International Journal of Current Pharmaceutical Research

ISSN- 0975-7066 Vol 17, Issue 6, 2025

Original Article

IMPACT OF 'SIP TILL SEND' HYDRATION PROTOCOL ON PREOPERATIVE PATIENT COMFORT AND POSTOPERATIVE OUTCOMES: A CONTROLLED STUDY

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Received: 18 Aug 2025, Revised and Accepted: 12 Oct 2025

ABSTRACT

Objective: The primary objective was to estimate actual fasting durations for solid foods and clear fluids. Secondary objectives included assessing preoperative thirst using the Perioperative Thirst Discomfort Questionnaire, recording the incidence of postoperative nausea and vomiting (PONV), measuring patient satisfaction, and evaluating the safety of the 'Sip Till Send' (STS) hydration protocol.

Methods: A controlled trial using the Plan-Do-Study-Act (PDSA) model was conducted over six months at Maharshi Vashishtha Autonomous State Medical College, Basti, Uttar Pradesh. Adults (18–65 y) scheduled for elective surgery under general anaesthesia were included, excluding emergencies and high-risk cases. A total of 1350 elective surgical patients were included in the study. The intervention group received the 'Sip Till Send' (STS) protocol, allowing sips of fluids until operating room transfer; the control group followed standard fasting. Outcomes included fasting duration, thirst scores, patient satisfaction, postoperative nausea and vomiting (PONV), and safety. Data were analysed using SPSS ($p<0.05$).

Results: A total of 1,350 patients participated (STS: n=772; control: n=578). The STS group demonstrated a significant reduction in median fluid fasting time (3.5±1.0 h vs. 7.5±1.5 h, $p<0.001$). Perioperative thirst discomfort was markedly lower in the STS group (mean score 3.1±2.4 vs. 7.1±2.9, $p<0.001$).98% patients of the STS group and 60% in the control groupdid not complain of nausea and vomiting in the postoperative period. Patient satisfaction scores improved correspondingly. No pulmonary aspiration events were reported, confirming the safety of the protocol. Iterative PDSA cycles improved adherence and clinical outcomes.

Conclusion: The 'Sip till Send' protocol effectively reduces preoperative fluid fasting duration, alleviates patient thirst, and enhances satisfaction without compromising safety. These findings support wider implementation of STS as a perioperative hydration strategy to improve patient comfort and outcomes.

Keywords: Fasting, Hydration, Patient satisfaction, Post-operative nausea vomiting

DOI: https://dx.doi.org/10.22159/ijcpr.2025v17i6.7094 Journal homepage: https://innovareacademics.in/journals/index.php/ijcpr

INTRODUCTION

Preoperative fasting is a long and respected tradition in anaesthetic and surgical practice, first instituted to avoid pulmonary aspiration of gastric contents upon induction of anaesthesia [1]. Once a universal policy, a blanket "nil by mouth after midnight" rule was traditionally applied to all surgical patients. However, in recent years increasing evidence has challenged the necessity and benefit of such prolonged fasting durations [2]. Evidence-based national and international guidelines now favour a liberal regime, allowing clear fluids within two hours of induction of anaesthesia, maintaining a prohibition on solid food for six hours [3].

Despite these updated guidelines, practice again tends to fall behind, particularly in busy surgery units where there is an uncertainty regarding the exact timings of surgery that generates excessive caution. Consequently, patients are frequently subjected to long fasting time's far exceeding clinical needs [4]. Long fasting has been repeatedly associated with adverse physiological and psychologic effects including thirst, hunger, anxiety, fatigue, irritability, and postoperative nausea and vomiting (PONV) risk [5, 6]. These effects not only influence patient comfort and wellbeing but also potentially influence recovery trajectories, especially for high-risk patient populations such as the elderly and children [7, 8].

As a result of the disadvantage of preoperative fluid fasting, a number of hospitals have initiated a patient-centred protocol known as the STS hydration protocol. This protocol allows patients to continue sipping small quantities of clear liquids, mainly water, until the time of being physically transferred to the operating room. The STS protocol seeks to minimize the period of fasting in a manner that is both safe and reasonably attainable. Its use has been demonstrated to have the ability to reduce preoperative discomfort and thirst, yet without increasing pulmonary aspiration rates or other complications [4, 9]. The STS evidence base is supported by research in gastric emptying, which are all in agreement to demonstrate that clear fluids regularly exit the stomach in under 90 min with normal physiology and therefore in minimal risk when consumed up to two hours before anaesthesia [10]. Second, hydration maintains mucosal integrity, optimizes cardiovascular stability, and enhances patient cooperation during surgery—all to the advantage of a smoother peri-operative course [11].

Despite these perceived benefits, the broader impact of STS on patient-reported outcomes, particularly peri-operative care overall satisfaction, remains understudied. While preoperative thirst is one of the most frequently reported causes of patient discomfort, it has not always been associated with dissatisfaction in peri-operative experience, suggesting a complex interplay between comfort, expectation, and perception of care [12–14]. But, reduction of thirst and optimization of preoperative well-being may have a significant role in a more holistic, patient-centred approach of surgical care. Early evidence has reported significant reductions in preoperative fluid fasting time since the onset of STS guidelines, with corresponding decreases in the incidence of PONV and subjective patient comfort enhancement [6, 15].

In the paediatric setting, identical fluid liberal approaches have similarly been linked to lower crying, decreased agitation, and better induction efficiencies [16]. The beneficial impact of intravenous hydration on PONV is particularly significant in paediatric anaesthesia since nausea and vomiting remain among the most distasteful postoperative complaints cited by patients, often outpacing the

frequency and intensity of pain [17]. Besides patient comfort, hydration level can influence postoperative recovery as well.

Mild dehydration has also been linked to impaired thermoregulation, wound healing, and postoperative delirium in the elderly [18]. Hydration level can also influence haemodynamic stability with anaesthetic induction, particularly in cardiovascular comorbid patients [19]. By minimizing physiological stress associated with extended fasting, STS protocols may provide systemic benefits beyond symptom control alone, despite a lack of strong evidence to support such a hypothesis. Implementation of the STS protocol also confronts cultural and logistic issues.

Implementation is dependent upon multidisciplinary coordination, clear communication about surgical schedules, and educational efforts among employees to justify the safety and logic of the policy. Misunderstandings regarding aspiration risk continue among clinicians despite overwhelming evidence for the safety of fluid intake up to two hours prior to induction [20]. Thus, there is a need for an evidence-based, data-driven examination of the clinical and experiential impacts of the STS protocol to break through existing resistance and allow for broader uptake. Furthermore, in value-based and patient-centred care-moving health systems, integrating patient comfort and satisfaction into peri-operative processes is increasing in significance. Such processes as STS, addressing a so far highly neglected aspect of the experience of surgery, can be an expense-neutral but highly valuable method of improving total quality of care and enhancing patient engagement [21].

The aim of this controlled trial is to assess the impact of the STSperi-operative fluid regimen, on preoperative patient comfort and early postoperative recovery, including the incidence of thirst, nausea, vomiting, and patient satisfaction with peri-operative care. By comparison with a traditional fasting group, we aim to determine whether the STS regimen provides value to patient-centred surgical care without detracting from safety.

MATERIALS AND METHODS

Study design and setting

This controlled trial was conducted as part of the phased implementation of the 'Sip Till Send' (STS) hydration protocol at Maharshi Vashishtha Autonomous State Medical College, Basti, Uttar Pradesh. Designed as a formal quality improvement (QI) initiative in perioperative care, the study aimed to evaluate hydration practices with a focus on patient comfort and safety. The research followed a Plan-Do-Study-Act (PDSA) model through several iterative cycles and served both as a service evaluation and a Bachelor of Medical Sciences (BMedSci) undergraduate research project.

No investigational drugs or products were used. As the study was classified as a service evaluation, written informed consent was waived by the relevant institutional bodies. Participants were verbally informed of the study purpose, and all data were anonymized to uphold confidentiality and ethical standards.

Study population and sampling

The study included adult patients aged 18–65 y scheduled for elective surgery under general anaesthesia. A convenience sampling approach was used based on patient availability and logistical considerations during the six-month data collection period. Eligible participants were those expected to fast for ≥4 h and capable of providing verbal assent.

Sample size determination

The required sample size was calculated to detect a 7% absolute reduction in the incidence of postoperative nausea (from 25% to 18%) with 80% power and a 5% significance level (two-tailed). Based on these assumptions and using the formula for comparing two proportions, a total of 1080 patients (540 per group) was needed. Accounting for a potential 20% dropout or protocol deviation rate, the final sample size was adjusted to 1350 patients.

The sample size was 1350 patients based on the inclusion and exclusion criteria.

Study timeline and protocol implementation

The STS protocol was implemented in phases from 2019 to 2024. Baseline data on preoperative fasting durations and patient comfort were collected before the first PDSA cycle. Interventions introduced over time included staff training, updated ward signage, inclusion of STS guidelines in pre-anaesthetic assessments, and real-time nursing reminders.

Under the STS protocol, patients were allowed small sips (30–100 ml) of clear fluids—typically water—at regular intervals until transfer to the operating room. Although the protocol permitted water, black coffee, and pulp-free juices, water was standardized across most patients. The aim was to minimize preoperative fluid fasting without breaching the standard 2-hour guideline before anaesthetic induction.

Each PDSA cycle incorporated feedback from surgeons, anaesthetists, nurses, and patients, allowing for iterative improvements in adherence and outcomes.

Inclusion and Exclusion Criteria (Detailed)

Inclusion criteria

- Age ≥18-65 y
- Elective surgery under general or regional anaesthesia
- ASA physical status I to III
- Ability to comprehend and follow instructions
- Verbal assent provided

Exclusion criteria

- Emergency surgeries
- Age<18 y
- Procedures under local anaesthesia only
- Cognitive or language impairments
- Enteral or parenteral nutrition
- Medical need for fluid restriction
- High aspiration risk (e. g., gastroparesis, reflux disorders)
- Pregnancy

All participants received standard nil-by-mouth (NBM) instructions prior to surgery and were available for structured interviews, questionnaires, and fluid intake monitoring during the study period.

Data collection tools and variables

Demographic and clinical data

Demographic parameters were age, gender, body mass index (BMI), comorbidities (i. e., diabetes, hypertension, and renal disease), and ASA physical status. Operative information regarding type of procedure, planned time, and actual start time was also noted.

Fasting times

Actual fasting times for solids and liquids were measured. Time of last intake (food or beverage) and time of anaesthetic induction were recorded exactly from patient records and anaesthesia charts. For the study's purposes, fluid fasting time was measured as time from last recorded fluid intake to anaesthetic induction.

Thirst assessment

Preoperative thirst was also assessed with a highly validated peri-operative thirst discomfort questionnaire (PTDQ), which includes subjective scores for discomfort in different domains of thirst. It has a rating scale ranging from 0 (no discomfort) to 14 (severe discomfort) (9). The questionnaire was requested to be completed when arriving at the operating theatre waiting area. Support was offered to those needing assistance in reading the items.

Postoperative outcomes

PONV were measured in the first 24 h following surgery via patient interview and nursing records. Need for antiemetic administration, self-reported thirst during the first 6 h after surgery, and time to first oral fluid intake after surgery were other variables that were documented. Unplanned admissions or prolonged post-anaesthesia care unit (PACU) stays due to dehydration, nausea, or aspiration were also collected.

Patient satisfaction

To measure satisfaction with preoperative hydration, patients were requested to rate the statement: "I am satisfied with the management of preoperative drinking" on a five-point Likert scale. The answers varied from 0 (strongly disagree) to 4 (strongly agree). This measure enabled subjective evaluation of the hydration policy and perceived sufficiency from the patient's viewpoint.

Adverse events and safety monitoring

To determine the safety of the STS protocol, adverse events were tracked via the institutional adverse incident reporting system. Special vigilance was directed to documented instances of pulmonary aspiration, induction regurgitation, and peri-operative desaturation necessitating intervention. Detailed case note review was carried out in order to ascertain any potential causal connection between timing of fluid intake and peri-operative complications.

Statistical analysis

All the collected data were entered into an anonymised and secured database and processed using trial version 28 of IBM SPSS software. Descriptive statistics were computed for all variables. Continuous variables (e. g., age, BMI, fasting time, and thirst scores) were presented as mean±SD or median (inter-quartille range) according to normality of distribution, which was evaluated with the Shapiro–Wilk test. Categorical variables (e. g., gender, ASA class, and occurrence of PONV) were reported as percentages and frequencies.

Independent-samples t-tests were used to compare the STS group and the control group (pre-implementation standard fasting) for normally distributed continuous variables. For non-normally distributed variables, Mann–Whitney U tests were performed. Chi-Square or Fisher's exact tests were used to compare categorical differences. Statistical significance was established at $p<0.05$ for all tests. Since the study was of a quality improvement nature, the impact of time as a confounding factor was not controlled for, although attempts were made to collect data over a short window to minimize this effect.

Data integrity and quality control

Double-entry verification on 10% of every data entry was used to ensure high data accuracy. Discrepancies were independently cross-checked against source documents by two reviewers. Standardized training in questionnaire administration and ethical management of patient information was delivered to research team members. Staff awareness campaigns were conducted prior to each PDSA cycle to assure protocol adherence and reduce variation in implementation practices among hospital units.

Ethical considerations

Participants were clearly informed that their participation was voluntary and would never affect their clinical care in any manner. The anonymisation of all data gathered was rigorously maintained, and all records were kept on encrypted institutional databases with access limited to authorised personnel only.

RESULTS

A total of 1350 elective surgical patients were included in the study. The intervention group, which was led by theSTS protocol, consisted of 772 patients, and 578 patients comprised the control group that was provided with standard care. Outcomes were assessed over three consecutive PDSA cycles, allowing iterative improvement in the intervention.

Patient demographics and baseline characteristics

Average age of the subjects was 52.0 y (±14.8) and male predominant (53%). ASA physical status distribution had the majority in ASA II in both groups. No clinically relevant differences at baseline between the groups existed.

Table 1: Patient demographics and baseline characteristics

Variable	STS group (n=772)	Control group (n=578)	P value
Age (Mean±SD)	51.8±14.6	52.3±15.1	0.41
ASA I	218 (28.2%)	162 (28.0%)	0.91
ASA II	402 (52.1%)	289 (50.0%)	0.49
ASA III	152 (19.7%)	127 (22.0%)	0.32

Overview of PDSA cycle implementation

Three PDSA cycles were undertaken to plan and refine the STS intervention:

PDSA Cycle 1: Rolled with bedside print reminders and nurse verbal reminders.

PDSA Cycle 2: Tapered with addition of staff education sessions and increased documentation of "last sip" time.

PDSA Cycle 3: Full rollout with electronic reminders, nurse tracking, and surgeon engagement at both facilities.

Duration of fasting: significant reduction in STS group

The median duration of fasting in the STS group was 3.5 h (±1.0), significantly lower than 7.5 h (±1.5) in the control group ($p<0.001$). The minimum fasting time observed was 0.4 h, and there were no aspiration events.

Table 2: Overview of PDSA cycle implementation

PDSA cycle	Sample size	Key interventions	Adherence rate
Cycle 1	220	Posters+nurse reminders	58%
Cycle 2	265	Staff education+enhanced documentation	73%
Cycle 3	287	Electronic alerts+entire team engagement	89%

Higher reliability during Cycle 3 was linked to enhanced clinical outcomes and fewer policy exceptions.

Table 3(a): Duration of fasting-mean scores of both groups

Fasting duration (h)	STS group	Control group	P value
Mean±SD	3.5±1.0	7.5±1.5	<0.001
Range	0.4-8.1	2.5-11.6	

Table 3(b): Duration of fasting: significant reduction in STS group

Cycle	Mean fasting time (in hours)
PDSA 1	4.1
PDSA 2	3.6
PDSA 3	2.8

Perioperative thirst scores

Patient-reported thirst on a 0–14 validated scale decreased significantly in the STS group with a mean score of 3.1 (±2.4) vs 7.1 (±2.9) in controls (p<0.001).

PONV

98% patients in STS group and 60 % patients in control group did not complain of nausea and vomiting during the postoperative period.

Patient satisfaction

Satisfaction was assessed on a 5-point Likert scale. The mean score in STS was 3.4, much higher than 2.3 in the control arm (p<0.001).

Safety and adverse events

Six adverse events occurred, five in the control and one in the intervention group. All were insignificant regurgitation, with no aspiration pneumonitis, ICU transfers, or deaths.

Table 4(a): Perioperative mean thirst score

Thirst score (0-14)	STS group	Control group	P value
Mean±SD	3.1±2.4	7.1±2.9	<0.001

Throughout PDSA cycles, thirst scores improved progressively as staff compliance and confidence with the protocol improved

Table 4(b): Cycle-wise perioperative thirst scores

Cycle	Mean thirst score
PDSA 1	4.3
PDSA 2	3.2
PDSA 3	2.4

Table 5(a): Patient satisfaction-mean scores

Likert rating	STS group (n=772)	Control group (n=578)
Strongly agree (4)	405(52.5%)	145 (25.1%)
Agree (3)	266 (34.5%)	202 (34.9%)
Neutral (2)	71 (9.2%)	138 (23.9%)
Disagree (1)	25 (3.2%)	68 (11,8%)
Strongly disagree (0)	5 (0.6%)	25 (4.3%)

Table 5(b): Cycle-wise mean satisfaction scores

Cycle	Satisfaction score
PDSA 1	3.0
PDSA 2	3.3
PDSA 3	3.7

Table 6: Safety and adverse events

Event	STS group	Control group	Total
Aspiration/Regurgitation	1 (0.13%)	5 (0.86%)	6

No statistically significant difference in event rate was observed (p = 0.11), which reinforced safety of liberal preoperative fluid intake.

Table 7: Staff feedback and process compliance

Measure	PDSA 1	PDSA 2	PDSA 3
"Last Sip" Recorded	42%	68%	94%
Nurses Confident to Take Action	51%	74%	91%
Surgeon Involvement	Minimal	Moderate	Full

Staff feedback and process compliance

Feedback from staff surveys and debriefs showed increasing confidence in advising patients to continue drinking until call to theatre. Documentation of "last sip" time was enhanced by PDSA cycles

These fig. demonstrate the power of repeated training, reinforcement, and leadership commitment in bringing about behavioural change.

The STS protocol effectively increased perioperative comfort, reduced fasting time, and enhanced patient satisfaction without compromising

safety. With three structured PDSA cycles, the intervention was highly feasible, safe, and adaptable in a broad variety of clinical settings. Of note, staff participation, documentation fidelity, and communication system-wide played a key role in its success.

The PDSA process ensured iterative refinements addressed early challenges and maximized implementation, providing a model course for behavioural modification and patient-centred improvement in perioperative care.

DISCUSSION

Preoperative fasting, a standard of perioperative care, has been aimed traditionally to minimize pulmonary aspiration risk during anaesthesia. But prolonged fluid fasting past recommended periods has frequently resulted in increased patient discomfort, most notably thirst, without meaningful reduced perioperative complication. Within our present environment, the recent move to avoid unnecessary fluid loss through the STS policy has brought significant results in bringing clinical practice closer to evidence-based fasting and thus possibly improving patient satisfaction and comfort.

We previously utilized the 'Think and Drink' strategy, promoting oral fluid intake up to two hours before surgery. Although theoretically consistent with modern fasting recommendations, practically various operating challenges have faced implementation. Notwithstanding attempts to enable individualized fluid intake, the average baseline fluid fasting duration was found to be more than 11 h, and such inefficiencies and unpredictability in the operating room schedule were uncovered. These extended fasting periods are neither patient-centred nor clinically indicated, especially if the risk of pulmonary aspiration of clear fluids consumed within two hours of surgery is small [22].

After the release of the STS guideline, there was a considerable change in the period of fasting. By allowing patients to consume fluids through to their most recent call for the operating room, the average fasting time from fluid was effectively reduced to below two hours. Importantly, this was achieved without the need to impose additional burdens on anaesthetic or nursing personnel, thereby validating the use of the protocol in daily clinical practice. This strategy demonstrates the value of system-level interventions that are patient-centred but also preserve workflow efficiency [23].

It was one major observation that the fact most of these patients came to hospital already fasted from fluids from the night before was quite likely due to a relic of bygone fasting myths. Despite various dissemination of revised fasting guidelines, patient education continues to be a broad problem due to misinformation and old habits causing undue distress. Research has conclusively shown that unrestricted fluid intake within two hours of surgery poses no risk of causing aspiration but is indeed of significant benefit in terms of hydration, comfort, and even metabolic stability [24].

Thirst, although less than optimally placed in its clinical worth, was a major patient concern. It is interesting that baseline satisfaction scores did not decrease, even when fasting periods were prolonged. This seeming contradiction is in agreement with extant literature that indicates that although thirst is most commonly noted as the most common distress in the perioperative period, it does not directly correspond to decreased patient satisfaction scores [25].

Patient satisfaction, a complex construct, is related to a variety of factors such as interpersonal communication, information exchange, pain management, and overall perioperative experience. Previous measurement instruments used in anaesthesia have placed considerable focus on informational and communication aspects relative to physiological discomforts like thirst [26]. However, thirst is a modifiable perioperative complication that can be conceptualized in this manner. If left uncorrected, it leads not only to subjective distress but may also underlie underlying differences in protocol compliance and patient-focussed care.

Further, liberal fluid regimens like STS could have effects in addition to the avoidance of thirst. Prevention of PONV, an unwanted outcome unanimously regarded as distressing for patients, has been linked to effective preoperative hydration [22]. Hydration makes hemodynamic stability easier to maintain and maximizes overall recovery patterns, especially in high-risk patient categories [22]. This multi-dimensional paradigm of benefits is further basis for the requirement of reassessment and reversion of conventional fasting models.

Our results also chime with the broader literature that says that it is not merely an academic exercise to reform fasting practices but it is of clinical benefit. Systematic review of a cohort of more than 10,000 patients revealed that postoperative patient satisfaction is most heavily influenced by whether or not there was a postoperative complication [27]. By preventing an avoidable complication such as thirst, which is inherently a component of fasting practices, clinicians can also increase the total satisfaction index.

Another significant observation in the process of performing the STS protocol was a lack of any rise in perioperative adverse effects. Furthermore, there were no reported incidents of aspiration or fluid consumption complications, further attesting to the safety of the approach. Evidence substantiates the observation because instances of aspiration events are exceedingly rare, especially with clear fluid administration up to two hours prior to anaesthesia [22]. Indeed, the vast majority of anaesthesiologists today acknowledge that the ancient 'nil per oral after midnight' maxim is outdated and no longer evidence-based.

Development and validation of scales for such measurement tools as the Perioperative Thirst Discomfort Scale underscore the clinical relevance of research into and treatment of surgical patients' thirst [23]. Objective measuring devices allow us to rigorously measure and treat, and counteract, formerly backgrounded discomfort. For inclusion in systematic assessment to facilitate intervention-based strategies, e. g., the STS protocol, allows subjective discomfort to be translated into measurable and treatable outcome.

It is worth noting also to think about the psychological character of thirst and its relationship to preoperative anxiety. Patients generally become more anxious when having surgery, and the superimposition of somatic distress such as dry mouth or thirst can worsen the picture. Through active fluid management, clinicians unwittingly may also regulate levels of anxiety, leading to an improved perioperative outcome. The psychosomatic junction of thirst and worry is a path that must be further explored.

From a quality improvement point of view, the effective implementation of the STS protocol follows the SQUIRE 2.0 framework that promotes systematic planning, stakeholder involvement, and outcomes assessment in healthcare interventions [24]. Our experience shows that an easily made change in protocol with a sound design can have significant clinical advantages without affecting existing practice. These types of interventions are particularly valuable in high-volume centres where patient care needs to be weighed against efficiency.

In addition, the protocol success indicates the significance of inter-professional collaborative practice in the perioperative care. Anaesthetists, nurses, and operating staff need to work together to ensure the patients are continuously informed about the practice of fluid intake. Use of reminders in electronic health records, revising patient information leaflets, and optimizing messages during preoperative consultation can be among the measures to increase compliance and efficiency.

In spite of the promising results that have been seen, there are several limitations to be noted. Our research was limited to a single centre in elective surgery patients, and this might restrict the generalizability of the results. Furthermore, although patient satisfaction was high, direct measurement of the effect of diminished thirst on long-term clinical endpoints, and on measures of satisfaction, was unavailable. It should be researched in the future regarding the link of thirst reduction measures and other postoperative recovery interventions.

The second area to be investigated is the tailoring of fasting protocols according to patient-specific variables like age, comorbidities, surgery type, and anticipated anaesthesia time.

Personalized fasting protocols with the assistance of technological aids and decision-making strategies may further optimize preoperative care while maintaining safety.

CONCLUSION

In summary, the STS protocol is a reasonable and patient-focussed innovation in perioperative care. Through the elimination of fluid fasting time without altering clinical workload or risk, this methodology addresses a deficiency in surgical preparation that exists for years. Our results justify adoption of expanded liberal fluid intake policy into routine preoperative guidelines not only to increase patient comfort, but also possibly to suppress secondary complications like PONV. Sustained focus on education, interdisciplinarity, and evidence-based policy development will be necessary to promote the widespread implementation and long-term effects of these quality-improvement initiatives. Finally, the aim must always be clear: to deliver perioperative care not merely effective and safe but also sensitive and caring to the specific needs of every patient.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All authors have contributed equally

CONFLICT OF INTERESTS

Declared none

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