our third cycle, we conducted small-scale testing of Gloup with patients to identify any practical or procedural considerations on the ward. We selected several patients with pill dysphagia and collected feedback from ward staff over a 4-week period.

We discovered that the recommended method of sandwiching crushed medications between two pumps of Gloup (the ‘Gloup Sandwich’ technique to encapsulate medication powder) was sometimes not successful, leading some nurses to revert to using food vehicles. Through further experimentation on the ward, we found that depending on the number of crushed medications, multiple Gloup sandwiches needed to be created or crushed medications needed to be mixed with Gloup.

Nursing staff became more confident in identifying patients with pill dysphagia and initiating Gloup. Feedback and learning were shared through regular email communication and ward meetings, such as prompting questions to identify pill dysphagia.

PDSA cycle 4: ward-level implementation

During the final cycle, we expanded the implementation to the entire ward and evaluated acceptability and uptake over a 3-month period of chart auditing. Facilitation support continued on the ward, and staff became more confident initiating Gloup. Medical staff also began suggesting a trial of Gloup for some patients during ward

rounds. At the end of this cycle, group feedback sessions were also held at the ward level.

Collecting patient feedback before discharge proved to be more challenging than expected due to a high proportion of patients with cognitive impairment and communication difficulties. There also continued to be some missing documentation for each consecutive shift for Gloup administration in the MAR. By the end of the cycle, ward staff had implemented a 'Gloup station' with stickers and resources to sustain implementation beyond the end of the evaluation phase. Changes to the sticker also included adding what level of Gloup the patient was using.

RESULTS

To evaluate PDSA cycle 4, auditing occurred between 1 January to 30 March 2023. Our main outcome was acceptability and uptake as measured by how many patients on the ward were using Gloup and or had crushed medications. We audited how many patients used Gloup each week as a proportion of all ward admissions. There were 210 patient admissions on this 22-bed ward during the audit period. Fluctuations in patient admissions were noted, particularly in January and February where there was a high number of patient outliers. Only patients with identified pill dysphagia used Gloup; the remaining ward patients had no indication of pill dysphagia.

Uptake of Gloup on the ward

Patients using Gloup (n=35) on the ward were mostly female (71%), aged between 71 and 102 years, with a fractured neck of femur. Half (51%) were aged care residents. As is typical for an orthogeriatric unit, 43% of patients using Gloup had a diagnosis of dementia and 69% had delirium (average 4AT score of 5.8). The ward has two close supervision cohort rooms for patients with delirium at high risk of falls and 60% of patients using Gloup were admitted to these areas.

Nurses usually identified pill dysphagia at the bedside by observation during medication administration (80%), or occasionally by patient/family report (20%). None used the dysphagia screening tool to identify the need for Gloup in the audit period. There were 54% of patients using Gloup on a full diet, 29% were on soft and bite sized, 14% pureed and 3% minced moist (based on IDDSI levels). Patients can also be placed on thickened fluids by a speech pathologist for dysphagia; all patients on Gloup were on thin fluids except one patient that was on mildly thick fluids.

Figure 1 shows the proportion of patients using Gloup out of the total number of ward admissions for each week, which ranged from 15 to 48%. While some patients used Gloup to swallow tablets whole, most had crushed medications with Gloup. Crushed medications ranged from 11 to 43% over this period. We expected some variation that reflected the patient population and extent of pill dysphagia on the ward. However, over this 13-week period the uptake of Gloup was high and staff used 44 bottles of Gloup, an average of 3.5 bottles or 1750 mL of Gloup used per week.

Some patients did have a combination of medications whole with Gloup and then other shifts medications crushed with Gloup. Approximately 23% of patients had small tablets crushed, 60% medium and 74% of large sized tablets crushed for pill dysphagia.

We found that over half (56%) of patient charts had withheld medications and 76% had refused medications in those audited; it was not possible to determine how many of these events were due to pill dysphagia.

Acceptability of Gloup in practice

Feedback meetings included pharmacists, speech pathologists and nursing staff (n=20). Overall staff found Gloup to be a beneficial resource on the ward. Nursing staff felt that Gloup reduced crushing, medication administration time and wastage of yoghurt/custard. It was also useful when patients were fasting for surgery. Staff also

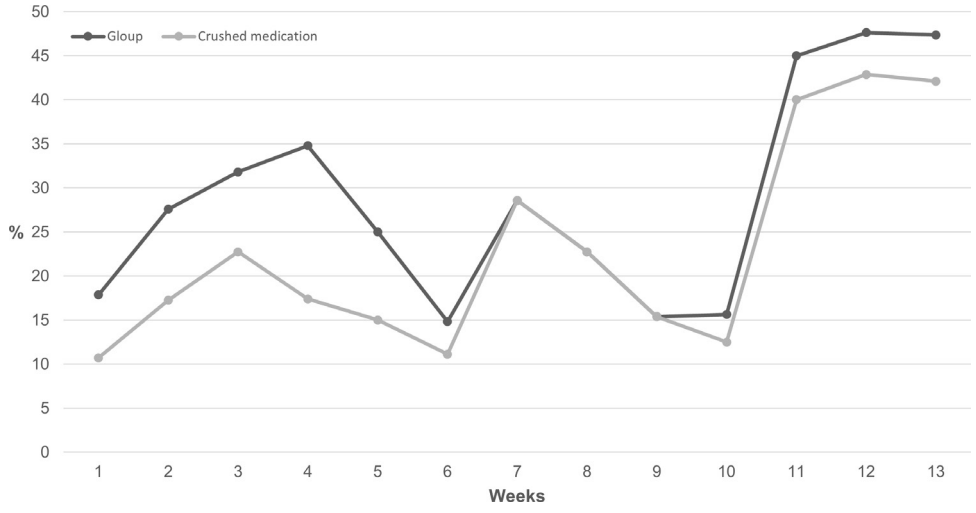

Figure 1 Percentage of ward patients receiving Gloup and crushed medications by week over 3 months.

commented on how Gloup was easily accessible. Nurses reported feeling confident to initiate Gloup with patients without a formal pill dysphagia screening tool and there were no safety incidents related to the practice change during implementation.

We were able to obtain feedback from eight patients: four agreed/strongly agreed that they liked the taste of Gloup and would continue using it at home, five agreed/strongly agreed that it was easy to swallow and had less fear of choking on tablets, and six strongly agreed that swallowing medication was easier with Gloup.

Use of food vehicles

Gloup was well used on the ward, once a bottle is opened it has a shelf-life of 60 days at room temperature. Over the period of 3 months, we saw a reduction in the use of custard and yoghurt; no additional ward orders were made for dairy products once Gloup was implemented across the ward. Gloup cost $A39 per 500 mL bottle at the time of the project, effectively $A0.39 per 5 mL dose (typically 5–10 mL is dispensed per medication administration).

DISCUSSION

Medication safety is a prominent focus of healthcare improvement and this project provided valuable insights into the successful implementation of Gloup as a solution for pill dysphagia. While the initial impetus for improvement came from nurses, the success of this initiative was the result of a collaborative and multidisciplinary team approach. Similar to previous studies of medication administration processes,[17 18] the active involvement of pharmacy, speech pathology and medical practitioners was crucial in understanding concerns and challenges during implementation. An inclusive approach allowed for the exploration of practice boundaries, thorough discussions regarding potential risks and concerns of each health professional group and generating effective solutions. This established a sense of ownership and partnership among the multidisciplinary team ensuring support for the nurse-initiated process. Without such an open and inclusive approach, this practice change could have faced significant obstacles.

Overall, there was a high uptake of Gloup and acceptability to ward staff. Time constraints and inefficient information sharing between health professionals are barriers to medication administration.[18] In our project, although duration of medication rounds was not captured, feedback indicated that the process of medication administration was quicker with the use of Gloup to aid medication swallowing. The use of a medication sticker as communication tool on which pharmacists confirmed the appropriateness of crushing mediations also improved the process. Although the ward used paper-based charts, an electronic medication record would make it easier to capture the sticker content and implement dysphagia alerts. A positive finding was that all nurses used bedside clinical assessment skills to screen for pill dysphagia. Nurses spend the greatest amount of contact time with patients, particularly those who have extended length of stay and are well placed to recognise and respond to dysphagia.

Nursing staff felt using Gloup reduced the amount of yoghurt and custard being used for medication administration. Prior to the implementation of Gloup, the use of food vehicles was a functional approach to medication administration for patients with pill dysphagia as it reduced the difficulty and discomfort caused by swallowing medications. The possibility of food drug interactions affecting medication safety and efficacy is well known particularly in older adults.[5 19] A decrease in the amount of food vehicles being used among our older patient cohort is a safer practice and a positive outcome of this project. Despite the relative advantages of Gloup, our findings show that sustainable reductions in crushed medications require more than the introduction of a medication lubricant. Medication modification can be viewed by staff as unavoidable in the care of the older person,[20] and nurses need adequate resources and support to improvepractice.

Ward staff turnover posed challenges to progress at times, particularly with rotating pharmacy, speech pathology, and medical staff. This required additional efforts to engage new staff members and ensure their understanding of the project and evaluation processes. The presence of ward champions was identified as crucial due to the 24/7 care provided. Staff emphasised the importance of facilitation and coaching on the ward to help move the project forward, address concerns, and actively involve staff in understanding the reasons behind the change.

We also encountered more challenges than expected in evaluating staff practices and obtaining patient feedback. While the use of Gloup over time reflected patient need and underlying rates of dysphagia on the ward, it is likely that factors we found difficult to measure may have limited uptake of Gloup for some patients, such as withheld/refused medications, patient preferences, or perioperative status. Yet we have successfully implemented Gloup on a ward with high levels of dependency and complexity, including dementia and delirium. Therefore, we expect less barriers to patient involvement and feedback in other acute wards, which are important areas for future improvement efforts.

CONCLUSION

Medication lubricants have not yet been widely implemented into Australian acute care settings. We have clearly identified a need and supported a safe process of nurse-initiated implementation in the hospital context. Over time nursing staff became more confident in using Gloup and uptake increased.

We believe the introduction of a medication lubricant for pill dysphagia is scalable and spreadable across acute

health services and there is support locally based on this project within our hospital and health service. Facilitation support at the ward level would be essential to coordinate a collaborative multidisciplinary approach.

Correction notice This article has been corrected since it was first published. Minor textual changes have been done under 'Background' secton.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This project was approved as a quality improvement project by the Metro North Metro North Health Human Research Ethics Committee (Ref. No.:EX/2022/MNHB/87637).

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